

Mai 2007, 27
www.cepres.de

Autor:
Philipp Krohmer

The Liquidation Dilemma of Money Losing Investments - The Impact of Investment Experience and Window Dressing of Private Equity and Venture Capital Funds

Abstract

This study examines the investor's decision on the exit of loss making projects. The investor faces a liquidation dilemma: follow-on financing versus terminating a loss making investment, and thereby giving up the turn-around option. I examine the role of investment experience on solving this liquidation dilemma. Evidence from a sample of 712 realized Private Equity and Venture Capital investments confirms that young and inexperienced fund managers (i) hold loss-making investments longer, (ii) invest a higher share of the fund's portfolio capital into these losers, and (iii) provide relatively more financing rounds to these deals before the exit compared to more experienced funds. The results are robust to controlling for potential reputational concerns.

JEL classification: G24; G33; E51

Keywords: Private Equity; Venture Capital; Staging; Risk; Losses

* Please address all questions or comments to corresponding author Philipp Krohmer, Department of Finance, Johann Wolfgang Goethe-University Frankfurt am Main, Germany and CEPRES Center of Private Equity Research, email-address for correspondence: Philipp.krohmer@cepres.de.
Acknowledgements: The author would like to thank Mark Wahrenburg, Rainer Lauterbach and Daniel Schmidt for their valuable comments. He thanks CEPRES (Center for Private Equity Research) and Venture Economics for the permission to access the data.

Introduction

When companies perform below plan and decrease in value, they often come into financial distress and depend on further financing to survive and potentially turn-around. In this critical situation, investors are faced with the liquidation dilemma of money losing investments: is it better to cut losses by terminating the investment or better to attempt a turn-around by follow-on financing the company?

This study is the first to empirically analyze the investment behaviour of Private Equity (PE) and Venture Capital (VC) Funds in regards to this liquidation dilemma. It focuses on the question, whether investment experience has an impact on the liquidation decision. Do less experienced managers lack the skills to terminate an investment efficiently or is their liquidation behaviour a consequence of less reputation potentially leading to window dressing behaviour?

Previous research has provided evidence that investment experience is an important factor for the exit decision. Boot (1992) argues in a theoretical framework that unskilled investment managers delay loss generating divestitures. Gompers (1996) shows in the context of successful investments, specifically VC backed IPOs, that young VC firms exit their winners faster and more underpriced than more established VC funds in order to signal quality. While Gompers' study has focused on the exit of winners ($IRR > 0\%$), this study concentrates on the investment behaviour associated with the exit of losers ($IRR < 0\%$). When the development of loss generating investments erodes into financial distress, the investment manager faces the liquidation dilemma of cutting losses versus injection of fresh capital to attempt a turn-around. Investment experience can play a key role in solving this dilemma successfully. Consequently, this study examines the role of investment experience for the decision between follow-on financing versus termination.

Younger investment managers have been found more prone to reputation concerns as confirmed by Gompers (1996). Disclosure of losers can impede raising the next fund (Musto 1999; Gompers et al., 1998). Follow-on financing of losers postpones the surfacing of a potential down-valuation or even write-off in the track record and thereby window dress the reported performance of a PE/VC fund. (Lakonishok et al., 1991; Morey et al., 2006). This might help the fund managers in the short-term, especially during periods of raising the next PE/VC fund, however at the expense of current investors by possibly throwing good money after bad. Therefore, this paper analyzes the role of window dressing at the liquidation dilemma.

The data is merged from the Venture Economics and CEPRES databases. It comprises of 712 realized investments spanning a period of 24 years from January 1979 until October 2003. The results confirm that investment experience plays a key role for solving the liquidation dilemma. Specifically, the findings show that investment experience has the following influence on investments with negative returns: (1) reduction of the share of the fund's capital invested into "loser" deals, (2)

shorter holding periods of investments with negative returns, and (3) fewer add-on financings before the termination of non-performing deals compared to PE/VC funds with less investment experience. This can be explained by the learning effect: more experienced fund managers have improved skills to distinguish between an efficient and an inefficient attempt to turn-around a distressed situation. They have learned to avoid inefficient attempts by terminating losers more rigorously. Further, the results are robust controlling for potential window dressing behaviour. Both, window dressing motives as well as investment experience play a role in the liquidation dilemma.

The remainder of the paper is organized as follows: The next section reviews the literature and develops the hypotheses. Following the data and methodology section, the empirical results are presented and interpretation is offered. The final section concludes with a discussion and suggestions for future research.

I. Literature and Hypotheses

The exit decision for loss making investments is based on the question of the viability of the project to either provide further financing or terminate the investment. The decision whether to further support or abandon a loss making investment, and thereby giving up the option to turn-around the project, is called the liquidation dilemma.

When loss making investments depend on further cash injection to survive, they can erode into financial distress. Kahl (2002) argues that the long-term nature of financial distress can solely be explained as the result of dynamic learning strategies of creditors and suggests that it may be unavoidable by product of an efficient resolution of financial distress. He introduces a model of dynamic liquidation and emphasizes that creditors – in my case PE/VC equity investors – “...lack the information that is needed to make quick and correct liquidation decisions.” Odean (1998) finds that individual public equity investors demonstrate a significant preference for realizing winners rather than losers. This tendency to hold losers too long and sell winners too soon has been labelled as the disposition effect by Shefrin and Statman (1985), which is one implication of extending Kahneman and Tversky's (1979) prospect theory to investments. A dynamic agency model for the provision of venture capital is provided by Bergemann and Hege (1998). They argue that the “...value of the venture project is initially uncertain and more information arrives by developing the project. The allocation of the funds and the learning process are subject to moral hazard.” In line with these theoretical predictions, Krohmer et al. (2007) show empirically that loss making investments of PE/VC funds have longer investment relationships, receive a higher share of financing rounds and capital before exit than successful investments.

Boot (1992) asks “Why hang on to Losers?” and explains in a theoretical framework the relation between the divestiture decision and the manager's investment experience. In the context of public equity investments, the key result of his study is that “...skilled managers generally make firm value-

maximizing divestiture decisions, whereas bad (that is, unskilled) managers delay divestitures. This result indicates that bad managers are not only less able to select projects but also less willing to correct their mistakes.” Several studies looked at the aspects of performance and investment management experience in regards to VC/PE investments. Kaplan and Schoar (2005) find significant persistence in the VC’s returns and conclude that the most likely explanation is the heterogeneity in the skills of these investors. Gottschalg et al. (2003) find that investment managers who outperform their peers are often more experienced. Sapienza et al (1996) conclude that more experienced funds are in a position to support their portfolio companies better, thereby adding more value and generating higher returns. Gompers (1996) empirically examines the relation between the divestiture behaviour and the VC fund managers’ experience. He shows in the context of successful investments, specifically VC backed IPOs, that young VC firms exit their winners faster and more underpriced than more established VC funds in order to signal quality. He denominates this behaviour as grandstanding. While Gompers’ study has focused on investment behaviour and experience related to the exit of winners ($IRR > 0\%$), this study concentrates on the investment behaviour associated with the exit of losers ($IRR < 0\%$). I argue that investment experience plays a key role in solving the liquidation dilemma of bad performing investments.

I measure *experience* twofold: (a) the number of years the PE/VC investment management firm is in business from its founding year until the initial cash-injection date of the observed investment, and (b) the number of funds the PE/VC firm has managed until the observed investment. *Investment behaviour* is measured by three characteristics: (a) investment duration, (b) investment amount, and (c) staging. I believe that the dynamic liquidation introduced by Kahl (2002) and the learning process around loss making projects explained by Bergemann and Hege (1998) have common patterns, which PE/VC fund managers are able to recognize and to manage better with increasing experience. More experienced investment managers have improved skills and know-how to assess the viability and to decide about the termination of a loss making project. Based on the theoretical models of Boot (1992), Bergemann and Hege (1998) and Kahl (2002) I derive the first hypothesis:

Hypothesis 1: Less experienced investment managers hold their loss making investments longer than more experienced investment managers.

In a general context to the theories of Boot (1992) and Kahl (2002), experience will enable the investment manager to better assess the viability of a non-performing project and to be willing to terminate a loser. According to the disposition effect studied by Shefrin and Statman (1985) and the prospect theory of Kahneman and Tversky’s (1979), investors underweight outcomes that are merely probable in comparison with outcomes that are obtained with certainty. This means that an investor faced with the liquidation dilemma may prefer to further finance the company to keep the option of improvement instead of terminating a nonperforming project, which would involve sure losses. These

studies provide the foundation for the argument that especially less experienced managers will have problems to terminate losers rigorously in time and therefore inject relatively higher amounts of capital in bad performing companies compared to more experienced fund managers. Therefore, the second hypothesis is as follows:

Hypothesis 2: Less experienced investment managers invest relatively higher amounts of capital in loss making investments compared to more experienced investment managers.

According to the theory of Bergemann and Hege (1998), the staged provision of capital allows the PE/VC fund to elicit information from the developing project. With each financing round, the investor obtains further information. In distressed situations, which are analyzed by Kahl (2002), the need for information and a follow-on financing round occurs most prior to the exit. To be able to empirically analyze the pre-exit staging behaviour, I build on the approach of Krohmer et al. (2007). By this approach, the total investment period from the first capital injection from the fund to the company until the final distribution from the company back to the fund is segmented into three periods of equal length, each one third of the total duration. The period before the exit is named pre-exit phase. To differentiate in detail for the staging behaviour during the pre-exit phase, the numbers of financing rounds during this phase are divided by the total number of financing rounds during the entire investment period. Technically, staging offers the investment manager the option to abandon poorly performing investments and minimize further associated expenses. I believe that more experienced fund managers will be able to apply their learning from previous investments and therefore need less follow-on financing rounds in order come to a termination decision about a loss making investment. This leads to the third hypothesis:

Hypothesis 3: Less experienced investment managers provide a relatively lower share of financing rounds prior to exit at loss making investments compared to more experienced investors.

The presented hypotheses argue that less experience is analogous to fewer skills in identifying and dealing with loss making projects. As an alternative explanation, it is further possible that less experienced managers lack the willingness to exit losers due to reputational concerns. According to the theory of Boot (1992), investment managers who care about their reputation try to present good results to their investors and hide losers longer than their future payoff distribution would justify. Less experienced VC/PE fund managers are more interested in building a strong reputation than already established funds, which is confirmed by the Grandstanding findings of Gompers (1996). Theoretical and empirical research on investment funds show the importance of reputation in raising capital, e.g. Lakonishok et al. (1991) as well as specifically for VC funds Gompers et al. (1998). Lakonishok et al. (1991) find that fund managers are overselling stocks that have performed poorly in the period before

their performance measurement, with the objective to “window dress” the portfolio to impress their sponsors. While a money manager can delete such poor performers from portfolios, the VC/PE fund manager has to disclose the complete investment history. In order to “window dress” his portfolio, the VC/PE fund manager can follow-on finance losers and thereby keep their valuation artificially higher than justified by their pay-off perspectives. As shown by Gompers (1996), younger funds can grandstand to signal quality. I argue that young funds can hide incapability by postponing liquidation of losers. There may also be a positive reputation effect from a fund manager’s willingness to provide funding to companies in critical situations, acting as the “white knight” that will save the portfolio company from bankruptcy. Hsu (2004) shows that a better reputation of a VC/PE fund may result in a higher probability to be invited by entrepreneurs to highly attractive deals at reduced entry prices. These alternative explanations in regards to reputational concerns could further support the hypotheses. In the analyses section, I strive to separate the experience and the reputation rationale by controlling for fundraising of a follow-up fund.

II. Data and Methodology

Current research concerning investors’ behaviour and investment performance may be divided into two categories. The first category focuses on analysing the influence of specific investment behaviour on performance. The second category (which is the focus of this paper) investigates the specific behaviour of fund managers, taking the outcome as exogenous (e.g. Gompers Grandstanding). The objective is to analyze the investment behaviour of PE/VC fund managers at bad performing investments. In contrast to the first category, which analyse the performance of *portfolio companies*, this paper focuses on the *investors’ concerns*.

Specifically, I strive to measure particular PE/VC funds’ decision at bad performing investments. *From the investors’ perspective*, the life of the investment relationship starts with the initial capital injection from the observed fund into the portfolio company. The investment relationship ends with the exit decision as capital is distributed back from the given portfolio company into the observed fund. Investors can time their initial investment at any stage of a given portfolio company’s development, whether in the early stages for seed financing, or in more mature stages (expansion or pre-IPO). Although PE and VC investments are frequently syndicated, implying that any one fund has only partial influence on the company’s performance, each investor independently decides on whether to pull out and exit from the deal, or to provide follow-on financing. PE/VC funds can use staging as an instrument that helps determine whether follow-on financing will be provided. Associated with this decision is the choice of what level of supervision and support to provide. At each round of financing, the fund decides on whether to exercise predetermined options like providing follow-on financing or abandoning the project and terminating the investment.

As described in the last section, I strive to analyse the investment behaviour in regards to three measures, the duration of the investment relationship, the amount of capital invested and the number of financing rounds. Given the need to compute these specific measures as well as accurately calculate investment performance to clearly identify the bad performing investments, I required specific data points that were not available using conventional datasets. The dataset used in this study is closely related to the one used by Krohmer et al. (2007) due to similarity of data requirements.

To obtain the data I need to test my predictions, I generate a unique dataset by merging congruent data from Venture Economics (www.thomsonfinancial.com) with the content from the CEPRES database (www.cepres.de). Both datasets combined provide congruent and complementing details for each investment.

To measure investment behaviour in terms of staging, I use Venture Economics data, which is very comprehensive for each financing round. Venture Economics gathers data voluntarily provided by investment firms. Several studies have used this database, including Gompers (1995) and Hege et al. (2003).

CEPRES is a private consulting firm affiliated with the University of Frankfurt, and was formed in 2001 specifically to gather detailed fund- and industry-specific information on private equity deals across different countries. CEPRES requests the data directly from the cooperating fund managers through standardized information request sheets and additionally validates the data with due diligence reports, including audited filings to guarantee high quality information. The empirical studies of Cumming and Walz (2004), Cumming et al. (2004) and Schmidt (2004) also provide more detailed information about the CEPRES database.

Though not as comprehensive as the Venture Economics database (as of November 2003 CEPRES had detailed information for 5,300 deals)¹, CEPRES data provides precise information about each cash injection from the investor to the portfolio company and each cash distribution from the company back to the investor. The accurate cash flow information provided in the CEPRES database enables me to *perform exact IRR calculations for the definition of the performance-subsets required for the tests*. This is distinct from other papers, who appear to proxy returns based on the exit type (e.g. Gompers, 1995), on valuations (e.g. Hege et al. 2003) or on initial cash flows and final cash flows (e.g., Cochrane, 2001). IRR measurements based on Venture Economics data alone can lead to a milestone bias, which can materially affect researchers' estimates of returns and valuation patterns over time. This aspect is pointed out by Kaplan et al. (2002). They stress the incapacity of Venture Economics in accurately measuring the precise milestone round information. The IRR is only meaningful when calculated on the exact date of the investment, but Venture Economics only provides dates of financing rounds, not the exact date of the cash injection which can differ from the

¹ However, CEPRES is growing steadily since its inception. As of April 2007, the database has detailed cash flow information on more than 18,000 investments.

round date due to the tranching of rounds into several cash injections also known as milestone rounds.

The same aspect applies to the exit date provided in Venture Economics, which does not always overlap with the precise date of the distribution cash flow back to the investor. This enables me to measure the *duration* of the investment relationship very accurately. The combined dataset comprises more than 150 variables. Table 1 shows a selection of variables analysed in this study.

In November 2003, the CEPRES database had detailed information for 5,308 investments in 4,476 portfolio companies by 229 PE and VC funds belonging to 74 different investment management firms. I matched this with the information from the Venture Economics database as of November 2003, ensuring that the specifics of each investment was consistent on the following four levels of identification: the PE/VC firm, the fund, the portfolio company and the date of the initial investment from the fund into the company. The merged dataset contains information on 1,747 investments, which is further reduced along the following steps: I first exclude all unrealized investments and focus on the fully and partially realised investments. For the partially realized investments, I perform a further selection step: I select only those investments with a relative small residual net asset value (RNAV) in order to reduce potential valuation bias of IRR calculations, as I calculate the IRR for the partially realized investments by taking the RNAV as the last cash flow paid back to the investor.²

The complete dataset after these reductions comprises of 712 different investments made by 122 PE and VC funds belonging to 51 varying investment managers. These investments include 1,549 financing rounds with 2,329 cash injections (tranches) – spanning a period of 24 years, from 1979 till 2003. The dataset can be considered as representative of the general pool of PE and VC deals, as it corresponds with the frequency distributions of key aspects of the PE and VC market. The frequency distribution over time of the beginning and exit of investments in this sample is in line with the market evolution from 1979 till 2003. The frequency distribution with respect to countries of origin is comparable with the size of regional PE and VC markets and as well comparable with respect to the industry distribution. Details on all frequency distributions are available upon request. While 712 investment relationships are a small sample of the universe of PE and VC deals, I believe the volume of data is comparable to sample sizes examined in previous studies (e.g. Gompers 1996).

As I strive to explore the specific investment behaviour in critical situations, I concentrate in this study on bad performing portfolio companies, specifically all investments with an IRR below 0%. I present two sub-sets of the complete sample to test the predictions: (1) all negatively performing investments with an IRR below 0% p.a.. This subset includes 315 investments, where the capital paid back to the investors was equal or below the invested capital. The mean IRR of investments within this sample is -71.19% p.a. (2) As second sub-set, I present the lower bound of the bad-performer-sample, the total write-offs with an IRR of -100% p.a.. This subset consists of 153 investments, where

² This approach is based on the model of Diller and Kaserer (2004) and further discussed in detail in Krohmer et al. (2007)

all of the invested capital was sunk. The reason why I additionally analyse the subset of total write-offs is, that I expect to observe slightly different patterns in these “extreme circumstances”. Considering the alternative explanation of reputational concerns for example, there is a big difference between a total loss with an IRR of -100% and a bad performer with an IRR of -5% showing up in the record. Additional negative-IRR-subsets were tested. The results are not sensitive to alternative cut-offs. The frequency distribution of the two subsets with respect to countries of origin is comparable with the distribution of the entire dataset, comprising around 60% of investments in US-American Portfolio companies, specifically 57.5% within the write-off subset and 63.5% within the bad-performers subset. With regard to the stage of development and the industry sector, I observe strong distinctions between the “loser”-subsets and the entire sample. The share of high technology investments within the negative IRR-sample is 59.7% and even higher among the total write-offs with 68.6%, compared to only 54.6% within the entire sample. The differences are even more significant with respect to the stage. The entire sample comprises of 47.6% early stage investments (seed, start-up, early and expansion), the “losers” of 63.5% and the write-offs even of 73.2%. Because early stage and high technology investments are riskier, their more frequent occurrence in the loser-subsets is plausible.

III. Empirical Results and Interpretation

A. Descriptive Statistics

To test the hypothesis presented in section 1, I first have to determine how to measure (1) the *experience of PE/VC-Fund managers* and (2) their *investment behaviour*.

I employ two different characteristics to measure the *experience of PE/VC-Fund managers*. The fund sequence number, which indicates whether the observed fund was the first fund of the manager, the second fund, etc., and the PE/VC-Fund managers age (years in business since foundation) at time of initial investment in the observed portfolio company. This measurement is in line with previous studies concerning experience of management firms, e.g. Gompers (1996) and Cumming et al. (2005). Gompers (1996) points out, that these variables are imperfect measures of experience “[...] because experienced partners sometimes leave to start new venture capital firms, which effect would tend to bias the results away from seeing any difference between new and old venture capital firms”. Other studies measure the experience for example in terms of number of investment rounds the VC firm has participated in (Sorensen, 2007) or the number of investments made by the VC firm (Gompers et al. 2005). As I strive to capture both effects, experience and reputation, I think that the fund sequence number and the VC/PE-fund manager’s age are more appropriate for my purposes, because they are directly observable for potential investors. Out of the sample of 122 PE/VC-funds, 29 (24%) are first-time funds, 27 (22%) second-timers and 66 (54%) the third or later fund of the manager. The reduced

dataset (unrealised investments excluded) consists of 154 (21.6%) investments by first-time-funds (thereof 64 negative performers with 26 total write-offs), 144 (20.2%) investments from second-time funds (64 losers with 26 write offs) and 414 (58.1%) investments of the third or a later fund of the manager (188 loser with 101 total write offs). Table 2 presents summary information for the comparison of young versus old PE/VC-Fund managers in the sample. I classify all PE/VC-fund managers to be young if the fund was the first or the second fund of the manager and those with the third or higher fund as old. The results are similar to alternative cut-offs. Table 2 shows that more experienced VC/PE-firms raise a new fund on average around 2.5 years after the closing of the prior fund, younger VCs on average not until after more than 4 years. Younger VC/PE-fund managers show on average a lower percentage of total losses within their funds, 14.6% versus 17.8% for more experienced fund managers. The sample does not contain unrealized investments, which might bias these proportions. A possible explanation for the higher write-off-ratio of the more experienced managers could be a higher disposition of risk-taking and a higher specialization of the funds (e.g. on risky early stage investments), discussed for example in Gompers et al. (2005). The mean IRR for all bad performing investments is also slightly higher for more experienced VC/PE-managers. The same does not hold true when excluding the total write-offs out of the negative-performer-subset. More experienced VC/PE-managers obtain on average an IRR of -41.01% p.a., whereas younger managers only a mean IRR of -49.68% p.a.

I measure the *investment behaviour* of PE/VC-fund managers at bad performing investments at three levels. First I look at the time horizon of the investment. The *duration of the investment* is defined as the time period between initial investment and the final cash flow in years. In case of write-offs, I assume that the last entry marks the period of the actual write-off. Previous studies examining various aspects of the investment duration include Gompers (1995), Cumming and MacIntosh (2001) or Megginson and Weiss (1991). There is no empirical study examining the investment behaviour in terms of duration specifically for bad performing companies. Table 3 presents summary statistics for investment behaviour characteristics for young versus old PE/VC-fund managers, Panel A for the subset of total write-offs, Panel B for all negatively performing investments. Analogous to Table 2, I classify all PE/VC-fund managers to be young if the fund was the first or the second fund of the manager and those with the third or higher fund as old. The statistics are consistent with the hypothesized differences of the investment duration in regards to the PE/VC-fund manager's experience. Younger VC firms hold total losses on average (median) 10 (8) months longer than older VC firms. The differences are even more significant with respect to the subset of all negatively performing investments. First- or second-time funds hold their bad-performing investments on average 51 months in their portfolio and thus 16 months longer than third-or-later funds. As one way to test if the dataset is viable, I draw a comparison to the results on the holding period of IPO's backed by young versus old VC-managers performed by Gompers (1996). He defines PE/VC-fund managers to be young if below six years old at date of IPO and those that are six years old and more

as old and finds out that young VC-firms sit on the board of directors 8 months less than old VC-firms. For the IPO's within the sample, I observe a difference of 7 months between young and old VC-firms and therefore the dataset supports Gompers' grandstanding hypothesis.

Furthermore, I analyse the amount invested in the bad performing company. I define two measures for the amount: the *absolute investment share*, which is the total amount invested by the fund in this portfolio company divided by the total amount invested by the fund in all portfolio companies and the *relative investment share*, which describes the total amount invested by the fund in this portfolio company divided by the average amount invested by the fund in all portfolio companies. I choose ratios rather than absolute amounts to measure investment size because there might be substantial differences between the absolute invested amounts by young, un-experienced and older, more experienced fund managers. Theoretical and empirical research, e.g. Gompers and Lerner (1999), demonstrate the importance of reputation in raising new capital. Gompers (1996) points out that this relation "[...] is consistent with industry wisdom. Established venture capital firms with long track records raise large funds quickly and with little effort". If more experienced fund managers raise larger funds, the investment amount per portfolio company will also most probably be larger and a comparison of absolute values would make no sense. Therefore, I consider ratios to analyse differences in investment behaviour concerning the investment amount between experienced and un-experienced fund managers. Summary statistics in Table 3 for the investment amount also support the predictions for the differences in regards to the PE/VC-fund manager's experience. Younger PE/VC-fund managers invest on average around 90% of the average invested capital per portfolio company, corresponding to around 4.5% of the total fund commitments. More experienced fund managers invest only about 80% of the average invested capital per portfolio company and around 3% of the total fund commitments. These differences become even more apparent, when looking at three fund-number-categories: first-time-funds invest on average more in losers than in winners (almost 110%, 5% of the total fund commitments), fund managers with their second, third or fourth fund invest on average 80% (4% of total capital) and fund managers with their fifth or later fund invest on average only around 70% (less than 2% of the total invested capital). These results are not shown in table 3, but available upon request.

The third variable refers to the *staging* behaviour in critical situations. The investor can use staging as an instrument to decide about the level of control he wishes to exercise as well as the amount of resources he chooses to allocate. These resources may come in the form of capital, managerial support, knowledge transfer, time or effort. I analyze this active role of the investor with respect to the number of financing rounds he participates. I build on Krohmer et al. (2007), who find out that staging has a positive influence on performance during the initial investment phase and is negatively associated with performance during the pre-exit phase. To analyse the changes in behaviour within the investment relationship, they segment the total investment period of each investment into three phases of equal length, each one third of the total investment duration. They

name the first third the initial phase (i-phase), the second third the maturity phase (m-phase) and the final third the pre-exit phase (p-phase). The relative share of staging during each of these phases is calculated as the number of rounds during a specific phase divided by the total number of rounds in all three phases. They interpret the increased staging during the p-phase as an attempt of the investor to address the termination dilemma by postponing his decision to abandon nonperforming projects. As I want to analyse the investment behaviour of PE/VC-fund managers with nonperforming projects, I concentrate on the p-phase and define the measure for staging in line with Krohmer et al. (2007) as the share of the number of rounds during the pre-exit phase to the total number of rounds during the entire investment duration. The summary statistics for the staging behaviour in table 3 are consistent with the predictions. The p-phase-round-ratio of inexperienced fund managers in total losses is on average 35.7%, whereas for experienced fund managers only 19.6%. The differences in staging behaviour between less and more experienced fund managers are smaller but still significant for the subset of bad-performers ($IRR \leq 0\%$).

In the literature section, I discussed an alternative explanation to experience for differences in investment behaviour between young and old fund managers, namely *reputational concerns* of showing bad performers in the track record and its negative impact on raising capital for new funds. Postponing the liquidation of an investment in order to not show them in the track record unless a follow-up-fund is raised can be interpreted as window dressing. After the next fund has been raised, the pressure to window dress the results is greatly reduced. Gompers (1996) describes “positive signalling” by young funds. He shows that young VC firms are more likely to exit their better investments earlier than that which would otherwise be optimal for the entrepreneurial firm, in order to signal quality (‘grandstand’) to institutional investors for the purpose of raising capital for a new fund. In order to separate the experience and reputation rationale, I introduce the variable “follow-up-fund raised”: a dummy variable equal to 1, if the fund manager raised a follow-up-fund already at time of investment in the portfolio company, and zero otherwise. As cut-off point for the starting date of the new fund, I take the exact date of the first cash flow in a portfolio company. Gompers (1996) states, that “[...] it takes approximately one year to solicit money and close a new fund”. I tested the fundraising-dummy with a time lag of one year. The results were qualitatively similar using this definition for the dummy. All funds within the sample managed to raise a follow-up-fund, which indicates some type of survivorship bias, looking only at the behaviour of successful managers, but this would affect to bias the results away from seeing any differences between young and old fund managers. Table 4 presents summary statistics for the investment behaviour before and after a follow-up-fund is raised by the fund manager for three data-subsets. Panel A shows the results for the subset of complete write-offs and Panel B for all negatively performing investments. As the change of investment behaviour with regards to fundraising could be in addition to the window dressing rationale related to re-deployment of managerial resources to new investments, I show in Panel C the results for the subset of all positively performing investments. For the subset of total write-offs, which is the

most important group with regards to window dressing, I observe high significant differences for all variables. The holding period of investments made *before* fundraising of a follow-up-fund is on average 16 months longer than for those investments, made *after* the closing of the follow-up-fund, supporting the hypothesis that fund managers tend to postpone the liquidation of weak investments in order to not show them in the track record until the follow-up-fund is raised. To keep the “losers” alive, fund managers have to continue to cover their financing needs with further capital injections. This is reflected by the significantly higher investment share and a three times higher pre-exit-round-share for those investments made before fundraising of the follow-up-fund. After having secured the capital for his next fund, the fund manager has less incentive to window dress and can stop these abortive follow-on investments in the existing fund with the effect that at the end the losers crop up in the records. Except for the investment duration, I do not observe these explicit differences regarding the subgroup of all negatively performing investments. For the subset of positively performing investments, the duration is only somewhat longer for those before fundraising of the follow-up-fund. For the sub-samples of “out-performers” with an IRR above 50% p.a. or all venture-backed IPO’s (not shown in this table), the differences disappear completely and the duration is even slightly shorter for investments before fundraising of the follow-up-fund, supporting the theory of signalling quality by taking companies public and discarding the alternative explanation of re-deployment of managerial resources.

Gompers and Lerner (1996) show that venture capital funds have predefined lifetimes, usually ten years with an option to extend the fund for up to three years. Therefore, it is arguable that the later the initial investment of a portfolio company occurs within the total fund-lifetime, the shorter will be its duration due to the predefined fund lifetime. This argument is also applicable to the investment amount. The results of the analyses for the winner-subsets and analyses with the lagged follow-up-fund-raised variable do not support this pattern, especially concerning more experienced fund managers, which raise funds shortly after the previous fund and may have several overlapping funds. To ensure that differences in investment behaviour are not simply caused by usual fund investment patterns, I additionally control in the regression analyses for the time between fund closing and initial investment in the portfolio company and the company investment sequence within the fund, which is calculated as the number of portfolio companies the fund has invested in since its closing date to date of initial investment of the portfolio company, divided by the total number of portfolio companies the fund invested in during the entire lifetime of the fund.

I further control for variables on four different levels: (1) the fund manager, (2) the fund, (3) the investment and (4) the market. (1) On the fund manager level, I examine, whether a fund manager is based in the United States. Studies reflecting on the relevance of the location for example in regards of legal regulations, macroeconomic conditions, or investment pattern include for example Bottazzi et al. (2005); Keuschnigg (2004); Cumming (2002); Jeng and Wells (2000); and others. (2) On the fund level, I control whether the fund is focused on Venture Capital investments or rather on later stage

investments like management buyouts. (3) Alternatively to this variable, I test on the investment level whether the investment was made in an early development stage of the portfolio company where informational asymmetries are highest. Analogous to the stage of development, the degree of information asymmetries can vary strongly among different sectors. I control, whether the portfolio company is active in the high tech sector. (4) At the market level, I control for several parameters: most importantly I analyse the level of committed capital on the overall private equity market in two ways: I observe the committed capital at date of initial investment of a fund into a portfolio company, as well as the growth over the entire investment period of the company. Poterba (1989) argues that changes in fundraising can arise from changes in the supply of venture capital. High supply of capital could make fundraising more easy and therefore affect fundraising-driven investment behaviour like window dressing or grandstanding. Free cash flow agency costs have been studied by Blanchard et al. (1994), who found that cash windfalls adversely affect companies' investment behavior. Gompers (1995) argues that growth of the investment pool may measure entry by inexperienced investors. I also account for business cycles, changes in the capital market and public market conditions by including the average variation of the real U.S. GDP growth per annum over the entire investment period, the short term interest rate at date of investment and the variation of the NASDAQ Composite Index over the entire investment period. Nowak et al. (2006) document the investment and divestment timing of PE/VC fund managers using the NASDAQ Composite as main market valuation index. Lastly, I want to take into account whether the investment happened during a period of abnormal market conditions, leading to exaggerated valuations and returns. Therefore, I create a dummy variable which is equal to 1 if the initial investment took place during the so-called "internet bubble", i.e. between September 1998 and March 2000 and equal to 0 otherwise.

B. Regression Results and Interpretation

In this section I report the regression results for the predictions developed before. Table 1 provides a description of all variables used in the regression models. Tables 5-7 report the results of the regression analyses. Regressions are performed on the following dependent variables: (1) the duration of the investment, (2) the absolute investment share, (3) the relative investment share and (4) the pre-exit-phase round-share. Panel A of each table shows all regression models for the subset of negatively performing investments ($IRR \leq 0\%$ p.a.), Panel B for the subset of write-offs ($IRR = -100\%$ p.a.). All results are also robust for varying cut-offs for the IRR-subsets. All of the presented and additionally performed OLS and Poisson regressions meet the model restrictions, linearity, normal distribution of the residuals, multi-collinearity and heteroscedasticity.

Predictions regarding the investment duration

The regression results in Table 5, Panel A confirm the prediction and show that less experienced VC/PE fund managers - measured either by the fund sequence-number or by the fund managers' years in business - hold negatively performing investments longer than more experienced investment managers. The regressions for the write-off subset shown in Panel B of Table 5 generally confirm the results presented in Panel A, albeit less significant. This finding confirms the theory of Boot (1992) that unskilled managers delay divestitures of losers. The results of all regression models are robust for a variety of investment specific and macroeconomic control variables, including the stage of the company's development, industry sector, as well as NASDAQ composite and industry cycles. All regression models express high quality with an adjusted r-square around 50 per cent.

Investment experience or window dressing

Younger investment management firms apparently have more difficulties to solve the liquidation dilemma of bad performing companies than older firms. As discussed in Section 2, part of the increased difficulties of younger investment firms in solving the dilemma could be related to their inferior skills and abilities. However, reputational concerns could be a further factor. Postponing the write-off of bad performers in order to whitewash the track record until the follow-on fund is raised, namely window dressing, could be a motivation to prolong the holding period of bad performers. This incentive is particularly strong for young investment management firms with higher reputational needs. Old VC/PE investment management firms with already established good reputations do not need as much to signal as young firms, because investors have evaluated their performance over many years and trust in their strong skills.

In order to differentiate between investment skills and window dressing influence on the investment duration of a portfolio company, I control for window dressing in the following way: a dummy variable is set equal to one in case the investment management firm already has raised a follow-up fund at time of initial investment of the current fund in the observed portfolio company, or equal to zero otherwise. The raising of the follow-up fund can motivate especially the less experienced investment managers to window dress their portfolio by follow-on financing bad performing companies and keeping them alive longer than their prospects alone would justify. The regression results in Table 5 show in all models that the holding period is longer for those bad performing investments initiated before the follow-up fund is completely raised. When controlling for the committed capital to new VC/PE funds in the market at date of the initial investment, the impact of the follow-up fund raising variable on the holding period becomes insignificant. This can be explained by the general interpretation that funds hold their loss making companies longer during "dry seasons", during which it is generally more difficult to raise a new fund.

On the contrary, additional analyses on the holding periods of the investments with positive return on investment (IRR >0% p.a.) do not show any significant differences in the holding period before or

after the follow-up fund has been raised. This confirms that the differences before and after the follow-up fund raising cannot be related to redeployment of managerial resources from the old to the new fund, but rather to window dressing. This finding can be interpreted in the way that fund managers do not rigorously abandon loss making projects until the follow-up fund has been raised – with the effect that good money might be thrown after bad for window dressing purposes. Controlling for this window dressing influence, the impact of experience on the holding period is still significant in all regression models. These results establish that a portion of this impact on the investment duration is explained by the investment experience supporting the prediction on the importance of investment skills for solving the liquidation dilemma.

Predictions regarding the investment amount

Table 6 presents the results for the regressions on the amount invested by the fund into the bad performing portfolio company. The first two regression models of Panel A and Panel B show the results for the absolute investment share as dependent variable, the last two models in each panel provide the results for the relative investment share. Variables are described in Table 1. These results strongly confirm the predictions. Younger fund managers inject relatively more capital in loss making deals than more experienced fund managers. These results are robust controlling for all of the previously introduced control variables, including potential window dressing behaviour. Until the follow-up fund has been raised, the fund managers inject more capital in loss making deals and after the follow-up fund has been raised, the investment amount decreases for loss making investments. This can be interpreted as potential window dressing, as fund managers might feed their losers with further cash injections until the follow-up fund has been raised.

Predictions regarding the staging behaviour prior to exit

Table 7 show the results for the count data regressions (Poisson) and the determinants of pre-exit phase round share of loss making investments. I further performed OLS regressions and obtained similar results, which are available upon request. The Poisson regressions seem more adequate due to the distribution of the dependent variable. The results confirm the predictions of hypothesis 3. Younger investment managers need a higher share of financing rounds prior to the exit of nonperforming projects compared to more experienced fund managers. More experienced investors have learned from previous investments to better assess the viability of the future prospects of a loss making company and apply the option to abandon those losers more rigorously.

In summary, the results confirm the importance of investment management experience in solving the liquidation dilemma more efficiently. I find that more experienced investment managers (1) provide less financing rounds prior to exit, (2) inject less capital to loss making deals and (3) hold these deals for a shorter period of time than un-experienced investment managers. These results are in line with

the findings of Lauterbach et al. (2007) who show empirically that more experienced VC/PE fund managers have a positive influence on reducing the losses of poorly performing companies (IRR < 0% p.a.). Sapienza et al. (1996) argue that investment managers add relatively more value when uncertainty is high, which also supports the given interpretations.

In regards to window dressing, the holding period is the most important criterion in order to postpone the disclosure of complete write-offs. Younger investment managers do not show significantly longer holding periods of complete write-offs compared to older investment managers. But younger investment managers inject significantly more capital through significantly more financing rounds to their complete write-offs. In summary, these results can be interpreted as follows: the investment skills (expressed by investment amount and financing rounds) have a stronger impact on the liquidation dilemma than window dressing (expressed most importantly by the holding period).

5. Conclusion

Investment managers of PE and VC funds face a liquidation dilemma at portfolio companies with eroding developments. When a loss generating company comes into financial distress, the investor has to decide to either cut further losses by abandoning the loser, or to attempt a turn-around by follow-on financing. The follow-on financing decision into a loss making investment is one of the most difficult decisions of an investment manager next to the initial investment decision. Several studies confirm investment experience as an important factor for successful investment decisions. This study offers new answers to the research question: what impact does investment experience have on the follow-on investment decision into loss making portfolio companies? The empirical analysis is based on 712 investments between 1979 and 2003, which are congruently provided by the Venture Economics and CEPRES databases. The merged dataset allows a precise analysis of the investment cash flow and more than 120 different variables for each of the observed investment.

The results show that investment experience plays a key role in solving the liquidation dilemma. Specifically, more experienced PE/VC fund managers (1) invest a lower share of the fund's capital into non-performing companies, (2) hold investments with negative returns for a shorter period of time, and (3) inject less often follow-on capital into a loss making deal before its termination. This result can be interpreted as a learning effect, so that more experienced PE/VC funds are less prone to throwing good money after bad in distressed situations.

Further, the examination separates between the role of investment experience and the reputation rationale in regards to the liquidation dilemma. Less experience is analogous to fewer skills in identifying and dealing with loss making projects. As an alternative explanation, it is possible that less experienced managers lack the willingness to exit losers due to reputational concerns. According to the theory of Boot (1992), investment managers who care about their reputation try to present good results to their investors and hide losers longer than their future payoff distribution would justify. The

findings show that during periods of time, when fund managers raise their next PE/VC fund, they postpone the termination of loss-making deals. This can be interpreted as follows: fund managers window dress their current portfolio's reported performance by delaying the termination and reporting of losers in order to improve the perceived track record for higher chances to raise capital from the potential new investor. This window dressing is confirmed for experienced and inexperienced PE/VC funds. In case this window dressing includes throwing good money after bad, it occurs at the expense of the current fund's investors. Controlling for this window dressing influence, the impact of experience on the holding period is still significant in all regression models. These results establish that a portion of this impact on the investment duration is explained by the investment experience supporting the prediction on the importance of investment skills for solving the liquidation dilemma.

In summary, this study provides for the first time evidence that investment experience has a positive impact on the investment behaviour of PE/VC fund managers in non-performing companies. They have learned how to successfully deal with the liquidation dilemma of loss making investments. On the more critical side, the findings confirm that fund managers window dress their portfolio and investors providing capital to the fund should be aware of this aspect, both in their due diligence, as well as in adjusting the incentive scheme and restrictions in order to mitigate potential window dressing behaviour.

References

- Bergemann, D. and U. Hege (1998), 'Venture Capital financing, moral hazard, and learning', *Journal of Banking & Finance*, Vol.22, pp. 703 – 735.
- Blanchard, O., F. Lopez de Silanes and A. Shleifer (1994), 'What do firms do with cash windfalls?', *Journal of Financial Economics*, Vol.36, pp. 337-360.
- Boot, A.W.A. (1992), 'Why hang on to Losers? Divestitures and Takeovers', *Journal of Finance*, Vol.47, No.4 (September), pp. 1401-1423.
- Bottazzi, L., M. Da Rin and T. Hellmann (2005), 'What Role of Legal Systems in Financial Intermediation? Theory and Evidence', American Finance Association Annual Meeting 2005.
- Cochrane, J. (2001), 'The risk and return to venture capital', Working Paper (University of Chicago).
- Cumming, D. (2002), 'Contracts and Exits in Venture Capital Finance', American Finance Association Annual Meeting 2003.
- Cumming, D. J. and U. Walz (2004), 'Private Equity returns and disclosures around the world', Working Paper (University of Alberta, Canada).
- Cumming, D. J., D. Schmidt and U. Walz (2004), 'Legality and Venture Governance around the World', Working Paper (University of Alberta, Canada).
- Cumming, D. J., G. Fleming and A. Schwenbacher (2004), 'Liquidity Risk and Venture Finance', Working Paper (University of Alberta).
- Cumming, D.J. and J.G. MacIntosh (2001), 'Venture capital investment duration in Canada and the United States', *Journal of Multinational Financial Management*, Vol.11, pp. 445-463.
- Diller, C. and C. Kaserer (2004), 'European Private Equity Funds – A Cash Flow Based Performance Analysis', Working Paper (TUM University Munich, Germany).
- Gompers P.A., J. Lerner, M.M. Blair and T. Hellmann (1998), 'What drives Venture Capital Fundraising?', *Brookings Papers on Economic Activity. Microeconomics*, Vol.1998, pp. 149-204.
- Gompers, P. A. (1995), 'Optimal investment, monitoring, and the staging of venture capital', *Journal of Finance*, Vol.50, No.5 (December), pp. 1461-1491.

- Gompers, P. A. (1996), 'Grandstanding in the venture capital industry', *Journal of Financial Economics*, Vol.42, pp. 132-157.
- Gompers, P.A., A. Kovner, J. Lerner, D. Scharfstein (2005), 'Venture Capital Investment Cycles: The Impact of Public Markets', NBER working paper No. 11385, MA.
- Gompers, P.A., J. Lerner (1996), 'The Use of Covenants: An Empirical Analysis of Venture Partnership Agreements', *Journal of Law and Economics*, Vol.39, No.2 (October), pp. 463-498.
- Gottschalg, O., L. Phalippou and M. Zollo (2003), 'Performance of Private Equity Funds: Another Puzzle?', Working Paper, (INSEAD-Wharton Alliance Center for Global Research and Development. Fontainebleau, France; Philadelphia, USA).
- Hege, U., F. Palomino and A. Schwienbacher (2003), 'Determinants of Venture Capital Performance: Europe and the United States', Working Paper (HEC School of Management, Paris).
- Hsu, D.H. (2004), 'What Do Entrepreneurs Pay for Venture Capital Affiliation?' *Journal of Finance*, Vol.59, No.4 (August), pp. 1805-1844.
- Jeng, L., P. Wells (2000), 'The determinants of venture capital funding: Evidence across countries', *Journal of Corporate Finance*, Vol.6, 241-289.
- Kahl, M. (2002), 'Economic Distress, Financial Distress and Dynamic Liquidation', *Journal of Finance*, Vol.57, No.1 (February), pp. 135-168.
- Kahneman, D. and A. Tversky (1979), 'Prospect Theory: An Analysis of Decision under Risk', *Econometrica*, Vol.47, No.2 (March), pp. 263-292.
- Kaplan, S. N. and A. Schoar (2005), 'Private Equity Performance: Returns, Persistence, and Capital Flows', *Journal of Finance*, Vol.60, No.4 (August), pp. 1792-1823.
- Kaplan, S.N., B.A. Sensoy and P. Strömberg (2002), 'How well do venture capital databases reflect actual investments?', Working Paper (University of Chicago).
- Keuschnigg, C. (2004), 'Venture Capital Backed Growth', *Journal of Economic Growth*, Vol.9, No.2 (June), pp. 239-261.
- Krohmer, P., R. Lauterbach and V. Calanog (2007), 'The Bright and Dark Side of Staging – Investment Performance and the Varying Motivations of Private Equity Firms', American

- Finance Association – Annual Meeting 2007, Chicago, Working Paper (Goethe University, Frankfurt, Germany).
- Lakonishok, J., A. Shleifer, R. Thaler and R. W. Vishny (1991), 'Window Dressing by Pension Fund Managers', Working Paper (NBER Series, Cambridge, MA).
- Lauterbach, R., I. Welppe, J. Fertig (2007), 'Performance Differentiation: Cutting Losses and Maximizing Profits of Private Equity and Venture Capital Investments', *Financial Markets and Portfolio Management*, forthcoming 2007.
- Meggison, W.L., K.A. Weiss (1991), 'Venture Capitalist Certification in Initial Public Offerings', *Journal of Finance*, Vol.46, No.3 (July), pp. 879-904.
- Morey, M.R., E.S. O'Neal (2006), 'Window Dressing in Bond Mutual Funds', *Journal of Financial Research*, Vol.29, No.3, pp. 325-347.
- Musto, D.K. (1999), 'Investment Decisions Depend on Portfolio Disclosures', *Journal of Finance*, Vol.54, No.3 (June), pp. 935-952.
- Nowak, E., A. Knigge and D. Schmidt (2006), 'On the performance of Private Equity Investments: Does market timing matter?', *Journal of Financial Transformation*, Issue 16 (April), pp.123 – 134.
- Odean, T. (1998), 'Are Investors Reluctant to Realize Their Losses?', *Journal of Finance*, Vol.53, No.5 (October), pp. 1775-1798.
- Poterba, J. (1989), 'Venture Capital and Capital Gains Taxation', in L. Summers (editor), *Tax Policy and the Economy*, (Cambridge: MIT Press).
- Sapienza, H.J., S. Manigart and W. Vermeir (1996), 'Venture Capitalist Governance and Value Added in Four Countries', *Journal of Business Venturing* Vol.11, pp. 439-469.
- Schmidt, D. (2004), 'Private equity-, stock- and mixed asset-portfolios: A bootstrap approach to determine performance characteristics, diversification benefits and optimal portfolio allocations', Working Paper (Center for Financial Studies, Frankfurt University, Germany).
- Shefrin, H. and M. Statman (1985), 'The Disposition to Sell Winners Too Early and Ride Losers too Long: Theory and Evidence', *Journal of Finance*, Vol.40, No.3 (July), pp. 777-790.

Sorensen, M. (2007), 'How Smart is Smart Money? A Two-Sided Matching Model of Venture Capital'
Working Paper (Stanford University).

The Liquidation Dilemma of Money Losing Investments - The Impact of Investment Experience and Window Dressing of Private Equity and Venture Capital Funds

Autor:
Philipp Krohmer

Table 1 Variable Description

| Variable Name | Variable Description |
|-------------------------------------|--|
| Investment Duration | Total Duration between the initial investment of the fund in the portfolio company and the exit date [in years] (if not fully realised we consider the valuation date instead of the exit date) |
| Absolute Investment Share | The Absolute Investment Share is the total amount invested by the fund in this portfolio company divided by the total amount invested by the fund in all portfolio companies (all amounts in real 2003 U.S. Dollars)* [for the regression analysis we take logs] |
| Relative Investment Share | The Relative Investment Share is the total amount invested by the fund in this portfolio company divided by the average amount invested by the fund in all portfolio companies (all amounts in real 2003 U.S. Dollars)* |
| Pp Round-share | The share of the No.of Phase p (pre-exit phase) rounds of the total No. of rounds (Pp rounds / All rounds) |
| Pp Tranche-share | The share of the No.of Phase p (pre-exit phase) tranches of the total No. of tranches (Pp Tranches / All Tranches) |
| Fund Sequence Number | The number of funds managed by the investment manager (this fund and all predecessor funds) |
| Fund-Number: first or second? | A dummy variable equal to 1 for first-or-second-fund investments and equal to 0 for third-or-later-fund investments |
| IM Age | The age (years in business) of the Investment Manager at time of the initial investment in the portfolio company |
| Follow-up-fund raised | A dummy variable equal to 1 if the investment manager raised a follow-up-fund already at time of investment in the portfolio company, 0 otherwise |
| Time since closing | Maturity of the Fund (in years since its closing date, which marks the end of its fund raising) at date of initial investment of portfolio company i |
| Fraction of Companies since closing | The fraction of companies is the number of portfolio companies the Fund has invested in since its closing date to date of initial investment of portfolio company i, divided by the total number of portfolio companies the Fund invested in during the lifetime of the fund. |
| High Tech | A dummy variable equal to 1 for Companies of the High Tech - Sector [The Company was classified as High Tech, when belonging to one of the following CEPRES Sector categories: healthCare/LifeScience, IT, High Tech, Semiconductor, Software, Internet, Telecommunications] |
| Later Stage | A dummy variable equal to 1 for Later Stage Companies [The Company was classified as Later Stage (early stage), when belonging to one of the following CEPRES Stage categories: Later, MBO/MBI, LBO, public to private, Mezzanine, turnaround, recapitalisation (seed, startup, early, expansion)] |
| NASDAQ | NASDAQ Development is the variation of the NASDAQ Composite Index [p.a.] over the entire investment period |
| GDP | GDP is the average variation of Real US Gross Domestic Product [p.a.] over the entire investment period |
| Growth Committed Capital | Comitted Capital is the average variation of the committed capital on the overall market [p.a.] over the entire investment period of the portfolio company |
| Committed Capital | Comitted capital on the overall market during the year of the observed investment (in real 2003 U.S. Dollars, in millions)* |
| Investment in Bubble | A dummy variable equal to 1 for portolio companies with the initial investment date during the so-called "bubble period" (1998-2000), 0 otherwise |
| Short-term interest rate | The short-term interest rate at investment date (For U.S. investments: The Federal Reserve Bank 1-month treasury bills; for EU investments: the BBA Libor rate) |
| US-IM | A dummy variable equal to 1 for Investment Managers with the main office in the United States, 0 otherwise |
| VC-Fund | A dummy variable equal to 1 for Funds specialized on Venture Capital, 0 otherwise |

The inflation adjustment is based on Consumer Price Index (CPI) data for all urban households and all items. Data is derived from the records of the U.S. Department of Labor (www.bls.gov)

Table 2 Comparison of Fundraising and Fund-Performance characteristics of young and old PE/VC Fund Managers

The total sample comprises of 712 PE/VC- investments made by 122 PE and VC funds belonging to 51 varying investment managers. For the IRR statistics we use the subset of (a) all negative performing portfolio companies and (b) all negative performing portfolio companies excluding the total losses (IRR=-100%).

| | First-or-second-Fund of the Investment Manager | Third-or-later-Fund of the Investment Manager |
|--|--|---|
| Time from fund vintage date till fundraising follow-up-fund | 4.10 | 2.47 |
| Percentage of total losses (IRR=-100%) of all fully and partly realised portfolio companies in fund | 14.6% | 17.8% |
| IRR of negative performing portfolio companies (including total losses) | -65.96% | -74.88% |
| IRR of negative performing portfolio companies (excluding total losses) | -49.68% | -41.01% |

Table 3 Comparison of the investment behaviour of young and old PE/VC Fund Managers

The total sample comprises of 712 PE/VC- investments. **Panel A** shows the results for the subsample of total losses (IRR=-100%), **Panel B** for the subsample of negatively performing investments (IRR<0%). Medians are in brackets. Significance tests in the third column are t-statistics of difference in averages (two-sided). *, **, *** Significant at the 10%, 5%, 1% levels, respectively. Variables are as defined in table 1.

| Panel A Subsample: write-offs (IRR=-100%) | | | |
|---|--|---|--------------|
| | First-or-second-Fund of the Investment Manager | Third-or-later-Fund of the Investment Manager | t-statistics |
| N | 52 | 101 | |
| Investment | 2.550 | 1.704 | 2.628*** |
| Duration | [2.043] | [1.333] | |
| Absolute Investment Share | 0.043 [0.036] | 0.031 [0.019] | 1.715* |
| Relative Investment Share | 0.895 [0.858] | 0.798 [0.665] | 0.853 |
| Pp Round-share | 0.357 [0.333] | 0.196 [0.000] | 2.661*** |
| Pp Tranche-share | 0.356 [0.333] | 0.299 [0.333] | 1.755* |
| Panel B Subsample: Negative Performing (IRR< 0%) | | | |
| N | 127 | 188 | |
| Investment | 4.252 | 2.914 | 4.099*** |
| Duration | [3.808] | [2.293] | |
| Absolute Investment Share | 0.044 [0.036] | 0.032 [0.021] | 2.802*** |
| Relative Investment Share | 0.932 [0.873] | 0.835 [0.716] | 1,304 |
| Pp Round-share | 0.208 [0.000] | 0.137 [0.000] | 1.977* |
| Pp Tranche-share | 0.195 [0.056] | 0.211 [0.200] | -0.650 |

Table 4 Comparison of the investment behaviour before and after fundraising follow-up-fund

The total sample comprises of 712 PE/VC- investments. **Panel A** shows the results for the subsample of total losses (IRR=-100%), **Panel B** for the subsample of negatively performing investments (IRR<0%) and **Panel C** for the subsample of positively performing investments (IRR>0%). Medians are in brackets. Significance tests in the third column are t-statistics of difference in averages (two-sided). *, **, *** Significant at the 10%, 5%, 1% levels, respectively. Variables are as defined in table 1.

| | follow-up-fund NOT raised at time of investment in the portfolio company | follow-up-fund already raised at time of investment in the portfolio company | t-statistics |
|---|---|---|--------------|
| Panel A Subsample: write-offs (IRR=-100%) | | | |
| Investment | 2.083 | 0.680 | 5.009*** |
| Duration | [1.619] | [0.254] | |
| Relative Investment Share | 0.856 [0.727] | 0.473 [0.295] | 1.780* |
| Pp Round-share | 0.262 [0.000] | 0.100 [0.000] | 2.233** |
| Panel B Subsample: Negative Performing (IRR< 0%) | | | |
| Investment | 3.548 | 1.796 | 3.592*** |
| Duration | [2.854] | [1.450] | |
| Relative Investment Share | 0.886 [0.821] | 0.660 [0.458] | 1.441 |
| Pp Round-share | 0.169 [0.000] | 0.108 [0.000] | 0.820 |
| Panel C Subsample: Positive Performing (IRR> 0%) | | | |
| Investment | 4.491 | 3.816 | 2.077* |
| Duration | [3.933] | [3.739] | |
| Relative Investment Share | 1.049 [0.895] | 0.963 [0.951] | 0.722 |
| Pp Round-share | 0.066 [0.000] | 0.015 [0.000] | 2.705*** |

The Liquidation Dilemma of Money Losing Investments - The Impact of Investment Experience and Window Dressing of Private Equity and Venture Capital Funds

Autor:
Philipp Krohmer

Table 5 Regression Analysis on the Determinants of the Duration of bad performing investments

The total sample comprises of 712 PE/VC- investments merged from the Venture Economics and Cepres databases. **Panel A** shows the results for the subsample of negatively performing investments (IRR<=0%), **Panel B** for the subsample of total losses (IRR=-100%). The dependent variable is the investment duration. We define the total investment relationship period of each investment starting from the initial cash injection from the PE or VC fund to the portfolio company and ending with the final cash distribution from the company to the fund. The first column defines the categories of the independent variables, the second column presents the variables. Independent variables include three measures for fund experience, the fund sequence number, the investment manager's age at date of in initial investment into the portfolio company and a dummy variable equal to one for first-or-second-fund investments and equal to 0 for third-or-later-fund investments. A dummy variable equal to one if the investment manager raised a follow-up-fund already at time of investment in the portfolio company controls for window dressing behaviour. Variables are as defined in table I. The last three rows present the model summary (N, R squared, Adjusted R squared and the F- statistic). The coefficients (only) of the OLS regression are illustrated in the third to tenth column. *, **, *** Significant at the 10%, 5%, 1% levels, respectively.

| | | Dependent variable: Duration of investment | | | | | | | |
|---------------------------------|-------------------------------|---|-----------|-----------|--------------|--|-----------|-----------|--------------|
| | | Panel A: Subsample: Negative Performing (IRR< 0%) | | | | Panel B: Subsample: write-offs (IRR=-100%) | | | |
| Independent variables | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Constant | 1.099** | 1.717*** | 2.639*** | 3.497*** | 0.236 | 0.371 | 1.414* | 2.304*** |
| Reputation/ Experience | Fund Sequence Number | -0.140*** | | | | -0.076* | | | |
| | Fund-Number: first or second? | | | 0.789*** | 0.478* | | | 0.263 | 0.074 |
| | IM Age | | -0.025** | | | | -0.005 | | |
| Manager | US-IM | 0.124 | 0.181 | 0.105 | -0.052 | 0.148 | 0.135 | -0.161 | -0.277 |
| Fundraising | Follow-up-fund raised | -0.882* | -1.270*** | -1.148** | -0.802 | -0.937** | -1.034** | -0.997* | -0.634 |
| Investment | High Tech | | -0.449* | -0.344 | | | -0.097 | 0.167 | |
| | Later Stage | 0.590*** | 0.425* | 0.382 | 0.396 | 0.588** | 0.664** | 0.363 | 0.335 |
| Macro- economic Variables | Investment in Bubble | | | -2.893*** | | | | -1.986*** | |
| | NASDAQ Development | 1.382*** | 1.336*** | | | 1.149*** | 1.178*** | | |
| | GDP | -0.680** | -0.778** | -0.533 | | -0.475** | -0.508** | -0.335 | -0.498* |
| | Growth Committed Capital | -0.044 | -0.085 | 0.154 | | 0.005 | -0.009 | 0.082 | |
| | Committed Capital | | | | -1.62E-05*** | | | | -1.01E-05*** |
| | Short-term interest rate | 0.210*** | 0.151** | 0.290*** | 0.309*** | 0.204*** | 0.155* | 0.263*** | 0.255*** |
| Model Summary | Number | 312 | 295 | 295 | 312 | 153 | 144 | 144 | 153 |
| | Rsquare | 0.590 | 0.573 | 0.408 | 0.450 | 0.561 | 0.558 | 0.415 | 0.447 |
| | Adjusted Rsquare | 0.580 | 0.560 | 0.389 | 0.437 | 0.537 | 0.528 | 0.375 | 0.42 |
| | F Statistic | 54.603*** | 42.554*** | 21.814*** | 35.509*** | 23.019*** | 18.790*** | 10.541*** | 16.732*** |

The Liquidation Dilemma of Money Losing Investments - The Impact of Investment Experience and Window Dressing of Private Equity and Venture Capital Funds

Autor:
Philipp Krohmer

Table 6 Regression Analysis on the Determinants of the Investment Amount Share of bad performing investments

The total sample comprises of 712 PE/VC- investments merged from the Venture Economics and Cepres databases. **Panel A** shows the results for the subsample of negatively performing investments (IRR<=0%), **Panel B** for the subsample of total losses (IRR=-100%). The dependent variables are the logarithm of the absolute investment share and the relative investment share. The absolute (relative) investment share is the total amount invested by the fund in this portfolio company divided by the total (average) amount invested by the fund in all portfolio companies. The first column defines the categories of the independent variables, the second column presents the variables. Independent variables include three measures for fund experience, the fund sequence number, the investment manager's age at date of in initial investment into the portfolio company and a dummy variable equal to one for first-or-second-fund investments and equal to 0 for third-or-later-fund investments. A dummy variable equal to one if the investment manager raised a follow-up-fund already at time of investment in the portfolio company controls for window dressing behaviour. Variables are as defined in table I. The last three rows present the model summary (N, R squared, Adjusted R squared and the F- statistic). The coefficients (only) of the OLS regression are illustrated in the third to tenth column. *, **, *** Significant at the 10%, 5%, 1% levels, respectively.

| Dependent Variable: | | Absolute Investment Share | | Relative Investment Share | | Absolute Investment Share | | Relative Investment Share | |
|---------------------------------|-------------------------------|---|-----------|---------------------------|----------|--|-----------|---------------------------|----------|
| | | Panel A: Subsample: Negative Performing (IRR< 0%) | | | | Panel B: Subsample: write-offs (IRR=-100%) | | | |
| Independent variables | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Constant | -1.880*** | -1.597*** | 1.048*** | 0.941*** | -2.159*** | -1.626*** | 1.153*** | 1.070*** |
| Reputation/ Experience | Fund Sequence Number | | | | -0.029** | | | | |
| | Fund-Number: first or second? | 0.259*** | | | | 0.272*** | | | |
| | IM Age | | -0.021*** | -0.011*** | | | -0.023*** | -0.010* | -0.048** |
| Manager | US-IM | 0.141* | 0.168** | 0.216** | 0.206** | 0.170 | 0.224** | 0.293** | 0.288** |
| Fundraising | Follow-up-fund raised | -0.300** | -0.236** | -0.179 | -0.138 | -0.521*** | -0.410*** | -0.341 | -0.340 |
| Investment | High Tech | -0.032 | | -0.139* | -0.137 | 0.187* | | -0.013 | -0.001 |
| | Later Stage | 0.192*** | 0.170*** | 0.044 | 0.068 | 0.301*** | 0.160* | 0.118 | 0.139 |
| Macro- economic Variables | Investment in Bubble | 0.115* | | | 0.034 | 0.104 | | | 0.053 |
| | NASDAQ Development | | | -0.006 | | | | -0.026 | |
| | GDP | -0.043 | -0.067 | -0.126 | -0.110 | -0.025 | -0.067 | -0.133 | -0.107 |
| | Growth Committed Capital | -0.029 | | -0.004 | 0.005 | -0.030 | | -0.008 | -0.005 |
| | Committed Capital | | 4.77E-07* | | | | 4.51E-07 | | |
| | Short-term interest rate | -0.013 | -0.002 | -0.018 | -0.013 | -0.002 | 0.005 | -0.064 | -0.057 |
| Model Summary | Number | 295 | 312 | 295 | 295 | 144 | 153 | 144 | 144 |
| | Rsquare | 0.139 | 0.245 | 0.075 | 0.057 | 0.181 | 0.272 | 0.102 | 0.112 |
| | Adjusted Rsquare | 0.112 | 0.228 | 0.046 | 0.027 | 0.127 | 0.237 | 0.042 | 0.053 |
| | F Statistic | 5.110*** | 14.089*** | 2.572*** | 1.910** | 3.302*** | 7.743*** | 1.688* | 1.887** |

The Liquidation Dilemma of Money Losing Investments - The Impact of Investment Experience and Window Dressing of Private Equity and Venture Capital Funds

Autor:
Philipp Krohmer

Table 7 Regression Analysis on the Determinants of the Pre-Exit-Phase Round-share of bad performing investments

The total sample comprises of 712 PE/VC- investments merged from the Venture Economics and Cepres databases. Panel A shows the results for the subsample of negatively performing investments (IRR<=0%), Panel B for the subsample of total losses (IRR=-100%). The dependent variable is Pre-exit-phase round-share. We segment the total investment period into three fractional periods of time, each one third of the total period: the first as the initial investment phase, or i-phase; the second as the maturity phase, or m-phase; and the final third as the pre-exit phase, or p-phase. The Pp-round-share is defined as the share of the No.of Phase p (pre-exit phase) rounds of the total No. of rounds (Pp rounds / All rounds). The first column defines the categories of the independent variables, the second column presents the variables.

Independent variables include three measures for fund experience, the fund sequence number, the investment manager's age at date of in initial investment into the portfolio company and a dummy variable equal to one for first-or-second-fund investments and equal to 0 for third-or-later-fund investments. A dummy variable equal to one if the investment manager raised a follow-up-fund already at time of investment in the portfolio company controls for window dressing behaviour. Variables are as defined in table I. The last three rows present the model summary (N and Pseudo R squared). The coefficients (only) of the poisson-regression are illustrated in the third to tenth column. *, **, *** Significant at the 10%, 5%, 1% levels, respectively.

| | | Dependent variable: Pre-exit-phase round-share | | | | | | | |
|---------------------------------|-------------------------------|---|--------------|--------------|---------------|--|--------------|--------------|--------------|
| | | Panel A: Subsample: Negative Performing (IRR< 0%) | | | | Panel B: Subsample: write-offs (IRR=-100%) | | | |
| Independent variables | | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| | Constant | 2.469*** | 3.029*** | 3.555*** | 3.016*** | 3.392*** | 3.998*** | 4.639*** | 4.014*** |
| Reputation/ Experience | Fund Sequence Number | -0.067*** | | | | -0.088*** | | | |
| | Fund-Number: first or second? | | 0.092*** | | 0.092*** | | 0.256*** | | 0.255*** |
| | IM Age | | | 0.005*** | | | | -0.001 | |
| Manager | US-IM | -0.318*** | -0.334*** | -0.251*** | -0.334*** | -0.279*** | -0.234*** | -0.371*** | -0.233*** |
| Fundraising | Follow-up-fund raised | -0.317*** | -0.099 | -0.012 | -0.103 | -0.787*** | -0.403*** | -0.368*** | -0.391*** |
| Investment | High Tech | | | 0.127*** | | | | -0.043 | |
| | Later Stage | -0.586*** | -0.573*** | -0.671*** | -0.574*** | -0.239*** | -0.143*** | -0.428*** | -0.140*** |
| Macro- economic Variables | Investment in Bubble | | | | -0.059 | | | | 0.079 |
| | NASDAQ Development | -0.223*** | | -0.441*** | | -0.135*** | | -0.269*** | |
| | GDP | 0.156*** | 0.196*** | 0.171*** | 0.200*** | -0.040 | 0.013 | -0.003 | 0.006 |
| | Growth Committed Capital | 0.232*** | | | | 0.125*** | | | |
| | Committed Capital | | -3.90E-06*** | -7.38E-06*** | -3.640E-06*** | | -4.98E-06*** | -6.62E-06*** | -5.34E-06*** |
| | Short-term interest rate | 0.185*** | 0.095*** | 0.099*** | 0.096*** | 0.083*** | -0.002 | -0.005 | -0.002 |
| Model Summary | Number | 312 | 312 | 295 | 312 | 153 | 153 | 144 | 153 |
| | Pseudo Rsquared | 0.104 | 0.117 | 0.181 | 0.117 | 0.069 | 0.169 | 0.201 | 0.168 |

