Review of Financial Economics 22 (2013) 20–35

Contents lists available at SciVerse ScienceDirect

Review of Financial Economics

journal homepage: www.elsevier.com/locate/rfe

The performance of venture capital investments: Do investors overreact? ☆

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A R T I C L E   I N F O

Article history:
Received 10 April 2012
Received in revised form 16 September 2012
Accepted 5 October 2012
Available online 12 October 2012

JEL classification:
G24
E32

Keywords:
Venture capital
Performance
Overreaction
Market volatility
IRR

A B S T R A C T

Using a unique proprietary data set of over 5400 realized and unrealized venture capital investments between 1980 and 2005, we examine the impact of demand-related factors, e.g. entrepreneurial activity, as well as supply-related factors, i.e. money provided by VC investors, on the return of individual VC investments. This way, we are able to shed more light on the question whether volatile VC investment returns are rather driven by fundamental changes with regard to the number of attractive investment opportunities or by the overreaction by investors. We find that rising demand for VC, i.e. an increase in entrepreneurial activity, results initially in higher returns. However, our results also indicate that overreaction on the supply side can be observed, destroying deal-level results. Overfunding, specifically overinvesting seems to be a recurring characteristic of the VC industry. In fact, contra-cyclical investment strategies yield highest deal-level returns.

1. Introduction

Intuitively, venture capital (VC) investors are primarily interested in the financial return this asset class generates. Only if VC firms accomplish sufficient financial returns on their investments, will they be successful in raising new funds for their future investment activity (see, e.g., Kaplan & Schoar, 2005). However, during the last decade in particular venture capitalists failed to generate attractive returns for their own investors. For example, by comparing four different data sources Harris, Jenkinson, and Kaplan (2011) consistently show that, on average, US VC funds with vintage years in the 2000s provided negative median internal rates of returns (IRRs). A similar pattern applies when referring to (weighted) average IRRs – returns to limited partners were slightly above or below 0%. Given the riskiness of this asset class, these returns can be considered inappropriately inadequate. As a result, less optimistic industry observers start to entertain some doubt on the overall vitality of this asset class and predict a potential lasting reduction of capital funds allocated to the VC industry (Lerner, 2011) – a development which could severely hamper capital supply for high-growth, and innovative young ventures.

Looking at the existing literature on VC transaction returns most researchers focus on the impact of certain VC related characteristics on investment success (Cumming & MacIntosh, 2003; Gompers, Kovner, Lerner, & Scharfstein, 2008; Hochberg, Ljungqvist, & Lu, 2007; Nahata, 2008). Thereby, the majority of previous studies conclude that it is, in particular, the VC's prior experience, reputation or ability to syndicate that determines investment success. Fundamental skills to better select and monitor portfolio companies build the foundation of superior investment performance.

Beyond that, a limited amount of studies focuses on market-related factors affecting VC deal-level returns. The majority of these studies analyze the relationship between the public capital market and VC performance (see, e.g., Gompers et al., 2008; McKenzie & Janeway, 2011). McKenzie and Janeway (2011) find that VC funds conducting their investments in a competitive market and exiting those in an unfavorable market environment, exhibit a low median fund-level IRR of 4%. In contrast, when transactions were entered during times of capital shortage and realized in boom periods the median fund-level IRR was 20%.

Finally, few studies analyze the "money chasing deal" phenomenon. Gompers and Lerner (2000) provide evidence that inflows of capital into venture funds increase the valuation of these funds' new investments. In addition, they do not find any significant relationship to the ultimate success of these investments. However, Inderst and Müller (2004) provide additional theoretical evidence for this phenomenon. According to their model, a sufficiently strong imbalance between capital supply and demand results in relatively little value creation in these start-ups. Both studies, however, fall short in providing specific evidence on the concrete impact on investment returns.

☆ We would like to thank two anonymous referees for the many helpful comments and suggestions.

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1058-3300/$ – see front matter © 2012 Published by Elsevier Inc.
http://dx.doi.org/10.1016/j.rfe.2012.10.001

This paper contributes to existing research on VC performance as we identify and evaluate in particular how market-related volatility impacts deal-level VC investment returns. Thereby, our analysis is less focused on the impact of volatile public markets, i.e. the availability of initial public offerings (IPOs), but on observed volatility of actual demand and supply for VC. This way, we build upon theoretical considerations by Lerner (2002) and analyze empirically whether VC performance shows return patterns as predicted by fundamental changes on these markets ("fundamental view") or whether returns are primarily driven by overreaction of market participants ("overreaction view").

In this regard, this paper extends existing literature in several dimensions. Firstly, we consider movements in entrepreneurial activity, i.e. the demand side for venture capital, in the analysis. Hence, we do not exclusively focus on the investment performance impact of volatility on the supply side, i.e. the level of VC fund inflows. To address existing research results, we thereby closely control for changing conditions on the public capital market. Secondly, since our analysis is based on a proprietary data set from two European private equity fund-of-funds, we are able to use actual deal-level returns (based on cash flows exchanged between the VC firm and its portfolio company). The advantage of this data is threefold: Given that VC funds usually have a pre-determined lifetime of 10–12 years and an investment period of approximately five years, funds typically experience both boom and bust cycles during their lifetime. This makes it difficult to investigate the influence of market shifts on returns from a fund-level perspective in detail. As a result, deal-level analyses are particularly suitable to understand the influence of volatile markets on VC performance. Furthermore, in contrast to prior studies which commonly use the achieved exit type as proxy for investment success, our unique dataset allows us to utilize a much more accurate return measure. Cash flow based, deal-level IRRs and Cash multiples are able to account for differences between exit types (e.g. between IPOs and trade sales) and heterogeneous investments in one exit type group (e.g. poor vs. high performing trade sales). In this way, on a more general level, our study also adds to the existing literature by providing detailed descriptive statistics on deal-level performance over time for a comprehensive sample of VC investments. In addition, our sample comprises VC deals entered between 1980 and 2005 which makes it possible to closely analyze several cycles, in particular the period after the burst of the dot-com bubble. Finally, we are able to dissect the data using both the fundamental and overreaction theory.

Overall, we find a rather positive connection between entrepreneurial activity and VC investment success. Accordingly, our empirical results confirm that VCs benefit from the continuous emergence of innovations and the respective demand for financing of entrepreneurial ideas. On the supply side, however, we find that both VC fundraising and investment activities are statistically significantly and negatively related to deal-level returns. Obviously, VCs and/or their limited partners (LPs) tend to overreact to perceived investment opportunities and, as a result, invest too much capital in relatively unattractive ventures. Intuitively, this leads to disappointing deal-level returns. Consequently, by utilizing superior data on deal-level performance we obtain results that are in line with theoretical considerations from Lerner (2002), who expected to observe overreaction behavior due to distinctive characteristics of the VC industry. Interestingly, however, our findings are in contrast to the results by Gompers et al. (2008) who find no support for the overreaction theory. Nevertheless, it is important to note that we obtain similar results if we substitute our detailed cash flow based deal-level return measures with a simple dummy success variable. This makes us confident that our results are reliable and emphasizes the importance of using very detailed performance measures when conducting deal-level analyses.

The rest of the paper is structured as followed. Section 2 introduces relevant theoretical considerations and derives testable hypotheses. Section 3 describes the construction of the utilized data sample and its representativeness. In addition, relevant dependent, independent and control variables are introduced. Section 4 analyzes historical VC return patterns. Relevant market related factors are studied by means of bivariate and multivariate analyses. Section 5 summarizes and discusses our key results.

2. Theoretical considerations and hypotheses

Intuitively, one could argue that the volatility in the VC industry is the result of the consistent emergence of new attractive investment opportunities. This is called the *fundamental* theory throughout the paper. For example, due to technological progress new markets develop which leads to an increase in capital demand and supply in this area. In other words, an increase in VC fundraising and investment activity goes along with the emergence of new investment opportunities, i.e. a transformation that would be based on fundamental changes in an industry. Building upon previous work by Poterba (1989), Gompers and Lerner (1998) and Lerner (2002) we utilize a simple supply and demand framework to discuss these relationships. Accordingly, just as in well-established markets for frequently traded goods like commodities, shifts in suppy and demand shape the amount of capital raised by venture funds (Lerner, 2002). Ultimately, these shifts also drive the returns that investors earn in these markets. Hence, if capital demand and supply increase proportionally, no effect on VC returns should occur. If we (reasonably) assume that there is a time gap until the capital supply adjusts, we would (even) expect higher returns due to more profitable investment opportunities throughout this adjustment period.[1] Therefore, in line with fundamental theory, upward shifts of the VC demand curve and subsequent adjustments to VC supply, as a consequence of better investment alternatives, should in general evoke unchanged or at most temporarily enhanced investment returns.

Hypothesis 1a. *Fundamental shifts of VC demand (i.e. entrepreneurial activity) and VC supply (i.e. VC fundraising activity) have a neutral impact on VC transaction returns.*

Hypothesis 1b. *Fundamental shifts of VC demand (i.e. entrepreneurial activity) and VC supply (i.e. VC fundraising activity) have a positive impact on VC transaction returns.*

On the other hand, however, many industry observers argue that the volatility of the VC industry (especially in terms of returns) is more a symptom of overreaction rather than a response to fundamental changes made by venture capitalists and entrepreneurs on these markets (Gompers et al., 2008; Gupta, 2000). Accordingly, the volatility of supply and demand in terms of fundraising and investment activity could be a symptom of "overshooting" by VCs (and their LPs) and entrepreneurs in reaction to perceived investment opportunities (*overreaction* theory). Accordingly, overreaction occurs, in particular, when VC firms (irrationally) associate past investment successes with future investment opportunities. Alternatively, it may stem from VCs who feel compelled to follow the herd out of concern for the reputation consequences of being contrarians (Scharfstein & Steiner, 1990). Therefore, during boom periods the prevalence of overfunding of specific industry sectors can lead to a significant decline in terms of venture fund's effectiveness (Lerner, 2002) Investments during these years grew dramatically and were concentrated in a few areas. Moreover, considerable sums were devoted to supporting very similar firms (Gompers et al., 2008). As a result, investments especially made towards the end of boom periods seem to yield poor investment results, or are phased out as complete write-offs. Existing research using the achieved exit type as the indicator for a successful investment seems to support this relationship (Hochberg et al., 2007; Nahata, 2008; Zarutskie, 2010). Therefore, if investment returns are negatively affected by the expansion of VC fundraising and/or investment activity, we interpret this as evidence for overreaction behavior in the VC industry. In this

[1] In his theoretical considerations regarding boom and bust cycles in the VC industry Lerner (2002) mentions various characteristics of the venture capital investment cycle that provoke time lags during the process of responding to changing investment opportunities.