Small Bus Econ (2014) 43:621–637
DOI 10.1007/s11187-014-9557-5

Industry relatedness in trade sales and venture capital investment returns

Ann-Kristin Achleitner · Reiner Braun · Eva Lutz · Uwe Reiner

Accepted: 3 February 2014 / Published online: 22 February 2014

Abstract We investigate relationships between the industry relatedness of venture capital-backed companies and their strategic acquirer in trade sales and the achieved investment returns of venture capitalists. Using a proprietary data set of 716 trade sales, we analyze return differences between lateral and synergetic trade sales, as well as between horizontal and vertical trade sales. We find that venture capitalists achieve higher returns with lateral rather than synergetic trade sales, and that the difference is greater for deals involving early stage companies characterized by strong information asymmetries. In addition, horizontal trade sales yield higher returns than vertical trade sales; however, in boom phases of the venture capital market, this effect reverses. Finally, we find that experienced venture capitalists are able to overcome disadvantageous situations in trade sales, resulting in comparable returns across all trade sale categories.

Keywords Trade sale · Venture capital · Venture capital exit · Industry relatedness · Investment rate of return

JEL Classifications G24 · G31 · L26 · M13

Electronic supplementary material The online version of this article (doi:10.1007/s11187-014-9557-5) contains supplementary material, which is available to authorized users.

A.-K. Achleitner · U. Reiner
TUM School of Management, Technische Universitaet München, Arcisstr. 21, 80333 Munich, Germany

R. Braun (✉)
Friedrich Alexander University Erlangen Nuremberg, Lange Gasse 20, 90402 Nuremberg, Germany
e-mail: reiner.braun@fau.de

E. Lutz
Heinrich Heine University Duesseldorf, Universitaetsstr. 1, 40225 Düsseldorf, Germany

1 Introduction

Venture capital deal-level returns are widely recognized to be highly volatile with a few transactions that deliver exceptional returns in a fund, while the majority of deals generate only mediocre or low returns, and many deals are written off. A high volatility of returns is not only observable within single funds, but also on an aggregate level over time because of market cycles in the venture capital exit markets. In cycles with optimistic market sentiment, high supply and demand for venture capital and liquid equity markets facilitate profitable exits (Gompers et al. 2008; Jeng and Wells 2000). In recent years, turbulence in public capital markets has made it difficult to realize an initial public offering (IPO) despite initiatives particularly in Europe to open second markets that focus on providing small companies the opportunity to access public capital markets (Vismara et al. 2012). Therefore, trade sales became

the dominant exit route for venture capitalists (NVCA 2011). They offer the opportunity to integrate the portfolio company into a larger organization, where it might add to the achievement of strategic objectives (Wang and Sim 2001). Hence, trade sales are suitable for a wide range of portfolio companies at different stages of development and success and are therefore recognized to be particularly heterogeneous in terms of their return potential for venture capitalists (Cumming and Johan 2008a; Giot and Schwienbacher 2007). Despite the dominance of trade sales as exit channel, theoretical knowledge as well as empirical evidence on underlying mechanisms that drive return differences between them is limited. Our aim is to close this research gap by analyzing whether the relatedness of the portfolio company industry with the acquiring firm industry affects the return to venture capitalists.

Industry relatedness is a commonly accepted dimension for distinguishing merger and acquisition (M&A) transactions in the literature (e.g., Datta et al. 1992; Healy et al. 1997; Lubatkin 1987). For venture capital trade sale exits, industry relatedness matters as information asymmetry between trade buyer and venture capitalist varies contingent on the similarity of portfolio company and acquirer industry. Similarly, we argue that the expected strategic value created for the buyer by integrating the portfolio company depends on how closely their industries are related.

In accordance with industry relatedness theory, we distinguish between lateral and synergetic trade sales. In lateral trade sales, the trade buyer does not yet operate in the same industry as the portfolio company, while in synergetic trade sales, the buyer is already active in the same or a similar field of business. We analyze how these different levels of industry relatedness in trade sales are related to venture capital investment returns. In addition, we argue that the return differences are subject to contextual factors, i.e., returns may vary contingent on venture capital—specific characteristics of the transaction. To account for these effects, we pursue a multilevel approach that identifies factors at the portfolio company, venture capital firm, and venture capital market levels that may be relevant in explaining return differences. More precisely, we examine whether the development stage of the venture, the experience of the venture capitalist, and the general venture capital market environment have a moderating influence on return differences between trade sale types.

Our unique, proprietary data set contains 2,355 North American and European venture capital deals realized between 1982 and 2008, of which 716 are trade sales. To the best of our knowledge, ours is one of the very few (if any) large-scale data sets with deal-level information on cash flows between the venture capital firm and the portfolio company, allowing us to calculate deal-level performance measures. In this way, we go beyond most previous studies, which must resort to alternative proxies for deal-level performance, for example, round valuations (Cochrane 2005). We believe that obtaining this information from due diligence documents of two fund-of-funds investors, which also cover venture capital funds in which the investors ultimately did not invest, substantially reduces the potential positive selection bias inherent in many publicly available venture capital data sets (Harris et al. 2013).

We find that venture capitalists can leverage the higher information asymmetries and distinct strategic value gains of lateral trade buyers and achieve higher investment returns with lateral than with synergetic trade sales. This return difference is particularly strong in transactions involving early stage ventures, where information asymmetries are particularly high and potential efficiency gains for synergetic trade buyers are limited. However, experienced venture capitalists are able to use their experience and reputation to make up for disadvantageous bargaining positions when selling a company and, as a result, they obtain comparable returns to both trade sale types. Overall, the findings suggest that industry relatedness in trade sales is one determinant of venture capital investment returns.

2 Theoretical background and hypotheses

2.1 Venture capital return differences in trade sales

In trade sales, the divestment success of venture capitalists depends on the willingness of the acquirer to buy the portfolio company, the acquirer's valuation, and the price determination process. Regarding the buyer's value perception, we argue that industry relatedness in trade sales has an influence on the level of information asymmetry between the trade buyer and the venture capitalist as well as on the expected strategic value created for the buyer. Both these

factors should have an impact on the buyer's willingness to pay and, thereby, on the investment return achieved by the venture capitalist (Capron and Shen 2007).

Regarding industry relatedness, trade sales can be grouped into lateral and synergetic trade sales. In lateral trade sales, the venture capitalist sells the portfolio company to a strategic buyer operating in an industry not related to the industry of the portfolio company. In contrast, synergetic trade sales involve a trade buyer already active in an industry similar to that of the portfolio company. In lateral trade sales, information asymmetries between the trade buyer and the venture capitalist are likely to be higher than in synergetic trade sales because of the buyer's unfamiliarity with the industry (Cumming and MacIntosh 2003). If the trade buyer already has a line of business in a similar or even in the same industry, it should be easier for the trade buyer to evaluate the portfolio company's success and future value potential (Capron and Shen 2007).

In terms of the relationship between the level of information asymmetry of the buyer and his or her willingness to pay, two opposing arguments exist. On the one hand, investigation costs for the buyer will be higher in an acquisition characterized by high information asymmetries. This makes the transaction less attractive than in a context with lower information asymmetries leading to an acquisition price discount. Further, an information-constrained investor aims to be compensated for taking the risk of investing in an uncertain asset (Merton 1987). An offer from a less informed buyer would therefore be lower than one from a more informed buyer. On the other hand, the less informed buyer will obtain valuable information through the acquisition that otherwise would not be accessible to him. He might therefore be willing to pay an acquisition premium compared to a more informed buyer for whom the information gain is less valuable (Zhu and Jog 2009). Venture capital-backed companies are usually characterized by a business model based on an innovative technology, product, or service with the potential to disrupt current business models in an industry. In this context, we expect the information access argument to be particularly high.

In addition to information asymmetries, strategic value gains from the acquisition are likely to shape the buyer's willingness to pay. Lateral acquisitions often occur in industries with high market entry barriers, as the buyer is able to gain access to an industry that would otherwise be difficult to enter (Martin and Sayrak 2003). A diversification strategy accomplished by a lateral trade sale can enable the buyer to enter innovative markets and to initiate radical change in its overall strategy. Usually, the business models of venture capital-backed companies offer high growth potential. The lateral trade buyer may not be in the position to enter such high growth markets with activities from within its own organization (Granstrand and Sjölander 1990). In contrast, synergetic buyers are already active in the same industry as the portfolio company, and gaining market access should be less relevant for them. Instead, synergetic trade buyers can gain synergetic value gains in acquisitions, such as efficiency gains, advantages from foreclosure, and potentially collusion (Chatterjee 1986). Operational efficiencies can emerge because of economies of scale or performance improvements from the combination of complementary resources (Martynova and Renneboog 2008). Foreclosure advantages can stem from improved purchasing efficiency, lower input costs, or an easier access to critical inputs in the combined entity post acquisition. Collusive synergies refer to an increase of market power in the combined entity and, hence, the ability to increase revenues by charging higher prices (Bradley et al. 1988). As market access is more relevant for lateral buyers and synergy potential is more important for synergetic buyers, it is difficult to make predictions about potential acquisition premiums paid by one type of buyer in comparison to the other.

Overall, it therefore remains an empirical question whether venture capitalists achieve higher returns with lateral or synergetic trade sales as clear-cut conclusions cannot be drawn from the differences in informational asymmetries or strategic value gains. However, we expect that the information access and market entry argument for lateral buyers are particularly strong in the context of acquiring venture capital-backed companies counterweighing the higher investigation costs and lower potential synergies compared to synergetic buyers. Therefore, we hypothesize that the returns from synergetic trade sales are lower than from lateral trade sales:

Hypothesis 1 *Venture capital investment returns are lower if the venture is sold to a synergetic rather than a lateral buyer.*

2.2 Moderating factors for venture capital return differences in trade sales

The relationship between industry relatedness in trade sales and venture capital investment returns may be influenced by additional factors concerning the development stage of the portfolio company, the experience of the venture capitalist, or the general market environment for venture capital exits. Therefore, we examine factors in all three of these areas that might enhance or mitigate venture capital investment return differences between lateral and synergetic trade sales.

Venture development stage On the level of the portfolio company, the company development stage is likely to have an influence on return differences of trade sales. Venture capitalists usually exit their investment 2 to 7 years after initial investment (Cumming and Johan 2008b). The time to exit realized by venture capitalists is shown to be relatively heterogeneous for trade sale exits (Giot and Schwienbacher 2007). Trade sale exits may occur in an early development stage, as the portfolio companies are not required to survive stand-alone post exit. In addition, trade sale exits are an option for portfolio companies in the later stages of company development that are not able to present an adequate equity story required for a successful IPO (Cumming and Johan 2008a). Given the relatively high variance in the maturity of candidates for trade sales, we analyze whether the stage of development of the venture has an impact on venture capital investment return differences.

First, the more mature a portfolio company becomes, the lower the inherent information asymmetries of a potential trade buyer are as to the future success of the venture (Gompers 1995). Early stage ventures have a short performance record (Tyebjee and Bruno 1984), and buyers are faced with relatively high uncertainties regarding supply and demand of the venture's product or service (Elango et al. 1995; Sapienza and Gupta 1994). This is likely to affect both lateral and synergetic buyers in their ability to judge the venture's future potential. Even though synergetic buyers might have an advantage because they are active in related industries, they are still faced with the liability of newness of ventures in an early development stage.

Second, early stages of venture development are likely to influence the strategic value creation potential for the trade buyer. Potential synergy gains are stronger if the portfolio company is already in a more mature stage, e.g., with developed production facilities and sales networks. The limited synergetic gains of early stage ventures dampen the willingness to pay of synergetic trade buyers and should have less of an effect on lateral trade buyers, as they still gain valuable information, market access and new strategic options through buying an early stage venture. Overall, we therefore propose that the difference between the investment returns gained by venture capitalists through synergetic and lateral trade sales is particularly high for early stage ventures:

Hypothesis 2 *The differences in returns to venture capitalists between synergetic and lateral trade sales are moderated by the venture development stage, such that these differences are more pronounced if the portfolio company is in an early stage.*

Experience of the venture capitalist The level of experience of venture capitalists is likely to be another factor behind the return differences between trade sales. Venture capitalists add value to their investments by closely monitoring the entrepreneur (Davila et al. 2003; Lerner 1995) and giving advice in strategic decisions (Bottazzi et al. 2008; Hellmann and Puri 2000; MacMillan et al. 1989). In addition, venture capitalists provide the entrepreneur access to their network to recruit new managers, identify additional suppliers or customers, and raise further external capital (Hellmann and Puri 2002; Hochberg et al. 2007; Hsu 2004). With increasing experience, venture capitalists improve their value-adding capabilities, build up a larger network of contacts, and receive a higher quality deal flow (Gupta and Sapienza 1992; Powell et al. 2002). For outsiders, this experience can hence act as a signal for the quality of the portfolio company, thereby reducing information asymmetries (Gompers 1996). Accordingly, it is shown that IPO underpricing is lower when the IPO company is backed by a high-quality venture capitalist (Barry et al. 1990; Gompers 1996; Megginson and Weiss 1991; Nanda and Yun 1997). Similarly, we expect that in trade sales the involvement of an experienced venture capitalist indicates a higher likelihood of future success of the venture, hence driving return differences between trade sales.

Venture capitalist experience as a signal of quality for the portfolio company is likely to affect both lateral

and synergetic trade buyers. As explained above, in lateral trade sales where trade buyers are not yet active in the same or similar lines of business, information asymmetries are higher than in industry-related trade sales. The involvement of an experienced venture capitalist is likely to reduce the importance of these informational disadvantages. Further, the expected value gain through obtaining additional information and strategic options in lateral trade sales is higher in case an established venture capitalist is involved.

However, synergetic trade buyers also profit from the involvement of experienced venture capitalists. Even though they have industry knowledge that helps them in judging the future probability of success of the venture, venture capital experience might still be an important quality signal for them. Their expected synergies are likely to be higher if the venture has had access to the know-how and network of an established venture capitalist. The assumed superior value-adding capability of such a venture capitalist acts as signal for potential efficiency gains from buying the portfolio company.

Overall, we expect that experience of the venture capitalist has an impact on the willingness to pay of both lateral and synergetic trade buyers. On the one hand, it could be that the reduction of information asymmetry of lateral trade buyers is particularly strong leading to more pronounced differences in returns between lateral and synergetic trade sales. On the other hand, the higher expected synergy gains in synergetic trade sales could be more important, which would reduce the return differences between lateral and synergetic trade sales. It essentially remains an empirical question how venture capital experience shapes the relationship between industry relatedness and return differences. We therefore conclude with a non-directional hypothesis:

Hypothesis 3 *The differences in returns to venture capitalists between synergetic and lateral trade sales are moderated by venture capitalist experience.*

Market environment for venture capital exits Venture capital exit markets follow so-called boom-and-bust cycles (Lerner 2002). Boom periods are characterized by liquid equity markets that facilitate venture capital exits via IPOs and by high supply and demand for venture capital (Gompers et al. 2008; Jeng and Wells 2000). During upswing markets, venture capital investors are likely to want to increase their exposure to this asset class; in addition, entrepreneurs are motivated by successful exit stories to start their own businesses (Lerner 2002). Exceptional market conditions are likely to have an impact on trade sale exits, as the relevance of information asymmetries between buyer and seller as well as risk considerations of trade buyers change. We therefore examine whether, during boom periods of the VC market characterized by strong capital inflows into the asset class, the above-hypothesized relationships between industry relatedness of trade sales and the investment returns achieved by venture capitalists are different than in other periods.

For lateral buyers, it may be particularly appealing to close an acquisition to enter a 'hot' market during boom periods, thereby receiving valuable additional information and new strategic options. In contrast, synergetic buyers are already active in a similar industry, and their information asymmetries regarding the potential target are lower. For a venture capitalist, it should hence be more difficult to take advantage of a boom period in negotiations with synergetic trade buyers, while in lateral trade sales the venture capitalist can use the positive market climate to persuade the less-informed buyer to pay a higher price. We therefore expect that the return differences of lateral and synergetic trade sales to be more pronounced during boom periods:

Hypothesis 4 *The differences in returns to venture capitalists between synergetic and lateral trade sales are moderated by the market environment for venture capital exits, such that these differences are more pronounced in boom periods.*

3 Data and variables

3.1 Sample description

Our analysis is based on a proprietary data set from two leading European private equity funds-of-funds. Both funds assembled comprehensive deal-level databases from fund managers to optimize their internal asset allocation decisions. However, we analyze not only transactions by venture capitalists in which these fund-of-funds finally invested, but also those in which they decided not to invest. This sampling method strongly reduces the issue of selective reporting by venture capitalists (Kaplan and Schoar 2005).

Table 1 Descriptive sample statistics

Panel A: VC firm and fund characteristics					
Number of different VC firms					107
Median age of VC firm at entry date (in years)					11.0
Median fund vintage year					1997
Median fund size (US$ million)					195
Trade sales exits only	Obs.	Min	Max	Average	Median
Panel B: Investment characteristics					
Entry year	716	1981	2005		
Exit year	716	1984	2008		
Holding period (in years)	716	0.3	21.8	4.0	3.5
Syndication size	701	1.0	32.0	6.5	6.0
Investment size at entry (US$ million)	716	0.0	79.7	7.0	4.2
Divestment size at exit (US$ million)	716	0.0	603.1	18.5	6.4

This table displays descriptive statistics on 716 venture capital–backed trade sales exited between 1982 and 2008. If not indicated otherwise, information is retrieved from our proprietary data set. Panel A presents selective characteristics for the 107 different venture capital firms in our sample. Venture capital firm age at entry refers to the number of years the venture capitalist (not the fund) has existed before the transaction at hand. Fund vintage year is the year in which the respective fund made its first investment. Fund size refers to total commitments in millions of US dollars at entry. Panel B shows selective descriptive statistics on the investment level. Entry year is the year in which the target company was acquired by the venture capital firm. Exit year is the year in which the last substantial cash flow from the portfolio company to the venture capital firm occurred. Holding period is the number of years a venture capital firm held a portfolio company, i.e., the time span between entry and exit year in years. Syndication size counts the number of involved venture capital firms in the current and previous financing rounds at entry date. Investment size and divestment size are the sum of all cash flows from the venture capitalist to and from the portfolio company in millions of US dollars

Panel A of Table 1 shows relevant key characteristics of venture capitalists included in our sample. Some 107 different venture capitalists are part of the sample, with a median fund vintage year of 1997, median age at the time of investment of 11 years, and median fund size of US$ 195 million. Our data set includes only independent venture capitalists and no government or corporate venture capitalists. In contrast to public databases, for each deal, we observe gross cash flows between the portfolio company and the venture capitalist. Additional information is added to the original databases via Thomson ONE Banker (TOB).

Since we focus exclusively on trade sale exits of venture capitalists, we do not consider unrealized transactions, investments not part of a typical venture capital investment stage (e.g., buyouts), or any other exit channels, such as IPOs, sales to financial buyers,[1] buybacks, or write-offs. In addition, due to limited data representation, we exclude all investments in regions outside North America and Europe.

In line with Gompers et al. (2008), we do not consider follow-up financings, as the empirical results are expected to reveal the distinct characteristics of individual investment events. In this context, follow-up financings depict only duplicates of the respective initial investments. We delete all transactions with total committed capital below US$ 10,000 and above US$ 100 million. Observations that fall into these categories are not considered to convey significant information about exit decisions in the traditional business model of venture capitalists (Giot and Schwienbacher 2007). Finally, we drop all transactions with total holding periods below 3 months because with such a short time period investment performance would be driven mainly by market conditions (Giot and Schwienbacher 2007; Hege et al. 2009). This pre-filtering process leads to a final sample of 716 trade sales exited between 1982 and 2008. Panel B of Table 1 summarizes the relevant

[1] We exclude all buyers with a Standard Industrial Classification (SIC) code of 6799, as this code represents financial institutions.

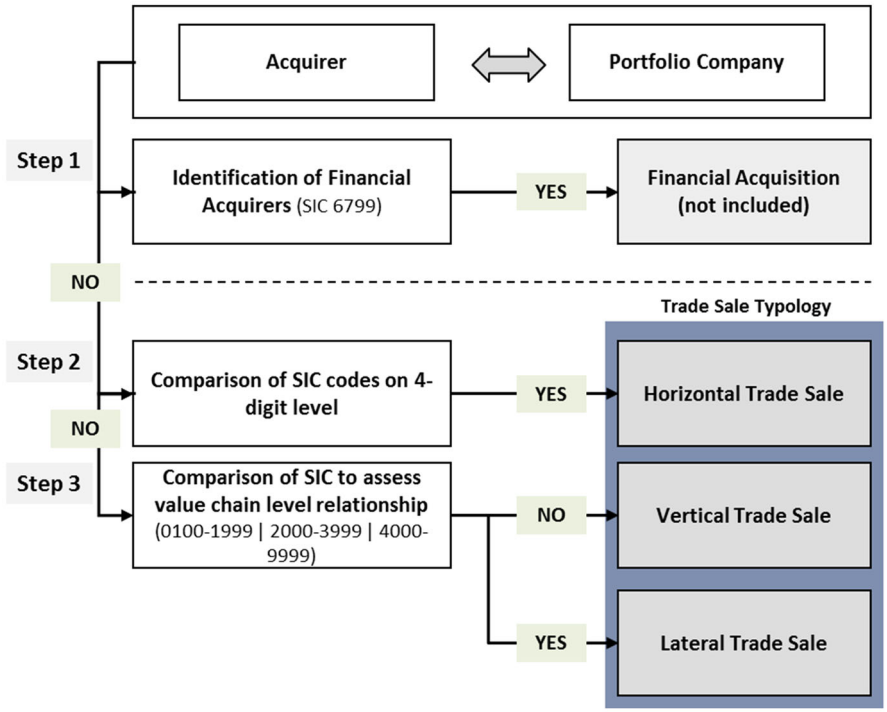

Fig. 1 Categorization scheme to identify fundamental strategic rationales. In assessing the relationship between the acquirer and the portfolio company, this figure outlines the simplified scheme used to identify the strategic rationale behind the trade sale exit (Capron 1999). To distinguish between industries, we resort to Standard Industrial Classification (SIC) codes, a hierarchical system that increases the granularity of differentiation with each digit of its code

descriptive statistics at the transaction level for our sample of trade sales.

3.2 Variable descriptions

3.2.1 Dependent variable: deal-level IRR

We measure deal-level performance from the perspective of the venture capitalist using the internal rate of return (IRR) for each deal, gross of fees, and carried interest. IRR is the most important and most widely used performance measure among practitioners and scholars (e.g., Cochrane 2005; Kaplan and Schoar 2005; Phalippou and Gottschalg 2009). Based on the time value of money assumption, the IRR depicts an implied discount rate of cash inflows and outflows from portfolio companies that results in a net present value of zero. While negative cash flows are incurred at the beginning and throughout the investment period, basically all positive cash flows are created at the point of exit. Hence, the IRR really represents the returns through exiting the investment and the problem of "non-normal" cash flows with time varying inflows and outflows does not affect the analysis. While extreme positive outliers are inherent in the venture capital business, for the most successful 1 % of transactions in our sample, we replace IRR with the highest IRR of the remaining 99 % of transactions (i.e., we winsorize IRR at the 99th percentile) to avoid problems of biased coefficients and large standard errors. In Sect. 4.3, we extensively discuss the robustness of results in terms of alternative performance measures.

3.2.2 Independent variables: trade sale categories and moderators

Building on the results of M&A research, the Standard Industrial Classification (SIC) codes serve as the fundamental basis to classify trade sales based on industry relatedness. Figure 1 outlines our classification procedure. The SIC coding for each of the portfolio companies and the trade buyer serves as our starting point.

To identify lateral and synergetic trade sales, we had to start with a more fine-grained differentiation of synergetic trade sales and at first identified horizontal trade sales. Despite a generally strong relatedness within SIC categories on the 2-digit and 3-digit level, we assume trade buyers target horizontal integration only if the portfolio company and the acquirer share the same 4-digit SIC code (Capron 1999). This implies

that these firms not only operate within the same industry, but that they also show a high degree of congruence with regard to their business activities; 247 (34 %) of the 716 trade sales in our sample meet this criterion and are, therefore, considered horizontal trade sales. To differentiate between vertical integration and diversification/lateral activities, we resort to the methodology of Davis and Duhaime (1992). These authors suggest splitting up the entire SIC code range in terms of a simplified value chain (raw materials: SIC 0100-1999, manufacturing: SIC 2000-3999, services: SIC 4000-9999). The result is that two businesses exhibit vertical integration if their primary SIC codes are located in different stages of the value chain. All other transactions are classified as lateral trade sales, with one exception: according to Davis and Duhaime (1992), vertical integration might also exist within the individual stages of the value chain, thus leaving the potential for false allocation of specific transactions.

To overcome this issue, we follow Shackman (2007), and test for within-stage vertical integrations through introduction of SIC-based Fama/French-industries and then test for relatedness on the two-digit SIC level (Fama and French 1997). In this way, we ensure that vertical trade sales are captured beyond application of the simplified value chain. Accordingly, for example, we consider an advertising agency (SIC 7311) to be vertically integrating if it acquires a software company (SIC 7372). Applying the outlined methodology to the remaining group of 469 trade sales (716 minus 247), we end up with 190 (27 %) vertical trade sales and 279 (39 %) lateral trade sales. We discuss an alternative methodology in Sect. 4.3.

In order to examine the three moderating factors, we use the following variables: First, we compute a binary variable differentiating between ventures in late and early development stages: the variable adopts a value of zero if the target is in the expansion or later stage and one otherwise. Second, we include venture capital firm age at the time of the transaction in years as proxy for experience (Kaplan and Schoar 2005). We calculate this variable by subtracting the founding year of the venture capital firm from the exit year of the respective transaction. Third, we use the logarithm of the total number of funds raised in the global venture capital industry in a given exit year (in US$ millions as reported in Thomson ONE Banker) as a proxy for VC market cycles. Previous studies have shown that boom periods are characterized by substantial capital inflows into the asset class (Gompers et al. 2008; Gompers and Lerner 2004).

3.2.3 *Control variables*

To capture differences in returns between trade sales in our multivariate analyses, we control for a number of other factors that previous studies have shown to influence the performance of venture capital investments.

As portfolio company-related control variables, we include industry affiliation[2] and geographic location, i.e., whether the portfolio company is located in North America or Europe. We utilize exit years to control for time fixed effects. On the level of the venture capitalist, we control for the impact of venture capital syndication. The literature suggests that syndication should lead to improved investment screening by securing a second opinion in the due diligence process (Casamatta and Haritchabalet 2007). Syndication is represented by the total number of venture capital firms that invest in the portfolio company throughout the entire investment period. Finally, as our trade sale groups are based on acquirer characteristics, we also control for the size of the trade buyer by including the log value of its assets. In the case that our original data source provides no information on acquirer size at exit date, we impute this variable to preserve these 172 observations for our multivariate analysis. Further, previous studies have shown that public bidders pay higher premiums for takeover targets (Betton et al. 2007). Therefore, we include a public buyer dummy variable adopting a value of one if the acquirer is a public company and zero if it is a private company.

4 Empirical results on venture capital return differences in trade sales

4.1 Descriptive statistics

Panel A of Table 2 reports deal-level investment performance for our sample of 716 trade sales. The median IRR of 19 % is comparable to median returns

[2] To build on a meaningful number of transactions per industry, we follow a similar approach as Gompers et al. (2008), merging the allocated 49 Fama/French industries into six broad industry sectors, namely software, technology, services, healthcare, telecommunications, and other.

Table 2 Deal-level investment performance

Dependent variable: IRR	Obs.	Mean (%)	25 %	Median (%)	75 %	Max (%)	SD
Panel A: All trade sales							
Trade sales	716	119.3	−12.5	19.0	66.0	14558.0	7.0248
Panel B: Trade sales by industry relatedness (according to Capron 1999)							
Lateral trade sales	279	100.6	−7.0	23.0	83.0	4012.0	3.8428
Synergetic trade sales	437	131.2	−14.0	17.0	60.0	14558.0	8.4543

	Lateral		Synergetic	
	Mean (%)	Median (%)	Mean (%)	Median (%)
Panel C: Trade sales by industry relatedness and financing stage, VC firm experience and VC market cycles				
C.1: Financing stage of portfolio company				
Later VC	84.2	23.0	164.0	20.5
Early VC	118.3	23.5	98.5	13.0
C.2: VC firm experience				
Less experienced	117.4	22.5	141.0	18.0
More experienced	82.6	26.0	122.2	15.5
C.3: VC market cycle				
Non-boom	33.5	18.0	51.5	8.0
Boom	178.6	34.0	218.2	30.0

This table displays deal-level investment performance (IRRs) for our sample of 716 venture capital–backed trade sales exited between 1982 and 2008 (Panel A). IRR is calculated from monthly cash flows between venture capital firms and the corresponding portfolio company, gross of fees and carried interest. It is the discount rate that equates the present value of these cash flows to zero (reported in percent). In panel B, we break the group of 716 strategic acquisitions down into lateral and synergetic trade sales on the basis of industry relatedness between portfolio company and acquirer (Capron 1999). Panel C exhibits performance differences of trade sales contingent on financing stage of the portfolio company (C.1), VC firm experience (C.2), and VC market cycles (C.3), respectively

of trade sales in the range of 15–26 % reported in previous studies (Bienz and Leite 2008; Cumming 2008; Gompers 1995).

Panel B reports aggregated returns for our two types of strategic trade sales. For the group of 279 lateral trade sales, we find a median return of 23.0 % IRR. This compares to a median IRR of 17.0 % for synergetic trade sales. Similar to previous studies, we find large differences between mean and median returns, highlighting the presence of a typical venture capital-like return distribution, including some strong investment performances in the sample.

Panel C shows that the differences among the groups of trade sales are indeed moderated by financing stage of the portfolio company, VC firm experience, and VC market cycles. Looking at median values, the financing stage (Panel C.1) seems to be particularly relevant in explaining returns to synergetic trade sales. In particular, horizontal trade sales in which the target company is in an early stage yield substantially lower returns. In terms of the moderating effect of VC firm experience (panel C.2), the descriptive results do not draw a coherent picture and (median) performance differences among less and more experience VC firms are relatively small. In contrast, the numbers in panel C.3 of Table 2 underlines that trade sale returns in boom times of the VC market are substantially higher than in non-boom or bust cycles.

4.2 Multivariate results

To test our hypotheses, we run multivariate cross-sectional regressions including all control variables. The resulting models related to performance differences between synergetic and lateral trade sales are presented in Table 3. Lateral trade sales generally show higher venture capital investment returns than

synergetic trade sales. However, statistical significance is only moderate for the main effect in model 1, providing some support for Hypothesis 1. In economic terms, model 1 indicates that, on average, synergetic deals yield a 21-percentage point lower IRR than lateral trade sales.

Models 2 and 3 in Table 3 show regression results for our subsamples of early and later stage venture capital-backed companies, respectively. The numbers show that there is a significant performance difference of about 42 IRR percentage points between lateral and synergetic trade sales for early stage but not later stage ventures. In addition, the F statistic for the three variables (synergetic trade sale dummy, early stage dummy, and their interaction) in model 4 is 2.4, which yields a p value of 0.07, showing that they are jointly significant. This supports Hypothesis 2 that higher returns for lateral trade sales are more pronounced for early stage ventures. With about 32 IRR percentage points, this moderating effect is also relevant practically.

Models 5 to 7 in Tables 3 provide evidence supporting our Hypotheses 3, stating that venture capitalist experience has a moderating effect on trade sale performance differences. While performance differences are both economically and statistically small if venture capital experience is high (Model 6 in Tables 3), the differences are substantial if venture capital experience is low (Model 5 in Tables 3). In addition, the synergetic trade sales × high venture capital experience interactions (10 % level, joint significant F statistic: 2.68, p value 0.05) are statistically significant and positive. We interpret this as strong support for our Hypothesis 3.

Turning to Hypothesis 4 (see Table 3, models 8 to 11), it is evident that the performance difference between lateral and synergetic trade sales is indeed more pronounced in boom periods of the market cycle. While the synergetic trade sales × boom period interactions are not statistically significant, the joint effect is weakly significant (F statistic: 2.27, p value 0.09). We interpret this as weak support for Hypothesis 4.

4.3 Endogeneity issues and robustness checks

One of the most important challenges in studying investment performance in conjunction with type of exit and their fundamental drivers is accounting for potential endogeneity issues (Hege et al. 2009). In our analysis, the critical question is whether the observed deal-level investment returns are caused by differences in the quality of the respective portfolio company rather than by the outlined value drivers of certain trade sales. Consequently, it could be argued that significant results such as the superior investment performance of lateral trade sales are in fact determined by unobservable characteristics that influence both the type of trade sale and the investment outcome. Similar considerations regarding endogeneity can be found in related studies (Brau et al. 2010; Cumming 2008).

In this regard, our study, as does most VC research, has to deal with data limitations regarding the quality of the included portfolio companies. Given the private nature as well as the young age of these companies, hardly any measurable data are available that could represent a reliable proxy for firm quality (Brau et al. 2010). However, it is above all the decision of the trade buyer as to how much to bid for a portfolio company up for sale. In this way, we argue that once a portfolio company qualifies for a successful exit route, specific indicators for firm quality are less relevant for return premia than are unique considerations of the acquirer.

To account, nevertheless, for potential differences in firm quality, we exploit several control variables, such as stage, venture capitalist age, and venture capital syndication in our regression model. Accounting for these factors should allow us to substantially reduce endogeneity problems with regard to fundamental firm quality considerations. Nevertheless, other factors might explain the relationship between exit type and investment outcome. For example, the size of the ownership might play a relevant role in the conflicts of interest between the VC firm and the target. For example, the incentive to accept a lower bid for a target might be higher if the VC firm owns a small share in the company only. We run unreported regressions for the 354 trade sale exits for which we know the VC firm ownership at exit, but our results remain unchanged. Related to the VC firm, it might also be argued that age is not an appropriate proxy for VC firm experience as experience is not gained over time per se. It is making investments that help VC firms learn. Therefore, we also run unreported regressions for the 419 trade sale exits for which we know the number of historic transactions. Given that VC firm age and the number of historic deals are highly

Table 3 Regression analysis—lateral versus synergetic trade sales

Specification Dependent variable IRR	(1) Main All	(2) Subsample Later VC	(3) Subsample Early VC	(4) Interaction Stage	(5) Subsample Less exp.	(6) Subsample More exp.	(7) Interaction Age	(8) Subsample Non-boom	(9) Subsample Boom	(10) Interaction Market cycle	(11) Interaction All
Lateral TS versus synergetic TS	−0.208*	−0.034	−0.420**	−0.055	−0.347**	−0.055	−0.482**	0.036	0.457**	1.359	1.610
	(0.107)	(0.124)	(0.164)	(0.124)	(0.171)	(0.142)	(0.205)	(0.102)	(0.177)	(1.128)	(1.082)
Early stage	0.094			0.288*	0.124	0.066	0.096	0.045	0.216	0.107	0.327*
	(0.109)			(0.167)	(0.223)	(0.092)	(0.108)	(0.146)	(0.183)	(0.110)	(0.167)
Early stage × Lateral TS versus synergetic TS				−0.317							−0.351*
				(0.202)							(0.200)
VC experience	−0.012	−0.012*	−0.015	−0.012			−0.026*	−0.007	−0.022*	−0.012	−0.028**
	(0.008)	(0.007)	(0.013)	(0.008)			(0.013)	(0.006)	(0.012)	(0.008)	(0.013)
VC experience × Lateral TS versus synergetic TS							0.023*				0.026**
							(0.013)				(0.013)
Boom market phase	0.248	−0.030	0.413**	0.265*	0.183	−1.003***	0.282*			0.313*	0.387**
	(0.154)	(0.312)	(0.184)	(0.150)	(0.198)	(0.347)	(0.165)			(0.160)	(0.177)
Boom market phase × Lateral TS versus synergetic TS										−0.150	−0.188
										(0.110)	(0.114)
Buyer size	0.118***	0.109***	0.110***	0.118***	0.134**	0.127***	0.119***	0.097***	0.125***	0.119***	0.119***
	(0.028)	(0.034)	(0.037)	(0.027)	(0.053)	(0.028)	(0.027)	(0.029)	(0.042)	(0.028)	(0.026)
Public buyer	0.432***	0.339**	0.565**	0.415***							
	(0.117)	(0.137)	(0.253)	(0.119)							
Europe	0.531**	0.417**	0.902**	0.524**	1.109***	−0.066	0.537**	0.487**	0.600**	0.528**	0.528**
	(0.214)	(0.170)	(0.437)	(0.214)	(0.350)	(0.151)	(0.214)	(0.208)	(0.266)	(0.212)	(0.213)
Syndication	−0.034***	−0.012	−0.057***	−0.035***	−0.012	−0.062***	−0.035***		−0.019	−0.034**	−0.036***
	(0.013)	(0.016)	(0.017)	(0.013)	(0.015)	(0.017)	(0.013)		(0.023)	(0.013)	(0.013)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	−2.362	0.054	−3.410*	−2.602*	−2.146	11.299***	−2.550	−0.022	0.471	−3.031*	−3.687**
	(1.572)	(3.349)	(1.898)	(1.528)	(1.889)	(3.748)	(1.659)	(0.279)	(0.417)	(1.630)	(1.747)
Observations	701	356	345	701	347	354	701	369	332	701	701
R^2	0.289	0.320	0.324	0.291	0.347	0.341	0.291	0.184	0.311	0.290	0.296

This table displays ordinary least squares regression results with heteroskedasticity-consistent standard errors clustered by venture capital firm on the determinants of investment performance using a sample of 716 venture capital–backed acquisition exits between 1982 and 2008. IRR is calculated from monthly cash flows between venture capital firms and the corresponding portfolio company, gross of fees, and carried interest. It is the discount rate that equates the present value of these cash flows to zero (reported in percent). We winsorize IRR at the 99th percentile. Time-fixed effects are based on the respective exit year. All variables are described in Supplementary Table 6. *, **, and *** indicate p values of 10, 5, and 1 %, respectively

positively correlated (about +0.6), it is not surprising that our results remain unchanged.

Another issue is the non-random decision to exit. Cumming and Walz (2010) find for their sample of early and late-stage ventures that unrealized returns, i.e., reported company values of enterprises that are not yet exited but still in the venture capitalist's portfolio, are lower than realized returns. To account for this potential effect, we follow their procedure and run a two-step, Heckman-like sample selection correction on realized and unrealized exits. In the first step, we model the probability of an exit (a realized transaction) as a function of the holding period and conditions in the venture capital exit market at the time of the reported company value. The longer a company is in the portfolio, i.e., the longer the holding period, the higher the likelihood of being exited (Cumming and Walz 2010). We define the holding period as the number of months from the beginning of an investment until its exit. Similarly, the probability of exiting a company in the portfolio should be higher if the exit market is favorable, i.e., there is a strong interest in acquiring venture capital-backed companies. As proxy we use the intensity of yearly VC-backed IPO and M&A activity for the transaction year as reported by NVCA. In the second step, we use the same specification as in the most comprehensive regressions (model 11 in Tables 3) to model differences in returns. In model 4 in Table 4, lambda coefficients are not statistically significant and economically small, indicating that in our sample, unrealized returns are not statistically different from realized trade sale returns. In addition, the coefficients and statistical significance levels of interest remain basically the same as in our ordinary least squares regressions. Therefore, we conclude that our results are robust to these effects.

Further, Phalippou (2010) shows that the implied reinvestment assumption of the IRR methodology may be a major pitfall with respect to venture capital investments. Therefore, we resort to cash multiples as an alternative performance measure commonly used in the venture capital industry (Harris et al. 2013; Phalippou 2011). We obtain deal-level cash multiples by dividing cash inflows to the venture capital firm by its outflows. Cash multiples circumvent the IRR pitfall by capturing investment performance without regard to the underlying timeframe. While statistical significance is reduced when performance is measured by cash multiples because of larger standard errors, economic relationships and significances remain largely unchanged (models 1 and 2 in Table 4).

Finally, previous literature offers alternative approaches to measuring industry relatedness. In order to test the robustness of our findings, we categorize the trade sales in our sample based on commodity flows, i.e., input–output relations among industries (Fan and Goyal 2006; Fan and Lang 2000; Shenoy 2012). Using tables and numbers provided by Fan and Lang (2000), for each pair of acquirer and target in our sample, we obtain a vertical relatedness coefficient. For example, this coefficient represents the dollar value of the acquirer's industry output that is required to produce on dollar's worth of the target industry's output, or vice versa. We assign the larger of the two possible values to each pair in our sample. While the horizontal transactions resulting from this procedure are identical to our initial categorization (those in which acquirer and target share the identical primary SIC code), lateral and vertical transactions are classified differently. Classifying all transactions that are not horizontals and that have a vertical relatedness coefficient higher than 1 % (or 0.01 dollars) as verticals (Fan and Goyal 2006) results in 248 vertical trade sales. The remaining 213 trade sales with differing primary SIC codes plus a vertical relatedness coefficient equal to or below 1 % are classified as lateral trade sales. (Given the combination of industries, we were unable to match eight transactions from the initial sample in the reference tables of Fan and Lang 2000.) Following this alternative methodology, 112 transactions that are vertical trade sales in our initial classification become laterals, and 172 vice versa. Again, unreported tests show the empirical patterns that we find to be robust against alternative ways of measuring industry relatedness.

5 Comparison of horizontal and vertical trade sales

A more fine-grained differentiation of synergetic trade sales into horizontal and vertical trade sales allows us to examine whether a venture capitalist can take advantage of certain types of synergies that a buyer can gain from the trade sale. In horizontal trade sales, the buyer is active in the same line of business as the portfolio company, whereas in vertical trade sales, the portfolio company operates in related business

Table 4 Robustness tests—lateral versus synergetic trade sales

Specification	(1)	(2)	(3)	(4)
Trade Sale (TS) dummy:	Lateral TS versus synergetic TS			
Regression type	OLS	OLS	Heckman	
Dependent variable	Cash multiple Main	Cash multiple Interaction	1st stage: Full exit Interaction	2nd stage: IRR
	All	All	All	
Trade sale (TS) dummy	−0.430**	3.864		−0.081
	(0.200)	(2.945)		(0.197)
Early stage	0.274	1.048***	0.162	0.403**
	(0.252)	(0.356)	(0.134)	(0.178)
Early stage × Trade sale dummy		−1.205***		−0.415*
		(0.385)		(0.227)
VC experience	−0.026	−0.054**	0.201	−0.398**
	(0.020)	(0.023)	(0.139)	(0.183)
VC experience × Trade sale dummy		0.044*		0.314
		(0.026)		(0.227)
Boom market phase	0.148	0.451		2.368***
	(0.629)	(0.668)		(0.403)
Boom market phase × Trade sale dummy		−0.406		−0.411
		(0.288)		(0.285)
Buyer size	0.359***	0.360***	0.975***	0.139***
	(0.081)	(0.078)	(0.082)	(0.032)
Public buyer	0.961***	0.888***		
	(0.283)	(0.281)		
Europe	0.559	0.540	12.865	0.455***
	(0.444)	(0.442)	(0.000)	(0.161)
Syndication	−0.106***	−0.112***	−0.028*	−0.036***
	(0.029)	(0.030)	(0.016)	(0.013)
Industry-fixed effects	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes
Log holding period			0.391***	
			(0.111)	
VC activity			−0.003***	
			(0.001)	
Lamda				0.049
				(0.140)
Constant	0.382	−2.707	−9.097***	−0.404
	(6.355)	(6.806)	(0.727)	(0.470)
Observations	701	701	1,947	1,947
R^2	0.236	0.242		

Models 1 and 2 of this table display ordinary least squares regression results with heteroskedasticity-consistent standard errors clustered by venture capital firm using the cash multiple as an alternative measure of venture capital firm returns. The cash multiple is obtained by dividing cash inflows to the venture capital firm by its outflows. Models 3 and 4 present results obtained from a Heckman-like two-step procedure. In a first stage, we model the decision to fully realize an investment (sell all the shares through a trade sale). In the second stage, we model performance measured by winsorized IRR, accounting for the selection effect. Time-fixed effects are based on the respective exit year. *, **, and *** indicate *p*-values of 10, 5, and 1 %, respectively

segments along the value chain of the trade buyer (Lubatkin 1987). We underwent similar analysis steps in our data to show differences between these types of synergetic trade sales. Our detailed empirical results can be accessed via the Electronic Supplementary Material (ESM) service.

Through foreclosure and collusion, synergetic trade sales might offer strategic value gains at the expense of other market players. For horizontal acquisitions, the combined entity is likely to have stronger buying power translating into lower input costs. However, empirical evidence rejects this collusion argument for horizontal acquisitions (Eckbo 1985; Eckbo and Wier 1985; Fee and Thomas 2004; Shahrur 2005). In vertical acquisitions, the foreclosure argument states that market power can be increased through denying other, nonintegrated firms access to critical inputs or outlets (Hastings and Gilbert 2005; Hortaçsu and Syverson 2007; Shenoy 2012). The foreclosure argument is likely to be equally relevant for horizontal and vertical trade sales.

Following the efficiency argument, horizontal acquisitions offer the potential of productive efficiencies through the realization of economies of scale and the elimination of overlapping facilities (Fee and Thomas 2004). By scaling up production, the horizontal trade buyer is able to achieve cost savings not only in terms of dispersion of fixed costs over higher volumes, but also through additional learning-curve effects. The combination of complementary resources potentially enables the trade buyer to develop innovations (Capron 1999). In the context of venture capital–financed businesses, which are typically innovative high-growth ventures, horizontal trade buyers can enhance their innovation capability within their field of business and gain access to new technologies (Behnke and Hültenschmidt 2007).

In contrast, in vertical acquisitions, productive efficiencies are less important, and contractual efficiencies are instead relevant. Vertical acquisitions can alleviate contractual inefficiencies as suppliers or customers are integrated into the organization, reducing the incentive to engage in holdup and increasing relationship-specific investments (Jain et al. 2011; Shenoy 2012). Contractual efficiency gains might be limited in transactions with venture capital-backed companies because they only seldom have an established market position, while operational efficiency gains through the access to an innovative business model should be particularly high in horizontal acquisitions. Overall, further analysis of our data shows that in line with this argumentation returns to venture capitalists are higher for horizontal trade sales than for vertical transactions. However, the results are statistically not significant so we cannot provide convincing evidence for this relationship.

For both horizontal and vertical trade buyers, venture capitalist experience signals a higher probability that the venture will be successful in the long term and that the expected strategic value gains can be realized. It is likely that the quality signal of an experienced venture capitalist is particularly relevant in the context of vertical trade sales, as this reduces uncertainty that the product or service offered by the venture will reach an established market position. Our data show that for deals involving experienced venture capitalists, the return differences between horizontal and vertical trade sales are lower than in other deals. Experienced venture capitalists seem to be able to use their involvement as a quality signal for the future success of the venture leading to comparable prices achieved in both horizontal and vertical trade sales.

Regarding the market environment, a positive market sentiment might increase the willingness of vertical trade buyers to forward or backward integrate. Particularly in turbulent industry environments, vertical integration is seen as a risky strategy as it increases the firm dependency on the industry. In times of optimistic market sentiment, vertical trade buyers are likely to perceive a lower risk of engaging in vertical integration (D'Aveni and Ilinitch 1992). This could lead to an increased willingness to pay for venture capital-backed companies by vertical trade buyers in upswing markets. Our data provide evidence for an economically strong moderating effect of venture capital market cycles on the performance differences between horizontal and vertical trade. In boom times, vertical trade sales yield even higher returns to venture capital firms than horizontal trade sales.

6 Discussion

6.1 General discussion

In this article, we find confirmatory evidence that venture capitalists achieve higher investment returns

from lateral trade sales compared to synergetic trade sales (Hypothesis 1). Provocatively, one could argue that venture capitalists harvest best from less informed buyers. The corporate development stage of the sold portfolio company seems to underpin this finding (Hypothesis 2). Hence, elevated results for early stage companies emphasize the relevance of information asymmetries on the level of the trade buyer for investment returns of the venture capitalist. In this way, we also link venture capital return analysis to general management investment considerations (Scharfstein and Stein 1990).

In line with the literature focusing on analysis of public exits, i.e., IPOs, we find further confirmatory evidence for the importance of experience in the venture capital industry (Barry et al. 1990; Gompers 1996; Megginson and Weiss 1991; Nanda and Yun 1997). If the venture capitalist is experienced, returns from synergetic trade sales are no longer lower than those from lateral trade sales (Hypothesis 3). We interpret this finding as pertaining to a skill obtained by venture capitalists over time and across transactions that allows them to leverage the expected strategic value gains of synergetic trade buyers. Underlying mechanisms could also include a superior ability to identify synergetic acquirers willing to pay a similar price for a given company as a lateral acquirer; such ability is gained through, e.g., better networks. Possibly, experienced venture capitalists also learn how to 'spin' a sales story and improve their bargaining position.

6.2 Implications for practice

Practical implications for venture capitalists can be drawn from our study. Due to the high heterogeneity in venture capital deal-level returns, it is important to understand specific drivers of investment performance. In times of limited access to public markets, trade sales become the dominant exit route and our findings inform venture capitalists on the return potential of different types of trade sales. Prior research has shown that venture capitalists often already plan for a specific exit route at the time of entry (Cumming and Johan 2008b). It is therefore important to understand differences in the return potential of trade sale exit channels. For exits of early stage ventures, our results suggest that they should aim to sell to a lateral trade buyer; this in turn has implications as to how to position the venture.

We believe that a better understanding of performance drivers in trade sales is imperative for venture capital as an asset class. The opportunity to complete IPOs evolves in cycles and is feasible for only a small fraction of venture capital-backed companies. In contrast, trade sales represent a broader and less volatile exit channel, yet the achieved returns are more volatile. Hence, for venture capitalists, it is relevant to know which potential trade buyer offers the most promising investment returns. Lateral trade sales offer greater return potential than synergetic trade sales, and within the latter, horizontal trade sales are likely to offer higher returns than vertical trade sales. Our findings suggest that this particularly holds outside of boom-market cycles, when differences are more pronounced.

6.3 Limitations and future research

While we complement existing research on venture capital exits, we see potential for future research efforts to gain additional insight on trade sales as a heterogeneous group of exit strategies. First, it would certainly be interesting to better understand the decision of the venture capitalist to pursue a particular trade sale: When do they identify potential trade buyers for their portfolio companies? How do they position a venture in order to make them attractive for a particular buyer? What are potential conflicts between the venture capitalist and the entrepreneur regarding the selection of a trade buyer and how can they be mitigated? Understanding the contextual factors that drive the decision on trade sales would assist us in improving our understanding of this increasingly relevant exit route for venture capitalists.

7 Conclusion

In conclusion, this study offers insights into the returns that venture capital firms achieve when selling portfolio companies to strategic acquirers, contingent on the industry relatedness of portfolio company and acquirer. Finding a lateral acquirer not yet active in the portfolio company's field of business yields higher returns than dealing with synergetic acquirers from similar industries and fields of business. Further, at the portfolio-company level, we find that strong information asymmetries, stemming from uncertainty about firm quality, in early stage portfolio companies

amplify the return differences between lateral and synergetic trade sales. At the venture capital firm level, our results suggest that experienced venture capital firms are able to achieve comparable results, irrespective of industry relatedness of the acquirer.

References

Barry, C., Muscarella, C., Peavy III, J, & Vetsuypens, M. (1990). The role of venture capital in the creation of public companies. *Journal of Financial Economics, 27*, 447–471.

Behnke, N., & Hültenschmidt, N. (2007). New path to profits in biotech: Taking the acquisition exit. *Journal of Commercial Biotechnology, 13*, 78–85.

Betton, S., Eckbo, B. E., & Thorburn, K. S. (2007). Corporate takeover. In B. Eckbo (Ed.), *Handbooks in finance: Empirical corporate finance*. Amsterdam: Elsevier/North-Holland.

Bienz, C., & Leite, T. (2008). The pecking order of venture capital exits. Working Paper. Bergen: Norwegian School of Economics and Business Administration.

Bottazzi, L., Da Rin, M., & Hellmann, T. (2008). Who are the active investors? Evidence from venture capital. *Journal of Financial Economics, 89*, 488–512.

Bradley, M., Desai, A., & Kim, E. H. (1988). Synergistic gains from corporate acquisitions and their division between the stockholders of target and acquiring firms. *Journal of Financial Economics, 21*, 3–40.

Brau, J. C., Sutton, N. K., & Hatch, N. W. (2010). Dual-track versus single-track sell-outs: An empirical analysis of competing harvest strategies. *Journal of Business Venturing, 25*, 389–402.

Capron, L. (1999). The long-term performance of horizontal acquisitions. *Strategic Management Journal, 20*, 987–1018.

Capron, L., & Shen, J. C. (2007). Acquisitions of private vs. public firms: Private information, target selection, and acquirer returns. *Strategic Management Journal, 28*, 891–911.

Casamatta, C., & Haritchabalet, C. (2007). Experience, screening and syndication in venture capital investments. *Journal of Financial Intermediation, 16*, 368–398.

Chatterjee, S. (1986). Types of synergy and economic value: The impact of acquisitions on merging and rival firms. *Strategic Management Journal, 7*, 119–139.

Cochrane, J. H. (2005). The risk and return of venture capital. *Journal of Financial Economics, 75*, 3–52.

Cumming, D. (2008). Contracts and exits in venture capital finance. *Review of Financial Studies, 21*, 1947–1982.

Cumming, D., & Johan, S. A. (2008a). Information asymmetries, agency costs and venture capital exit outcomes. *Venture Capital: An International Journal of Entrepreneurial Finance, 10*, 197–231.

Cumming, D., & Johan, S. A. (2008b). Preplanned exit strategies in venture capital. *European Economic Review, 52*, 1209–1241.

Cumming, D. J., & MacIntosh, J. G. (2003). A cross-country comparison of full and partial venture capital exits. *Journal of Banking & Finance, 27*, 511–548.

Cumming, D., & Walz, U. (2010). Private equity returns and disclosure around the world. *Journal of International Business Studies, 41*, 727–754.

Datta, D. K., Pinches, G. E., & Narayanan, V. (1992). Factors influencing wealth creation from mergers and acquisitions: A meta-analysis. *Strategic Management Journal, 13*, 67–84.

D'Aveni, R. A., & Ilinitch, A. Y. (1992). Complex patterns of vertical integration in the forest products industry: Systematic and bankruptcy risks. *Academy of Management Journal, 35*, 596–625.

Davila, A., Foster, G., & Gupta, M. (2003). Venture capital financing and the growth of startup firms. *Journal of Business Venturing, 18*, 689–708.

Davis, R., & Duhaime, I. M. (1992). Diversification, vertical integration, and industry analysis: new perspectives and measurement. *Strategic Management Journal, 13*, 511–524.

Eckbo, B. E. (1985). Mergers and the market concentration doctrine: Evidence from the capital market. *Journal of Business, 58*, 325–349.

Eckbo, B. E., & Wier, P. (1985). Antimerger policy under the Hart-Scott-Rodino Act: A reexamination of the market power hypothesis. *Journal of Law and Economics, 28*, 119–149.

Elango, B., Fried, V. H., & Hisrich, R. D. (1995). How venture capital firms differ. *Journal of Business Venturing, 10*, 157–179.

Fama, E. F., & French, K. R. (1997). Industry costs of equity. *Journal of Financial Economics, 43*, 153–193.

Fan, J. P. H., & Goyal, V. K. (2006). On the patterns and wealth effects of vertical merges. *Journal of Business, 79*, 877–902.

Fan, J. P. H., & Lang, L. H. P. (2000). The measurement of relatedness: An application to corporate diversification. *Journal of Business, 73*, 629–660.

Fee, C. E., & Thomas, S. (2004). Sources of gains in horizontal mergers: Evidence from customer, supplier, and rival firms. *Journal of Financial Economics, 74*, 423–460.

Giot, P., & Schwienbacher, A. (2007). IPOs, trade sales and liquidations: Modelling venture capital exits using survival analysis. *Journal of Banking & Finance, 31*, 679–702.

Gompers, P. A. (1995). Optimal investment, monitoring, and the staging of venture capital. *Journal of Finance, 50*, 1461–1489.

Gompers, P. A. (1996). Grandstanding in the venture capital industry. *Journal of Financial Economics, 42*, 133–156.

Gompers, P. A., Kovner, A., Lerner, J., & Scharfstein, D. (2008). Venture capital investment cycles: The impact of public markets. *Journal of Financial Economics, 87*, 1–23.

Gompers, P. A., & Lerner, J. (2004). *The venture capital cycle*. Cambridge: MIT Press.

Granstrand, O., & Sjölander, S. (1990). The acquisition of technology and small firms by large firms. *Journal of Economic Behavior & Organization, 13*, 367–386.

Gupta, A. K., & Sapienza, H. J. (1992). Determinants of venture capital firms' preference regarding the industry diversity and geographic scope of their investments. *Journal of Business Venturing, 7*, 347–362.

Harris, R., Jenkinson, T., Kaplan, S. (2013). Private equity performance: What do we know? Journal of Finance, forthcoming.

Hastings, J. S., & Gilbert, R. J. (2005). Market power, vertical integration and the wholesale price of gasoline. *Journal of Industrial Economics, 53*, 469–492.

Healy, P. M., Palepu, K. G., & Ruback, R. S. (1997). Which takeovers are profitable? Strategic or financial? *Sloan Management Review, 38*, 45–57.

Hege, U., Palomino, F., & Schwienbacher, A. (2009). Venture capital performance: The disparity between Europe and the United States. *Finance, 30*, 7–50.

Hellmann, T., & Puri, M. (2000). The interaction between product market and financing strategy: The role of venture capital. *Review of Financial Studies, 13*, 959–984.

Hellmann, T., & Puri, M. (2002). Venture capital and the professionalization of start-up firms: Empirical evidence. *Journal of Finance, 57*, 169–197.

Hochberg, Y. V., Ljungqvist, A., & Lu, Y. (2007). Whom you know matters: Venture capital networks and investment performance. *Journal of Finance, 62*, 251–301.

Hortaçsu, A., & Syverson, C. (2007). Cementing relationships: Vertical integration, foreclosure, productivity, and prices. *Journal of Political Economy, 115*, 250–301.

Hsu, D. H. (2004). What do entrepreneurs pay for venture capital affiliation? *Journal of Finance, 59*, 1805–1844.

Jain, B. A., Kini, O., & Shenoy, J. (2011). Vertical divestitures through equity carve-outs and spin-offs: A product markets perspective. *Journal of Financial Economics, 100*, 594–615.

Jeng, L., & Wells, P. (2000). The determinants of venture capital funding: Evidence across countries. *Journal of Corporate Finance, 6*, 241–289.

Kaplan, S., & Schoar, A. (2005). Private equity performance: Returns, persistence, and capital flows. *Journal of Finance, 60*, 1791–1823.

Lerner, J. (1995). Venture capitalists and the oversight of private firms. *Journal of Finance, 50*, 301–318.

Lerner, J. (2002). Boom and bust in the venture capital industry and the impact on innovation. *Economic Review, 87*, 25–39.

Lubatkin, M. (1987). Merger strategies and stockholder value. *Strategic Management Journal, 8*, 39–53.

MacMillan, I. C., Kulow, D. M., & Khoylian, R. (1989). Venture capitalists' involvement in their investments: Extent and performance. *Journal of Business Venturing, 4*, 27–47.

Martin, J. D., & Sayrak, A. (2003). Corporate diversification and shareholder value: A survey of recent literature. *Journal of Corporate Finance, 9*, 37–57.

Martynova, M., & Renneboog, L. (2008). A century of corporate takeovers: What have we learned and where do we stand? *Journal of Banking & Finance, 32*, 2148–2177.

Megginson, W., & Weiss, K. (1991). Venture capitalist certification in initial public offerings. *Journal of Finance, 46*, 879–903.

Merton, R. C. (1987). A simple model of capital market equilibrium with incomplete information. *Journal of Finance, 42*, 483–510.

Nanda, V., & Yun, Y. (1997). Reputation and financial intermediation: An empirical investigation of the impact of IPO mispricing on underwriter market value. *Journal of Financial Intermediation, 6*, 39–63.

NVCA. (2011). Yearbook 2011. New York.

Phalippou, L. (2010). Venture capital funds: Flow-performance relationship and performance persistence. *Journal of Banking & Finance, 34*, 568–577.

Phalippou, L. (2011). Why is the evidence on private equity performance so confusing? Working Paper. University of Oxford, Said Business School.

Phalippou, L., & Gottschalg, O. (2009). The performance of private equity funds. *Review of Financial Studies, 22*, 1747–1776.

Powell, W. W., Koput, K. W., Bowie, J. I., & Smith-Doerrs, L. (2002). The spatial clustering of science and capital: Accounting for biotech firm-venture capital relationships. *Regional Studies, 36*, 205–291.

Sapienza, H., & Gupta, A. (1994). Impact of agency risks and task uncertainty on venture capitalist-CEO interaction. *Academy of Management Journal, 37*, 1618–1632.

Scharfstein, D. S., & Stein, J. C. (1990). Herd behavior and investment. *American Economic Review, 80*, 465–479.

Shackman, J. D. (2007). Corporate diversification, vertical integration, and internal capital markets: A cross-country study. *Management International Review, 47*, 479–504.

Shahrur, H. (2005). Industry structure and horizontal takeovers: Analysis of wealth effects on rivals, suppliers, and corporate customers. *Journal of Financial Economics, 76*, 61–98.

Shenoy, J. (2012). An examination of the efficiency, foreclosure, and collusion rationales for vertical takeovers. *Management Science, 58*, 1482–1501.

Tyebjee, T., & Bruno, A. (1984). A model of venture capitalist investment activity. *Management Science, 30*, 1051–1066.

Vismara, S., Paleari, S., & Ritter, J. R. (2012). Europe's second markets for small companies. *European Financial Management, 18*, 352–388.

Wang, C. K., & Sim, V. Y. L. (2001). Exit strategies of venture capital-backed companies in Singapore. *Venture Capital: An International Journal of Entrepreneurial Finance, 3*, 337–358.

Zhu, P. C., & Jog, V. M. (2009). Information Asymmetry and Acquisition Premiums in Domestic and Cross Border M&As in Emerging Markets, Working Paper, University of the Pacific, Eberhardt School of Business.