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# Venture Capital Investment Strategy and Portfolio Failure Rate: A Longitudinal Study

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**Given the importance and prevalence of new venture failure, having a better understanding of the factors that affect its occurrence is a paramount research objective. In view of the increased focus on venture capital firms (VCFs) as important stakeholders for entrepreneurial ventures, in this study we examined the relationship between VCFs' investment strategies and their portfolio failure rates. We examined two aspects of a VCF's investment strategy: (1) the extent to which the VCF develops specialized expertise and (2) the extent to which the VCF undertakes investments in cooperation with other investors through syndication. We tested our hypotheses on longitudinal data of the realized strategies of 200 U.S.-based VCFs over a 12-year period. We found that a VCF's specialized development stage expertise had a negative effect on the proportion of defaults in the VCF's portfolio. We also found that the level of syndication positively—rather than negatively—affected the proportion of defaults. We discuss our findings from both theoretical and practical points of view.**

## Introduction

Starting a new venture is an activity that entails a high level of risk. As a consequence, the failure rates for new businesses are far from trivial, hovering around 40% in the first year and even up to 90% over 10 years (Timmons, 1990). While a better understanding of the factors that contribute to new venture failure represents a critical aspect of entrepreneurship studies, the entrepreneurship literature has spent disproportionately more attention on success stories and factors rather than on new business failures (Deakins, 1996). Failure is often viewed from a negative perspective even if it is considered an important characteristic of the entrepreneurial reality (McGrath, 1999). One likely difficulty in examining new venture failure stems from the lack of access to (financial) data on failed businesses. In addition, even if researchers can identify failed entrepreneurs, these entrepreneurs may be very resistant to discussing their experiences or may be unable to articulate the factors that contributed to the failure, particularly if a long period of time has passed since the failure took place (Bruno & Leidecker, 1987). Nevertheless, given the importance of new business failure in the economic reality, there is definitely a need to get

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a better understanding of factors that drive or—more interestingly—diminish entrepreneurial failure (McGrath, 1999; Zacharakis, Meyer, & De Castro, 1999).

Prior research has suggested that an important driver for new venture failure is the venture's "liability of newness" (Stinchcombe, 1965). More specifically, new firms are particularly likely to fail because they have not had the time to develop internal performance routines and working relationships. In addition, new ventures lack external legitimacy with potential investors, buyers, suppliers, employees, and other stakeholders (Stuart, Hoang, & Hybels, 1999). An important vehicle for new firms to overcome their liability of newness is the formation of cooperative relationships with other firms. These cooperative relationships may allow young firms to access critical resources and knowledge (Baum & Oliver, 1991). Further, relationships with others can also act as signals of increased legitimacy for emerging ventures (Stuart et al., 1999).

In regard to the possible stakeholders that may stimulate new venture performance, there has been research interest in the role and contribution of venture capital firms (VCFs) in enhancing new venture survival and success (e.g., Baum & Silverman, 2004; Dimov & Shepherd, 2005; Elango, Fried, Hisrich, & Polonchek, 1995; Hellman & Puri, 2002; Sapienza, Amason, & Manigart, 1994; Sapienza, Manigart, & Vermeir, 1996). However, while this research has pointed to the positive contribution of VCFs *as a group* in terms of preventing new venture failure, there has been much less focus on the differences *among* VCFs in doing so. We contend that because VCFs differ in the amount and nature of expertise they possess, some VCFs may be more able than others to prevent the failure of their portfolio companies (Dimov & Shepherd, 2005). Furthermore, such differences, in terms of expertise, are likely to be related to differences in the investment strategies pursued by VCFs.

The purpose of this study was to examine—through a longitudinal design—the effects of VCFs' investment strategies on the failure rates in their portfolios. Our unit of analysis is the portfolio of a VCF. We focus on two specific strategic choices that VCFs face—(1) developing specialized expertise and (2) investing together with syndicate partners—and we analyze the effect of these choices on the extent of failure within their portfolios. Our empirical data consists of the realized investments (i.e., investment strategies) of 200 independent VCFs over a 12-year period (1990–2001). We contribute to the literature on venture survival by adding a novel understanding of the differences among VCFs in enhancing such survival.

The article is organized as follows. In the next section, we present a theoretical framework for VCFs' contribution to new venture survival and develop specific hypotheses. In the following section we present our methodology and results. Finally, we discuss our findings from both a theoretical and practical perspective and offer some concluding comments.

## Theory and Hypotheses

A significant stream of research has emphasized the "coach" role that VCFs perform (Baum & Silverman, 2004). In particular, venture success is often attributed to the ability of VCFs to manage their portfolio companies through the staging of disbursements (Gompers, 1995), oversight, and board representation (Lerner, 1995), as well as involvement in recruiting key managers (Hellman & Puri, 2002). Several studies have examined in more detail the active role that VCs may play in the postinvestment phase. For instance, a distinction has been made between three categories of venture capitalists, i.e., the "inactive" investors, the "active advice givers," and the "hands-on" investors (Elango

et al., 1995), with the latter category attaching most importance to venture-assisting activities (e.g., seeking additional financing, recruiting management, helping with operational planning, or serving as the entrepreneur's confidant). Furthermore, others have suggested the following three key roles played by VCFs in their relationship with portfolio companies: (a) a strategic role as sounding boards for and generators of strategic initiatives, (b) an operational role as providers of key external contacts for locating managerial recruits, professional service providers, or key customers, and (c) a personal role as friends, mentors, and confidants (Sapienza et al., 1994; Sapienza et al., 1996).

While the effectiveness of postinvestment management may be partially attributed to the VCF's ability, there is also a strategic choice facing the VCF in terms of how much involvement to undertake in each of its portfolio companies (Elango et al., 1995). Because VCFs are driven by maximizing the returns of the funds they raise, their often crucial involvement may be lacking for ventures that do not provide prospects of high or adequate returns, turning them into "living dead" (Ruhnka, Feldman, & Dean, 1992). Prior research has indeed indicated that VCFs often attempt to devote as much time as possible to their "home runs," i.e., those deals that generate the majority of their returns (Sahlman, 1990; Sapienza et al., 1994). Gifford (1997) also pointed out that venture capitalists face serious time allocation dilemmas with regard to supporting portfolio companies, raising new funds, and locating and closing new investment deals. Therefore, a VCF may pick and choose where to allocate its time so as to optimize its own outcomes, possibly at the expense (or benefit) of a given portfolio company (Gifford, 1997). As a result, when VCFs make a conscious choice of reduced involvement in their portfolio companies (PFC), the consequences for venture survival may be gruesome.

To a large extent, the difficulties associated with effective postinvestment involvement stem from the uncertainty that VCFs face in selecting their investments. It is now well established in the literature that VCFs use different strategies to manage this uncertainty. In particular, they may specialize (Amit, Brander, & Zott, 1998; Gupta & Sapienza, 1992) or syndicate (Bygrave, 1987; Lerner, 1994) their investments as means of reducing deal-related uncertainty and agency risks as well as of enhancing the quality of their investment judgment or value added. In this study, we accordingly reason that the degree of postinvestment involvement, and thus its effectiveness, may be linked to the extent to which these two strategies are used by a focal VCF. Subsequently, we discuss the effects of these two strategies on the proportion of failures within the VCF's portfolio.

## **Specialized Expertise and Venture Failure**

An organization's capability to prevent failure is inherently related to learning from past failures (Levitt & March, 1988). Indeed, in the venture capital context, there is evidence that prior deal-related experience of the VCFs' top management teams contributes to higher survival among their portfolio companies (Dimov & Shepherd, 2005). In addition, learning outcomes increase when a firm assimilates new knowledge that is related to its existing knowledge structure (Bower & Hilgard, 1981; Cohen & Levinthal, 1990). This suggests that failure-related learning may be more effective for VCFs that develop specialized expertise in regard to their portfolio investments.

Prior researchers have pointed out that a VCF may leverage its knowledge and experience across multiple PFCs by investing in specific types of ventures (De Clercq, Goulet, Kumpulainen, & Mäkelä, 2001; Gupta & Sapienza, 1992; Norton and Tenenbaum, 1993). A VCF's specialization strategy may be represented by the development of expertise in areas such as a particular venture development stage or a particular industry (Gupta & Sapienza, 1992; Norton & Tenenbaum, 1993). These two areas constitute

dimensions along which the VCF, through its strategic decisions, develops its portfolio over time.

There are several ways in which a VCF's specialized expertise may reduce the failure rate of its portfolio investments. First, specialized expertise facilitates the control that the VCF exercises over the management of the new venture (Gupta & Sapienza, 1992). In turn, such control allows, for instance, for an easier detection of deteriorating venture performance and thus, a more timely undertaking of corrective measures. Second, specialized expertise allows for a better understanding of the complexities that are associated with particular development stages or industries, and these insights can then be used to manage similar investments more effectively (De Clercq et al., 2001). Indeed, as the organizational learning literature indicates, failure may be reduced through the development of learning curve effects (Argote, 1996). More specifically to the context of our study, VCFs that continuously invest in particular types of ventures can maximally benefit from such learning curve effects through the accumulation of superior knowledge over time and can therefore reduce the likelihood of venture failure (Gupta & Sapienza, 1992; Hall & Hofer, 1993; Norton & Tenenbaum, 1993). New venture failure is less likely to occur, for instance, when VCFs better understand the critical success factors related to particular development stages of their portfolio companies or the competitive dynamics of particular industries. In short, the development of particular expertise through an investment specialization strategy enhances the learning capability of a given VCF (i.e., the "focal VCF"<sup>1</sup>), and thus decreases the proportion of failures in its portfolio.

**Hypothesis 1:** The focal VCF's specialized expertise is negatively related to the failure rate of its portfolio.

## Investment Syndication and Venture Failure

The second aspect of the VCF's investment strategy on which we focus pertains to the extent to which it engages in syndication partnerships. Prior research has shown that venture capitalists often "coinvest" with others when allocating capital to new ventures (e.g., Brander, Amit, & Antweiler, 2002; Bygrave, 1987, 1988; Lerner, 1994; Lockett & Wright, 2001). Investment syndication pertains to the simultaneous investment by at least two VCFs in the same venture within the same investment round (Bygrave, 1987; Lerner, 1994; Wright & Lockett, 2003). Subsequently, we argue that there may be equally compelling arguments for a negative as well as for a positive effect of syndication on venture failure.

The arguments for a negative effect of syndication on venture failure stem from the (potentially) more effective knowledge input that several (rather than only one) VCFs can provide to their portfolio companies, thereby enhancing these companies' survival chances. That is, the greater the number of partners in the syndicate, the greater the diversity of available expertise and thus, the higher the likelihood that a particular critical piece of information or advice can be promptly accessed. For instance, since different syndicate members may contribute different sets of capabilities that are potentially useful to a particular venture (e.g., particular management or operational expertise, or access to potential customers, top managers, and other investors), more syndication increases the

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1. Throughout the article, we use the label "focal investor" or "focal VCF" when confusion can arise between the VCFs under study (i.e., the VCFs included in our hypotheses and sample) and their syndicate partners (i.e., coinvestors).

value added to the venture (Brander et al., 2002) as well as improves venture selection (Lerner, 1994).

Therefore, the wider knowledge base that the syndicate provides allows for the knowledge effects discussed in hypothesis 1 to be enhanced even further. Also, with more than one VCF involved, there is a higher likelihood of more overall investor involvement with the venture. Such involvement, in turn, may further enhance venture survival. Prior research on venture capital financing has indeed found that ventures' rating of VCFs' knowledge input is positively related to the amount of involvement by the investors in the portfolio company (Sapienza, 1992). Finally, for a venture that is managed by a syndicate, there may be a higher chance that deteriorating performance (if it occurs) is detected and that solutions are found to correct such deterioration. Accordingly, we put forth the following hypothesis:

**Hypothesis 2a:** The extent to which a focal VCF syndicates its investments is negatively related to the failure rate of its portfolio.

Contrary to the above survival-enhancing effect of syndication, we suggest that there may also be a failure-enhancing effect of syndication. Rather than focusing on the potential benefits of diversity in expertise and information that the syndicate brings, this second argument highlights the interpartner dynamics inherent to the investment syndicate. We focus on two particular processes, escalation of commitment and social loafing, that may create traction within the syndicate.

Prior research has argued that VCFs may withdraw support from ventures that turn out not to hold promise for a high return, thereby rendering them into a "living dead" status (Ruhnka et al., 1992). However, for portfolio companies that face failure, survival can be enhanced if the VCF maintains its commitment to the company, despite the negative performance signals. The notion of escalation of commitment pertains to a VCF's continued involvement with a portfolio company despite the latter's deteriorating performance (Birmingham, Busenitz, & Arthurs, 2003). With such escalated commitment, the continued hope by the VCF for an ultimately positive outcome for its investment may protract the declaration of bankruptcy and thus, the registration of default. Such hope is driven by self-justification, i.e., the need to prove to others that one is competent and rational (Staw, 1980). A main precondition for this self-justification motive is the perception of personal responsibility for the negative performance (Staw, 1976). However, research has shown that there is less perceived personal responsibility in group decision making compared with individual decision making (e.g., Mynatt & Sherman, 1975). This suggests that, for a given VCF, perceived responsibility for the portfolio company's failure is highest when the VCF is the sole investor in the PFC. Therefore, when the focal VCF is part of an investment syndicate, escalation of commitment may be lower, and ventures facing failure may be pushed into bankruptcy proceedings because the VCF (and its coinvestors) will hope to salvage some value. There is indeed evidence that the greater the number of VCFs involved in the first-round funding of a venture, the lower the likelihood of escalation of commitment in later rounds (Birmingham et al., 2003).

A related argument for the positive—rather than negative—effect of syndication on venture failure can be drawn from the literature on collective action and social loafing (e.g., Earley, 1989; Olson, 1965; Wagner, 1995). The phenomenon of social loafing pertains to the reduced efforts of actors who act as part of a group rather than alone (Harkins & Petty, 1982). For instance, prior studies have shown that individuals who believed they performed a task in conjunction with others, although they were actually performing alone, engaged in less efforts compared with individuals who believed they acted alone (e.g., Latane, Williams, & Harkins, 1979). In the context of our study, we

reason that for any given portfolio company, the focal VCF trades off its own effort with the potential effort undertaken by its coinvestors. There is thus a significant agency cost involved in coordinating decisions and portfolio company involvement among the syndicate members (Wright & Lockett, 2003). Given the serious time allocation dilemmas that venture capitalists face with regard to supporting portfolio companies, raising new funds, and locating and closing new investment deals (Gifford, 1997), we reason then that the effort reduction is highest when a focal VCF deals with a portfolio company facing potential failure. That is, the focal VCF is less likely to be highly involved with a venture that is in trouble when the VCF is part of an investment syndicate. As a result, all else being equal, syndication may lead to relatively more defaults in the VCF's portfolio.

**Hypothesis 2b:** The extent to which a focal VCF syndicates its investments is positively related to the failure rate of its portfolio.

## Methodology

### Data Collection

In order to make an assessment of the failure rate of VCFs' investments over time, we selected VCFs that had already made a substantial number of investments. Our initial population consisted of all independent U.S.-based VCFs that had invested in at least 20 portfolio companies, as reported in the VentureXpert database published by Thomson Financial. From the resulting 547 VCFs, we randomly selected 200 "focal VCFs." For each of these 200 VCFs, we collected data on their "first-time rounds" (i.e., the rounds at which the VCFs invested in their portfolio companies for the first time) over the period 1990–2001. A total of 10,057 investment rounds were so identified. These rounds provide an image of the realization of the focal VCFs' investment strategies as they contain all the points at which portfolio companies joined the VCFs' investment portfolios. On average over the period 1990–2001, a VCF in our data set made seven first-time investments per year (with a standard deviation of 8.2) for the years in which it has been active (i.e., has made at least one investment).

For each of the first-time rounds, we collected the following information: the founding date, stage of development, and industry of the portfolio company; the number of coinvestors in the round, the date of the round, and the number of the investment round (reflecting how many previous infusions of venture capital the portfolio company had received); and the focal VCF's age. These data were then grouped according to the year in which the first-time rounds took place, i.e., 12 groups in total (1990–2001). For each of the 200 VCFs and each of the 12 years, we calculated the following *average* values for all the first-time investments that the VCF had undertaken in that particular year: number of coinvestors, PFC development stage, PFC age, and round number. In addition, we recorded the public status of each portfolio company at the time of the data collection.

### Measures

**Dependent Variable.** We measured the *failure rate of the focal VCF's portfolio* by the proportion of defaults among companies that have been added to the VCF portfolio in a given year. Thus, e.g., the failure rate for a given VCF for 1995 pertains to the proportion of defaults occurring among the portfolio companies in which the VCF had invested for the first time in 1995. We calculated the failure rate for each VCF and for each year of

observation. Since the investment strategy parameters for the VCF were also calculated for each of the years in the 1990–2001 time period, the default measure was thus directly related to the particular strategic input for each year. In calculating the proportion of defaults, we first obtained information from the VentureXpert database on the status of each portfolio company as of the time of the data collection. We regarded a company as defaulted if its status was listed as “defunct.” In the VentureXpert database, a company is classified as “defunct” if it has filed for bankruptcy or has simply ceased trading. We then counted the number of defaulted companies for each VCF and for each year, and divided this count by the total number of first-time investments that the VCF had made in the particular year.

**Independent Variables.** The focal VCF’s specialized expertise was assessed on two dimensions, i.e., development stage and industry. We measured the focal VCFs’ *specialized industry knowledge* by calculating the relative industry specialization of its first-time investments made in a particular year. To do this, we assigned the PFCs industries to one of nine potential categories based on Venture Economics’ classification system for industries: (1) communications, (2) computer related, (3) electronics, (4) biotechnology, (5) medical/pharmaceutical, (6) energy, (7) consumer related, (8) industrial/chemical, and (9) other manufacturing and services. Similarly, in measuring *specialized stage knowledge*, we assigned the PFCs development stages to one of six categories used by Venture Economics to represent a continuum of such stages, i.e., (1) seed stage, (2) startup stage, (3) other early stage, (4) expansion stage, (5) later/acquisition stage, and (6) other. We then assessed the extent to which the VCFs’ investments were concentrated in particular industries and stages by calculating a Herfindahl–Hirschman index (HHI) across the above industry and stage categories. By calculating an HHI measure on the distribution of the VCFs’ investments across industries and stages, we estimated the degree to which the VCFs’ knowledge was concentrated (i.e., specialized) across different industry or stage categories. We calculated the Herfindahl index with the following formula:

$$\text{HHI} = \sum p_i^2$$

where  $p_i$  represents the proportion of investments made in a particular industry (or stage) category in a given year.

Further, we measured the *degree of syndication* as the average number of coinvestors for the first-time investments made by a focal VCF in a given year. We preferred this approach to simply calculating the proportion of syndicated deals in a given year since the vast majority of first-time deals were indeed syndicated, thereby creating little variation in terms of whether syndication was used. Thus, the bulk of the variance in syndication behavior could be captured by the degree rather than by the existence of syndication.

**Control Variables.** We also included several control variables. First, to account for the possibility that less established PFCs were more likely to fail, we controlled for the (average) development stage and age of the PFCs, as well as the (average) number of the round at which the PFCs joined the focal VCF’s portfolio. We used the six stage categories previously described, assigned to them values from 1 to 6 to reflect their increasing degree of development, and then calculated an average stage value for each VCF and each year. Similarly, we calculated the average PFC age and average round number of the first-time investment for each VCF and each year. These PFC characteristics also served as indicators of deal quality, thereby ensuring that the results could not be explained by the VCFs’ keeping good deals to themselves and syndicating only

excessively risky deals. Second, to tease out the effect of VCFs' overall, cumulative investment experience, we controlled for the age of the VCF. Third, in order to account for the fact that PFCs in some industries (e.g., computer related) were more likely to default, we controlled for the industries in which a VCF had invested in a given year. We used the nine industry categories previously outlined and calculated the proportion of first-time investments made in a given category in a given year. Finally, we controlled for the investment year in order to account for the possibilities (1) that investments made in a particular year may have faced more turbulent conditions (e.g., the frenzy of entrepreneurial and venture capital activity that occurred over the 1998–2000 period), and (2) that the investments made in more recent years (e.g., 2000, 2001) may have not had “enough” time to fail.

## Analysis

Since our data structure represented repeated observations of the same units (200 VCFs) over a 12-year time period, we used panel data estimation techniques to test our hypotheses. An important advantage of panel data, compared with regular time series or cross-sectional data sets, is that it allows for the identification of certain parameters or questions that cannot be assessed with more traditional techniques. For instance, panel data are not only suitable to model or to explain why individual firms behave differently, but also to model why a given firm behaves differently at different time periods (e.g., because of different decisions made in the past) (Verbeek, 2000). In theory, our model included 2,400 (i.e.,  $200 \times 12$ ) firm-year combinations. However, the panel was unbalanced as not all VC firms were active in all years—some of them had ceased to invest by the time of our observation period (1990–2001), while others had been founded during the observation period and had thus made investments in only some of the years. There were a total of 1,038 firm-year combinations for which there were no investments made. This, together with other missing information on some of the independent variables, reduced the usable observations to 1,008.

In running the estimation, we needed to determine whether a fixed or a random effect model would be more appropriate. Theoretically, this determination was driven by our expectation of whether the unobserved firm-specific effects were fixed or random, and whether they were correlated with our set of predictors. Statistically, a comparison of the two types of estimation is possible, with any systematic differences between the two suggesting that a fixed effects model is more appropriate. For this purpose, we ran a Hausman specification test, which entailed a comparison between the fixed and random effects estimation. The test revealed no systematic differences in the coefficients in the two estimations ( $\chi^2 = 16$ ; 25 degrees of freedom;  $p > .91$ ). We therefore used a random effects estimation of the following form:

$$Y_{i,t} = \alpha + \beta X_{i,t} + C_{i,t} + T_t + e_{i,t}$$

where  $Y_{i,t}$  denotes the proportion of defaults among the first-time investments made by firm  $i$  in year  $t$ ,  $X_{i,t}$  represents a vector of the investment strategy variables for firm  $i$  in year  $t$  hypothesized as influencing the proportion of defaults,  $C_{i,t}$  represents a vector of control variables for firm  $i$  in year  $t$ , and  $T_t$  represents a fixed effect for year  $t$ . Under this specification, all firm-specific effects are contained in the error term,  $e_{i,t}$ .<sup>2</sup>

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2. In order to check for heteroscedasticity in the data due to the nonnormal distribution of the dependent variable, we inspected the plot of residuals versus predicted values from the estimation. The plot suggested that the constant variance assumption needed for efficient estimation was not violated in our data.

## Results

The descriptive statistics and correlations among the variables in the model are shown in Table 1. Table 2 shows the regression results: model 1 (the base) contains only the control variables, while models 2 and 3 add the hypothesized effects of specialized expertise and syndication. Given the high correlation (.66) between the industry and stage specialization variables, we entered these variables separately: industry specialization in model 2 and stage specialization in model 3. The base model is significant (Wald  $\chi^2 = 79.13$ ;  $p < .001$ ). After adding the predictor variables, there is significant improvement in both model 2 (Wald  $\chi^2 = 88.951$ ;  $p < .001$ ) and model 3 (Wald  $\chi^2 = 92.72$ ;  $p < .001$ ). Hypothesis 1 predicted a negative effect for specialized industry and stage expertise on the failure rate of the portfolio. The coefficient for stage specialization in model 3 was negative and significant ( $B = -.026$ ;  $p < .05$ ), providing support for hypothesis 1. In model 2, the effect of industry specialization on portfolio failure was negative and not significant ( $\beta = -.016$ ;  $p < .12$ ), although it displayed a strong trend in the predicted direction.

Further, hypotheses 2a–2b provided competing explanations for the effect of syndication on portfolio failure. The coefficient for syndication was positive and significant in both models 2 and 3 ( $\beta = .004$ ;  $p < .01$ ) providing support for hypothesis 2b. Specifically, the more a VCF syndicates its first-time investments, the higher the proportion of defaults among these investments.

## Discussion

New firms are vulnerable to failure given their lack of legitimacy in the business community and their lack of knowledge and resources (Stinchcombe, 1965; Stuart et al., 1999). Since new venture failure is an important aspect of economic reality, it is important to have a better understanding of the factors that affect the likelihood of such failure. In this study, we examined the likelihood of new venture failure from the perspective of one important stakeholder for entrepreneurial ventures, VCFs. More specifically, we hypothesized that VCFs' portfolio failure rate depends to some extent on the investment strategy pursued by the VCFs. We examined two aspects of such strategy—the extent to which the VCF develops specialized expertise and the extent to which the VCF syndicates its investments. We found that the focal VCF's specialized stage expertise had a negative effect on the failure rate of its portfolio. We also found that the degree of syndication of the focal VCFs' first-time investment positively—rather than negatively—affected portfolio failure. Overall, our findings outline two main conceptual contributions. First, we demonstrated the importance of knowledge creation and utilization by VCFs for decreasing venture failure. Second, we illustrate the potentially detrimental effect of investment syndicates on venture survival resulting from reduced commitment and free riding on others' (i.e., coinvestors') efforts.

In addition, our study makes some methodological contributions to the literature on venture capital investing. First, we examined the effects of *realized* rather than *intended* VC investment strategies on the nature of investment outcomes. That is, our approach is different from previous research that assessed individuals' *perceptions* in terms of the nature of VC investments (e.g., Gupta & Sapienza, 1992) or of the involvement in investment syndication (e.g., Lockett & Wright, 2001; Manigart, Lockett, Meuleman, Landström, & Desbrières, 2002). Second, prior research on VCFs' investment strategies has devoted most attention to how differences *between* VCFs rather than changes *within*

Table 1

Descriptive Statistics and Correlations<sup>†</sup>

	Mean	SD	N	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	
1	.03	.11	1,362																
2	.58	.28	1,362	-.00															
3	.57	.28	1,362	-.04	.66														
4	3.81	2.11	1,362	.12	-.02	-.03													
5	3.39	.91	1,339	-.05	.03	.22	.01												
6	1.82	1.58	1,016	.01	.04	-.02	.17	.11											
7	2.18	1.39	1,362	.08	.02	.05	.48	.20	.25										
8	12.62	9.68	1,905	.05	-.17	-.10	.01	-.02	.00	-.00									
9	.18	.24	1,362	.04	-.09	-.09	.21	-.07	.02	.03	-.00								
10	.39	.34	1,362	.06	.17	-.06	.08	-.14	.11	.05	-.04	-.26							
11	.05	.14	1,362	.01	-.10	-.01	.03	-.13	-.05	.03	.04	-.05	-.16						
12	.06	.16	1,362	.01	-.06	-.07	.12	-.03	-.02	.13	-.02	-.15	-.22	-.06					
13	.11	.22	1,362	-.03	-.01	.04	-.01	-.11	.04	.03	.02	-.21	-.30	-.09	.04				
14	.07	.18	1,362	-.02	-.01	.04	-.03	.01	.02	-.00	.00	-.06	-.10	-.03	-.04	-.04			
15	.03	.11	1,362	-.08	-.02	.09	-.16	.21	-.11	-.07	.01	-.17	-.26	-.09	-.10	-.11	.01		
16	.10	.22	1,362	-.03	-.08	.02	-.09	.12	-.07	-.07	.02	-.11	-.19	-.02	-.06	-.07	-.00	.05	
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<sup>†</sup> All correlations with an absolute value above .06 are significant at  $p < .05$ . SD, standard deviation; PFC, portfolio company; VCF, venture capital firm.

Table 2

### Regression Results for Portfolio Failure Rate

	Model 1	Model 2	Model 3
Industry specialization		-.016	
Stage specialization			-.026**
Syndication		.004**	.004***
Average PFC stage	-.001	-.001	.001
Average PFC age	-.002	-.002	-.002
Average round	.006**	.002	.002
VCF age	.000	.000	.000
Communications	.007	-.002	-.002
Computer related	.017	.014	.011
Electronics	-.014	-.024	-.018
Biotechnology	-.005	-.016	-.019
Medical/Pharmaceutical	.014	.008	.011
Energy	-.039	-.042	-.036
Consumer related	-.025	-.028	-.027
Industrial/Chemical	-.018	-.025	-.022
Year 1991	-.027	-.023	-.023
Year 1992	-.021	-.019	-.020
Year 1993	-.020	-.016	-.016
Year 1994	-.028	-.023	-.022
Year 1995	-.003	.001	.000
Year 1996	-.007	-.004	-.004
Year 1997	-.001	.002	.002
Year 1998	-.014	-.013	-.013
Year 1999	.033**	.032**	.031**
Year 2000	.003	.001	.000
Year 2001	-.024	-.024	-.024
Constant	.023	.026	.026
Wald $\chi^2$	79.13****	88.95****	92.72****
df	23	25	25
R <sup>2</sup> within	.074	.080	.081
R <sup>2</sup> between	.062	.093	.109
R <sup>2</sup> overall	.074	.083	.086
N	1,008	1,008	1,008

\*\*  $p < .05$ ; \*\*\*  $p < .01$ ; \*\*\*\*  $p < .001$   
df, degree of freedom.

VCFs over time affect investment outcomes. In this study, however, we examined how incremental investment decisions affect the failure rate of new ventures over time. Our outcome measure reflected the proportion of defaults within a specific yearly lot of investments. It is thus a reflection of the relative effectiveness of the VCF's strategic investment decisions (in terms of expertise development and syndication) that were made in the past. Finally, while the literature on the role of VCFs in enhancing portfolio company survival has mostly examined the effects of the VC industry as a whole, typically comparing VC-backed with non-VC-backed firms (Baum & Silverman, 2004), we focused on identifying differences within VCFs and across time, thereby adding to a small body of literature that examines differences across VCFs (e.g., Dimov & Shepherd, 2005).

In the remaining paragraphs, we give a more detailed discussion of our findings, and we also devote attention to the implications, limitations, and avenues for future research.

## Effect of Specialized Expertise

Our findings show that the likelihood of new venture failure is reduced when the venture is supported by a VCF that brings knowledge relevant to the specific situation of the venture. This specialized expertise diminishes the uncertainty that surrounds venture capital investments and allows the VCF to add substantial value to its portfolio companies (Gupta & Sapienza, 1992; Norton & Tenenbaum, 1993; Sapienza, 1992). However, when there is limited compatibility between the VCF's investment expertise and the specific context of a portfolio company, the VCF may fail to detect the venture's needs or potential challenges, or may simply apply its own expertise to the company's detriment. Furthermore, our results also indicate that specialized expertise may not only allow for more effective assistance from the VCF's point of view, but may also allow for a higher receptivity by the venture to the VCF's input (Busenitz, Moesel, Fiet, & Barney, 1997). That is, when the venture is exposed to relevant advice from the VCF, the acquisition of this new information is enhanced because the venture can more readily recognize and use its value (Cohen & Levinthal, 1990). Prior research has indeed suggested that overlap in terms of the specific backgrounds between two partners reduces failure because familiarity with the assumptions underlying external information facilitates the absorption of new knowledge (Lane & Lubatkin, 1998). As a result, new ventures that share characteristics with the VCF's prior investments are more likely to benefit from the VCF's advice, and therefore are less likely to fail.

In short, we empirically showed that VCFs' strategy of developing expertise in particular areas may be an effective tool for averting venture failure. Although we did not find a significant effect for industry specialization, we argue that, given its high correlation with stage specialization (.66) and the strong trend of the effect of industry specialization in the predicted direction, stage and industry specialization may go hand in hand. This is related to the possibility that companies in different industries may consider VC financing at different stages of development. Thus, if a VCF prefers a particular industry, it is likely that its deal flow includes more companies of a particular stage. This suggests that VCFs need to consider aspects related to both development stage and industry when developing expertise aimed at future investments.

## Effect of Syndication

A particularly interesting outcome of this study pertains to the positive effect of syndication on the proportion of defaults in the VCF's portfolio. That is, we examined the effect of a focal VCF's syndication of its first-time investments on the relative number of failures in its portfolio, and we found that syndication led to an increased likelihood of failure. This finding is contradictory to the generally held belief about the beneficial effects of syndication. For instance, it has been argued that the success of VC investments may increase when the VCF is able to exchange information with *other* coinvestors before an actual investment decision is made; i.e., syndication may help the investor find better investment targets than it would find on its own (Lerner, 1994). Furthermore, Brander et al. (2002) argued that syndication decreases the likelihood of failure because syndicate partners can bring complementary knowledge to the table.

However, our findings run counter to the notion that syndication is an important strategy for knowledge sharing and uncertainty reduction (Brander et al., 2002; Bygrave, 1987; Lerner, 1994), as applied to the context of averting failure. One explanation of this finding is that once a venture loses its promise of high (or even adequate) returns, it may be shut off from the expertise of the investment syndicate. Thus, it is rendered a "living dead" status (Ruhnka et al., 1992). When such companies face failure, their "living dead"

status precludes obtaining timely help and thus accelerates the risk of default. In particular, we believe that when *multiple* VCFs are involved in financing the company, a continued commitment by any of them may be diminished (Birmingham et al., 2003), thereby precluding additional involvement through value-added input or subsequent investments. This lower commitment may result from the VCFs' feeling of lower responsibility *vis-à-vis* a prior investment decision when this responsibility is shared with other investors (Staw, 1976). Ultimately, the VCFs may then opt for default as a more speedy option for retrieving at least some value from the company.

A related explanation for the positive effect of syndication on failure pertains to the group dynamics that take place within investment syndicates. More specifically, when confronted with ventures that are poorly performing, the focal VCF may be more likely to free ride on the coinvestors' activities, i.e., to trade off its own effort with the potential effort undertaken by the others (Olson, 1965; Wagner, 1995). This behavior needs to be seen in the light of the limited time that venture capitalists have at their disposal (Gifford, 1997). Gifford explained that venture capitalists face a serious time allocation dilemma with regard to devoting attention to their portfolio companies, to raising new funds, and to locating and closing new investment deals. She argued that VCFs economize on allocating their effort across these activities in ways that are optimal for the VCF itself, but not necessarily optimal for the portfolio companies. Given that VCFs may devote as much time as possible to those deals that generate the majority of their returns (Sahlman, 1990; Sapienza et al., 1994), each of the VCFs in an investment syndicate may become more inclined to count on their coinvestors when faced with a portfolio company that is not meeting preset performance standards. As a result, the financial backers of such a company will reduce or even stop their effort *vis-à-vis* the company, and the likelihood of default will increase.

## Implications

From a practical point of view, our results suggest that VCFs' investment strategies matter in terms of the outcomes of their investments. For instance, new ventures will be less likely to fail when the VCFs hold expertise that is particularly relevant to the context of their investments. The nature of the expertise that the VCF has developed over time, e.g., in terms of development stage, may be crucial to better understand the pitfalls associated with effectively managing entrepreneurial ventures. Therefore, VCFs should be selective by investing in portfolio companies to which they can provide relevant operating experience or good stage- or industry-specific input. Furthermore, from a learning perspective, VCFs may be better off in the long run when developing mechanisms that allow for effective knowledge accumulation that can be applied to future investments. This assimilation of skills allows the VCF to better understand the needs of its current and future portfolio companies.

Our results for the effect of specialized expertise also have implications for entrepreneurs looking for finance. That is, the choice of a venture capital investor may go beyond financial considerations, and CEOs need to be selective when choosing their potential investors. That is, new ventures ought to have a clear understanding about which specific competencies they are looking for within potential investment firms. These insights may be, in particular, important if help is expected in specific areas of expertise.

Our results for the role of syndication also have practical implications. While syndication may lead to positive investment outcomes because it gives a venture access to a broader range of relevant knowledge, our results indicate that syndication may also accelerate the risk of investment default. This suggests that entrepreneurs should be on the

alert once negative performance signals start appearing. While a VCF may be motivated to build its ventures to become spectacular successes, it may be more reluctant to prevent looming failure, especially when other coinvestors are involved in the deal. More specifically, VCFs may reason that, given the excessive demands on their time, they can count on efforts of their coinvestors to turn around the performance of disappointing deals, and therefore can turn their attention to their success deals or to other tasks such as raising new funds and screening more deals (Gifford, 1997). Even if this behavior, from an individual investor's perspective, may appear logical in the short term, it may have long-term consequences in that such behavior may harm the reputation of the VCF in the investor community and may discourage future invitations to join interesting syndicate partnerships.

## Limitations and Future Research

This study has some limitations that need to be taken into account when interpreting the results. First, our use of yearly aggregate data may have decreased our ability to assess important variation in the data. Future research should examine in more detail how a VCF develops expertise over time by examining its investment pattern on a company-by-company basis. For instance, what type of ventures are best added to the portfolio in order to diminish failures?

Second, although we have shown that increased syndication positively affects VCFs' portfolio failure rate, our crude measure of syndication only allowed us to explore its broader nature. One should therefore consider this when tallying our results with those of other studies showing more beneficial performance effects of VC syndication. Given this broader measure, we were not able to distinguish between different types of syndication partners (i.e., other independent VCs, corporate VCs, or captive VCs). For instance, it would be interesting to examine which type of coinvestors need to be attracted in order to reduce the likelihood of free riding occurring in investment syndicates. Future research could therefore determine whether the potential detrimental effect of syndication varies by the type of syndication partners. In addition, as we have not addressed all possible nuances to the syndication–performance relationship, future research could explore its possibly curvilinear nature as well as its possible moderators. Such a refined, more precise analysis would make a significant theoretical contribution to the literature.

Third, despite our detailed focus on the effect of a VCF's investment strategy on the likelihood of new venture failure, we have treated the VCF as a "black box." Future research should examine the relationship between various competencies that are present *within* the VCF's management team, the nature of the investment decisions that are taken, and the likelihood of default. A possible additional explanation of our findings may be that the proportion of defaults is also determined by the fit between investment decisions that are made and the specific capabilities that are present within the individual investment managers. This explanation also suggests a fruitful area for future research.

Finally, the ultimate success (i.e., the rate of return) of a VCF's portfolio is determined less by the number of defaulted companies than by the number of successful exits (Sahlman, 1990). Achieving such exits is thus a primary goal of a VCF. In this regard, preventing failure may only be a secondary consideration. This suggests that the results presented in this article may also be a derivative from the success-enhancing strategies of the VCF. Although the factors underlying portfolio success and failure have been shown to be distinct (Dimov & Shepherd, 2005), analyzing failure separately from success is a limitation of this article.

## Conclusion

This study contributes to the entrepreneurship literature in general and to the literature on venture capital finance in particular by highlighting the unrecognized role that VCFs' investment strategies play in the survival of new ventures. We found that VCFs' specialized expertise decreases the relative number of defaults in their portfolio. Further, we found that the level of syndication in VCFs' investment deals positively—rather than negatively—affects the proportion of defaults. We hope that our study leads to deeper investigation of the antecedents of successful venture building.

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