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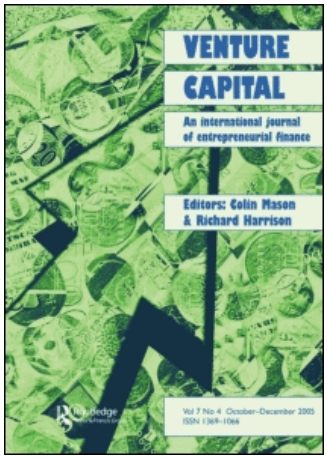

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Explaining venture capital firms' syndication behaviour: a longitudinal study

DIRK DE CLERCQ and DIMO P. DIMOV

(Final version accepted 23 July 2004)

Using a unique methodological approach, this paper examines the factors related to venture capital firms' (VCFs') involvement in syndication. It is argued that VCFs' investment strategies matters in terms of the extent to which VCFs engage in syndication. Several hypotheses pertaining to VCFs' syndication behaviour are tested based on a longitudinal data set of the realized strategies of 200 US-based VCFs over a 12-year period. Overall, support is found for both knowledge-based and financial arguments for why VCFs engage in syndication. Results are discussed and avenues are provided for future research.

Keywords: venture capital firms; syndication; panel data 2

Introduction

An important part of the venture capital investment process is that venture capital firms (i.e. VCFs) often 'co-invest' with other investors (i.e. syndicate partners) when allocating capital to new ventures. Investment syndication pertains to the simultaneous investment by at least two VCFs in the same portfolio company (i.e. PFC) within the same investment round (Bygrave 1987, Lerner 1994, Wright and Lockett 2003). In line with the high prevalence of syndication among venture capital firms, researchers have sought to understand the motivations behind this practice, applying a diverse set of theoretical perspectives as well as empirical methodologies (e.g. Bygrave 1987, 1988, Brander *et al*. Lerner 1994, Lockett and Wright 2001, 2002, Wright and Lockett 2003). Despite this increased interest, however, there remains a need to integrate and consolidate the existing diversity of views in order to derive new theoretical insights. In addition, while the existing research focus has been mainly on highlighting the commonalities and differences among VCFs in regard to their syndication behaviour, there has been no examination of how this behaviour changes across time for a given firm, i.e. how syndication behaviour is driven by VCFs' investment strategies

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The purpose of this study is to examine how VCFs' syndication behaviour relates to their realized investment strategies. The study builds on prior research on knowledge acquisition, financial risk sharing, investment strategies, and syndication as it pertains to VCFs' investments in their portfolio companies (De Clercq *et al*. 2001, Lockett and Wright 2001, Brander *et al*. 2002, Dimov and Shepherd in press). We essentially argue that, given the VCFs' inevitable exposure to investment uncertainty, the invitation of other investors to investment deals may help reduce such uncertainty. More specifically, we offer and test two alternative rationales for syndication: the sharing of complementary knowledge and the sharing of financial risk among syndicate partners. In order to determine which rationale prevails (or whether both rationales are equally important), we examine how the extent to which a *focal VCF* engages in syndication is affected by (1) the extent to which the focal VCF focuses on particular industries or development stages, and (2) some other important characteristics of the focal VCF's portfolio that reflect uncertainty, namely (a) the round number at which the focal VCF makes its first-time investment in its PFCs, (b) the development stage of its PFCs, and (c) the age of the PFCs.[1,2]

Our empirical setting is the US venture capital industry between 1990 and 2001. Given the existence of a sufficient number of US-based VCFs with extensive portfolios and the availability of extensive data on VC investments in the USA, we had a unique opportunity to examine VCFs' investment strategies in terms of their knowledge acquisition and syndication. That is, the length of the time period and scope of activity under study allowed us to provide evidence of the characteristics and consequences of VCFs' investment strategies.

Through this study we make several contributions to the existing literature on venture capital investing. First, the recent literature on syndication has been mostly focused on between-firm (i.e. between-VCF) syndication effects, looking at centrality (Seppä and Jääskeläinen 2002), differences in perception (Manigart *et al*. 2002), and the characteristics of syndication dyads (Sorenson and Stuart 2001). We, in turn, also focus on within-firm (i.e. within-VCF) effects, tracing variations in syndication behaviour of particular VCFs across time to their investment decisions. Second, our hypotheses are tested using data on *realized* as opposed to *intended* investment strategies. Prior research on VCFs' investment strategies has often used investors' perceptions in terms of the focus of their investments (e.g. Gupta and Sapienza 1992) or syndication behaviour (e.g. Manigart *et al*. 2002). We examine data on actual investments that have been undertaken by 200 VCFs in a 12-year time period (1990–2001), and we examine, on a year-by-year basis, the varying prevalence of syndication in the VCFs' portfolios. Third, we use a longitudinal design in testing our hypotheses. We are therefore able to draw conclusions regarding the *causal* relationship between VCFs' investment strategies and portfolio characteristics on one hand, and syndication on the other. We a statistical technique that is appropriate for studying panel data, i.e. a fixed effects model, in which multiple observations over time are analyzed for our sampled VCFs.

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The paper is organized as follows. In the next section, we present and discuss the two rationales for investment syndication, and then develop competing hypotheses for the nature of the relationship between VCFs' investment strategies and their involvement in syndication. In the subsequent sections, we present our methodology and results. Finally, we discuss our results and offer some concluding remarks.

Theory and hypotheses

Prior researchers have pointed out that a VCF may leverage its knowledge and experience across multiple PFCs by investing in specific types of ventures (Gupta and Sapienza 1992, Norton and Tenenbaum 1993, De Clercq and Sapienza 2001, De Clercq *et al*. 2001). We approach the *specialization* strategy that a focal VCF may use as a two-dimensional construct. More specifically, we use two key variables that have been previously identified to characterize VCFs' investment behaviour, i.e., 'industry scope' and 'development stage scope' (Gupta and Sapienza 1992). Each of these two variables may be considered strategic dimensions through which VCFs manage their portfolio development over time.

Several reasons can be given for why VCFs opt for investment specialization in terms of industry and development stage. First, a limited industry (or development stage) scope of PFC investments may facilitate control over the management of these companies by the focal VCF (Gupta and Sapienza 1992). That is, it may be more difficult for PFCs to hide issues of management incompetence or other crucial information regarding company performance when the VCF has more in-depth understanding of their industry (or development stage) (Eisenhardt 1989, Cable and Shane 1997). Furthermore, by limiting the number of industries (or development stages) in which to invest, VCFs can develop a more specialized understanding of the complexities of these industries (or development stages), which will allow for quick, incremental knowledge acquisition that can be horizontally applied across PFCs (Sahlman 1990, Gupta and Sapienza 1992, Hall and Hofer 1993, Norton and Tenenbaum 1993, De Clercq *et al*. 2001, Dimo and Shepherd forthcoming). Also, a specialization investment strategy may make VCFs more efficient in dealing with stakeholders for specific types of PFCs, such as customers, suppliers, management recruiting firms or investment bankers.

While investment specialization may have several advantages for VCFs, there may also be reasons to *diversify* investments across a wide variety of ventures in terms of their industry or development stage (Gupta and Sapienza 1992, De Clercq *et al*. 2001). For instance, a greater variety of industries in which to invest may offer increased investment opportunities for the VCF. This increased range of opportunities will provide the capability for the VCF to more selectively identify higher-return investments. Furthermore, investment diversification may decrease, e.g. the industry-specific risk through the spreading of investments across different types of PFCs (Norton and Tenenbaum 1993, De Clercq *et al*. 2001).

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In this study, we argue that VCFs' investment strategies in terms of specialization (or diversification) will have implications for the extent to which VCFs engage in syndication. Prior research has shown that venture capitalists often co-operate (i.e. syndicate) with other investors in the process of new venture finance (e.g. Bygrave 1987, 1988, Lerner 1994, Lockett and Wright 2001, Brander *et al*. 2002). As mentioned earlier, the phenomenon of syndication involves the simultaneous investment by at least two VCFs in the same PFC within the same investment round (Bygrave 1987, Lerner 1994). We develop two sets of *competing* hypotheses that relate VCFs' investment strategies to their syndication behaviour, based on two different rationales used to explain syndication.

The first rationale for why VCFs may decide to collaborate with other investors is that syndicate partners can provide each other with complementary knowledge before and after investments are made. That is, co-operation with syndicate partners may provide the focal VCF with a wide set of complementary information. It has been argued that this information can facilitate the finding of better investment targets and increase value-adding capability (Lerner 1994, Lockett and Wright 2001, Brander *et al*. 2002).

We build further on this argument, and posit that the focal VCF's decision to syndicate its *first-time investment round* in a given PFC may indicate a desire to access complementary skills necessary for the post-deal management.[3] This desire could be particularly relevant for specialized VCFs, as their skill sets, while abundant in a particular industry or development stage, may be lacking in management and financial expertise that is vital for successful strategy execution and exits. In other words, VCFs that have more specialized knowledge in their portfolio will have a higher need to engage in syndication in order to receive complementary knowledge necessary for effective involvement in the future affairs of their PFCs.

> *H1a*: The level of specialized industry knowledge held by the focal VCF is positively related to the degree of syndication at the focal VCF's first-time investment rounds.

> *H1b*: The level of specialized stage knowledge held by the focal VCF is positively related to the degree of syndication at the focal VCF's first-time investment rounds.

Further, sharing knowledge may be essential for the focal VCF when faced with the uncertain prospects of a new potential PFC (Lerner 1994). By combining diverse knowledge and opinions a better judgment on the investment merit of the PFC is possible. Lerner (1994) found confirmation for this idea in showing that there is a careful selection of syndication partners in earlier round numbers.[4] Similarly, Bygrave (1987) showed that rounds laden with more uncertainty tend to be more syndicated. When viewed from the perspective of the focal VCF, uncertainty will be higher for earlier investment rounds, less developed PFCs, and younger PFCs.

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H1c: The round number of the focal VCF's investment in its PFCs is negatively related to the degree of syndication at the focal VCF's first-time investment rounds.

H1d: The development stage of the focal VCF's PFCs is negatively related to the degree of syndication at the focal VCF's first-time investment rounds.

H1e: The age of the focal VCF's PFCs is negatively related to the degree of syndication at the focal VCF's first-time investment rounds.

A second rationale for why syndication is important is the sharing of financial risk among multiple investors (Bygrave 1987; 1988, Smith and Smith 2000). That is, syndication may be used to access a wider range of deals, thereby achieving a diversification of a VCF's portfolio that reduces the overall portfolio risk. To the extent that this rationale is valid, we would expect that VCFs with more diversified portfolios use more syndication. Put differently: investment specialization is negatively, rather than positively, related to the degree of syndication.

H2a: The level of specialized industry knowledge held by the focal VCF is negatively related to the degree of syndication at the focal VCF's first-time investment rounds.

H2b: The level of specialized stage knowledge held by the focal VCF is negatively related to the degree of syndication at the focal VCF's first-time investment rounds.

Another aspect of the sharing of financial risk is that VCFs may be wary of or restricted from undertaking large deals by themselves. VCFs may therefore syndicate in order to increase their exposure to large deals. Following this reasoning, we would expect later stages and rounds as well as investments in older PFCs to have a higher degree of syndication, the opposite of the effect predicted by *H1c–e* above.

H2c: The round number of the focal VCF's investment in its PFCs is positively related to the degree of syndication at the focal VCF's first-time investment rounds.

H2d: The development stage of the focal VCF's PFCs is positively related to the degree of syndication at the focal VCF's first-time investment rounds.

H2e: The age of the focal VCF's PFCs is positively related to the degree of syndication at the focal VCF's first-time investment rounds.

Finally, VCFs may decide to 'window dress' their portfolio by investing in PFCs shortly before these companies go public, thereby increasing the

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number of successful exits in their portfolio (Lerner 1994). This implies that the number of the round at which the focal VCF joins an investment syndicate may be an important driver for syndication, making this rationale consistent with *H2c*.

Methodology

Data collection

As we were interested in the evolvement of VCFs' syndication behaviour over time, it was important to select VCFs that had made enough investments in order to reach any meaningful conclusions. From the VentureXpert database, we thus used a sampling frame of all independent VCFs in the USA that had invested in at least 20 portfolio companies—547 VCFs in total. From these 547 VCFs, we randomly selected 200 *focal* VCFs for testing the hypotheses we put forth. For each of these 200 VCFs we collected data on all the *first-time investment rounds*, i.e. the rounds at which the VCF invested in particular PFCs for the first time, over the period 1990–2001—15 174 rounds in total. These rounds thus represent the realization of the investment strategies by VCFs, as they contain all the points at which PFCs joined these VCFs' investment portfolios.

For each of the first-time rounds, we collected the following information: the date of the round, the number of co-investors in the round, the PFC's industry, the PFC's stage of development at the round, the number of the round (reflecting all previous venture capital investments in the PFC), the PFC's age, and the 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).

Measures

In measuring our dependent variable, i.e. *degree of syndication,* for each year and focal VCF, we calculated the average number of co-investors for all the first-time rounds undertaken by the focal VCF in that year. Again, we want to emphasize that the term *first-time* round pertains to the investment round at which a PFC entered the focal VCF's portfolio for the first time.

In terms of our independent variables, the focal VCF's *specialized industry knowledge* was measured by the degree to which the first-time investments made in a particular year were concentrated in particular industries. We used nine industry categories as classified in the Venture-Xpert database—communications, computer related, electronics related, biotechnology, medical/pharmaceutical, energy related, consumer related, industrial products and other services and manufacturing—and calculated the proportions of a VCF's first-time investments going to these industry categories in a given year. Similarly, we measured the *specialized stage knowledge* by the degree to which the first-time investments made in a

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particular year were concentrated in companies of particular development stages. We used the following categories from the development stage classification in the VentureXpert database—seed, start-up, other early stage, expansion, later stage/acquisition, and other stage—and calculated the proportions of a VCF's first-time investments made at these development stages in a given year. In both cases, we calculated a Herfindahl Hirschman Index to measure concentration, i.e. Σp_i^2—where p_i represents the proportion of investments made in a particular industry or development stage in a given year.

In terms of the other independent variables, for each year and VCF, we calculated the average round number, average PFC development stage, and average PFC age for all the first-time rounds undertaken by the particular VCF in the particular year. In the VentureXpert database, all financing rounds received by a particular company are numbered sequentially. We used these numbers in calculating the average round at which a focal VCF became an investor in its PFCs in a given year. Further, we assigned numbers from one to six to the stage categories specified above to reflect the degree of development of the PFC (a lower number represents a less developed PFC). We then used these numbers to calculate the average PFC stage for the focal VCF's first-time investments in a given year.

Finally, we also included three control variables. First, we included the age of the VCF, calculated for each year, in order to account for the possible differences between older and younger venture capital firms in regard to their syndication patterns and networks. Second, because syndication is often used to increase deal flow (e.g. Sorenson and Stuart 2001), we controlled for the VCF's total number of first-time investments in a given year. Both the 'age' and 'number of investments' variables also serve as proxies for VCF size, as one can typically expect older and more investment-intensive VCFs to be larger. Third, we controlled for the year of the investments in order to capture any industry-wide effects stemming from the inflation and burst of the Internet and telecom bubbles of the late 1990s.

Analysis

We used a longitudinal research design for predicting the focal VCF's degree of syndication (i.e. dependent variable) resulting from the VCF's investment strategy developed over time (i.e. independent variables). That is, we tested our hypotheses based on panel data, i.e. repeated observations over the same units (200 VCFs) collected over a 12-year time period. An important advantage of panel data compared to 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 explain why individual firms (i.e. VCFs) 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).

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In practice, our panel included 2400 (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 1038 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 number of observations to 1008.

In running the estimation, we needed to determine whether a fixed or a random-effect model would be more appropriate. Theoretically, this determination is driven by our expectation of whether any unobserved firm-specific effects are fixed or random and whether they are correlated with our set of predictors. Practically, the existence of fixed effects would suggest that the relationship between investment strategy and syndication is different in within- and between-firm contexts. 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 that the differences in the coefficients in the two estimations were systematic (Chi-square = 39.3, 7 df, $p < 0.001$). We therefore used a fixed-effects estimation of the following form:

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

where $Y_{i,t}$ denotes the average number of syndicate partners for VCF_i in year t, $X_{i,t}$ represents a vector of the investment strategy variables for VCF_i in year t (hypothesized as influencing the degree of syndication), $C_{i,t}$ represents a vector of control variables for VCF_i in year t, F_i represents the specific, time-invariant effect for VCF_i, and T_t represents a fixed effect for year t.

The above model is essentially a '*within-firm*' one, i.e. it focuses on how a VCF's syndication behaviour evolves based on its investment decisions made over time. The nature of a fixed effects model reflects that VCFs' syndication behaviour may not only be based on the inherent characteristics of the VCFs, but also on their investment strategy over time. In order to complement the within-firm aspect of syndication, we also included a *between-firm* model, which sought to flesh out any systematic differences in the firm fixed effects. This between-firm model contained the same variables as its within-firm counterpart, except for the control variable for the year of investment. We used Stata version 8 to run both the within-firm and between- firm estimations.

Results

The descriptive statistics and correlations are shown in table 1. Table 2 contains the estimation results for the within-firm and between-firm

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Table 1. Descriptive statistics and correlations

		Mean	S.d.	N	1	2	3	4	5	6	7
1	Degree of syndication	3.81	2.11	1362	1.00						
2	Specialized industry knowledge	0.58	0.28	1362	− .02	1.00					
3	Specialized stage knowledge	0.57	0.28	1362	− .03	.66	1.00				
4	Round number of first-time investment	2.18	1.39	1362	.48	.02	.05	1.00			
5	PFC development stage	3.39	0.91	1339	.01	.03	.22	.20	1.00		
6	PFC age	1.82	1.58	1016	.17	.04	.02	.25	.11	1.00	
7	VCF age	12.62	9.68	1905	.01	− .17	− .10	− .00	− .02	.00	1.00
8	Number of investments	3.99	7.10	2400	.03	− .40	− .45	− .07	− .08	.04	.05

All correlations with absolute values above .04 are significant at the 0.05 level (2-tailed).

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Table 2. Regression results

Dependent variable →	Degree of syndication (within-firm effects)[a]	Degree of syndication (between-firm effects)
Specialized industry knowledge	−.46^{+}	.91
Specialized stage knowledge	.30	−.57
Round number of first-time investment	.67***	.81***
PFC development stage	−.01	−.36**
PFC age	.02	−.00
VCF age	−.01	−.01
Number of investments	−.01**	.02
Constant	1.53***	3.09***
F-value (degrees of freedom)	20.09*** (17; 809)	10.16*** (7; 174)
R^2	.300	.290
n	1008	182

***$p < 0.001$; **$p < 0.01$; *$p < 0.05$; $^{+}p < 0.10$; [a]The coefficients for the year variables are not included in the table.

models respectively. For the within-firm analysis (first column in table 2), we found a marginally significant negative effect for specialized industry knowledge ($B = -0.46$, $p < 0.10$), suggesting that as a VCF specializes more in terms of industry, it uses syndication to a lower degree. In other words, we found weak support for *H2a* (rather than *H1a*), i.e. support for the financial risk sharing (rather than knowledge sharing) arguments. There was no significant effect for specialized stage knowledge, thereby failing to support *H1b* or *H2b*. Furthermore, we found a significant positive effect for round number on the degree of syndication ($B = 0.67$, $p < 0.001$), providing support for *H2c* (rather than for *H1c*). Again, the financial rather than the knowledge sharing rationale for syndication was the prevailing one. Finally, there were no significant effects for PFC stage and age, thus failing to support *H1d, H1e, H2d* and *H2e*.

In the between-firm analysis (second column in table 2), we found no significant effect for both specialized industry and stage knowledge, although there was a positive trend for specialized industry knowledge ($B = 0.91$, $p < 0.15$) suggesting a prevalence of the knowledge sharing rationale. Consistent with the within-firm analysis and the financial rationale for syndication, there was a significant positive effect of round number on syndication ($B = 0.81$, $p < 0.001$). This suggests that, in line with *H2c*, VCFs that tend to invest at later rounds use syndication to a higher degree. We also found a significant negative effect for PFC development stage on the degree of syndication ($B = -0.36$, $p < 0.01$), providing support for *H1d* (rather than *H2d*). This last finding is consistent with the knowledge sharing rationale for syndication—VCFs that tend to invest at earlier-stage companies are confronted with higher uncertainty and are therefore more likely to rely on the expertise of colleague-investors. Finally, there was no significant effect for PFC age on syndication.

In summary, we found both within-firm and between-firm effects of components of VCFs' investment strategy on syndication. This suggests that syndication is driven by both stable 'baseline' features of the VCF and year-to-year decisions. By combining the two analyses, we have also derived a more diverse picture on the motivations underlying syndication,

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i.e. we find that both knowledge sharing and financial risk sharing arguments contribute to explaining VCF syndication behaviour.

Discussion

In this study, we set out to examine the effect of VCFs' investment strategies with regard to the scope of their investments and certain portfolio preferences on the extent to which they collaborate with syndicate partners. We examined different rationales for explaining syndication behaviour and sought to determine their relative prevalence. More specifically, we put forward parallel arguments for why the sharing of knowledge and the sharing of financial risk could explain syndication behaviour. Syndication may be motivated by providing co-investors with a wider set of complementary information or by sharing financial risk among multiple investors (Bygrave 1987, 1988, Lerner 1994, Smith and Smith 2000, Lockett and Wright 2001, Brander *et al*. 2002). We tested our predictions on panel data on the investments made by a sample of 200 venture capital firms over a 12-year period and found support for both rationales. In addition, our results suggest that the extent to which a VCF engages in syndication is dependent on the investment strategy it has developed over time as well as on some baseline characteristics that are inherent to the VCF.

When examining within-firm effects on syndication, we found that there was a higher degree of syndication for higher round numbers and for lower specialized industry knowledge. Both of these findings suggest that the reduction of financial risk (and window dressing) is an important driver for syndication. The lack of 'knowledge-based' results for the antecedents of syndication may be explained by the fact that individual VCF expertise is slow to build and thus slow to change. Thus, the extent to which a VCF undertakes investments outside its current domain of developed expertise and consequently relies on the help of syndicate partners may be difficult to detect when examining VCFs' year-to-year strategic investment decisions. This conclusion is highly speculative, however, and more research is needed in this area.

When running a between-firm rather than within-firm analysis, we found support for both the financial *and* knowledge-based arguments. More specifically, across VCFs, those that tend to join PFCs at later rounds also tend to have more syndicate partners. This is again consistent with the financial rationale for syndication. PFCs at later rounds typically require higher amounts of capital. Such increased investment requirements often cannot be met by one VCF and thus ask for access to new investors. As regards the knowledge sharing rationale for syndication, we found that VCFs that tend to invest in earlier-stage companies also tend to have more syndicate partners. Because PFCs at earlier stages of development require smaller amounts of capital compared to their later-stage counterparts, the motivation for more extensive syndication in this case cannot be explained by the VCF's needs to reduce their financial exposure. Rather, given that there is more uncertainty related to early-stage PFCs in terms of their

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prospects for success, VCFs will seek to bridge this uncertainty by accessing the *knowledge base* of a larger group of investors. Nevertheless, there is also a possibility that the increased syndication by VCFs who focus on earlier-stage deals stems from their need to maintain stable deal flow. More specifically, given that deal origination is more difficult at earlier stages (because of the uncertainty enshrining such companies), deal sharing through syndication may be an effective way to maintain deal flow. In this regard, it is interesting to note that for investments in early-stage companies, potentially 'bad' deals may be more likely to be shared with others whereby VCFs would want to keep the really high-potential deals to themselves. However, given the repeated nature of deal sharing and interaction among VCFs, such behaviour may not be optimal in the long run. That is, VCFs that continuously offer bad deals may be eventually excluded from the deal flow of their syndicate counterparts.

Although the effects of specialized knowledge on syndication did not reach the designated threshold of significance in the between-firm analysis, there are some interesting trends in our analysis that may prompt further theory building and empirical testing. The sign of the effects for both specialized industry and stage knowledge reversed when we switched from the within-firm to the between-firm analysis. One interpretation of this sign reversal may be that any year-to-year variation in the VCF's established knowledge base may lead to an immediate use of syndication to counter-balance such variation. This year-to-year change in syndication behaviour could then be different from the aggregate change over a longer time period. In addition, we noticed that the effects for specialized industry and stage knowledge are opposite to one another in both the within-firm and between-firm analyses. This observation could be explained by the fact that industry specialization and stage specialization are two distinct components of VCFs' investment strategy, which might have different influences on the VCFs' syndication behaviour, both on a year-to-year basis and over a long period over time. Further research is needed, however, to flesh out how different types of specialization affect syndication behaviour.

Overall, this paper makes several theoretical and methodological contributions to the literature on venture capital investing and syndication. From a theoretical point of view, we showed the joint importance of knowledge-based and financial rationales for syndication as well as their differential importance in year-to-year variations in the VCFs' syndication behaviour versus the VCFs' stable 'baseline' behaviour. From a methodological point of view, we complemented existing research that focused mostly on between-firm syndication effects (e.g. Sorenson and Stuart 2001, Manigart *et al*. 2002, Seppä and Jääskeläinen 2002) by demonstrating the importance and distinct nature of within-firm effects, i.e. the variation in syndication behaviour attributed to a VCF's changing investment strategy decisions across time. In addition, we tested our hypotheses using data on *realized* as opposed to *intended* investment strategies. Finally, we used a longitudinal design in testing our hypotheses that allowed us to draw conclusions regarding the *causal* relationship between investment strategies and syndication behaviour.

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We are aware that there are some limitations to the results of our study, which also open avenues for future research. For instance, by using yearly aggregate data we may have overlooked important variation in the data. Future research could examine in more detail how a VCF expands its portfolio on a company-by-company basis. It may be interesting, for example to examine what *type* of syndicate partners are attracted by the focal VCF based on the characteristics of the existing portfolio. Furthermore, in this paper we have mainly looked at the VCF as a black box. Future research could also look into more detail at the link between the varied capabilities of a VCF's management, the VCF's investment strategy, and its syndication behaviour. A possible additional explanation of our findings may be that VCFs' involvement in syndication is also determined by the fit (or misfit) between investment strategies and the experiential background of the individual investment managers. Further examination of the issues mentioned above would provide deeper insights into the mechanisms through which the decisions to engage syndication are made.

In conclusion, this study contributes to the entrepreneurship literature in general and the literature on venture capital finance in particular by providing a novel approach to examining the factors that affect syndication among venture capitalists. Overall, we found that both knowledge-based and financial risk arguments explain the extent to which investors engage in syndication. We hope that our study will lead to a deeper investigation of the process through which investment syndicates may enhance successful venture building.

Notes

1. Throughout the paper we use the label 'focal VCF' or 'focal investor' 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. co-investors).
2. Portfolio companies often get VC funding through subsequent investment rounds, and different VCFs may join the investment syndicate at different investment rounds (Sahlman 1990, Gompers 1995). Throughout the paper, the term *round number* pertains to the number of the round, from the *PFCs' perspective*, at which the focal VCF joined the investment syndicate for that particular PFC for the first time. In contrast, the focal VCF's *first-time investment round* pertains to the initial involvement of the *focal VCF* with a particular PFC.
3. We focus on the antecedents of the degree of syndication at the focal VCF's *first-time investment rounds* since syndication at later investment rounds may not as such stem from the focal VCF's strategic investment decisions but rather from the extent to which the PFCs have met pre-set milestones.
4. We want to emphasize again that the term *round number* pertains to the number of the round, from the *PFCs' perspective*, at which the focal VCF joined the investment syndicate for that particular PFC for the first time, whereas the term *first-time investment round* pertains to the initial involvement of the *focal VCF* with a particular PFC.

References

Brander, J.A., Amit, R. and Antweiler, W., 2002, Venture capital syndication: Improved venture selection versus the value-added hypothesis. *Journal of Economics and Management Strategy*, **11**(3), 423–452.

Downloaded By: [University of Connecticut] At: 16:45 12 September 2007

Bygrave, W., 1987, Syndicated investments by venture capital firms: A networking perspective. *Journal of Business Venturing*, **2,** 139–154.

Bygrave, W., 1988, 'The structure of the investment networks of venture capital firms. *Journal of Business Venturing*, **3,** 137–158.

De Clercq, D., Goulet, P.K., Kumpulainen, M. and Mäkelä. M., 2001, Portfolio investment strategies in the Finnish venture capital industry: a longitudinal study. *Venture Capital*, **3**(1), 41–62.

De Clercq, D., and Sapienza, H., 2001 The creation of relational rents in venture capitalist-entrepreneur dyads. *Venture Capital*, **3**(2), 107–128.

Dimov, D. and Shepherd, D., in press, Human capital theory and venture capital firms: Exploring 'home runs' and 'strike outs'. *Journal of Business Venturing.*

Eisenhardt, K., 1989, Agency theory: An assessment and review. *Academy of Management Review*, **14,** 57–74.

Gompers, P., 1995, Optimal investment, monitoring, and the staging of venture capital. *Journal of Finance*, **50**(5), 1461–1489.

Gupta, A. and Sapienza, H., 1992, Determinants of venture capital firms; preferences regarding the industry diversity and geographic scope of their investments. *Journal of Business Venturing*, **7,** 347–362.

Hall, J. and Hofer, C., 1993, 'Venture capitalists' decision criteria in new venture evaluation. *Journal of Business Venturing*, **8,** 25–42.

Lerner, J., 1994, The syndication of venture capital investments. *Financial Management,* **23**(3), 16–27.

Lockett, A. and Wright, M., 2001, The syndication of venture capital investments. *Omega*, **29,** 375–390.

Manigart, S., Lockett, A., Meuleman, M., Landström, H. and Desbrières, P., 2002, The syndication of venture capital investments in Europe: evidence from five European countries. Paper presented at the Babson Kauffman Entrepreneurship Research Conference, Boulder, CO, 6–8 June.

Norton, E. and Tenenbaum, B., 1993, Specialization versus diversification as a venture capital investment strategy. *Journal of Business Venturing*, **8,** 431–442.

Sahlman, W., 1990, The structure and governance of venture capital organizations. *Journal of Financial Economics*, **27,** 473–521.

Sapienza, H., 1992, When do venture capitalists add value? *Journal of Business Venturing*, **7,** 9–27.

Seppä, T. and Jääskeläinen, M., 2002, How the rich become richer in venture capital: firm performance and position in syndication networks. Paper presented at the Babson Kauffman Entrepreneurship Research Conference, Boulder, CO, 6–8 June .

Smith, J.and Smith, L., 2000, *Entrepreneurial Finance* (New York: Wiley).

Sorenson, O. and Stuart, T., 2001, Syndication networks and the spatial distribution of venture capital investments. *American Journal of Sociology*, **106**(6), 1546–1588.

Verbeek, M., 2000, *A guide to modern econometrics* (Chichester: John Wiley & Sons).