

THE EXPORT INTENSITY OF VENTURE CAPITAL BACKED COMPANIES

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ABSTRACT

In this study we examine how venture capital (VC) firms influence the export behavior of their investee companies. VC firms perform an important governance function for investee companies by providing monitoring and value-added activities. Drawing on agency theory, the resource-based view of the firm and governance life-cycle theory we hypothesize that the relationship between VC governance resources and investee exporting behavior is moderated by investment stage. Employing a sample of 340 VC-backed firms, our results confirm the hypothesis that the relationship between VC governance resources and investee exporting behavior is moderated by investment stage. Monitoring resources are most effective in promoting export behavior for late-stage ventures and value-added resources in promoting export behavior in early-stage ventures.

EXPORT INTENSITY OF VENTURE CAPITAL BACKED COMPANIES

INTRODUCTION

The extensive literature concerning the internationalization of small and medium sized enterprises (SMEs) has emphasized that smaller and newer firms may face problems in internationalization due to a lack of resources both with respect to human capital and finance (Bilkey and Tesar, 1977; Bonaccorsi, 1992; Oviatt and McDougall, 1994; McDougall and Oviatt, 1996; Bloodgood, Sapienza and Almeida, 1996; Leisch and Knight, 1999; Westhead, Wright and Ucbasaran, 2001). The argument that limited resources retard internationalization is based on a narrow conceptualization of firm resources (Bonaccorsi, 1992). Resources may be internal or external to the firm, and external resources may play an important role in the development of a firm's strategy (Bonaccorsi, 1992).

Firm governance is a resource of the firm (Barney, Wright and Ketchen, 2001) and is increasingly being viewed as an important driver of internationalization (George, Wiklund & Zahra, 2005). Venture capital (VC) firms perform an important governance function for their investee companies by providing monitoring and value-added activities (Pruthi, Wright and Lockett, 2003). VC firms are risk-seeking, active participants in the development of their portfolio companies (Carpenter et al, 2003) and are an important source of external governance resources for their investee companies. Both early stage investees with high expectations of growth, and late stage firms reinvigorated through a buy-out (Wright, Hoskisson, Busenitz and Dial, 2000), may turn to international markets as a means to achieve growth. In both cases, VC firms may have an important role to play in providing external resources to enable the investee to realize its internationalization potential.

Examination of this role is important since debate continues, both among researchers and practitioners, about whether and how VC firms add value to their investees (Wright and Robbie, 1998; Cumming, Siegel and Wright, 2007). Surprisingly, scant attention has been directed towards the effect of VC firms on the internationalization activity of their investees. Exceptions include Zahra and Neubaum's (2007) recent study of the impact of VC equity holding on the development of investee firm (SMEs) resources for internationalization; and George et al's. (2005) study that finds that internal owners tend to be risk averse and have a lower tendency to increase scale and scope of internationalization than external

owners such as VCs. However, there has been no previous examination of the relationship between the nature of VC involvement and investee internationalization, nor of how this involvement varies between early and late stage investees. Exploration of these dimensions is warranted since there is growing recognition of the heterogeneity of VC investee types and their different support requirements (Elango, Fried, Hisrich and Polonchek, 1995; Bruining and Wright, 2002).

In this paper we address this gap in the literature by investigating the following research question: *How and when* do VC firms influence the export intensity of their investee firms? First, we examine the nature of governance resources provided by VC firms and how they may affect firm exporting behavior. In building our arguments we draw on the resource-based view (RBV) and agency theory (AT). Second, to develop a more nuanced understanding of the effect VC firms have on their investee companies we employ the concept of the governance life-cycle (Filatotchev and Wright, 2005). Specifically, we examine how the effect of VC firm governance resources on export intensity may be moderated by investment stage. To test our model we draw on multiple sources of data to develop a representative dataset of 340 VC-backed firms covering a wide range of industrial sectors and spread across some twenty countries in Europe.

The remainder of the paper is structured as follows. In the next section we outline our conceptual model and derive hypotheses. Section 3 outlines the data and sample we employ. Section 4 presents our model specification and the Heckman statistical method employed in the analysis. The penultimate section presents the results of the study. The final section presents a discussion of the results and conclusions from our study.

CONCEPTUAL MODEL AND HYPOTHESES

Expansion into foreign markets presents opportunities for growth and value creation. The decision to export is a strategic choice influenced by a firm's resources (McDougall, Shane and Oviatt, 1994; Bloodgood et al., 1996; Autio et al., 2000; Westhead et al., 2001). The intensity of export activity is a strategic outcome. Export intensity will be contingent on management's strategic decisions, and influenced by the resources available to the firm and the role of financiers (Filatotchev, Dyomina, Wright and Buck, 2001). It requires that the organization has accumulated resources and selected strategies to enter new markets and represents a fundamental departure

from existing domestic practices (Lu and Beamish, 2001). Strategies focusing upon identifying and exploiting opportunities in foreign markets are more risky than those focusing upon domestic markets and improving internal efficiency (Sanders and Carpenter, 1998). Entrepreneurs' risk attitudes and changes in corporate ownership and governance can shape the resources accumulated by organizations, and the strategies adopted to identify and exploit foreign market opportunities. The resources and capabilities available to the organization, which include governance, are a function of its historical development (Wernerfelt, 1984).

Resource-based theorists argue that firms should be thought of as a bundle of productive resources that are semi-permanently tied to the firm (Wernerfelt, 1984; Barney, 1991). Over time, as the firm's resource base develops, more experienced firms will have developed more internal resources *ceteris paribus*. A central tenet of the RBV is that each firm's opportunity set is unique, a product of the resources acquired as a result of its past experience (Lockett and Thompson, 2001). Consequently, firms may not necessarily generate internal resources in the area of internationalization if they have not historically been involved in international activities.

As outlined above the key resources of a firm may not necessarily be under the direct control/ownership of the firm (Bonaccorsi, 1992). A firm may seek to access external resources for its own benefit. VC firms may provide these resources in terms of both equity finance and involvement in entrepreneurial firms (Gorman and Sahlman, 1989). Unlike listed companies, VC-backed firms are characterized by concentrated ownership between the entrepreneur (and commonly the entrepreneurial team) and the VC firm. The introduction of the VC investor changes the agency and governance relationships in the firm. In the case of early-stage deals, the stake of the entrepreneur is diluted through VC investment. In contrast, in late-stage management buy-outs and buy-ins (MBO/Is) managers take a stake in the business that they previously did not own.

With their specialist skills and significant equity blockholding, VC firms have both the skills and incentives to adopt an active governance role (Wright and Robbie, 1998), which includes exerting costly effort to improve outcomes (Kaplan and Strömberg, 2001). Active governance involves monitoring and shaping the decisions taken by top management (Zahra & Pearce, 1989; Johnson et al., 1996). Existing research indicates that governance is more proactive in terms of monitoring and

advising management where it involves outsiders (Gersick, Davis, McCollom & Lansberg, 1997; Cowling, 2003). Zahra and Neubaum (2007), in a survey of 384 US SMEs find a positive relationship between the presence of a VC investor and the development of resources for internationalization.

The role of active governance by VC firms is an interesting area which is situated at the interface between RBV and AT. The governance literature has traditionally seen a bifurcation between the RBV and AT. More recently some RBV scholars have highlighted the importance of governance as an important firm-specific resource (Barney, Wright and Ketchen, 2001). Governance has implications for the level of agency costs and the optimal configuration of the firm's activities, which we expand on below.

The Nature of VC Involvement

The availability of external financial resources can help overcome some of the barriers to exporting by providing funds to meet the costs and risks of entering and increasing activities in overseas markets (Bilkey and Tesar, 1977). In addition, internationalization expertise may be required (Liesch and Knight, 1999). Some ventures may be able to internationalize early in their life-cycle as they possess the necessary expertise (Autio, et al., 2000). The resources required for internationalization may not reside within the boundaries of the firm but may be accessible through specialist organizations (Peng and Ilinitich, 1998). Firms can adopt entry modes that tap into host country resources, such as through acquisitions, branch offices run by locals and joint ventures, which provide a platform to increase export intensity (Meyer and Estrin, 2001). Assistance may be required to find and select a partner that is compatible with the strategy of the entering firm (Madhok, 1997). VC firms are a potential source of external expertise to enable firms potentially to address these issues and increase their export intensity.

Considerable debate surrounds the contribution of VC firms to their investee companies beyond the provision of finance (Sapienza, 1992; Sapienza, Manigart and Vermeir, 1996). VC firm governance resources lie in two distinct areas: monitoring and value-added (Pruthi et al, 2003).

Value-added governance resources can help in growing and developing the investee firm. These resources relate to developing new strategies, acting as a sounding board, interfacing with the investor group, etc. (Gorman and Sahlman, 1989;

MacMillan, Kulow and Khoylian, 1989) and may be more valued than purely financial monitoring (Rosenstein, et al., 1993). Value-added governance resources may also extend to enabling the investee firm to increase its export intensity. Firms seeking to develop strategies to realize international market opportunities need to recruit, incentivize and motivate management who can implement this strategy. They also need to develop suitable marketing plans consistent with their internationalization strategy. VCs with internationalization expertise may be able to assist investee management in honing foreign market opportunities and advise them on appropriate entry strategies that will form the best platform to enhance exports. Through their networks in foreign markets, they may also be able to help identify requisite management. We argue, therefore, that a VC firm's contribution that emphasizes the provision of value-added resources will have a positive impact on the export intensity of their investee companies. Based on the above arguments we hypothesize:

H1a: There is a positive relationship between the provision of VC firm value-added resources and a venture's export intensity.

As VC firms extend funds to entrepreneurs in an environment of asymmetric information and incomplete contracts there is generally considered to be a need for the monitoring of investees (Mitchell, Reid and Terry, 1995). To address this need, the VC firm provides monitoring resources for their investee firms. These resources are necessary to enable the firm to develop and also for the VC firm to protect their investment. These resources include the provision of detailed and regular budget information as well as the monitoring of performance through board representation and regular meetings between the venture capitalist and the entrepreneur (Mitchell, et al, 1995). The interaction of the VC firm with the investee can lead to the augmentation of the investee's resource base with the monitoring resources of the VC firm. The monitoring resources will require the investee firm to be more pro-active in terms of developing its financial position through cost control and revenue generation. One way of increasing revenues is to increase exports. Monitoring resources may better discipline the investee firm to be more alert to capitalizing on overseas opportunities. Based on the above arguments we hypothesize:

H1b: There is a positive relationship between the provision of VC firm monitoring resources and a venture's export intensity.

Stage of Investment

Firm governance is influenced by the firm's life cycle (Filatotchev and Wright, 2005). An analysis of governance systems at the different stages in the life cycle of firms suggests that it is important that the board of directors performs an enterprising (value-added) function for young, growing firms (Lynall et al., 2003), or for those firms facing dynamic and uncertain environmental conditions (Filatotchev and Wright, 2005), for example SMEs in international markets. As the governance requirements of a firm change over its life-cycle, we argue that the governance resources (value-added and monitoring) provided by a VC firm, and their effectiveness at promoting exporting behavior, may be influenced by the stage of development of the investee company. In this paper we focus on two investment stages: Early stage (seed and start-up) and late stage (MBO/I).. The distinction between early and late-stage investments is well accepted in the VC literature and VC community (Ruhnka and Young, 1991; Elango et al, 1995; Wright and Robbie, 1998).

Early-stage investments (encompassing seed and start-up) are the classic form of venture capital. VC firms invest in young companies, typically introducing professionalization of the management of the business at the beginning of the governance life-cycle. At the seed stage, the role of the VC firm is to help develop the idea for a business before a product is launched on a market. At the start-up stage, the product or service will have been developed sufficiently for it to be made available in the market place. At start-up, the VC firm's role is to help establish the company as a commercial organisation with premises and employees etc. Early-stage investee companies are characterized by limited internal resources as the firm has not yet had time to develop or acquire the necessary resources for its development. In addition, little accounting information is available as the track record of the firm is not well established. Early-stage investments carry considerable risk as it is by no means clear that the product will be commercially viable and VC firms face major asymmetries of information.

In contrast to LBOs in the US, management buy-outs and buy-ins (MBO/Is) in Europe account for a major share of venture capital activity (EVCA, 2005); these firms are at a much later stage in the governance life-cycle. Typically, a board of

directors and other governance mechanisms are already in place but the entry of the VC firms leads to their enhancement. In MBO/Is the managers in an organization can purchase the majority of its equity in order to create a newly independent firm in which they are significant equity owners (Wright, Thompson and Robbie, 1992; Zahra, 1995). Where incumbent managers become equity owners, the term MBO is used. When external managers, not previously employed in the organization purchase a business, a management buy-in (MBI) is created. VC firms typically provide various forms of equity finance when investing in a firm, and introduce active monitoring and assistance of management where it was absent prior to the ownership change (Bruining and Wright, 2002).

Building on the arguments above, we argue that early and late-stage deals exhibit two material differences. First, a late-stage firm will have a more fully developed resource base than is the case with an early-stage firm. By virtue of competing in markets over time, late stage firms will have had more opportunity to develop and acquire value-added resources. In addition, late-stage firms may have better developed monitoring resources. However, monitoring problems still exist with late-stage deals and are frequently a key motivation for conducting the transaction (Jensen, 1993; Thompson and Wright, 1995). Second, accounting-based information is much more available for late-stage than early-stage deals. Consequently, late-stage investment decisions can be made in accordance with widely recognised financial models.

The more fully developed resource bases, allied to the availability of accounting-based information, mean that late-stage deals are characterised by lower levels of risk than early-stage deals. Late-stage firms have valuable assets which can be borrowed against when leveraging the company. Conversely, early-stage firms are inherently more risky due to the absence of formal assets and the lack of accounting-based information. VC firms, therefore, place greater emphasis on non-accounting-based information when deciding on early-stage investment opportunities (Wright and Robbie, 1996). Table 1 presents a summary of our arguments relating to the influence of investment stage.

INSERT TABLE 1 HERE

Building on the notions of a life-cycle of governance and the observation that VCs are important providers of governance resources to their investee firms, we investigate the interaction between the two below. We argue that the provision of VC governance resources will have different effects on the export intensity of the investee firm depending on the type of governance resources (value-added or monitoring) provided and its investment (life-cycle) stage. Simply stated, the relationship between the provision of VC firm governance resources and investee firm export intensity (H1a and H1b) will be moderated by investment stage.

VC Value-Added Resources and Investment Stage

As outlined above, early- and late-stage companies exhibit important differences in relation to their resources. Late-stage firms will have had time to develop a broader and more complex resource-base through competing over time (see Penrose, 1959; Wenerfelt, 1984). This more developed resource-base means that the impact of external VC firm value-added resources is likely to be less than in firms with less developed internal resources. Furthermore, late-stage firms will have developed path dependency, which may further reduce the ability of external VC firm value-added resources to effect strategic change.

Conversely, the external value-added resources provided by the VC firm will have an important impact on early-stage ventures. Early-stage ventures are highly dependent on external resource providers because of the limited nature of their internal resource bases. We argue that access to a VC firm's value-added resources is particularly important because the early-stage firm may have ambitions of expanding its operations internationally but does not have the necessary resources to do so. The introduction of external VC value-added resources will have a more dramatic impact because of the relative absence of internal resources. Furthermore, as the firm is newer and has less path dependence, the VC firm will find it easier to effect strategic change through the introduction of external VC value-added resources.

Our arguments above indicate that external VC value-added resources will have a greater impact on promoting export intensity for early-stage than late-stage companies. Based on the above arguments we hypothesize:

H2a: The relationship between external VC value-added resources and export intensity will be greatest for early-stage investments.

VC Monitoring Resources and Investment Stage

Monitoring has been shown to vary according to the investees' needs (Barry, 1994; Lerner, 1995). Evidence suggests greater involvement during the more uncertain earlier stages than during the later stages when the firm is more established (Sapienza, Amason and Manigart, 1994; Elango, Fried, Hisrich and Polonchek, 1995). Although there may be a requirement for greater monitoring for early-stage investments than in later-stage investments, it cannot be assumed that this has a positive effect on export intensity for early-stage firms. We argue that the external monitoring resources provided by VCs will not be important in effecting an increase in export intensity in early-stage ventures.

The internal resource-bases of early stage firms are limited. Without the development of new internal resources the investee firm cannot survive in the medium to long-term. For early stage firms, the resources they require are the basic building blocks of a business, which include, people, product (service), organization, social capital etc. (Vohora, Wright and Lockett, 2004). A small number of firms may begin with an international orientation, i.e. they are born global, but this is not the norm (Knight and Cavusgil, 2004; Wright, Westhead and Ucbasaran, 2007). The vast majority of new firms are embedded in their local environment and do not have the resources to enter international markets (Bloodgood et al., 1996; Autio et al., 2000). To the extent that they do enter international markets, this is likely to be at a low intensity through low resource-intensive modes such as export agents, responding to orders or being pulled abroad through sub-contracting for domestic customers (Westhead, Wright and Ucbasaran, 2002). In general, therefore, the development of new resources will be focused towards local operations in the formative years of the business. The focus of external VC monitoring resources will likely be on ensuring that the finance provided is invested in building the domestic resource base of the firm. Consequently, external VC firm monitoring resources will not have a strong effect on increasing the intensity of international activities for early-stage firms.

This is in contrast to late-stage deals. Although late-stage deals may have greater internal resources and be characterized by lower levels of risk than early-stage

deals, a common characteristic is the presence of governance problems prior to the transfer of ownership (Jensen, 1993; Thompson and Wright, 1995). A lack of internal monitoring resources, and the associated agency costs, may have led to sub-optimal internationalization behavior. Although the late-stage firm may have the necessary internal resources to capitalize on international market opportunities, corporate management or former owners may have faced problems in monitoring this activity. Consequently, management may have opted for the easier option of home markets even though these may not necessarily be the most profitable or may have not fully exploited international market opportunities. Late-stage transactions, through the transfer of ownership, may breathe new life into an existing venture. The augmentation of the investees' internal resources with new external VC monitoring resources may force the new owner/managers to seek out new revenue sources to improve the financial position of the business, i.e. to use their existing internal resources more effectively. The introduction of external VC monitoring resources will improve financial discipline in the firm and may help to overcome previous organizational inertia (Autio, et al., 2000). VC monitoring resources may encourage the managers of the late-stage firm to become more entrepreneurial in seeking out new (international) markets or in expanding existing international markets (Wright et al, 2000).

The above arguments suggest that external VC monitoring resources are less important than for early-stage firms, but more important for late-stage firms, in assisting the international expansion of the business. Based on the above arguments we hypothesize:

H2b: The relationship between external VC monitoring resources and export intensity will be greatest for late-stage investments.

A summary of our model is presented in Figure 1. The stage of investment of the investee company is presented as a variable that moderates the relationship between the external resources provided by the VC firm and the export intensity of the firm.

INSERT FIGURE 1 HERE

DATA AND METHODS

The Sample

The sample utilized in the study comprises venture-backed firms. There is no comprehensive publicly available dataset in Europe on venture-backed investments covering the period since 1990. This study draws on two proprietary pan-European datasets of venture capital-backed firms relating to early and late-stage investments that cover the entire period and one publicly available dataset covering more recent years. First, the early-stage firms in the sample are derived from the European Private Equity & Venture Capital Association (EVCA) and the Europe Unlimited database which effectively comprise the population of venture-backed firms in these stages. Data are captured through the provision of information by member firms. Second, the late-stage venture-backed management buy-outs and buy-ins in the sample are drawn from the database compiled by the authors. Data in this database, which effectively comprises the population of management buy-outs and buy-ins across Europe, are captured from a twice-yearly survey of private equity and venture capital firms, intermediaries and banks which obtains a full response rate.¹ Press and corporations annual reports are also used to identify and check further deals. These databases provided the sample frame for the study.

The data relating to the sample firms was drawn from four main sources. First, based on the existing literature and discussions with practitioners, a questionnaire was designed to capture the principal independent variables of interest in this study. After taking into account variations in venture capital legislation and practice in each country, the questionnaires were translated into French, German, Italian and Spanish and back-translated into English. The questionnaires were also slightly differentiated to take account of differences between early-stage and late-stage management buy-out/buy-in investments. To check for consistency, relevance, clarity and comprehension in the different countries covered by the study, the questionnaire was piloted with twenty venture backed firms in the UK, Netherlands, Spain, France, Italy, Denmark, Germany and Sweden. The survey was mailed to the CEOs of venture-backed investments completed from 1992 and was conducted between mid 2000 and

¹ Respondents are incentivized to supply data through receipt of a free copy of a quarterly review of the buy-out market.

early 2002 to a total of 5,267 venture-backed firms contained in the above datasets. Given the size and nature of the firms being targeted, and that the information related to the strategic behavior of the firms, we rely on senior management as key informants in the business (Kumar, Stern and Anderson, 1993). After administering one mail reminder and telephone follow-up calls, a total of 544 responses were obtained, providing an overall response rate of 10.3%. From reported data on respondents' roles, 72.6% were CEOs/Presidents, 20.7% were Directors including Deputy CEO, and the remaining 6.7% were senior management typically associated with a strategic activity, such as business development manager. Due to missing data on certain items, the usable sample for the analysis presented here was 340 firms. The stage and geographical distributions of the population, initial responses and responses used in the analysis presented here are summarized in Table 2.

INSERT TABLE 2 HERE

The stage distribution of the initial responses is broadly in line with the population distribution as identified from the EVCA, Europe Unlimited and CMBOR databases. However, there is a noticeable reduction in the share of early-stage investments and a corresponding increase in MBO/I investments in the sample used in the study. This shift reflects the lower penetration of internationalization activity among early-stage firms. With respect to the geographical distribution, the UK is somewhat over-represented and the Mediterranean region is somewhat under-represented in the initial responses. This reflects well-known differences in response rates to survey instruments across Europe (Bygrave, Hay and Peeters, 1994). In the final sample used in the analysis, the over-representation of the UK is increased, while North Europe becomes somewhat under-represented. Comparison of the survey sample with the population of EVCA investments over the same period as that covered by the survey shows a similar distribution with respect to most categories, with the exception that computer related activities are somewhat over-represented while consumer related activities are somewhat under-represented in the sample (see Appendix).

The EVCA, Europe Unlimited and CMBOR databases were a second source of data that provided firm-level data on industrial sector, investment stage, geographical location, employment size and time since first investment of venture capital.

A third source of data related to export-intensity was on-line databases such as ONESOURCE. As requirements for the disclosure of export information by private companies varies across countries,² we also requested this information from respondents in the questionnaire to enable us to use this information where it was not otherwise publicly available. A cross-check between exporting and sales turnover data from the questionnaire and archival public databases for 110 respondent firms showed differences in only two cases. The questionnaire based exporting data would therefore appear to be reliable.

As a fourth data source, we obtained the names of the VCs investing in each firm from the EVCA, Europe Unlimited and CMBOR databases and then used EVCA directories to obtain information relating to the international presence of the VC firms.

Measures

The variables employed in the study are outlined below and their definitions are summarized in Table 3.

INSERT TABLE 3 HERE

Dependent Variables

The dependent variable is the export intensity of the firm (EXPINTENSITY) at the end period of the survey or the year of exit if different, measured as the percentage of sales turnover that was exported. In addition, we also created a dummy variable of whether or not the firm was an exporter (0 = not an exporter and 1 = exporter) in order to construct our selection model for the Heckman procedure (see below).

² In the UK, for example, the Companies Act 1967 required directors to include a statement of the value of goods exported as long as turnover was above a certain level, with subsequent legislation allowing an exemption where this would seriously be prejudicial to the company's interests. In contrast, in the Netherlands, for example, private companies are not obliged to disclose exports.

Model Variables

Venture Capitalist Resource Variables⁴ - Nine statements were identified covering a variety of resource contributions venture capitalists can make to enhance the development of supported firms. We obtained strategic/ operational resource variables from Gorman and Sahlman (1989) and MacMillan, Kulow and Khoylian. (1989) while governance (monitoring) resource variables were drawn from Mitchell, Reid and Terry (1997). The venture capitalist resource contribution statements were data reduced by an R-mode PCA (Table 4). All the assumptions of the PCA model were satisfied (i.e. Bartlett's test of sphericity; Kaiser-Meyer-Olkin measure of sampling adequacy (0.85); the anti-image correlation matrix; and tests for communality). One statement (provision of financial advice) failed to survive the R-mode PCA, and is reported at the bottom of Table 4. Two components with eigenvalues greater than unity were identified by the varimax rotated PCA, and they accounted for 64% of the total variance. Each of the venture capitalist contribution variables had component loadings greater than 0.67 on either of the two components. With reference to the component loadings, the two components were given the following descriptive labels. Component 1 was termed venture capitalists mostly focusing on monitoring resources (VCM) and included 'more regular budget reporting', 'monitoring financial performance' and 'monitoring operational performance'. Component 2 was termed venture capitalists mostly focusing upon value-added resources (VAR), and included 'formulating corporate strategy/direction', 'sounding board for management ideas', 'management recruitment/development', 'formulating, testing or evaluating marketing plans' and 'communicating with/motivating employees'.

³ We do not distinguish between sources of MBO/Is in terms of agency issues since these issues have been identified across the spectrum of buy-outs including public to private, divestment, privatization and family firm cases (see e.g. Thompson and Wright, 1995; Howorth, Westhead and Wright, 2004).

⁴ Our choice of method raises an important issue in the VC literature about what actually are the resources that are provided to the investee company. Many studies in the literature employ aggregated measures of resources or human capital at the VC firm level. A problem with measuring resources and human capital at the firm level is that it does not accurately represent the resource interaction between the VC firm and the investee. We feel that actually asking the investee firm what assistance they received from the VC firm is a potential solution to the problem.

INSERT TABLE 4 HERE

Reliability tests were conducted with regard to each component / composite venture capitalist contribution scale. The components had a Cronbach's alpha coefficient of 0.81 and 0.83, respectively. These standardized and orthogonal new composite venture capitalist contribution scales were utilized as independent variables in the presented regression models.

VC Investments Stage Variables - The investee firms were classified according to stage of investment. We employed two different stage dummy variables. Early stage (EARLY) which includes seed and start-up – (0 = not early stage and 1 = early stage) and late stage (LATE) which includes MBO/I (0 = not late stage and 1= late stage).

Interaction Variables - In order to assess the impact of stage as a moderating effect on the nature of the VC's contribution to the investee firm (VCVA and VCM) we created a range of interaction terms. The interaction terms were calculated by multiplying the VCVA and VCM contributions by the stage dummies (early stage and late stage). This resulted in the creation of four interaction terms VAR*EARLY, VAR*LATE, VCM*EARLY and VCM*LATE).

Control Variables

The data collected relating to the control variables is outlined below. These control variables include: the industry the firm operates in, size, geography, the time period involved between the venture capital investment and the end period of the study, internationalization experience. We expand below.

The main industrial activity of a firm has been found to influence the propensity to export (Miesenböck, 1988). We include a series of dummy variables to control for the chief industrial sector of the firm. Respondents could select up to 27 industrial sectors which were derived historically from CMBOR and EVCA databases. Some of these sectors were then combined to form fewer categories in order to simplify the analysis presented here. In this way the number of sectors was reduced from 27 to 16 (Table 5).

INSERT TABLE 5 HERE

The RBV suggests that firms with larger resource endowments may be able to address the constraints to business development and obstacles to exporting. Empirical evidence on the effect of size on exporting is rather mixed. Bonaccorsi (1992) detected a significant positive relationship between large resources and the ability to be an exporter. This relationship has been supported in numerous studies that have focused on employment size (Calof, 1994; Westhead, 1995; Bloodgood et al., 1996; Burgel et al., 2001). Data relating to the total employment size of the business in final year of the survey (or the year of exit if before the end of the survey period) was collected and included as a control variable, after being (naturally) log transformed (EMPSIZE).

The time period covered by the sample of firms was not the same across all firms, therefore, it was necessary to control for the time window covered by each firm. To do this we constructed the variable (TIME) as the number of months covered between the firm first receiving an equity investment and the end of the period or the time of exit if before.

To examine the impact of the VC's contribution on the export behavior of the investee firm we needed to control for the level of export intensity prior to the VC investment. In order to do so we constructed the variable EXPINTENSITY (-1) that measured the export intensity in the year prior to the VC investment. This approach has been employed by Filatotchev et al (2001).

The impact of the VC's financial and non-financial contributions may also be affected by whether or not the VC firm itself has internationalization experience. We construct a variable VCINTEXP which takes a value of 1 if the VC invested abroad and zero otherwise.⁵

As there may also be important country-specific effects present, we also include the national gross domestic product (GDP) of the country of operation of each

⁵ We have constructed this variable so that the 61.7% of the sample who have responded that they have invested abroad = 1 and all other = 0. An alternative would be to specify those for whom we do not have information as being zero. Doing this, however, results in a significant loss of observations, but leaves our key results unchanged. As a robustness check we also defined internationalization as the VC having branch offices abroad; the results were unchanged.

firm at the time of the buy-out. Further country-specific variables (e.g. population) have very little additional explanatory power and are omitted.⁶ Our key results are also robust to alternative treatments of geographical effects such as the inclusion of regional dummy variables.

STATISTICAL METHOD AND MODEL SPECIFICATION

Statistical Method

In order to model the effects of stage and VC contribution on investees' export intensity we must first address the selection problem. This problem arises because export intensity for non-exporting firms is zero. It is well known that simply omitting such observations from the analysis can lead to biased estimates. One approach would be to estimate both decisions (i.e. the decision as to whether to export and then the intensity of exporting) together using a Tobit model. This approach, however, involves the restrictive assumption that variables that explain the propensity decision are exactly the same as those that affect export intensity. In our view, there is little *a priori* evidence that this should be the case. Hence, we employ the Heckman two-stage selection model (see, for example, Greene 2000: 926-37). In the first stage, the selection decision is estimated using a probit model, as outlined above. In the second stage, the intensity decision is estimated with the coefficients adjusted according to the results of the first stage.

The underlying model of export intensity is:

$$EXPINTENSITY_i = \gamma'w_i + u_i \quad (1)$$

in which \mathbf{w} is another vector of firm and market/industry variables and $u_i \sim N(0, \sigma)$. In the sample, $EXPINTENSITY_i$ is only observed if the firm actually exports. In other words:

⁶ Following the suggestion of an anonymous referee, we also experimented with the inclusion of other control variables in the model, namely including GDP in the exporting equation and several alternative variables to controls for EU integration (including adoption of the Euro). Without exception these variables had little explanatory power and had only a marginal effect on the coefficients of the key variables in our model. These results are not reported here but are available on request.

$$p(\overline{EXPINTENSITY}_i > 0) = (\phi'z_i + v_i) > 0 \quad (2)$$

where \mathbf{z} is a vector of variables that affect whether the firms exports or not and $v_i \sim N(0, 1)$. The Heckman model is appropriate (and will produce consistent and efficient estimates) if the correlation between u_i and v_i (defined as ρ) is different to zero.

Estimation of the Heckman model is undertaken in two stages. In the first stage, probit estimates of the following selection equation are obtained:

$$p(\overline{EXPINTENSITY}_i > 0 \mid z_i) = \Phi(\phi'z_i) \quad (3)$$

From these, estimates of the ‘hazard’ of non-selection (the inverse Mills ratio) are obtained for each observation, m_i where

$$m_i = \frac{\phi(\phi'z_i)}{\Phi(\phi'z_i)} \quad (4)$$

and ϕ is the normal density. In the second stage, consistent estimates of the coefficient vector, $\boldsymbol{\gamma}$, are obtained by regressing $\overline{EXPINTENSITY}_i$ on both \mathbf{w}_i and m_i .

In total we run two different models. The first model does not contain any interaction terms, which allows us to focus on hypotheses 1a, 1b, 2a and 2b. The second model is the full model, including interaction terms. This model enables us to address hypotheses 3a and 3b. In the second model, we omitted the VCM and VCVA terms and included the interaction terms only in order to avoid any problems associated with multicollinearity. We expand on the specification of these models below. In each case, we run a Wald test that the two equations are independent, in other words of the null hypothesis that $\rho = 0$.

Model Specification

As outlined above, in order to perform the Heckman two-stage selection model we specify both a selection equation and a full equation for each of our models. In order for the model to be identified, we need to identify at least one factor that affects the propensity to export and not the export intensity. The obvious such factor

is whether or not the firm has previous experience of exporting. Thus, in our selection equation we include a binary variable (EXPERIENCE) taking a value of one for firms that exported at all prior to the VC investment, with the expectation that the coefficient on this variable will attract a positive coefficient. Further, it is likely that the propensity to export will be influenced by country-specific factors related to, for example, size of the home market. On the other hand, for firms that do export, there seems little reason to expect a regional difference in export intensity. For this reason, we include the value of GDP in the firm's country of origin at the time of the buyout.⁷ We also include in the selection equation, the following variables (anticipated direction of relationship in parentheses): VCVA (+), VCM (+), EMPSIZE (+), TIME (+), VCINTEXP (+).⁸

The second stage involved the specification of the full Heckman models. Model 1 excludes all interaction terms and Model 2 excludes VCVA and VCM but includes the interaction terms.

The full model 1 (anticipated direction of relationship in parentheses), was specified as export intensity being a function of: EARLY (+), VCM (+), VCVA (+).

The full model 2 differs from model 1 as the terms for VCM and VCVA were interacted with the different investment stages. As a result, the model specification differs as we removed the VCM and VCVA terms and replaced them with a series of interaction terms. The full model (anticipated direction of relationship in parentheses), excluding control variables, was specified as export intensity being a function of: EARLY (+), VCM*EARLY (+), VCM*LATE (+), VAR*EARLY (+), VAR*LATE (+).

⁷ There is statistical support for this hypothesis in that, when we included GDP in the main regression equation it attracts an insignificant coefficient. Reassuringly, our key results are robust to the exclusion of different sub-sets of control variables from the selection and main regression equations.

⁸ VCMVCVA and VCVA VCM are included as these variables may play a role in removing or imposing constraints that affect the decision over whether or not to export. We exclude EARLY from the selection model on the grounds that the decision over whether or not to export (as opposed to how much to export) is affected primarily by the nature of the firm and industry rather than by the stage of the firm. Again there is empirical support for this proposition in that these variables attract insignificant coefficients when included in the selection equation without materially changing the other results.

RESULTS

Table 6 presents the correlation matrix for the variables employed in the analysis and it is evident that multi-collinearity does not present a problem for the analysis.

INSERT TABLE 6 HERE

The results of the two models are presented below. Note that the coefficients in the full model need careful interpretation. Each coefficient represents the overall estimated marginal impact of the variable on export intensity. We also present in the tables of results, the conditional effects. These are the marginal impact of each variable on export intensity *conditional on the firm being an exporter*. For variables that are only in the full equation, the conditional effect will be equal to the coefficient. However, if the variable enters into both selection and full equations, the two effects will be different. As, in our case, the two effects are very similar, we restrict our discussion below to the unconditional marginal effect (i.e. the coefficients).

Model 1

The results of model 1 are presented in Table 7. The Wald test of independent equations is strongly significant and confirms the value of the Heckman procedure.

INSERT TABLE 7

The results of the selection model indicate that a firm's propensity to export is: positively related to a firm's export experience ($p < 0.01$), negatively related to size ($p < 0.1$), positively associated with time ($p < 0.05$), positively related to VC internationalization experience ($p < 0.1$) and negatively related to national GDP ($p < 0.01$).

Our results lead us to reject H1a, that (on average) there is a positive relationship between a VC's contribution to monitoring resources (VCM) and export intensity. The coefficient here is positive but insignificant. However, the results of the regression equation provide evidence to support hypothesis H1b, that is there is a positive relationship between a VC's value-added resources and (VCVA) and export intensity ($p < 0.01$). In particular, if the strategic contribution increases in absolute

terms by 0.1, we estimate that export intensity will be increased by 0.3463 (standard error, 0.1217) of a percentage point.⁹

Model 2

The results of Model 2 are presented in Table 7. As with model 1, the Wald test that the selection and regression equations are independent is strongly significant, confirming our decision to use the Heckman two-step procedure.

The results of the second selection model mirror those above both in the direction and the statistical significance of the effects. The results of the second regression equation provide strong evidence to support hypothesis H2a, that the relationship between external VC value-added resources (VCVA) and export intensity will be greatest for early-stage investments. To illustrate this, if the strategic contribution increases in absolute terms by 0.1, we estimate that export intensity will be increased by 0.8925 (standard error, 0.3315, $p < 0.01$) of a percentage point for early-stage investments, but by just 0.1311 (standard error, 0.1097) percentage points for late-stage investments.

The results also provide some support for hypothesis H2b, that the relationship between external VC monitoring resources and export intensity will be greatest for late-stage investments, although the significance level is much lower. In this case, if the monitoring contribution increases in absolute terms by 0.1, we estimate that export intensity will be increased by about 0.1593 (standard error 0.871, $p < 0.1$) for late-stage investments but by just 0.0386 (standard error, 0.3997) for early-stage investments.¹⁰

⁹ The marginal effects are reported here using 0.1 as the degree of change as this is a more realistic figure than a full unit. If a 1 unit change was to occur, e.g. if the venture capitalists' value-added contribution (VCVA) was to increase in absolute terms by 1 unit then the marginal effect and standard error would need to be multiplied by 10 as reported here. In this instance a 1 unit change in the VCVA would result in an increase in export intensity of 3.463 (standard error 1.217) of a percentage point.

¹⁰ As highlighted on footnote 3, the marginal effects are reported here using 0.1 as the degree of change as this is a more realistic figure than a full unit. Hence, in order to calculate the marginal effect of a full unit change in VCM or VCVA the marginal effects and standard errors reported here would need to be multiplied by 10.

DISCUSSION AND CONCLUSIONS

In this paper we have provided the results of the first systematic study of the relationship between internationalization activity and VC involvement in firms. Employing a unique pan-European dataset, we have examined the relationship between export intensity, investment stage of the investee company and the nature of the venture capitalist's contribution. A novel feature of our analysis is to consider the impact of VC involvement on firms at different investment stages. Our findings provide two interesting results, both of which highlight the importance of investment stage as a moderating variable for the relationship between external VC resources and investee firm export intensity.

First, although external VC value-added resources are positively related to export intensity across all firms in our sample, we find evidence to suggest that investment stage moderates this relationship. That is, external VC value-added resources have a greater impact on export intensity for early-stage ventures than late stage ventures. The effect is not significant for late-stage MBO/I ventures.

Second, although we do not find a significant effect of external VC monitoring resources on export intensity across all firms in our sample, we find that the effect is significantly moderated by the stage of investment of the investee firm. Specifically, external VC monitoring resources have a significant effect for late-stage MBO/I firms, however, no significant effect exists for early-stage firms. The finding that the stage of investment moderates the relationship between external VC resources and the export intensity has implications for both researchers and practitioners.

Implications for Researchers

For researchers, our analysis provides interesting insights into the impact of VC firms on investee internationalization, an area of VC activity that has hitherto been neglected. First, given the increasing internationalization of markets, an important aspect of our study is that we demonstrate that VC firms can assist their investee companies in becoming more internationalized. In our study we focused on two broad categories of VC resources (value-added and monitoring), future research should provide a more nuanced understanding of the precise nature of VC resources in relation to internationalization activities. This is a complex task that will involve trying to define, with greater precision, the nature of the resource-space that investee

firms and VC firms operate in. The issue of resource-spaces in general (Lockett, O'Shea and Wright, 2007), and the resource-spaces of internationalizing SMEs in particular, is an area that requires further study.

Second, our analysis extends the limited research on the role of VCs in the internationalization of investees. Zahra and Neubaum (2007) find a positive relationship between the equity-holdings of VC firms and the development of knowledge-based resources for internationalization using a US sample of firms. Our analysis emphasizes the need to dig more deeply into what VC firms actually do to influence their investees (Gorman and Sahlman, 1989). In contrast to Zahra and Neubaum (2007) our study covered VC investments in Europe which include both early stage and late stage MBO/I transactions. Our findings emphasize that the nature of the VC's involvement in influencing internationalization may vary between the type of investment. Overall, our findings add to growing appreciation of the need to understand the heterogeneity of VC activity in terms of type of involvement, type of investee and type of context (Wright, Pruthi and Lockett, 2005). Although there has been some transfer of VC expertise to other contexts outside the US, it may be necessary to adapt approaches to suit the local institutional environment. This point applies to both the building of conceptual arguments (Meyer, 2006) and to the nature of VC involvement (Pruthi, Wright and Lockett, 2003; Wright, 2007). Future research might usefully extend the analysis of the influence of VCs on internationalization to other contexts such as Asia and South America.

Third, our focus in this paper has been on the export intensity of firms as a strategic outcome, however, the importance of VC value-added resources for early stage companies may also hold for other types of strategic behavior. By demonstrating that there is a link between external resources and firm behavior we suggest that this opens up the potential for studying changes across a range of different strategic behaviors.

Third, as internationalization by VC firms increases, an interesting area for further research concerns the nature of the resources VC firms are able to bring to foreign markets that can enable them differentiate themselves from the domestic competition. While there is some evidence concerning the adaptation by VCs when they enter foreign markets in terms of their information, valuation and monitoring behavior (Wright, Lockett and Pruthi, 2002; Pruthi, Wright and Lockett, 2003), there

is an absence of evidence regarding the relative success of foreign VCs in aiding firms to internationalize. We hope our work stimulates further interest in this area.

Implications for Practitioners

For practitioners, our research emphasizes how and when VCs can influence their investees' strategic behavior. Our results have important implications for both VCs and their investee companies.

First, VC firms are able to effect most strategic change, in terms of promoting export intensity, when the investee is an early stage firm. If VC firms are keen to expand the international operations of their early stage investee firms, it is important for investment executives to understand the important role they play in the process. Likewise, managers of SMEs should view VC firms as a potential provider of value-added resources, in addition to finance and monitoring resources, when selecting an investor. A central tenet of the RBV is that all firms are heterogeneous and so some VC firms will have more developed resources to assist international expansion than others. It is important that investee firms select their investors based on a knowledge of what external resources the VC firm can offer them.

Second, Wright et al (2000) argue that late stage transactions (MBOs) can have a potentially liberating effect on firms, however, our findings suggest that this effect is rather weak across the late stage firms in our sample. Our findings may indicate that VC firms may be missing an opportunity to promote the expansion of their investees' activities overseas through their external monitoring resources. An interesting issue here relates to why the potential impact of VC monitoring resources on investee companies far exceeds the eventuality.

Limitations

There are a number of limitations associated with our study. First, although our method incorporates time lags with respect to export intensity, we have focused on a cross-sectional analysis of different investment stages. Future research might trace the changes in VC involvement in promoting export intensity over time in particular ventures, i.e. take a panel data approach. Such an approach, while interesting, is fraught with the problems of gaining access to venture-backed firms over a long-period of time, as well as the usual problems with sample attrition.

Second, we are not able to draw on accounting data in order to examine the sales, exports and performance affects of internationalization. This problem is largely unavoidable in the context of multi-national studies where practice on information disclosure varies between countries.

Third, we only employ one measure of internationalization activity in our study, export intensity. Future research might examine a range of different indicators of a firm's involvement in international markets including foreign direct investment.

Fourth, we only focus on two broad categories of resources (value-added and monitoring). As articulated above, future studies should seek to provide a more nuanced understanding of the relationship between the investee companies' resource-base, the VC firm's resource-base and internationalization. That is, much more work needs to be undertaken in mapping the resource-spaces involved in VC firm and SME internationalization.

Conclusion

SMEs face considerable problems in internationalizing due to limitations in their internal resource-bases. Internal resources, however, may be augmented with external resources (Bonaccorsi, 1992). VC firms are important external resource provider for SMEs. Our empirical evidence demonstrates that the investment stage of the investee moderates the effect of external governance resources on the export intensity of the investee firm. Specifically, value-added resources are most important for early stage and monitoring resources for late stage firms. We feel that both theory and practice can benefit from a more detailed understanding of *how* and *when* VC governance resources affect the exporting behavior of investee firms.

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Table 1: Internal and External Resources by Investment Stage

	Early Stage (seed, startup)	Late Stage (MBO/I)
Internal Dimensions		
Accounting Information	Limited	Available
Internal Monitoring Resources	Limited	More fully developed than with early stage but potentially problematic
Internal Value-Added Resources	Limited	Well developed
External Dimensions		
External (VC) Monitoring Resources	Less important as little accounting information to work with – governance focuses on monitoring cash burn	Important in disciplining the venture to seek new revenue sources as accounting information is available
External (VC) Value-Added Resources	Important in developing the business	Less important due to internal well developed internal resource base

Figure 1: Model

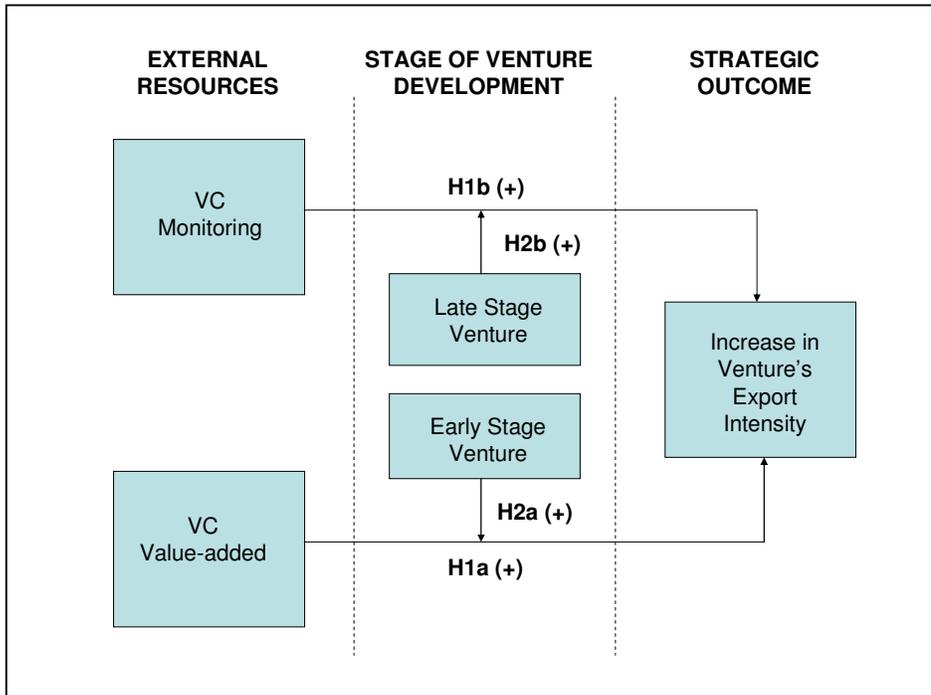


Table 2: Investment Stage and Industrial Breakdown

	Population		Initial Response		Study Sample	
	No.	%	No.	%	No.	%
STAGE						
EARLY	2,908	55.3	245	45.0	102	30.0
LATE	2,359	44.7	299	55.0	238	70.0
TOTAL	5,267	100.0	544	100.0	340	100.0
INDUSTRY						
AGRICULTURE	74	1.41	6	1.10	6	1.76
BIOTECHNOLOGY	226	4.29	45	8.27	18	5.29
CHEMICALS & MATERIALS	141	2.68	15	2.76	11	3.24
CONSTRUCTION	164	3.11	19	3.49	17	5.00
ENERGY	58	1.10	8	1.47	6	1.76
INDUSTRIAL AUTOMATION	81	1.54	13	2.39	7	2.06
OTHER INDUSTRIAL	671	12.74	44	8.09	32	9.41
OTHER SERVICES	612	11.62	50	9.19	33	9.71
ELECTRONICS	264	5.01	19	3.49	12	3.53
COMMUNICATIONS	400	7.59	19	3.49	7	2.06
OTHER MANUFACTURING	421	7.99	95	17.46	68	20.00
COMPUTER	725	13.77	103	18.94	49	14.41
TRANSPORT	123	2.34	14	2.57	9	2.65
OTHER CONSUMER	737	13.99	28	5.15	21	6.18
MEDICAL	292	5.54	31	5.70	17	5.00
OTHER	278	5.28	35	6.44	27	7.94
TOTAL	5,267	100.0	554	100.0	340	100.0

Table 3: Variable Definitions

VARIABLE	DESCRIPTION
Dependent variables	
EXPORT	Exporter = 1, Non exporter = 0
EXPINTENSITY	Export intensity in last period of survey
VC contribution variables	
VCM	VC firms focus on monitoring resources
VCVA	VCs firms focus on value-added resources
Interaction variables	
VCM*EARLY	Interaction of VCM and EARLY
VCVA*LATE	Interaction of VCVA and LATE
VCM*EARLY	Interaction of VCM and EARLY
VCVA*LATE	Interaction of VCVA and EARLY
Control variables	
Stage variables	
EARLY	Early stage = 1, Not early stage = 0
LATE	Late (MBO/I) stage = 1, Not late stage = 0
EMPSIZE	Natural log of number of employees
TIME	Time window for the firm in months
EXPINTENSITY (-1)	Export intensity at time of VC equity investment
EXPERIENCE	Exporter at time of VC equity investment = 1; non-exporter = 0
VCINTEXP	VC backer has internationalization experience
GDP \$	National GDP at constant prices and current exchange rates (billions USD)
AGRICULTURE	Agriculture sector = 1, other sector = 0
BIOTECHNOLOGY	Biotechnology sector = 1, other sector = 0
CHEMICALS & MATERIALS	Chemicals & materials sector = 1, other sector = 0
CONSTRUCTION	Construction sector = 1, other sector = 0
ENERGY	Energy sector = 1, other sector = 0
INDUSTRIAL AUTOMATION	Industrial Automation sector = 1, other sector = 0
OTHER INDUSTRIAL	Other industrial sector = 1, other sector = 0
OTHER SERVICES	Other services sector = 1, other sector = 0
ELECTRONICS	Electronics sector = 1, other sector = 0
COMMUNICATIONS	Communications sector = 1, other sector = 0
OTHER MANUFACTURING	Other manufacturing sector = 1, other sector = 0
COMPUTER	Computing related sector = 1, other sector = 0
TRANSPORT	Transport sector = 1, other sector = 0
MEDICAL	Medical sector = 1, other sector = 0
OTHER CONSUMER	Other consumer sector = 1, other sector = 0
OTHER	Any other sector = 1, other sector = 0

Table 4: Venture Capitalist Participation Variables: Varimax Rotated Principal Component Analysis^(a)

		Varimax Rotated Components		
Venture capitalist participation variables (b) (c)		1	2	Communality (h ²)
V1	Formulating corporate strategy/direction	<u>0.73</u>	0.32	0.64
V2	Sounding board for management ideas	<u>0.68</u>	0.29	0.55
V3	Management recruitment/development	<u>0.79</u>	0.14	0.64
V4	Formulating, testing or evaluating marketing plans	<u>0.67</u>	0.32	0.54
V5	Communicating with/motivating employees	<u>0.71</u>	0.16	0.53
V6	More regular budget reporting	0.28	<u>0.80</u>	0.71
V7	Monitoring financial performance	0.24	<u>0.87</u>	0.81
V8	Monitoring operational performance	0.25	<u>0.80</u>	0.70
Sums' of squares of the component loadings		2.76	2.35	
Percent of variance		34.50	29.41	
Cumulative percent of variance		34.50	63.91	
Cronbach's alpha		0.81	0.83	

Notes: (a) Data gathered from a postal questionnaire administered between 2000 and 2002; (b) Respondents were asked: "Please circle the number you feel is the most appropriate description of the input of the venture capitalist in the following activities in your company". The following scale was used: (1) no VC participation to (5) all by the VC. (c) One statement failed to survive the R-mode PCA: financial advice.

Table 5: Industry Sectors

Old Sectors (questionnaire)	New Sectors (this study)
Agriculture	Agriculture
Biotechnology	Biotechnology
Chemicals and materials	Chemicals and Materials
Construction	Construction
Energy	Energy
Industrial Automation	Industrial Automation
Industrial Products/services	Other Industrial
Other Services	Other Services
Services (other)	
Financial Services	
Electronics	Electronics
Communications	Communications
Telecommunications: Carriers	
Telecommunications: Hardware	
Communication (other)	
Other Manufacturing	Other Manufacturing
Manufacturing (other)	
Food and Drink	
Computer	Computer
Computer: Hardware	
Computer: Semiconductor	
Computer: Services	
Computer: Software	
Internet technology	
Transportation	Transport
Other Consumer	Other Consumer
Consumer: Retail	
Consumer: Other	
Hotels, Catering and Leisure	
Medical	Medical
Medical: Healthcare	
Medical: Instruments	
Medical: Pharmaceuticals	
Other	Other

Table 6: Correlation Matrix

	MEAN	S.D.	EARLY	VCM	VCVA	EMPSIZE	TIME	VCINTEXP	EXPINTENSITY (-1)	EXPERIENCE	GDP \$
EARLY	0.300	0.459	1.000								
VCM	-0.072	1.026	0.259	1.000							
VCVA	-0.154	0.952	0.256	0.097	1.000						
EMPSIZE	416.96	1189.54	-0.202	0.072	0.044	1.000					
TIME	48.48	21.83	-0.595	-0.230	-0.178	0.059	1.000				
VCINTEXP	0.644	0.479	-0.398	-0.130	-0.109	0.121	0.251	1.000			
EXPINTENSITY (-1)	18.16	28.46	-0.150	-0.054	0.117	0.013	0.018	0.092	1.000		
EXPERIENCE	0.556	0.498	-0.332	-0.116	0.072	0.069	0.145	0.139	0.571	1.000	
GDP \$	1138.11	548.20	0.039	0.032	-0.145	-0.046	-0.069	-0.047	-0.062	-0.028	1.000

Table 7: Heckman Selection Estimates of Export Intensity

	MODEL 1			MODEL 2		
	SELECTION	REGRESSION	CONDITIONAL EFFECT	SELECTION	REGRESSION	CONDITIONAL EFFECT
STAGE						
EARLY		10.557#	10.557#		8.143	8.143
		[5.451]	[5.451]		[6.438]	[6.438]
VC INVOLVEMENT						
VCM	0.280**	0.769	0.358	0.283**		
	[0.108]	[1.002]	[1.016]	[0.110]		
VCVA	0.139	3.463**	3.259**	0.164		
	[0.128]	[1.217]	[1.205]	[0.127]		
INTERACTION TERMS						
VCM*EARLY					0.386	0.386
					[3.997]	[3.997]
VCVA*LATE					1.593#	1.593#
					[0.871]	[0.871]
VCM*EARLY					8.925**	8.925**
					[3.315]	[3.315]
VCVA*LATE					1.311	1.311
					[1.097]	[1.097]
CONTROLS						
EMPSIZE	-0.000#	-0.001	-0.0002	-0.0002#	-0.0004	-0.0001
	[0.000]	[0.001]	[0.001]	[0.000]	[0.001]	[0.001]
TIME	0.014*	0.034	0.013	0.014*	0.031	0.008
	[0.006]	[0.061]	[0.062]	[0.006]	[0.061]	[0.062]
EXPINTENSITY (-1)		0.802**	0.802**		0.829**	0.829**
		[0.037]	[0.037]		[0.039]	[0.039]
EXPERIENCE	3.582**			3.538**		
	[0.542]			[0.545]		
VCINTEXP	0.504#	2.42	1.611	0.537*	1.328	0.298
	[0.268]	[2.881]	[2.869]	[0.268]	[3.060]	[3.046]
GDP \$	-0.001**			-0.001**		
	[0.000]			[0.000]		
AGRICULTURE	2.232*	-5.495	-6.430	2.220*	-5.718	-6.838
	[0.964]	[11.045]	[10.992]	[0.948]	[13.953]	[13.93]
BIOTECHNOLOGY	2.167**	-8.845	-9.899	2.096**	-7.166	-8.419
	[0.676]	[11.088]	[11.076]	[0.680]	[14.283]	[14.289]
CHEMICALS & MATERIALS	2.837**	-1.95	-2.970	2.788**	-3.834	-5.053
	[0.903]	[9.315]	[9.228]	[0.878]	[12.952]	[12.911]
CONSTRUCTION	0.299	-11.995	-12.366	0.264	-11.421	-11.819
	[0.407]	[9.503]	[9.495]	[0.415]	[12.964]	[12.875]
ENERGY		0.067	0.067			
		[14.853]	[14.853]			
INDUSTRIAL AUTOMATION	2.652**	-1.426	-2.387	2.524**	-1.143	-2.289
	[0.777]	[9.625]	[9.6562]	[0.779]	[13.228]	[13.196]
OTHER INDUSTRIAL	2.748**	-2.603	-3.920	2.708**	-3.047	-4.614
	[0.982]	[9.474]	[9.348]	[0.969]	[12.882]	[12.802]
OTHER SERVICES	1.627**	-12.057	-13.160	1.601**	-12.749	-14.060
	[0.522]	[9.178]	[9.106]	[0.525]	[12.839]	[12.792]
OTHER	1.150*	-0.99	-1.917	1.097*	-0.522	-1.608
	[0.546]	[10.048]	[9.926]	[0.552]	[13.558]	[13.451]
ELECTRONICS	2.617**	-0.028	-1.049	2.557**	-0.456	-1.674

	[0.815]	[12.181]	[12.095]	[0.814]	[15.122]	[15.074]
COMMUNICATIONS	2.552**	-13.773	-14.731	2.449**	-14.254	-15.397
	[0.923]	[15.654]	[15.677]	[0.916]	[18.354]	[18.395]
OTHER MANUFACTURING	1.541**	-9.635	-10.995	1.547**	-9.517	-11.144
	[0.579]	[9.100]	[8.897]	[0.577]	[12.665]	[12.577]
COMPUTER	1.989**	-0.232	-1.592	1.905**	0.233	-1.359
	[0.567]	[10.236]	[10.180]	[0.574]	[13.651]	[13.622]
OTHER CONSUMER	1.108#	-9.284	-10.169	1.112#	-9.778	-10.839
	[0.595]	[9.269]	[9.202]	[0.601]	[12.762]	[12.714]
MEDICAL	2.031**	2.877	1.847	2.009**	1.157	-0.074
	[0.646]	[10.106]	[10.028]	[0.644]	[13.304]	[13.265]
TRANSPORT	1.320#			1.302#	-1.484	-2.535
	[0.737]			[0.728]	[15.360]	[15.383]
Constant	-2.488**	12.103	12.103	-2.438**	12.108	
	[0.614]	[10.198]	[10.198]	[0.619]	[13.219]	
N	340			340		
Chi-square	1196.01***			1330.56***		
Log-likelihood	-1071.9			-1067.6		
Wald test of independence	9.45**			8.71**		

Notes:

(i) Robust standard errors in parentheses

(ii) # p<.1 * p<.05; ** p<.01; *** p<.001

(iii) Conditional effects are the marginal change in export intensity conditional on the firm being an exporter.