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# THE EFFECT OF VENTURE CAPITALISTS ON THE EARLY STAGE GROWTH OF HIGH TECH VENTURES

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## ABSTRACT

On the cross borders of growth literature and venture capital literature, quite a lot of research has been done on the impact of VC on company growth. The confusion on the role of VC however remains. This confusion can be partially related to the relatively simplistic view the aforementioned studies have on the role of VCs. Despite the large heterogeneity in the VC industry, most studies consider VCs as a homogenous group of firms and include them as dummy variables in the analysis. A better understanding is needed about how differences between VC funds lead to selecting the firms with the highest growth potential and/or realizing the potential. In this paper, we investigate the relation between VC selection and follow behaviour and portfolio company growth using a unique dataset of European VCs and 99 of their portfolio companies across Europe.

## INTRODUCTION

Understanding the growth of high tech ventures has increasingly become an important area for research due to the contribution these ventures are expected to make in terms of employment and technological and economic development (Rothwell and Zegveld, 1982; Freeman, 1983; Keeble, 1989; Murray, 1996). Despite the romantic belief among practitioners and policy makers that many of these high tech start-ups are potential gazelles, several scientific studies (Autio and Yli-Renko, 1998; Mustar, 1997) indicate that most high tech start-ups do not grow at all. Still, some more recent studies indicate that those high tech start-ups that succeed in attracting venture capital tend to outperform those that do not in terms of time to market (Hellman and Puri, 2000), innovative activity (Kortum and Lerner, 2000) and employment/revenue growth (Heirman and Clarysse, 2005). But even for this category of firms, evidence seems to be mixed. Schoonhoven et al. (1990) show that US high tech start-ups that receive venture capital need more time to ship their first product for revenues. A finding which is attributed by the authors to the slack that is the result of a more comfortable cash position that most VC backed start-ups have.

Most of the aforementioned studies treat the presence of venture capital as a dummy variable. This means that each VC is assumed to have the same selection capacity and competence to play a post-investment role (Davila et al., 2003; Hellmann and Puri, 2000; Baum and Silverman, 2004). However, the venture capital literature shows a very different story. In fact, the venture capital industry is a rather fragment industry with different approaches in selection and follow-up behaviour (Muzyka et al., 1996; MacMillan et al., 1985; 1987; Sapienza et al., 1994).

The confusion about the role of VCs in growing companies can be partially related to the relatively simplistic view the aforementioned studies have on the role of VCs. Despite the large heterogeneity in the VC industry with respect to selection and follow-up behaviour and despite the large differences between VC funds in terms of size, focus, shareholder structure and age, they are considered to be a homogeneous group of firms. A better understanding is needed about how differences between VCs funds, both with respect to their characteristics and in terms of selection and follow up behaviour lead to selecting the highest growth potentials and realizing the potential.

We investigate the relation between VC involvement and portfolio company growth using a unique dataset of European VCs and 99 of their portfolio companies across Europe.

## THEORETICAL BACKGROUND

In this section we summarize some of the theoretical explanations that have been given to explain growth. Within the strategic management literature, we analyse the resource based view, which has mainly focused on internal firm factors that might explain growth. Second, we analyse the Porterian or market view which has mainly focused on external market conditions that explain growth.

### **The Resource based view**

The analysis of firm-specific factors that lead to growth goes back to Penrose's (1959) groundbreaking work. She highlighted the importance of managerial resources to firm expansion. In particular, she emphasized that a lack of managerial resources causes problems that are a constraint for further growth— i.e. the so-called Penrose effect. Wernerfelt (1984) added the imperfect working of markets as a critical element in explaining how resources generate competitive advantage. Resources are only valuable if they are difficult to trade or imitate on the spot market. His seminal article was the start of a stream of research which is called the Resource Based View. Researchers in this stream argue that success is depending on the characteristics of the firm's resource bundle (e.g. Barney, 1991). Its human resources include the founding team and entrepreneur (e.g. Utterback et al., 1988; Shane and Stuart, 2002); its technical resources encompass its product and technology (Utterback et al., 1988; Roberts, 1991), its organisational resources (Wernerfelt, 1984; Teece et al., 1997) and financial resources (Hellmann and Puri, 2000).

### **The market view**

During the past decade, the resource based framework has been the most popular conceptual model to study sources of competitive advantage and, related, company growth. However in the seventies and eighties, the Bain-type Porterian framework was the dominant model to study. Both theories find their roots in the fifties with respectively Bain (1962) as a pioneer of the Porterian framework (Porter, 1980) and Penrose (1959) pioneering the resource based theory. In the seventies and eighties, most attention was given to the Porterian hypothesis that structural industry conditions determine performance differences between firms.

In line with this tradition, industrial organisation scholars have analysed the impact of first mover advantages, innovative activity and market opportunities on growth (for reviews, see Kamien and Schwartz, 1982; Cohen and Levin, 1988; Acs and Audretsch, 1990). This stream converges on the idea that firms grow fastest in markets where there is relatively little competition. At the theoretical site, Jovanovich (1982) developed a model, which predicts that, if price is constant over time and if incumbents choose to produce less on average in the next period due to expected decreases in efficiency, then increases in demand should be met by new entrants (these two conditions are very likely to be met if no technological breakthroughs take place which affect both expected efficiency and price and if the industry is not subject to ever increasing returns to scale). In the particular case of ever increasing returns to scale (or natural monopolies), Baumol et al.'s (1983) contestable market theory might be applied. Consistent with Jovanovich (1982), this theory predicts that large increases in demand are likely to be met by new entrants in the industry which occupy (temporarily) contestable niches. The argument was taken over and further developed by management practitioners such as Moore (1991), who argued that focusing on a specific market segment or niche market is critical to market and sell new high tech products and argue that once the potential of the product/technology is demonstrated in a smaller market segment, the firm can use these first customers as a reference to go after larger, broader market experience.

## **MODEL DEVELOPMENT**

In this section we develop our model about how differences in VC selection and follow-up behaviour may affect investee growth.

### **Selection behaviour and employee growth**

Amit et al. (1998) state that VCs exactly emerge because they develop specialized abilities in selecting and monitoring entrepreneurial projects, which decrease the chance of encountering adverse selection and moral hazard problems caused by information asymmetries. First, before making an investment, VCs carefully scrutinize the founders and their business concepts (Fried and Hisrich, 1994). Besides, VCs are expected to select those start-ups that have potential to obtain high growth and a management pursuing high growth (Zacharakis and Meyer, 1998; 2000).

In what follows, we build hypotheses on the link between selection behaviour of VCs and employee growth of their portfolio companies.

Researchers in the resource-based view of the firm report that the entrepreneur's skills and experience are positively related to new firm success (Roberts, 1991; Cooper et al., 1994). Heirman and Clarysse (2005) found that the commercial experience of the founding team highly contributed to company performance, and research by Gorman and Sahlman (1989) has shown that weak operating business senior management is a dominant cause of failure.

Human capital investors mainly look at two factors in order to make their decision. These are 1) the entrepreneurial team and 2) the lead entrepreneur. These investors believe that the experience and network of the team of entrepreneurs and the leadership potential of the lead entrepreneur will, above all, affect the company's performance. They believe that changing a team after investment takes too much time and makes them lose market share to competitors in the meanwhile.

Therefore, we offer the following hypothesis:

***H1: There is a positive relationship between a VC emphasis on the experience and completeness of the venture team as a selection criterion and the growth of the portfolio company.***

Besides a complementary team, the new venture may also need a strong entrepreneur who will, at least during the first years, be able to build the team and to manage the company. This person should understand the challenges the venture will be facing and be willing to let the company grow, even if this requires attracting new or other team members, and even putting his own position in question at times. Research has confirmed the importance of the lead entrepreneur. Murray (1996) for instance stresses in his analysis of six European case studies of successfully exited, venture capital-financed NTBFs the importance of the track records and competence of the founders.

Therefore, we offer the following hypothesis:

***H2: There will be a positive relationship between a VC emphasis on the lead entrepreneur's abilities as a selection criterion and the growth of the portfolio company.***

There are a number of reasons why some VCs are attaching the most importance to the expected market growth. First, research confirms (e.g. Finley et al., 1994) that the firm workforce growth rate is positively correlated to growth of the targeted market. Second, VCs indicate that they are mainly interested in investing in businesses that target fast growing markets as these companies will be providing more interesting exit routes to them. They argue that it are mainly these portfolio companies that are likely to be successfully exited, either through IPO or trade sale. In case of a new technology, IPOs are only likely to be realised if the company that is preparing the IPO is playing on a high growth market. This makes them interesting to both individual and institutional investors, who are willing to take the perceived higher risk attached to high tech as long as markets targeted look more promising than for

traditional businesses. Beside the exit route through IPO, also trade sales are more likely to be realized for ventures operating on high growth markets, as this high growth potential makes them extremely interesting to larger, established companies that have waited to jump on the bandwagon, and are seizing the opportunity by buying the company that built an established position in the emerging market. Therefore, these investors, focusing on market growth, believe that companies targeting high growing markets will grow faster than those that do not, and will provide more interesting exit routes to them. This is confirmed by Murray's (1996) research on successfully exited ventures indicating that they were all playing on high growth markets.

Therefore, we offer the following hypothesis:

***H3: There will be a positive relationship between a VC emphasis on the expected market growth as a selection criterion and the growth of the portfolio company.***

Besides this high growth market argument put forward by VCs emphasizing market criteria, some VCs stress the fact that the market targeted is a specific market segment or a niche market. They believe that this focus is necessary in order to sell new high tech products and argue that once the potential of the product or technology is demonstrated in a smaller market segment, the firm can use these first customers as a reference to go to larger, broader markets. This is also found by Moore (1991). If new ventures target niche markets they may be able to grow faster, as they face less competition from established players. Focusing on niche markets has another advantage: as niche markets are specialised markets with a small number of players, new ventures may be able to faster acquire a position in the market, and may not have to compete against large established companies. At the same time, the fact that they are targeting niche markets, which larger companies find hard to target given their focus on mainstream markets and their large overhead structure, makes them interesting take-over targets to established companies, and may explain why some VCs emphasis this criterion during the selection phase.

Therefore, we offer the following hypothesis:

***H4: There will be a positive relationship between a VC emphasis on niche market as a selection criterion and the growth of the portfolio company.***

Companies that have protected technologies and products may be growing faster than those that have not. The protection of their technology gives them a head start compared to competitors that may find it difficult to put products on the market that do not violate the patent. Even though the protection may be limited in time, it gives the company that owns it the chance of expanding its market share and growing faster than its competitors. It gives companies the opportunity to diversify with respect to commercialisation paths, allowing them to grow faster, and to differentiate themselves. Venture capitalists interviewed, that were emphasizing this protection, indicated another reason why protection of technology is important: it allows to make changes to the team that are necessary in order to increase professionalisation, without loosing knowledge to competitors (which may for instance occur if team member take the company's knowledge with them when leaving the company). Both venture capital and entrepreneurship emphasize the importance of having protectable technologies: Lee et al. (2001) found the protectability of the technological innovation to positively impact company growth. In venture capital literature, MacMillan et al. (1987) indicated that VCs link lack of protection for the product to unsuccessful ventures. Murray et al. (1996) indicate that for each of the six successfully exited ventures studied, patent protection was important.

Therefore, we offer the following hypothesis:

***H5: There will be a positive relationship between a VC emphasis on the protectability of the technology as a selection criteria and the growth of the portfolio company.***

Interviews indicate that European VCs have shifted over the previous years from investing in platform technologies to non-platform technologies. Platform technologies are broad technologies with lots of different applications. VCs indicated that platform technologies have both advantages and disadvantages. The advantage is that there are multiple possibilities if one application fails to live up to the expectations. The disadvantage, which was found by some VCs to be more important than this advantage, is that there is no real focus during development and commercialisation. Small high tech ventures only have limited resources and in case of a platform technology approach, resources are split over several projects, causing a longer period before technological finalisation and commercialisation. The risk of platform technologies may be that entrepreneurs keep on developing several applications without really coming to commercialisation of any of them. Researchers (e.g. Murray, 1996) indicate that a danger with new technologically sophisticated products is that their inventors never stop improving them, which is often described as the entrepreneurs being in love with the elegance and novelty of the technology itself rather than its ability to make money. This may be extremely problematic in case of a platform technology that involves the development of different applications.

Therefore, we offer the following hypothesis:

***H6: There will be a negative relationship between a VC emphasis on the platform technology as a selection criteria and the growth of the portfolio company***

Follow-up behaviour and employee growth

We again find theoretical backing in the resource based view of the firm, indicating that venture capital is smart money provided to the company. VCs play an active role in their portfolio companies and are involved in monitoring and value-adding activities (Sapienza et al., 1996; Fried et al., 1998; Hellman and Puri, 2000; Schefczyk and Gerpott, 2001; Gompers, 1995; MacMillan et al., 1989). The rationale for the active role with respect to monitoring lies in information asymmetries between VC and entrepreneur that might give rise to agency conflicts that drive VCs to monitor their portfolio companies. Agency theory suggests that equity finance provides entrepreneurs with incentives to engage in activities from which they benefit disproportionately (Gompers, 1995). Another reason for this post-investment involvement lies in the belief by VCs that they can add value to the ventures invested in and thus improve outcomes of their investments (Sapienza, 1992, 1996; Fried et al., 1998; Hellman and Puri, 2000; Schefczyk and Gerpott, 2001). Sapienza (1992) and Sapienza and Timmons (1989) detected positive correlations between VC management support intensities and portfolio company performance. Schefczyk (2001) found intensifying co-operation between VCs and portfolio companies to coincide with above average success of portfolio companies.

There are a number of indications of how intensity of follow-up behaviour could link to portfolio company growth. First, venture capitalists have the same objective when following up on portfolio companies from a monitoring or from a value-adding point of view: making sure that the value of the venture increases, either by making sure that the entrepreneurs does not take actions that decrease the company's value (monitoring) or by taking actions that are expected to contribute the company's value (value-adding). In this reasoning, the intensity of follow-up behaviour is expected to positively correlate to portfolio company growth.

Therefore, we offer the following hypothesis:

***H7: There will be a positive relationship between a VC's intensity of follow-up behaviour and the growth of the portfolio company.***

## METHODOLOGY

We used a sample of 68 European early stage high tech VCs interviewed in 2003 as a starting point.

In order to get insight into the selection behaviour of these VCs, a conjoint methodology was used. In short, we presented the VCs in our sample with a number of fictive business cases that differed on attributes that were based on four main categories of selection criteria: team, market, product and finance. In total, twelve different attributes were included: team, entrepreneur, contact with the entrepreneur, uniqueness of the product, protection of the product, market acceptance, platform technology, location, size and growth of the targeted market, time to break-even and return on investment. Using the conjoint technique resulted in utility scores for each attribute and respondent.

With respect to follow-up behaviour, investment managers were asked to estimate the average number of days spent per month per portfolio company.

Mid 2004, all of the interviewed investment managers were asked to provide us with a list of portfolio companies. We asked them only to include those companies for which they had been involved in the selection phase, and that were currently being followed up by them. We received responses from 37 of the 68 interviewed VCs. 107 founders of portfolio companies were interviewed by telephone concerning the starting configurations (such as founding team, commercial experience of the founders), the activities of the company and the evolution of the company's financial resources over its lifetime.

In order to collect information on portfolio company growth, we relied in first instance on a European database of annual accounts of companies, called Amadeus. The Amadeus' data were supplemented by information retrieved from national databases. This resulted in a unique dataset of 99 firms for which both annual account, starting resource information, and information on the VC investing were available. These 99 firms had received financing from 32 different European VCs. 5 companies were based in the Netherlands, 14 in the UK, 11 in Germany, 8 in France, 25 in Belgium, 19 in Sweden, 12 in Finland, and 5 in other European countries, Israel or the US.

In order to study the effect of VC behaviour and VC characteristics on company growth, we used OLS regression analysis. The variables used in this analysis are explained below.

## Variables

Information from annual accounts was transformed to yearly absolute post-investment growth measures. The growth measure studied in this chapter is yearly absolute post-investment employee growth, calculated as

$$\left( \frac{FTE_t - FTE_{i-1}}{FTE_{i-1}} \right) (t - i - 1)$$

Where  $FTE_t$  is the number of employees at the end of the last available year (t) (2002 or 2003) and  $FTE_{i-1}$  is the number of employees at the end of the last year before investment (i-1) by the VC.

The utility scores, derived from the conjoint analysis described above for team, market and product/technology characteristics were used as measures with respect to selection behaviour. We use the average days spent per month per portfolio company as a measure for the intensity of follow-up behaviour by the VC.

## RESULTS

The regression results are presented in Table 1.

The importance of market focus during the selection process

The full model had significantly positive coefficients for the emphasis that VCs put on the growth potential of the targeted market during the selection process, the amount of capital raised, fund size and fund age.

Therefore, we conclude that **no support** was found for **H1**: the experience and complementarity of the team was not found to significantly affect growth of portfolio companies. **No support** was found for **H2**: VCs that emphasize potential of the lead entrepreneur during the selection process do not tend to have faster growing portfolio companies. Focusing during the investment decision on the human capital factors therefore was not found to lead to having portfolio companies that are attaining higher growth, despite the emphasis that was put by resource-based view scholars on these human capital factors. The reason for this may lie in the fact that companies that start off with complementary teams and strong human capital factors may be too static. It may be a good thing to have team changes now and then, especially in the early stage of a venture where there are different milestones to be taken that require different skills. There is no use of having a high level business developer in the company at the moment that the technology is still in a development phase. The company may be doing fine with the founder/inventor as a CEO during this phase, but may need another CEO profile at the time of commercialisation. Therefore, team changes are not necessarily bad for the company and sticking to the original founding team, because it is complementary may be paralysing the company. Also Hellman and Puri (2000) found that executive turnover in a company is necessary for new ventures, leads to a higher degree of professionalisation and connected to its company growth.

We find **support for H3**: VCs that emphasize the growth potential of the targeted market in the business proposal, have faster growing companies in their portfolio. **No support** was found for **H4**: VCs that prefer to invest in niche markets do not have portfolio companies that exhibit higher growth. **No support** was found for **H5** and **H6**: emphasis during the selection process on the protectability of the technology and on platform technologies does not seem to have an impact on portfolio company growth. **No support** was found for **H7**: no clear relationship between the intensity of follow-up behaviour by the VC and company employee growth was found. This is consistent with the findings of Macmillan et al. (1989) who found that there was no significant difference in operating business performance between different levels of involvement (identified as limited, moderate and high). There may be several explanations for this. First, we only studied companies that were still in the VC's portfolio. It may be that it takes longer before impact of VC's involvement becomes visible, or it may even take until exit before results of efforts put into follow-up of portfolio companies become clear, with VC that have been more involved with their portfolio companies having larger chances of realizing the appropriate exit for the company. Second, it may be that the involvement level of the VC increases in case portfolio companies are doing worse, consistent with Fredriksen et al. (1997), finding that VCs are 'firefighters' that allocate their scarce time to portfolio companies with problems. In this case, it is employee growth that is likely to impact the involvement level, and not vice-versa. Finally, as mentioned earlier, the group of VCs in our sample showed above average involvement in their portfolio companies, which may be the reason for no significant results with respect to follow-up coming through.

This seems to suggest that it are only those VCs that put emphasis during the screening process on the growth potential of the targeted market are selecting the best deals with the largest growth potential. Other factors, such as the emphasis put on other screening criteria, or the time spent during the follow-up phase do not seem to have explanatory power for growth of portfolio companies.

However, further analysis of the results shows that, interestingly, the control variables that linked to the VC's fund size and age were significantly positive, just as the amount of capital that the company had raised over its lifetime. This finding called for further analysis. The link between VC fund size and portfolio company growth

There are a number of reasons why larger VCs may have faster growing companies in their portfolio.

According to Davila et al. (2003), VC funding events are important signals about the quality of the new venture, diminishing uncertainty for employees, and increasing credibility, and thus enhancing the likelihood of new employees joining the company. Megginson and Weiss (1991) indicate that the

reputation of some long-existing VC companies is second to none, and their presence in the capital structure sends a strong positive signal to other investors and stakeholders. Stuart et al. (1999) found that privately held biotech firms with, amongst others, organizational equity investors went to IPO faster and earned greater valuations at IPO than firms that lack such connections. The extent to which there is an effect of reputation may be determined by the size of the VC fund. Smaller and younger VCs may however enhance no or a less pronounced reputation effect towards company stakeholders, and may therefore have a smaller impact on the portfolio company growth.

The signaling or reputation effect is an **effect** of attracting large funds in the capital of a new venture on portfolio company growth. However, in this context, it is hard to distinguish between cause and effect. There may be other mechanisms at work than a signaling effect towards employees only. VC's fund size, age, and connected to it, its reputation may have a signaling effect to other VCs. These VCs can then prefer to syndicate with this reputed VC, given its financial capacity and its reputation. Or it may be that entrepreneurs with high growth potential business proposals try to get funding from large VCs first, before stepping to their smaller counterparts. In this case, the fund size **causes** having portfolio companies that grow faster: larger VCs simply attract the better (faster growing) deals, which come directly to them, or are suggested to them by syndication partners, because of their financial capacity and their reputation. In this case, larger funds get the first choice to pick the deals with high growth potential, and smaller funds may be presented deals that were previously turned down by larger funds.

Some may argue that smaller funds prefer to invest in projects that are not expected to grow exponentially, but that will be break-even in short term and not be burning huge amounts of cash. Given their limited funds, they are more dependent on other financiers in subsequent rounds of financing. In this case, small funds may avoid subsequent rounds of financing, during which they may be put in a parlous financial position, making the pricing of equity to the follow-on co-investors potentially difficult, and causing dilution of the initial investment (Murray, 1999). Therefore, smaller VCs may be inclined to invest in companies that are less likely to grow in number of employees, in order to reduce the cash burn from salary costs. Our results show that this is not likely, and that, after taking into account the selection focus of VCs, smaller VCs tend to have slower growing companies in portfolio. Research by Gompers (1996) indeed shows that young and thus, small, VCs have incentives to grandstand, i.e. to take actions that signal their ability to potential investors. These VCs were even found to bring companies public earlier than old venture capital firms in order to establish a reputation and successfully raise capital for new funds. Therefore, given that previous research found that past performance influences fundraising ability (Lakonishok et al., 1991; Patel et al., 1991), small VCs have a large incentive to invest in those companies that are likely to grow fast and can be brought public in an IPO. This is shown to be the most effective way of signaling ability or the value of portfolio companies to potential fund investors, increasing the chances of raising a new fund within a short, predetermined time, and their chances of surviving as a fund in the longer run. Therefore, also small funds have an incentive to pick the business proposals with high growth potential from their deal flow. However, our research shows that they end up with a portfolio of slower growing companies. This finding may have implications for the survival chances of these small funds.

Further analysis of the sample indicates that larger VC funds may indeed be attracting the better deals. Further examination of the data showed that 7 of the 10 top-growing portfolio companies in our sample had been invested in by one VC. This VC is managing 3 billion Euro for direct investments, and was established in 1959. Both its size and age were found to be an exceptional to our sample. Further analysis of the portfolio companies of this VC showed that the VC was rarely lead investor in these companies and rarely had a board seat. The investor had always been part of large syndicates, often with the same syndication partners, and often in a first round. Given that this VC was an exception to our sample, we excluded its portfolio companies from further analysis.

Stage 2 of the analysis involved re-estimating the model on the sample when the cases had been removed. We report on the results in the next section.

## RESULTS: limited sample

The results of the limited sample are presented in Table 1. As in the full model, we find significant results for the emphasis put on the high growth criterion in the business proposal (H3) and the VC fund size variable. No significant coefficients were found for the amount of capital raised by the companies and the VC fund age variable. The importance attached by the VC to the fact that the targeted market is a niche market was found to be significantly affecting portfolio company growth (in a positive way). Therefore, we conclude that in the limited model, we find **support for H4**. Therefore, we can conclude that for the limited sample of VCs, the focus on market criteria, such as market growth and niche markets, affects the growth of portfolio companies. Interestingly, no significant result was obtained anymore for the amount of finance raised by the company, which was the case in the full model. This may indicate that for mega funds, of which the exceptional VC is one, the size of the market does not matter, as long as it is a fast growing one. This is linked to the fact that they have deep pockets and can provide the portfolio company with huge amounts of capital, which is the case for the exceptional VC portfolio companies. This comfortable cash position does not require these new ventures to focus on a niche market. They do not need to secure a market position in a niche market first before expanding to broader, larger markets, as Moore (1991) suggested to be the most appropriate growth path for new ventures. The large amounts of finance that the VC provides allow to follow an acquisitive growth path, and allow to acquire companies or technology that has been established in the market earlier, even if this market is a mainstream one.

## CONCLUSIONS

Using a unique, hand-collected dataset, we analyzed how venture capital can impact portfolio company growth. So far, in entrepreneurship literature, venture capital has been included as a dummy variable. Venture capital literature however indicates that VCs exhibit heterogeneity both in selection and follow-up behaviour. These differences may explain why entrepreneurship researchers have obtained no consensus on the role of venture capital and have found differences in the growth pattern of VC-backed companies and have even found non VC-backed companies to outperform VC-backed ones. Therefore, building on previous research, we united both selection and follow-up behaviour of VCs to explain how differences in VC behaviour may affect portfolio company growth. Our research shows that both the VC's selection behaviour and the VC's fund size are explanatory for portfolio company growth.

We find that VCs that focus on the potential growth of the targeted market in the business plan have portfolio companies that obtain higher growth. Also VCs that target niche markets tend to select those portfolio companies that grow faster, unless megafunds are investing. These megafunds provide large amounts of finance so that the portfolio company can pursue an acquisitive growth strategy, and may target a mainstream market.

We do not find the time that VCs spend during the post-investment follow-up phase to affect portfolio company growth.

We find the size of the VC investing to be positively correlated to portfolio company growth. The analysis shows that, besides the possibility that a signaling effect occurs, some other factors are at play. First, VC firms looking for syndication partners may first approach larger, reputed funds, and these larger funds may then get the first opportunity to invest in potentially high growing companies. Second, entrepreneurs with high growth business proposals may first approach larger funds, causing smaller funds to get business proposals that were already rejected by these larger funds, and thus getting worse deal flow. This finding raises questions on the survival chances of smaller funds, given that additional fund raising is only expected to be successful if a considerable track record, mainly based on successful IPOs, can be shown.

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## REFERENCES

- Acs Z.J., Audretsch D.B. (1990). *Innovation and Small Firms*. Cambridge, MA: MIT Press.
- Amit R., Brander J., Zott C. (1998). Why do venture capital firms exist? Theory and Canadian evidence. *Journal of Business Venturing*. 13: 441-466.
- Autio E., Yli-Renko H. (1998). New, technology-based firms in small open economies. An analysis based on the Finnish experience. *Research Policy*. 26: 973-987.
- Bain J.S. (1962). *Barriers to New Competition*. Cambridge, MA: Harvard University Press.
- Barney J.B. (1991). Firm resources and sustained competitive advantage. *Journal of Management*. 17(1): 99-120.
- Baum J.A.C. and Silverman B.S. (2004). Picking winners or building them? Alliance, intellectual and human capital as selection criteria in venture financing and performance of biotechnology start-ups. *Journal of Business Venturing*. Vol. 19, iss. 3. p. 411.
- Baumol W.J., Panzar J.C., Willig R.D. (1983) Contestable Markets: An Uprising in the Theory of Industry Structure: Reply. *American Economic Review*. 73(3): 491-497.
- Bottazzi L., Da Rin M. (2002). Venture capital in Europe and the financing of innovative companies. *Economic Policy* 34, 231-269.
- Cohen W.M., Levin R.C. (1988). Empirical Studies of Innovation and Market Structure. In Schmalensee, R. and R.D. Willig (eds). *Handbook of Industrial Organization*. Vol. II, chapter 18: 1060-1107.
- Cooper A.C., Gimeno-Gascon F.J., Woo C.Y. (1994). Initial human and financial capital as predictors of new venture performance. *Journal of Business Venturing*. 9: 371-395.
- Davila A., Foster G., Gupta M. (2003). Venture capital financing and the growth of startup firms. *Journal of Business Venturing*. 18:689-708.
- Finley L., Buntzman G.F. (1994). What does affect company performance? *Arkansas Business and Economic Review*. 27(2): 1-15.
- Fredriksen O., Olofsson C., Wahlbin C. (1997). Are venture capitalists firefighters? A study of the influence and impact of venture capital firms. *Technovation*. 17(9): 503-511.
- Freeman C. (1983). *The economics of industrial innovation*. Cambridge, MA: MIT Press.
- Fried V., Hisrich R. (1994). Toward a model of venture capital investment decision making. *Financial Management*. 23(3): 28-37.
- Fried V.H., Bruton G.D., Hisrich R.D. (1998). Strategy and the board of directors in venture capital-backed firms. *Journal of Business Venturing*; 13(6): 493-504.
- Gompers P.A. (1995). Optimal Investment, Monitoring, and the Staging of Venture Capital. *Journal of Finance*. 50(5): 1461-1489.
- Gompers P.A. (1996). Grandstanding in the venture capital industry. *Journal of Financial Economics*. 42: 133-156.
- Gorman M., Sahlman W.A. (1989). What do venture capitalists do? *Journal of Business Venturing*. 4: 231-248.
- Hellmann T., Puri M. (2000). The interaction between product market and financing strategy: the role of venture capital. *The Review of Financial Studies*. 13(4): 959-984.
- Heirman A., Clarysse B. (2005). The initial resources and market strategy to create high growth firms. Forthcoming in: *Academy of Management Best Paper Proceedings, 2005*.
- Jovanovich B. (1982). Selection and the Evolution of Industry. *Econometrica*. 50(3): 649-670.
- Kamien M.IK, Schwartz N.L. (1982). *Market Structure and Innovation*. Cambridge: Cambridge University Press.
- Keeble D.E. (1989). High-technology industry and regional development in Britain: the case of the Cambridge phenomenon. *Environment and Planning*. 7: 153-172.

- Kortum S., Lerner J. (2000). Assessing the contribution of venture capital to innovation. *The Rand Journal of Economics*. 31(4): 674-693.
- Lakonishok J., Shleifer A., Thaler R., Viskny R. (1991). Window dressing by pension fund managers. *American Economic Review*. 81: 227-231.
- Lee C., Lee K., Pennings J.M. (2001). Internal capacities, external networks, and performance: a study on technology-based ventures. *Strategic Management Journal*. 22: 615-640.
- MacMillan, I.C., Siegel, R. and Subbanarashima, P.N. (1985). Criteria used by venture capitalists to evaluate new venture proposals. *Journal of Business Venturing*. 1: 119-128.
- MacMillan, I.C., Zemann, L. and Subbanarashima, P.N. (1987). Criteria distinguishing successful from unsuccessful ventures in the venture screening process', *Journal of Business Venturing*. 2: 123-137.
- MacMillan I., Kulow D., Khoylian R. (1989). Venture capitalists involvement in their investments: extent and performance. *Journal of Business Venturing*. 4: 27-47.
- Martin R., Sunley P., Turner D. (2002). Taking risks in regions: the geographical anatomy of Europe's emerging venture capital market. *Journal of Economic Geography*. 2(2): 121
- Meggison W.L., Weiss K.A. (1991). Venture Capitalist Certification in Initial Public Offerings. *The Journal of Finance*. XLVI(3): 879-903.
- Moore G.A. (1991). Marketing and Selling High-Tech Products to Mainstream Customers. Crossing the Chasm. Harper Business. New York.
- Murray G. (1996). A synthesis of six exploratory, European case studies of successfully exited, venture capital-financed, new technology-based firms. *Entrepreneurship Theory and Practice*, summer, 41-60.
- Murray G. (1999). Early-stage venture capital funds, scale economies and public support. *Venture capital*. 1(4): 351-384.
- Mustar P. (1997). Spin-off enterprises. How French academics create hi-tech companies: the conditions for success and failure. *Science and Public Policy*. 24: 37-43.
- Muzyka, D., Birley, S., Leleux, B. (1996). Trade-offs in the investment decisions of European Venture Capitalists, *Journal of Business Venturing*, 11: 273-287.
- Patel J., Zechkhauser R., Hendricks D. (1991). The rationality struggle, illustrations from financial markets. *American Economic Review*. 81: 232-236.
- Penrose E.T. (1959). The theory of the growth of the firm. New York: Wiley.
- Porter M. (1980). Competitive Advantage. The Free Press.
- Roberts E.B. (1991). Entrepreneurs in high technology. Lessons from MIT and beyond. Oxford University Press. New York.
- Rothwell R., Zegveld W. (1982). Industrial innovation and small and medium sized firms. London: Francis Pinter.
- Sapienza H.J., Timmons J.A. (1989). The roles of venture capitalists in new ventures: what determines their importance? *Academy of Management Best Paper Proceedings*. 74-78.
- Sapienza H.J. (1992). When do venture capitalists add value? *Journal of Business Venturing*. 7: 9-27.
- Sapienza H.J., Amason A.C., Manigart S. (1994). The level and nature of venture capitalist involvement in their portfolio companies: a study of three European countries. *Managerial Finance*. 20 (1): 3-17.
- Sapienza H.J., Manigart S., Vermeir W. (1995). A comparison of venture capitalist governance and value-added in the U.S. and Western Europe. *Academy of Management Journal*. 105-109.
- Sapienza H.J., Manigart S., Vermeir W. (1996). Venture capitalist governance and value added in four countries. *Journal of Business Venturing*. 11: 439-469.
- Schefczyk M. (2001). Determinants of success of German Venture Capital Investments. *Interfaces*. 31: 43-61.
- Schefczyk M., Gerpott T.J. (2001). Management support for portfolio companies of venture capital firms: an empirical study of German venture capital investments. *British Journal of Management*. 12: 201-216.
- Schoonhoven C.B., Eisenhardt K.M., Lyman K. (1990). Speeding Products to Market: Waiting Time to First Product Introduction in New Firms. *Administrative Science Quarterly*. 35: 177-207.

- Shane S., Stuart T. (2002). Organizational Endowments and the Performance of University Start-ups. *Management Science*. 48(1): 154-161.
- Stuart T.E., Hoang H., Hybels R.C. (1999). Interorganizational Endorsements and the Performance of Entrepreneurial Ventures. *Administrative Science Quarterly*. 44: 315-349.
- Teece D.J., Pisano G., Shuen A. (1997). Dynamic capabilities and strategic management. *Strategic Management Journal*. 18(7): 509-530.
- Tyebjee T.T., Bruno A.V. (1984). A model of VC investment activity. *Management Science*. 30: 1051-1066.
- Utterback J.M., Meyer M., Roberts E., Reitberger G. (1988). Technology and Industrial Innovation in Sweden: A Study of Technology-Based Firms formed between 1965 and 1980. *Research Policy*. 17: 15-26.
- Wernerfelt B. (1984). A Resource-based View of the Firm. *Strategic Management Journal*. 5(2): 171-181.
- Zacharakis A.L., Meyer G.D. (1998). A lack of insight: do venture capitalists really understand their own decision process? *Journal of Business Venturing*. 13: 57-76.
- Zacharakis A.L., Meyer G.D. (2000). The potential of actuarial decision models: can they improve the venture capital investment decision? *Journal of Business Venturing*. 15: 323-346.

**Table 1: Regression analysis (growth analysis)**

	Base model	Base model + selection criteria	Base model + follow-up behaviour	Full sample	Limited sample
<b><u>Importance of selection criteria</u></b>					
Utility of experienced, compl team		-.119		-.122	-.062
Utility of lead entrepreneur		.027		.040	-.013
Utility of high growth market		.163**		.167**	.298***
Utility of niche market		.113		.138	.336**
Utility of protectability		.164		.169 <sup>1</sup>	-.018
Utility of platform technology		-.049		-.040	.060
<b><u>Intensity of follow-up behaviour</u></b>					
Average time spent per portfolio cy			.099	-.054	-.006
<b><u>Control variables</u></b>					
Size of the founding team	.000	-.040	.011	-.045	-.115
Commercial experience founding team	.073	.045	.069	.044	.077
Amount of capital raised	.196**	.164*	.169*	.176*	.118
Biotech	.058	-.02	.072	-.02	-.038
ICT	.093	.104	.083	.112	.212*
Pre-investment size	.032	.043	.017	.054	-.095
Xth year after founding	-.066	-.057	-.056	-.060	.070
Timeframe between investment and now	.020	-.018	.004	-.008	-.095
Log Fund size	.452****	.419***	.512****	.397***	.307**
Log Fund age	.220**	.193**	.214**	.191**	-.069
Constant	-7.997***	-6.946**	-9.400***	-6.565*	-.328
<b><u>Model</u></b>					
F statistic	10.200****	8.240****	9.494****	7.700****	3.051****
R <sup>2</sup>	.54	.62	.54	.62	.42
Adjusted R <sup>2</sup>	.48	.54	.49	.54	.28

Levels of significance: \*=.10; \*\*=.05; \*\*\*=.01; \*\*\*\*=.001; n=99 (91 for limited sample)

<sup>1</sup> The utility of protectability was significant (.10 level) in the fixed effects model that was run in order to correct for independency between observations of the same VC