Determinants of required return in venture capital investments :

A five country study[*]

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Determinants of required return in venture capital investments

ABSTRACT

We empirically investigate the determinants of the return required by venture capitalists in five countries. As expected, a higher risk leads to a higher required return; later stage investments require a lower return than early stage investments. Agency risk may be reduced through bonding, especially by letting the entrepreneurs have a higher equity stake, and through monitoring, especially through being the lead investor. The longer the expected holding period of the investment, the lower the required return. Captive or public venture capital companies and Belgian or Dutch companies require a lower return than independent companies or US and UK companies.

EXECUTIVE SUMMARY

An important question for entrepreneurs seeking external equity for their venture is the cost of the equity. We have empirically investigated in five countries the determinants of the return required by venture capital companies (VCCs) for their overall portfolio, for investments in different stages of development and for specific investments. A postal questionnaire was used to gather the data from senior VC managers. We found that diversification over investment stages is not perceived by VC investors as a risk-reduction strategy, contrary to the expectations of conventional finance theory. However, their responses show that agency risk may be reduced through monitoring and bonding mechanisms and that *lower agency risk leads to a lower required return. A higher monitoring intensity is mainly enacted through a higher percentage of lead investments, but not through a higher equity stake in the venture. A powerful bonding mechanism is the percentage of equity retained by the management team. The stronger the bonding or monitoring mechanisms, the lower the required return. We found an effect of value-added by VC managers on the required return*: *the fewer investments per VC manager, indicating greater value-adding intensity, the higher the required return.* Further, *we found that longer expected holding periods of the investments leads to a lower required return .*

For individual investments, VCCs may require very different rates of return. Everything else equal, it appears that independent VCCs require a higher return than captive or public VCCs, especially for early stage and expansion stage. Belgian and Dutch VCCs, furthermore, require lower internal rates of return than their American, French or British colleagues.

Some venture characteristics have a significant impact on the required return. As expected, the return required for early stage investments, is higher than for expansion and later stage investments. A longer expected investment horizon leads to a lower required return; whether or

not the exit is planned in advance has, however, no influence on the required return. The higher the retained equity stake by the entrepreneurial team, the lower the required return. Thus, by influencing some investment characteristics, entrepreneurs may be able to influence the required return.

For early stage projects, more refined conclusions may be drawn. VCCs specialised in early stage ventures require a higher return for early stage projects, due to the higher risk of their total portfolio. They may, however, be able to provide more managerial assistance to the early stage ventures, thanks to their specialisation; the higher the percentage of lead investments and the number of investments per VC manager, the lower is the required return for early stage projects. Independent VCCs, on the other hand, require a higher return. Entrepreneurs thus have an incentive to know the type and the overall investment strategy of VCCs, so that they are able to identify the optimal source of finance.

A fundamental question, from both a theoretical and a practitioner's point of view, is whether VC strategy matters. Finance theory assumes that investors' role includes *picking the right investments up-front and diversifying the portfolio to the desired level of risk. Due to the highly imperfect environment in which VC investors operate, a more* involved *approach may be rewarding. We still do not know enough about the diversification versus specialisation choice. Is the effect of learning and knowledge* realized through risk reduction only, or does value-enhancement also play a part*?*

A related matter concerns the level of monitoring and value-adding after the investment is made.. What is the optimal level of hands-on involvement, given that it is costly? We have found that the perceived agency risk is lower when investments are tracked closely. The effect of value-adding is less clear, however: our results show that both cost arguments and enhanced

profit arguments are important in a VC environment.

INTRODUCTION

How much return do venture capital companies (VCCs) require on average on their investments? Which factors lead them to require a higher return for some investments and a lower return for others? Overall, conventional financial theory asserts that in perfect financial markets the return required for a project by a rational investor is influenced by two factors : the risk of the investment project and the return on riskless investment alternatives (Brealey and Myers, 1996). By holding a diversified portfolio of investments, however, investors are able to diversify their risk positions and thus reduce total portfolio risk. This implies that investors do not require a higher return for an investment project with a higher idiosyncratic risk, which can be eliminated by investing in several non-related projects. It is thereby assumed that losses incurred on some investments will be offset by gains on others.

The market for venture capital (VC) investments, however, is far from perfect. Not all investors have the same information at the same point in time (Admati and Pfleiderer, 1994). As the companies in which venture capital companies invest are mostly private, unquoted companies, the pressure to divulge information is limited. This implies that there are no financial analysts to permanently monitor these companies and that potential investors know considerably less about these investments than about publicly quoted companies. On the other hand, VC managers are more actively involved in the company than passive investors on the stock market (Elango et al., 1995 ; Sapienza et al., 1996). Once the investment is made, this is likely to lead to a more thorough understanding of the business than outside analysts would normally acquire, through post-investment monitoring and value-adding.

Second, VC investments are highly illiquid as they cannot be sold easily at any point in time (Cooper and Carleton, 1979). Shares from quoted companies may be traded on the market at relatively little cost and at any point in time. For unquoted companies, potential buyers have to be sought and some value for the business has to be agreed upon. This makes trading in private stocks a costly and time-consuming process. Moreover, VC investments are typically long term investments : for early stage projects it takes approximately five years before investments are mature enough to be sold and often several investment rounds are required before harvesting is possible (Cooper and Carleton, 1979 ; Sahlman, 1990 ; Stevenson et al., 1987).

It is moreover more difficult to hold a fully diversified portfolio of unquoted investments than one of quoted investments. High information and transaction costs will only be economical when the potential gains from the investment are substantial, resulting in a need for relatively large investments. The amounts invested in a VC project are often a significant part of the total amount of funds at the disposal of the VCC, thus restraining its ability to diversify (Robinson, 1987).

Finally, VC investments are more risky than investments in quoted companies (Martin and Petty, 1983 ; Schilit, 1993), due to the high business risk faced by this type of companies. For all these reasons, a higher overall return will be required a priori by VCCs than by investors on the stock market.

Moreover, the existence of huge market imperfections implies that idiosyncratic investment risk and other investment characteristics may become important, rather than solely market risk. For example, Rea (1989) found that negotiations between VC managers and early stage entrepreneurs often fail due to the perceived riskiness of the business plan, even when market opportunities of the venture are favorable.

In this paper, we examine the determinants of the return required by VCCs in this imperfect financial market, for different stages of maturity of investee companies. We focus on the return for different investment stages, as it is well documented that the stage of development of a company is an important risk dimension. Moreover, VC managers use 'investment stage' as a natural categorisation of investments, as evidenced by managerial reports on the VC industry or VC industry guides. Using a managerially intuitive risk dimension increases the validity of the results (McNamara and Bromiley, 1999). The return determinants are empirically researched in five different VC markets : the US, the UK, the Netherlands, Belgium and France. This international setting allows for a broad applicability of the results and for differences between countries to be identified, as called for by McDougall and Oviatt (1997).

This study is important as the relation between expected risk and return is central in the study and practice of strategic management (McNamara and Bromiley, 1999). Investors in funds need to be well informed on the a priori required return of VCCs, given their risk profile, in order to be able to optimally allocate the funds of their portfolio. They have to be aware of the heterogeneity of the VC community across different countries, giving them broader opportunities to diversify. Entrepreneurs need to be aware of the factors, influencing the decisions of the VC managers, so that they can anticipate their needs and be better prepared for the investment negotiations. Finally, this study helps to increase our understanding of a highly imperfect market by focusing on an aspect of VCC behaviour that has been largely neglected by researchers.

The structure of the paper is as follows : in the next section we discuss the theoretical determinants of the required return and develop hypotheses. Section 2 describes the research method and the sample under study, while section 3 reports the results. Finally, we restate the

major conclusions and discuss the implications for entrepreneurs and for further research.

DETERMINANTS OF THE REQUIRED RETURN

The impact of specialisation on required return

Conventional finance theory states that there is a positive relationship between the risk of an investment and the return required by the investor (Brealey and Myers, 1996). Thanks to diversification, the risk of a portfolio of investments is lower than the average risk of individual investments, as losses in some of the investments are likely to be compensated by gains in other investments. The risk and return attributes of a diversified VC portfolio will not totally mirror these of its individual investments (Martin and Petty, 1983 ; Manigart et al., 1994). The return required for a less diversified portfolio of investments will therefore be higher than for a well diversified portfolio (Norton and Tenenbaum, 1993), everything else equal. The more the VC portfolio is focused or specialised in a specific investment stage, the more the outcomes of the investments will be correlated with each other. Therefore, a VCC specialised in a specific investment stage will require a higher return than a non-specialised VCC.

In a perfect market, the only important risk dimension is the degree to which an investment or portfolio of investments varies with fluctuations in "the market" or in the economy at large. Specific business risk factors, such as technological or market development or the development stage of the company, are unimportant because they can be diversified away. Some VCCs, however, concentrate their investments in specific stages of the development of companies, for example in early stage investments or in management buy-outs (Robinson, 1987 ; Muzyka et al., 1996). Manigart et al. (1994) have shown that specialised VCCs in Europe have a higher systematic risk than generalist VCCs. Therefore, conventional finance theory suggests that specialised VCCs will require a higher return for investments in the stage of their specialty. For

example, early stage VCCs will require a higher return for an investment in an early stage company than non-early stage VCCs, as this further increases their specialisation. On the other hand, when investing in an early stage company, a non-early stage VCC increases its portfolio diversification and thus lowers its overall risk, thus requiring a lower return for this type of investment. Hence :

H1A : Specialised VCCs will require a higher return than non-specialised VCCs for investments in their area of specialisation (*financial view*).

Resource based theories come to the opposite prediction, however. Specialising in a specific investment stage allows VC managers to gain a better understanding of the specificities for that particular investment stage. This deeper knowledge allows them to make better investment decisions than VC managers not specialised in that investment stage and to select the appropriate companies to invest in. They will be better able to assess the inherent risk and expected return for a specific investment. Moreover, their better understanding will allow them to monitor the investee company more effectively after the investment is made, thus lowering the risk. Both effects lead to the assertion that, a priori, specialised VCCs will require a lower return for an investment in their area of specialisation, everything else equal. Hence : (ARGUMENTEN UITBREIDEN – UITERAARD OOK MEER REFERENTIES ! (MW)).

H1B : Specialised VCCs will require a lower return than non-specialised VCCs for investments in their area of specialisation (*resource based view*).

<u>Impact of ownership status of VCC on required return</u>

Finally, perfect market investors are supposed to have only one goal: to obtain the best return for a given level of risk. VCCs, however, may pursue other goals than purely financial goals,

depending on who their backers are. Public sector VCCs, for example, may emphasise employment creation in a certain area or environmental-friendly investments, rather than purely financial measures. Bank affiliates may hope that, thanks to the VC investment, the investee companies will become good clients of the bank. VC investment activity is then seen as an extension of the services provided to a potentially profitable market segment and as a mechanism for binding clients into the financial investor (Bruno, 1986). Captive VCCs, dependent on an industrial company, may want to invest in order to get a window on technology, to obtain technology licences, product marketing rights or to secure international business opportunities (Winters and Murfin, 1988 ; Siegel et al., 1988 ; Manigart and Struyf, 1997). For example, pharmaceutical companies may create a biotechnology fund in order to capture developments in technological areas that may be important to them, but which are beyond their expertise. In all these examples, financial return is only one of the goals that captive and public sector VCCs want to achieve. Independent VCCs, however, invest money from a diverse set of investors, with as major objective to obtain a financial return on the investment. This is increasingly the case as providers of funds to independent VCCs appear to be monitoring such investments more closely (Wright et al., 1997). They will therefore require a higher return than captive or public sector VCCs, independent of their investment stage preference.

H2 : Independent VCCs require a higher overall return than captive or public sector VCCs.

Impact of monitoring on the required return

In a highly imperfect VC market agency risk and business risk are likely to become important (Sapienza and Gupta, 1994). Agency risk refers to the fact that the entrepreneur may take actions in his/her personal interest, but which destroy value for the VCC (Admati and Pfleiderer, 1994 ; Barney et al., 1994). In perfect markets, agency problems are addressed in ways that are not always available to VC investors. If perfect market investors fear large agency problems, they

may sell their stocks at any moment in time at a fair market price. This, of course, is not possible in a highly illiquid VC context where possible new investors are not readily available. Agency risk may be reduced in a VC environment by closely monitoring the investee companies after the investment is made. Thanks to this monitoring, entrepreneurs are less able to take potentially detrimental actions to destroy company value. Stevenson et al. (1987) have furthermore shown that superior knowledge of the true value of an investee company, requiring subsequent additional capital in further investment rounds, leads to superior IRRs. This knowledge may be gained through monitoring activities. Monitoring intensity will be especially high when there are fewer investments per investment manager or when the VCC acts as the lead investor. Both MacMillan et al. (1988) and Elango et al. (1995) have shown that the amount of time spent with a firm after investment, thus the monitoring intensity, does not depend on investment stage. We therefore expect the impact of monitoring to occur across all investment stages.

H3A : More monitoring leads to a lower required return (*risk reduction argument*).

Monitoring and adding value is costly, however, as it is time-consuming. Therefore, VC managers will invest their time only when they expect that the venture will be worth more with a hands-on approach than with a hands-off approach (MacMillan et al., 1989). The cost argument leads to the opposite hypothesis :

H3B : More monitoring leads to a higher required return (*cost argument*).

Impact of investment time horizon on required return

We speculate that the average expected holding period impacts the return required by VCCs. Stevenson et al. (1987) have shown with a simulation that the average realised IRR of VCCs

decreases with a decreasing holding period, everything else equal. VCCs with shorter investment horizons should thus require a higher a priori IRR per investment in order to realise the same IRR as VCCs with longer investment horizons. Moreover, the reinvestment problem is a further problem encountered by VCCs who do not distribute their proceeds immediately to Limited Partners, as is the case for most closed end funds. Indeed, after divestment, venture capitalists are unable to reinvest the proceeds immediately in profitable business opportunities, whereas perfect market investors can buy and sell on the spot. The shorter the expected investment horizon of VC investments, the higher the risk of being left with idle cash for some time. For all those reasons, VC managers will require a higher return when their expected holding period is shorter, independent of their investment stage preference.

H4 : The overall required return will be lower when the expected investment horizon is longer.

Apart from the above dimensions, management theory asserts that risk perceptions are also influenced by constant factors (Sitkin and Pablo, 1992), such as the individual characteristics of the managers (Laughun, Payne and Crum, 1980), organizational culture (Morgan, 1986), national culture (Hofstede, 1980) and institutional environment (Tyebjee and Vickery, 1988). In this study, we are unable to take individual managerial characteristics into account, but this may not be a serious problem as it has been suggested that rate of return and valuation issues are typically determined by the VCC rather than individual investment managers (Wright and Robbie, 1996a). We control for national context, as the study is undertaken in five countries, and organizational culture, proxied by the size of the VCC (measured by the number of offices), its number of hierarchical layers (Lerner, 1994), and its age. March and Shapira (1987) found that the risk-taking behavior of companies does change over time, and particularly that there is a tendency to underestimate risk as a result of favorable experiences. The age of the VCC may thus be an important determinant for the overal required return.

RESEARCH METHOD AND SAMPLE DESCRIPTION

A questionnaire was designed and pre-tested with UK venture capitalists, advisors and academics (Wright and Robbie, 1996a). The questionnaires were translated into French and Dutch, in order to be used in France, Belgium and the Netherlands. They were sent to (i) the full members of the British Venture Capital Association in early 1994, (ii) the full members of the 'Association Française des Investisseurs en Capital Risque', the 'Nederlandse Vereniging voor Paraticipatiemaatschappijen' and the Belgian Venturing Association (i.e. the French, Dutch and Belgian national VC associations), and to the French, Dutch and Belgian members of the European Venture Capital Association who were not member of their national association, in late 1995 - early 1996 and (iii) 299 US venture capitalists in late 1996. Follow-up reminders were sent after two to three months. An organisation-wide response was sought, with the covering letter to senior investment managers specifically asking respondents to report institutions' perceptions rather than individual approaches ; piloting had suggested that the issues examined here were in any case generally driven by organization-wide policies.

The response rate was as follows (see table 1) : 66 completed and usable replies out of 114 questionnaires sent in the UK (58% response rate) ; 73 of 299 in the US (24% response rate) ; 32 of 133 in France (24% response rate); 24 of 58 in the Netherlands (41% response rate) and 14 of 28 in Belgium (50% response rate). The VCCs in our sample represent 81% of all new VC investments in the UK, 25% in France, 58% in the Netherlands and 86% in Belgium;[1] thus, the sample includes a high percentage of investors in the European countries.

[1] The total number of investments our study encompasses are related to the total number of investments in the differing countries as reported in the EVCA Yearbook (1997).

Insert table 1 about here

Table 1 gives an overview of sample characteristics. 58% of the responses come from independent venture firms and 20% from captive funds, dependent on a financial institution or an industrial company. The remainder are government agencies or semi-captive funds. The US and the Netherlands have the highest proportion of independent companies in the sample (82% and 62% respectively), while more French companies are dependent on financial institutions (44%). The investment patterns differ widely between the US on the one hand and the European countries on the other : US VCCs invest almost half of their portfolio in early stage ventures, while this percentage varies between 12% in France and 21% in the Netherlands. Acquisition and management buy-out financing are much more important in the four European countries than in the US.

In order to test for representativeness of the sample for the entire VC population in the four European countries, sample characteristics are compared to data from the European Venture Capital Association (EVCA) (see table 1). Our continental European sample consists of a relatively larger number of independent VCCs compared to the VC industry in the respective countries. The stage distribution of the investments in the sample under study is, moreover, more heavily weighted towards acquisition/buy-out investments, compared to population statistics. The fact that the VCCs in our sample report less early stage investments than found in the EVCA statistics can be explained by the fact that EVCA statistics report the stage distribution of new investments in 1995, whereas our sample reports the stage distribution of the current investment portfolio. This might thus include investments VCCs entered at the early stage of development, but which have matured and are now reported as an expansion/development investment.

Tables 2 give an overview of the basic statistics and correlations of the variables used in this study. The required return for specific investment stages is reported in 7 categories: less than 20%, from 21% to 25% , from 26% to 30%, from 31% to 35%, from 36% to 45% , from 46% to 55%, and more than 55%. Due to the sensitive nature of the data, we did not ask for a specific number. Moreover, our pre-tests indicated that they did not have a fixed required return in mind, but would rather say "around 30%", for example.

On average, the VCCs require a return between 36% and 45% for early stage investments and between 26% and 30% for expansion investments, acquisitions, buy-outs and other later stage categories. Stage specific required rates of return reported are comparable to those in Elango et al. (1995) who found a 42 % hurdle rate for early stage investments and 33 % for later stage investments. The return required for early stage investments is significantly higher than the return required for late stage (expansion and acquisition/buyout) investments in our data, while Elango et al. (1995) only found partial support for this statement.

Insert Table 2 about here

Portfolio specialisation is measured along the stage investment dimension[2] (Norton and Tenenbaum, 1993). Respondents were asked what percentage of their portfolio (in number of investments) was invested in early stage ventures, in expansion stage ventures, in MBOs/MBIs or other later stage ventures. When 50% or more is invested in a particular investment stage (early stage, expansion stage, acquisition/MBO/MBI), the VCC is classified as a specialist of that particular stage. If it does not invest more than 50% in either of the categories, it is

classified as a non-specialist. In our sample, 46 VCCs are early stage companies, 41 are expansion stage specialists, 85 are acquisition/MBO/MBI specialists, while 21 have no particular specialisation. We thus measure actual investment behavior, which is very close to investment preference in this sample, evidenced by the high correlation between the two variables. Further, a Hirshman index (Hirschman, 1964) is computed as a measure of specialisation in a particular investment stage ; it may vary between 0 for a fully specialised company (all investments of the VCC in the same category) and 0.67 (n=3) for a company with 33.34% of its activities in each of the three investment stages. The mean value in our sample is 0.33 with a high standard deviation of 0.22, hinting that our sample comprises a wide range of specialised and unspecialised VCCs.

As proxy for the monitoring intensity of the VCCs, we calculate the the number of lead investments as a percentage of total investments and the average number of investments per investment manager. Almost two thirds of the investments are undertaken as lead investor. On average, each investment managers follows 5.6 investments, a figure in line with Gorman and Sahlman, (1989).

In order to measure the expected investment time horizon, we asked the respondents to indicate how long they expected their average investment in a specific investment stage to remain in their portfolio. The average expected investment time horizon is longest for early stage investments (6.16 year), a year shorter for expansion stage investments (5.10 year) and shortest for acquisition or MBO/MBI investments (4.74 year). These figures are in line with Robinson (1987).

The control variables, which control for the constant factors likely to affect risk preferences and

[2] We have no data on sectorial investment patterns.

required return in the multivariate analyses, are the natural log of the age of the VCC (11.06 years on average), the natural log of the number of offices as a proxy for size (1.56 offices on average), the natural log of the number of hierarchical layers as a proxy for organizational culture (1.90 hierarchical layers on average), the percentage of small size investments (51% on average) and of early stage investments (23% on average), and 3 country dummies in order to capture national culture and institutional context. The base case in this study is the US ; Belgium and the Netherlands are taken together, as they show similar investment behavior. Table 2 shows further that the correlation between independent variables is quite low : most correlations, except for the country dummies, are below 40 %.

Bivariate statistical techniques such as Pearson correlations, t-tests for independent samples and chi-square tests are used to analyse the data ; for the multivariate models, limited dependent variables (LDV) techniques (in the statistical package LIMDEP) are used. The latter is used instead of OLS regressions as the dependent variable of interest, namely the required return, is reported in 7 discrete return intervals. The LDV technique allows for the dependent variable to be an interval variable and takes the different band widths of the intervals into account. The output of LDV are maximum likelihood estimates of parameter coefficients[3]. The LDV technique uses case-wise deletion of missing variables, reducing the sample size in the multivariate analyses to 105 cases. Comparison of the means and standard deviations of the variables in the group of respondents used in the LDV analyses with those of the group of omitted sample elements using t-tests for independent samples, shows that the characteristics of both groups do not differ significantly (5% level) except that the omitted sample elements have fewer investments as lead investors, a higher percentage of early stage investments, and a consequently longer investment horizon. We thus conclude that we may use the reduced sample in the LDV analyses.

[3] As a check, the same analyses were done with OLS ; comparable MANOVA analyses were performed. All analyses yield comparable results. Results are not reported here, but may be obtained from the corresponding

RESULTS

Impact of specialisation on required return

Table 3 reports the results of t-tests and chi-squared tests between independent samples and table 4 reports the LDV maximum likelihood estimations for the required return for early stage investments, for expansion/development stage investments and for management buy-out/acquisition investments.

Insert Table 3 about here

We proposed two competing hypotheses for the impact of specialisation on required return. The first, driven by finance theory, asserts that VCCs specialised in a specific investment stage will require a higher return when investing in their area of specialisation and a lower return when investing in a different investment stage. The second, driven by the resource based view of the firm, comes to the opposite results. Table 3 shows that stage specialists do not require a significantly different return for investments in their area of specialisation than VCCs, not specialised in that particular investment stage. Neither the financial nor the resource based view is supported.

The results show, however, that early stage specialists require a significantly higher return than other VCCs when investing in expansion companies, consistent with the resource based view, while acquisition/buyout specialists require a (marginally) significant lower return when investing in expansion companies, consistent with the financial view.

author upon request.

However, a further analysis of the 'missing data' is interesting. It shows that 45% of the early stage VCCs (21 out of 46) do not report a required return for acquisitions or MBO/MBIs, and 52% of the acquisition/MBO VCCs (44 out of 85) do not report a required return for early stage companies. This percentage is at most 24% for the other combinations. When interpreting the fact that VCCs do not report a required return for a certain category of investments, while they do it for others, as an indication of their unwillingness to invest in that particular investment stage, the specialisation hypothesis receives further support. If a VCC has insufficient knowledge about a particular investment stage, it prefers not to invest, rather than to require an extremely high return. This is particularly true for both early stage investments and MBO/MBIs, as these investments require more specialised skills and knowledge than expansion stage investments. This may explain the lack of significance found in table 3A and lends support to hypothesis 1B, especially for early stage and MBO/MBI VCCs and investments.

Insert Table 4 about here

Table 4 reports the results of the multivariate LDV analyses. The first hypothesis is tested with the continuous 'stage diversification' variable, which may be thought of as the opposite of specialisation. It is shown that highly diversified companies require a significantly higher return for early stage investments (C1) and (marginally) for acquisitions or MBO/MBIs (C3), while the degree of diversification does not influence the return required for expansion stage investments. This again lends support to the resource based view, rather than to the financial view. Learning and knowledge seems to be more important in a VC context than portfolio

diversification, especially for early stage and for acquisition/MBO/MBI investments.

Impact of ownership status of VCCs on the required return

It was expected that independent VCCs would require a higher return than captive or public sector VCCs. Table 3, panel A shows that the mean return, required by independent VCCs, is significantly higher for every investment stage[4] than that required by captive or public VCCs. Multivariate analyses in table 4 support this finding. The coefficient of the "independent VCC" dummy is positive in all three models and significant for early stage and expansion stage investments. Independent VCCs require a higher return than captive or public VCCs, supporting Hypothesis 2. It is thus likely that captive or public VCCs pursue other goals than solely achieving maximal financial return.

Impact of monitoring on required return

Two opposing hypothese were proposed with respect to the impact of monitoring on the required return : the risk reduction and the cost argument. Table 2 shows that the percentage of lead investments is not correlated with the required return, but the number of investments per ventuer capital manageris significantly negatively correlated with the required return for expansion investments and for acquisitions/MBO/MBIs. The latter relationship is confirmed in the multivariate analysis in table 4, and also shows up for the early stage investments. The results thus support the cost argument, rather than the risk reduction argument : a higher monitoring cost leads to a higher required return, everything else equal.

The risk reduction hypothesis receives some support, however. Table 4 shows that there is a significantly positive coefficient for the percentage of lead investments in the early stage model (C1).

Impact of expected time horizon on the required return

A longer time horizon was expected to lead to a lower required return (H4). The investment horizon is significantly negatively correlated with the expected return in each specific investment stage (table 2). The coefficient of this variable is moreover negative in all multivariate models (table 4) ; it is marginally significant for early stage and expansion stage investments. Hypothesis 4 is thus supported.

The control variables

The coefficients of the control variables in the multivariate models (table 4) show that: 1) older VCCs require a significantly lower return overall; 2) compared to their American colleagues**,** Belgian and Dutch VCCs require a significantly lower after-tax return overall and for all investment stages separately, and British VCCs require a significantly lower return for expansion or development investments (these findings are confirmed in table 3, panel B); 3) a higher percentage of small investments leads to a significantly lower required return for all investment stages. The other control variables do not significantly influence the required rates of return.

[4] Except the chi-square test for IRR early stage.

DISCUSSION

This paper has shed light on the risk-reward trade-off in a highly imperfect capital market, namely the VC industry. We found that diversification over investment stages is not perceived by VC investors as a risk-reduction strategy, contrary to the expectations of conventional finance theory. Agency risk may be reduced through monitoring and bonding mechanisms ; lower agency risk leads to a lower required return. A higher monitoring intensity is mainly enacted through a higher percentage of lead investments, but not through a higher equity stake of the VCCs. A powerful bonding mechanism is the percentage of equity retained by the management team. We found that the effect of value-added by VC managers is as expected: the **fewer** investments per VC managers, thus the **greater** the value-adding intensity, the **higher** the required return. The cost/benefit trade-off argument is thus prevalent here. Finally, we have shown that the reinvestment problem is important in a VC setting and that independent VCCs do require a higher return than captive or public sector VCCs.

Implications for entrepreneurs

We have shown that, for an investment project with given characteristics, VCCs may require very different rates of return. Finding the 'cheapest' financing source is of course important. Everything else equal, it appears that independent VCCs require a higher return than captive or public VCCs, especially for early stage and expansion stage investments. When only the cost of funding is taken into account, we conclude that entrepreneurs would be better off seeking VC with captive or public VCCs. Belgian and Dutch VCCs are furthermore cheaper than their American, French or British colleagues. **Required return, and consequently the price of venture capital, is an important issue for entrepreneurs. P**ost-investment value adding and monitoring behaviour of the VC manager are **also** important considerations **but were not directly measured here. However, as discussed below, such issues may play an important part in investors' return requirements**.

We found that some venture-**specific** characteristics have a significant impact on the required return. **It is not surprising that investors have higher return hurdles for early stage ventures: early stage ventures are riskier and benefit more from investor involvement than** expansion and later stage investments **(Sapienza & Gupta, 1994). Our results show further that longer expected investment horizon leads to a lower required return; this may reflect the inflexibility of illiquid, shorter-term investments**. **Entrepreneurs may benefit from keeping these factors in mind as they approach investors, though adjustments to their own venture situation** is not always feasible.

For early stage projects, **our results allow** more refined conclusions. **Our results show that for early stage ventures lower returns are required by VCCs who were lead investors in a greater percentage of their investments, had a greater number of investments per investor,**

and were non-private. Given the critical role of access to financing and the danger that being turned down by one investor may harm chances with the next one (Bygrave & Timmons, 1992), entrepreneurs running seed and early stage ventures have an incentive to know investors' expectations and requirements before they approach them. Our results suggest that if the entrepreneurial team is totally confident that it needs no advice or other type of hands-on assistance from a VCC, it may wish to seek the profile of a VCC likely to seek the lowest require returns. Indeed, given the strict assumption that investors' only role is to select a portfolio with a favorable risk-return structure, such a strategy may be seen as generally superior. Some of our results, however, are not consistent with the conventional assumption investors seek only to influence the risk profile of their investment portfolio. Rather, they suggest that investors believe they add value. Unfortunately, our data do not permit a test of this idea.

We assumed that obtaining additional information through greater monitoring and specializing could be used to reduce risk. We found support for the fomer in terms of more lead investing being associated with lower required returns. We did not find support for the latter. A close look at the pattern of results suggests that VCCs may expect to be compensated not just for taking greater risks but also for having greater expertise and exerting additional effort. For example, we found that VCCs specializing in early stage investments required higher not lower returns on early stage investments. This result may be because the specializing does not so much reduce the risk as it increases the chances for greater returns, a benefit shared by the entrepreneurial team for which the VCC seeks compensation; this interpretation is consistent with past evidence indicating that VCCs put more time into early stage ventures and especially into early stage ventures performing well (Sapienza & Timmons, 1989). It is also consistent with Gupta and Sapienza (1992) who noted that VCCs specializing in early stage ventures do not diversify

their portfolios by industry as would be expected if their intent was to reduce risk; rather they specialize by industry as well, in an apparent attempt to bring value-adding knowledge to bear on their investments.

Other results could also reflect the expectation of being compensated for knowledge and/or effort. For example, the lower required return rate of VCCs in Belgium and the Netherlands may reflect a relatively lower level of effort or involvement than their counterparts in the US and the UK. This interpretation is consistent with Sapienza et al.'s (1996) finding that US and UK investors tend to be more actively involved and spend more time working on post-investment involvement than do VCCs in continental Europe. Similarly, independent VCCs tend to have greater equity stakes in their investments and consequently additional incentive to maximize the upside results of their investments. In short, the greater price of some venture capital may reflect not only additional risk-taking but also additional effort on behalf of the ventures. These are also considerations that entrepreneurs should keep in mind. Those entrepreneurs not as fully confident that they can build and foster their ventures quickly and fully on their own might be well-advised to suspect "cheap" money. As stated earlier, however, our data do not provide direct evidence regarding investor effort nor its value.

Implications for further research

This paper has provided evidence on the determinants of the rate of return required by VCCs, an area of venture capital research which has hitherto received little attention from researchers. The results of the study and the limitations of the approach adopted suggest the following areas for further research.

We have shown that the risk-reward trade-off is complex; **therefore,** many questions remain

unanswered. A fundamental question, from a theoretical point of view as well as from a practitioners' point of view, is whether VC investment strategy matters. **Finance theory suggests that in** a perfect market picking the right investments up-front and diversifying the portfolio to the desired level of risk is the only strategy that investors should worry about. **However,** the highly imperfect environment in which VC investors operate **may cause additional approaches to be** rewarding. First, they may choose to manage the inflow, **including specializing in terms of** investment stages and investment sectors. **More research must be done to reveal the relative value of** diversification versus specialisation choice. Is the effect of learning and knowledge realized through rsik reduction or value addition or both? **And, how may both parties share in the gains?**

Further, VC managers have to decide upon the level of monitoring and value-adding after the investment is made. What is the optimal level of hands-on involvement, given the fact that it is costly? We have shown that closer monitoring, achieved through more investments as lead investor, leads to a lower required return, everything else equal. We may thus assume that the perceived agency risk is lower when investments are tracked closely. The effect of value-adding on required return is less clear, however. Our results show that cost arguments and enhanced profit arguments are both important in a VC environment. At this point, the optimal trade-off between both the factors is still not settled. **Clearly, additional research into the effects of investor effort is needed**.

The study has also not examined the issues relating to the cooperative fit (Cable & Shane, 1997) or the level of trust (Sapienza & Gupta, 1994) between entrepreneurs and VCCs and how this might influence the required rate of return. For example, greater cooperative fit and/or greater trust may reduce perceived risk and hence lead to a lower required rate of return. Hence, while much behavioral research has previously focused on the entrepreneur-VCC monitoring

relationship, there appears to be a need to examine behavioural aspects of this earlier stage in the process. Such research might usefully focus on examining entrepreneur-VCC dyads, **a topic** beyond the scope of this paper.

In conclusion, we have shown in this paper that conventional finance theory does explain a proportion of the variance in required returns by VCCs. We hope it will stimulate theoretical and empirical research into factors not accounted for by this framework.

References

Admati, A.R. and Pfleiderer, P. 1994, Robust financial contracting and the role of venture capitalists. *The Journal of Finance* 49(2) : 371-402.

Amit, R., Glosten, L. and Muller, E. 1990. Entrepreneurial ability, venture investments, and risk sharing. *Management Science* 36(10) : 1232-1245.

Barney, J.B., Busenitz, L., Fiet, J. and Moesel, D. 1994. The relationship between venture capitalists and managers in new firms : Determinants of contractual covenants. *Managerial Finance* 20(1) : 3-15.

Brealey, R.A. and Myers, S.C. 1996. *Principles of Corporate Finance*. 5th ed. McGraw-Hill International Editions.

Bruno, A.V. 1986. A structural analysis of the venture capital industry. *The Art and Science of Entrepreneurship* : 109-117

Bull, I. 1989. Financial performance of leveraged buyouts: An empirical analysis, *Journal of Business Venturing*, 4(4):263-279.

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

Cable D.M. and S. Shane, 1997. A prisoner's dilemma approach of the entrepreneur-VC relationship. *Academy of Management Review* 22(1) : 142-176.

Chan, Y.S., Siegel, D. and Thakor, A.V. 1990. Learning, corporate control and performance requirements in venture capital contracts. *International Economic Review* 31(2) : 365-382.

Cooper, I.A. and Carleton, W.T. 1979. Dynamics of borrower-lender interaction : partitioning final payoff in venture capital finance. *The Journal of Finance* 34(2) : 517-529.

Demsetz, H., Hirschey, M. and Jensen, M.C. 1986. The market for corporate control. *American Economic Review* 76(2) : 313-329.

Elango, B., Fried, V.H., Hisrich, R.D. and Polonchek, A. 1995. How venture capital firms differ. *Journal of Business Venturing* 10 : 157-179.

EVCA, 1997. *Yearbook : A survey of venture capital and private equity in europe*. Zaventem.

Hirschman, A. 1964. The paternity of an index. *American Economic Review* 54 : 761-762.

Hofstede, G. 1984. *Culture's consequences : International differences in work-related values*. Beverly Hills, CA : Sage.

Jensen, M.C. and Meckling, W.H., 1976, Theory of the firm : Managerial behavior, agency costs and ownership structure, *Journal of Financial Economics* 3 : 305-360.

Jensen, M.C. 1993. The modern industrial revolution, exit, and the failure of internal control systems. *Journal of Finance*, 48(3):831-880.

Kimberly, J.M. 1979. Issues in the creation of organizations : Initiation, innovation, and institutionalization. *Academy of Management Journal* 22(3) : 437-457.

Laughunn, D.J., Payne, J.W. and Crum, R. 1980. Managerial risk preferences for below target returns. *Management Science* 26 : 1238-1249.

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

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

Manigart, S. and Struyf, C. 1997. Financing high technology startups in Belgium : An explorative study. *Small Business Economics* 9(2) : 126-135.

Manigart, S., Joos, P. and De Vos, D., 1994. The performance of publicly traded European venture capital companies. *Journal of Small Business Finance*, 3(2):111-125.

March and Shapira, 1987. Managerial perspectives on risk and risk taking. *Management Science*, 33 : 1404-1418.

Martin, J.D. and J.W. Petty, 1983. An analysis of the performance of publicly traded venture capital companies. *Journal of Financial and Quantitative Analysis*, 18(3):401-410.

McDougall, P.P. & Oviatt, B.M., 1997.International Entrepreneurship Literature in the 1990s and Directions for Future Research, Chapter 13 in *Entrepreneurship 2000*, ed. Sexton, D.L. & Smilor, R.W. Chicago, Upstart Publishing Company.

McNamara, G. and P. Bromiley, 1999. Risk and return in organizational decision making. Academy of Management Journal, 42(3):330-339.

Morgan, G. 1986. *Images of Organization*. Beverly Hills, CA : Sage.

Muzyka, D., Birley, S. and Leleux, B. 1996. Trade-offs in the investment decisions of European venture capitalists, *Journal of Business Venturing,* 11: 273-287.

Norton, E. and Tenenbaum, B.H., 1993. Specialization versus diversification as a venture capital investment strategy. *Journal of Business Venturing* I8 : 431-442.

Rea, R.H. 1989. Factors affecting succes and failure of seed capital/start-up negotiations. *Journal of business Venturing* 4 : 149-158.

Robinson, R.B. 1987. Emerging strategies in the venture capital industry. *Journal of Business Venturing* 2 : 53-77.

Rosenstein, J., Bruno, A.V., Bygrave, W.D. and Taylor, N.T., 1993. The CEO, Venture Capitalists, and the Board. *Journal of Business Venturing 8(2) : 99-114*.

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

Sapienza, H., Manigart, S. and Vermeir, W. 1996. Venture capitalist governance and value added in four countries, *Journal of Business Venturing* 11(6) : 439-469.

Sapienza, H.J. and Gupta, A.K. 1994. Impact of agency risks and task uncertainty on venture capitalist-CEO interaction. *Academy of Management Journal* 37(6) : 1618-1632.

Schilit, K.W. 1993. A comparative analysis of the performance of venture capital funds, stocks and bonds, and other investment opportunities, *International Review of Strategic Management* 4 : 301-320.

Siegel, R., Siegel, E. and MacMillan, I.C. 1988. Corporate venture capitalists : autonomy, obstacles and performance. *Journal of Business Venturing* 3 : 233-247.

Sitkin, S.B. and Pablo, A.L. 1992. Reconceptualizing the determinants of risk behaviour. *Academy of Management Review* 17(1), 9-38.

Stevenson, H. H., D.F. Muzyka and J.A. Timmons, 1987. Venture capital in transition : A Monte-Carlo simulation of changes in investment patterns. Journal of Business Venturing 2(2):103-121.

Stinchcombe, A.L. 1965. Social structure and organizations. In James G. March (Ed.), *Handbook of Organizations* : 142-193. Chicago, Ill. : Rand McNally.

Tyebjee, T. and Vickery, L. 1988. Venture capital in Western Europe. *Journal of Business Venturing* 3(2) : 123-136.

Winters, T.E. and Murfin, D.L. 1988. Venture capital investing in corporate development. *Journal of Business Venturing* 3(3) : 207-222.

Wright, M. and Robbie, K. 1996a. Venture capitalists, unquoted equity investment appraisal and the role of accounting information. *Accounting and Business Research* 26(2) : 153-168.

Wright, M. and Robbie, K. 1996b. Venture Capital Strategies to the Millennium, BVCA,

London.
Wright, M., Robbie, K. and Chiplin, B., 1997. Funds providers monitoring of venture capital firms. *Entrepreneurship : Theory and Practice* (**forthcoming**).

TABLE 1 : Characteristics of the sample

	US	UK	France	The Netherlands	Belgium
Number of responses	73	66	32	24	14
Response rate	24%	58%	24%	41%	50%
Total # of new investments as % of industry total*	N.A.	81%	25%	58%	86%
Investor type					
Independent VCCs	60 (82%)	33 (50 %)	13 (40 %)	15 (62%)	6 (43 %)
% of investments by independent VCCs (EVCA data)	N.A.	57 %	33 %	46%	8%
Stage distribution of investments					
Early	46%	17%	12%	21%	18%
according to EVCA data		6%	14%	28%	32%
Expansion/development	31%	30%	32%	26%	43%
according to EVCA data		44%	50%	50%	50%
Acquisition/buyout/others	23%	53%	56%	53%	39%
according to EVCA data		50%	36%	22%	18%

* : Compared to data from the EVCA statistics (EVCA Yearbook, 1997)

TABLE 2 : Descriptive statistics and correlations

	Mean	St.Dev.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Independent variables																	
1 Stage diversification	0.33	0.21	1.00														
2 Independent VCC[2]	0.63	0.48	.07	1.00													
3 % lead investments	64.4%	28.1%	-.02	.16	1.00												
4 # investments per VCM1	6.55	5.56	.38 *	-.08	-.30 *	1.00											
Stage-specific independent variables																	
5 Early stage investment horizon[1]	6.16	2.24	-.12	.18	-.02	.06	1.00										
6 Expansion investment horizon[1]	5.10	2.12	-.04	-.14	.13	.08	.32	1.00									
7 Acq/buyout investment horizon[1]	4.74	2.02	-.02	-.10	.36*	.12	.32*	.78*	1.00								
Control Variables																	
8 Age [1]	11.06	7.96	.04	-.06	-.12	.47 *	.06	.05	-.01	1.00							
9 # offices1	1.56	1.43	.00	-.04	.05	-.16	.03	-.14	-.07	.04	1.00						
10 # hierarchical layers1	1.90	0.84	.06	-.13	-.13	.10	.06	.14	.21*	.12	-.13	1.00					
11 % small size investments	50.9%	0.40	0.21*	.19	.11	.19	.19	-.06	.01	.02	-.15	-.04	1.00				
12 % early stage investments	22.7%	30.2%	-.06	.26 *	-.01	-.04	-.07	-.44*	-.27*	.02	.11	-.04	.37*	1.00			
13 UK[2]	0.38	0.49	.09	-.08	.00	.12	.17	.03	-.06	.13	.16	.12	.18	-.20 *	1.00		
14 France[2]	0.13	0.34	-.12	-.16	-.08	-.08	-.25*	.12	.07	-.08	-.10	.23 *	-.35*	-.15	-.31 *	1.00	
15 Belgium, the Netherlands[2]	0.14	0.35	.08	-.08	.07	.20 *	.13	.50*	.43*	.07	-.06	.12	-.05	-.03	-.32 *	-.16	1.00
Dependent Variables																	
IRR early stage[3]	5.30	1.86	.13*	.18	-.15	-.19	-.35*	-.51*	-.51*	-.12	.12	-.25 *	-.22	.11	.09	.05	-.43 *
IRR expansion[3]	3.48	1.55	-.08	.35*	-.07	-.31*	-.00	-.46*	-.40*	-.13	.15	-.38*	-.10	.32*	-.12	-.24*	-.38*
IRR acquisition/buyout[3]	3.31	1.23	.03	.16	.03	-.33*	-.14	-.49*	-.56*	-.19	.18	-.16	-.16	-.05	.18	-.05	-.44*

[1]: the natural log of the variable is used in the correlations.

[2]: dummy variable

[3]: The required return is reported in 7 categories: less than 20% (category 1), from 21% to 25% (cat. 2), from 26% to 30% (cat. 3), from 31% to 35% (cat. 4), from 36% to 45% (cat. 5), from 46% to 55% (cat. 6) and more than 55% (cat. 7).

*: correlates significant at the 5% level (2-tailed)

TABLE 3 : Test results with sample split

Panel A : Split according to investment stage strategy of VCC

	Early stage specialist				Expansion stage specialist				Acquisition/buyout specialist			
	Mean No	Mean Yes	p (t-test)	p (chi-square)	Mean No	Mean Yes	p (t-test)	p (chi-square)	Mean No	Mean Yes	p (t-test)	p (chi-square)
IRR Early Stage[1]	5.244	5.284	0.905	0.766	5.321	5.086	0.510	0.560	5.253	5.268	0.964	0.543
IRR Expansion[1]	3.318	3.851	0.067	0.024	3.482	3.361	0.682	0.496	3.669	3.172	0.051	0.114
IRR Acquisition-buyout[1]	3.412	2.853	0.062	0.362	3.292	3.370	0.778	0.193	3.212	3.400	0.416	0.133
N	141	46			146	41			102	85		

[1]: The required return is reported in 7 categories: less than 20% (1), from 21% to 25% (2), from 26% to 30% (3), from 31% to 35% (4), from 36% to 45% (5), from 46% to 55% (6) and more than 55% (7).

Panel B : Split according to ownership status and location of VCC

	Mean Captive/Public	Mean Independent	p (t-test)	p (chi-square)	Mean US & UK	Mean Continental Europe	p (t-test)	p (chi-square)
IRR Early Stage[1]	4.892	5.505	0.040	0.282	5.648	4.455	0.000	0.000
IRR Expansion[1]	2.856	3.856	0.000	0.005	3.935	2.463	0.000	0.000
IRR Acquisition/buyout[1]	2.957	3.404	0.044	0.044	3.683	2.388	0.000	0.000
N	82	127			139	73		

[1]: The required return is reported in 7 categories: less than 20% (1), from 21% to 25% (2), from 26% to 30% (3), from 31% to 35% (4), from 36% to 45% (5), from 46% to 55% (6) and more than 55% (7).

TABLE 4 : Results of the LDV regressions

coefficient (p-value ; 2-sided)	C1 IRR Early stage	C2 IRR Expansion	C3 IRR Acquisition / buyout
Constant	76.26	50.13	37.32
	(0.000)	(0.000)	(0.000)
1)Diversification variables(H1)			
stage diversification	19.76	-1.67	5.80
	(0.032)	(0.690)	(0.109)
2) Affiliation (H2)			
independent VCC	6.54	3.86	1.46
	(0.083)	(0.013)	(0.246)
3) Monitoring variables (H3)			
% lead investments	-15.40	-4.32	-2.32
	(0.009)	(0.128)	(0.424)
Ln(# investments per VCM)	-4.74	-2.30	-1.95
	(0.054)	(0.045)	(0.074)
4) Investment horizon (H4)			
ln(investment horizon)	-7.55	-5.00	-0.91
	(0.170)	(0.104)	(0.724)
5) Control variables			
ln(age)	-2.00	0.20	-0.87
	(0.464)	(0.852)	(0.552)
ln(# offices)	-0.01	0.92	1.08
	(0.997)	(0.554)	(0.529)
ln(# hierarchical layers)	-6.26	-2.13	0.42
	(0.188)	(0.277)	(0.865)
% small size investments	-13.09	-5.49	-3.82
	(0.018)	(0.012)	(0.053)
% early stage investments	12.54	2.98	-1.80
	(0.051)	(0.389)	(0.567)
UK	7.09	-4.75	0.24
	(0.136)	(0.019)	(0.886)
France	2.80	-10.40	-3.59
	(0.730)	(0.020)	(0.131)
Belgium, the Netherlands	-11.17	-9.57	-8.49
	(0.075)	(0.001)	(0.001)
N	94	112	101
Adjusted R^2	0.262	0.426	0.187
F-value	3.540	7.339	2.774
Log-likelihood	-140.119	-162.314	-140.615

Note : The figures between brackets are 2-sided p-levels of significance of the coefficients