



small
business
service

Factors Determining the Performance of Early Stage High-Technology Venture Capital Funds – A Review of the Academic Literature

Research

March 2006

dti

A DTI SERVICE



**FACTORS DETERMINING THE PERFORMANCE OF
EARLY STAGE HIGH-TECHNOLOGY
VENTURE CAPITAL FUNDS**

– A Review of the Academic Literature –

Anna Söderblom
Stockholm School of Economics

Supervisor: Johan Wiklund
Jönköping International Business School

ABSTRACT

The purpose of this literature review is to document academic research concerning factors influencing the performances of venture capital funds, as well as the venture capital fundraising decisions. Industry specialisation, large fund sizes, strong deal flow, syndication of investments, and especially, experience, all appear to be factors leading to superior investment performance, which is particularly well illustrated by the US venture capital industry. The review also concludes that venture capital fund returns to a great extent depend on an early or later stage focus, and the timing of the fundraisings. For policy makers the most significant measures, according to the findings, are to nurture a competitive local technology stock market, establish efficient legal frameworks and tax structures, and minimize labour market rigidities. Moreover, it seems like the vast majority of all venture capital returns are generated by the limited number of funds in the top quartile. Therefore, the possibility to get access to the best performing venture capital funds is probably more important than anything else in order for institutional investors to gain excess returns. In terms of geographical differences, the UK venture capital situation appears to be somewhere half way between the US and the continental Europe.

<u>1.</u>	<u>EXECUTIVE SUMMARY</u>	4
<u>2.</u>	<u>INTRODUCTION</u>	7
2.1.	<u>Background</u>	7
2.2.	<u>Research Purpose</u>	8
2.3.	<u>Research Methodology</u>	9
2.4.	<u>Organisation of This Review</u>	10
<u>3.</u>	<u>VENTURE CAPITAL (VC) OVERVIEW</u>	12
3.1.	<u>A Brief Description of VC</u>	12
3.2.	<u>Some Industry Data about the UK VC Market</u>	13
3.3.	<u>VC Performance</u>	14
3.3.1.	<u><i>VC performance and success – for whom?</i></u>	14
3.3.2.	<u><i>How to evaluate VC returns</i></u>	15
3.3.3.	<u><i>Academic studies of VC returns</i></u>	16
3.3.4.	<u><i>Empirical evidence for claims that US VC outperforms EU VC</i></u>	17
<u>4.</u>	<u>VC RESEARCH STREAMS AND SCOPE FOR THIS REVIEW</u>	19
4.1.	<u>A Brief Overview of VC Research Streams</u>	19
4.1.1.	<u><i>Academic research: Portfolio company level</i></u>	19
4.1.2.	<u><i>Academic research: VC firm level</i></u>	19
4.1.3.	<u><i>Academic research: LP level</i></u>	20
4.1.4.	<u><i>Academic research: Market factors</i></u>	21
4.2.	<u>Scope for this Literature Review</u>	21
<u>5.</u>	<u>LITERATURE REVIEW OF VC PERFORMANCE FACTORS</u>	23
5.1.	<u>Characteristics of Portfolio Companies</u>	23
5.1.1.	<u><i>Summary: Characteristics of portfolio companies</i></u>	24
5.2.	<u>Characteristics of VC Funds</u>	25
5.2.1.	<u><i>Partnership structure</i></u>	25
5.2.2.	<u><i>Specialisation</i></u>	25
5.2.3.	<u><i>Continuous success and importance of brand</i></u>	25
5.2.4.	<u><i>Fundraising</i></u>	26
5.2.5.	<u><i>Summary: Characteristics of VC funds</i></u>	27
5.3.	<u>The Investment Process</u>	27
5.3.1.	<u><i>Deal generation</i></u>	27
5.3.2.	<u><i>Due diligence and valuation</i></u>	28
5.3.3.	<u><i>Deal structuring</i></u>	28
5.3.4.	<u><i>Syndication</i></u>	29
5.3.5.	<u><i>Summary: The investment process</i></u>	31
5.4.	<u>The Management of Portfolio Companies</u>	32

5.4.1.	<i>VC experience and competence</i>	32
5.4.2.	<i>Replacement of entrepreneurs</i>	33
5.4.3.	<i>Summary: The management of portfolio companies</i>	33
5.5.	The Exit Process	33
5.5.1.	<i>IPOs</i>	34
5.5.2.	<i>Trade sales</i>	34
5.5.3.	<i>Exit rates and VC firm characteristics</i>	34
5.5.4.	<i>Summary: The exit process</i>	35
5.6.	Institutional and Environmental Factors	36
5.6.1.	<i>National and international dependent macro factors</i>	36
5.6.2.	<i>Home market characteristics</i>	37
5.6.3.	<i>Local VC market characteristics and situation</i>	37
5.6.4.	<i>Legislatures and government</i>	39
5.6.5.	<i>Universities and research</i>	41
5.6.6.	<i>Business angels</i>	42
5.6.7.	<i>Summary: Institutional and environmental factors</i>	42
6.	<u>LP'S INVESTMENT PATTERNS</u>	43
6.1.	<u>Asset Allocation to Alternative Asset Classes</u>	43
6.2.	<u>Asset Allocation to Private Equity Funds</u>	44
6.2.1.	<i>Overall capital supply to VC funds</i>	44
6.2.2.	<i>Motives for LPs' VC allocation</i>	44
6.2.3.	<i>Characteristics of LPs and related performance</i>	45
6.2.4.	<i>Summary: LP's investment patterns</i>	46
7.	<u>COMMENTS AND FINAL REMARKS</u>	48
7.1.	<u>Comments about this Literature Review</u>	48
7.2.	<u>Final Remarks</u>	48
8.	<u>TABLE I: VC RETURN STUDIES</u>	50
9.	<u>TABLE II: VC PERFORMANCE FACTOR STUDIES</u>	51
10.	<u>REFERENCES</u>	60

1. EXECUTIVE SUMMARY

On behalf of the Small Business Service (SBS), a UK government agency, this literature review was undertaken to document accurately from robust empirical research what has been found to influence the performance of VC funds as well as VC fundraising and allocation. In excess of 120 peer reviewed papers were examined.

A number of common, performance related findings were evident in the review, where the factors influencing venture capital fund performance can be split into two categories. The first category includes factors having a more direct effect on VC fund returns. These factors often relate to the VC fund investors, the VC fund/firm itself, and the companies the VC firms invest in. The second category consists of institutional and environmental factors that generally have more indirect effects on VC fund performance. They are, however, of high importance in order to create and keep a vital VC industry alive. This review has pointed out several factors that appear to affect VC fund performance.

Specialized VC firms, focusing on investments in a limited number of industry sectors, turn out to perform better than generalist VCs with a broad sector focus. At least until recently, VC investments in the ‘new economy’ sectors have yielded the highest returns. Specialisation in early stage phases, however, has had a negative effect on returns. Neither should the geographical focus for investments be too narrow. VC funds with limited partnership structures have shown to be more successful than those with other structures. In addition, sophisticated structuring of VC investments and “US-inspired” legal contracts with portfolio companies has a strong impact on the fund performance. Taking the role as lead investor and thereby controlling a significant part of the portfolio companies’ share capital also have positive impact on fund returns. Larger fund sizes correlate with higher returns – although they should not be too large or grow too fast. A high availability of investment opportunities has a crucial impact on performance as well as screening capabilities. Syndication of deals is another factor that seems to have a clear impact on fund performance. However, the most important performance factor is likely to be the quality and skills of VC firms’ management, which are highly correlated with fund performance whereby older VC firms, with former fund success and developed brand recognition, achieve better fund returns. The results also show that bringing portfolio companies to the public stock markets does not only generate excess returns due to its limitation to the ‘most promising’ ventures, but also the gain in reputation within the investment community. Keeping investments longer in the portfolio have turned out to be negative for fund performance. Another important factor is the capability to abandon early the non-performing investments.

If we take these structural and managerial factors that influence performance and compare the US and UK/European VCs, we find that European VC firms to a higher degree invest in early stage companies, compared to their US counterparts. The UK investors, however, seem to differ from other European VCs by placing a heavier focus on later stages. The UK VCs tend to invest primarily in established activities rather than in new technology, in contrast to the US VCs. Research shows further that the European fund sizes in general are smaller compared to the US VC funds although data on average UK fund sizes was not available from the studies included in this review. In the UK the limited partnership structure seems to be dominating, as well as the use of US-based contracts. Whether the US VC firms have a better deal flow in

quality terms compared to their European counterparts, cannot be concluded from this review. However, given the longer history of the US VC industry, the location of many leading high-tech companies in the US and the close cooperation with universities, US VCs are most likely exposed to a greater number of potential investment opportunities. One could also assume that US VCs therefore have developed better screening capabilities. Another negative factor is that the UK VC firms syndicate considerable less often than their US counterparts.

This review has not shed light on whether UK VC fund managers have the same VC skill sets as their US colleagues. We know, though, that the General Partners (GPs) in the top US VC firms often have held senior management positions in relevant industry sectors before becoming venture capitalists. Recruiting investment managers to European VC firms with the same level of industrial experiences, given that the headquarters of the vast majority of targeted industries are situated in the US, is most likely more difficult (this goes for the recruitment of portfolio company senior management as well). In addition, the investments in early stage phases by UK VCs have, in monetary terms, been considerably smaller than in the US. Consequently, although the UK private equity industry may have a relatively long history, one can assume that the experience from early stage investing and related skills is behind the US.

The abandoning of non-performing investments seems to be done more often and sooner by US VCs than by their European counterparts. Statistics from EVCA show that the number of IPOs in the UK is currently low, but that seems to be true also for the US market at the moment. Finally, while a high proportion of UK private equity is invested abroad, conclusions about the VC investors' international activities cannot be concluded from this review.

What about indirect, environmental and institutional factors? The most considerable environmental tasks for VC fund managers seem to be to reduce geographical and industrial obstacles through syndication, to avoid fundraising in boom times and to interact closely with universities. For policy makers the most significant measures are to nurture a deep and liquid local stock market, establish efficient legal and tax structures, increase incentives for investing by business angels, and reduce labour market rigidities. The US universities are considered to generate more spin-offs and to be more effective in facilitating the commercialisation of business ideas compared to their European counterparts. The UK, although still lagging behind the US NASDAQ stock exchange, seems to have a fairly good working stock market for high-tech companies and also appears to have a large informal VC market. The UK is also considered to have one of the most favourable legal and fiscal environments in Europe.

Finally, some comments about decision factors and processes which influence the manner in which institutional investors determine whether or not to make an asset allocation to venture capital and the subsequent size of such allocation. It turned out that the academic literature in this area is limited. Limited Partners (LPs) primarily invest in alternative asset classes, including venture capital, in order to diversify their investment portfolios with assets characterised by low assumed correlation to traditional investments. However, there might be other reasons than those related to performance behind decisions to allocate assets to venture capital, such as desire to establish contacts, herding behaviour or stimulating local economies. Non-financial performance related reasons seem to occur more often in Europe than in the US. And again,

the possibility for LPs to get access to the best performing funds is probably more important than anything else in order to gain excess returns.

Summary of VC Success Factors – Direct implications

Performance factor*	Effect on VC fund return	Impact**	UK situation
Access to investment opportunities	Positive	High	Compared to the US, probably weaker
Large VC funds (but not too large)	Positive	High	Probably OK
Previous VC fund success and related brand	Positive	High	Compared to the US, probably weaker
Role as lead investor including having large ownership	Positive	High	Information not available
Shorter holding periods of investments	Positive	High	Information not available
Skilled VC firms with long investment experience	Positive	High	Compared to the US, probably weaker
Syndication	Positive	High	UK VC firms syndicate less often than US firms
Use of US style contracts	Positive	High	UK VC firms uses US based contract
VC fund specialisation in early stage investments	Negative	High	UK invests mainly in later stage
Fast growing funds	Negative	Medium	Information not available
High share of IPOs	Positive	Medium	IPO rate in UK currently low
Investments in 'new economy' sectors	Positive	Medium	Probably to lesser extent than US VCs
Limited partnership structure	Positive	Medium	Limited partnership structure is prevalent in the UK
Screening competence	Positive	Medium	Compared to the US, probably weaker
VC fund specialisation in industries	Positive	Medium	Information not available
Abandon non-performing investments	Positive	Some	Information not available
Narrow geographical investment focus	Negative	Some	Information not available
VC partners with earlier industrial/technical experience	Positive	Some	Compared to the US, probably weaker

Summary of VC Success Factors – Indirect implications

Performance factor*	Effect on VC fund return	Impact**	UK situation
Deep and liquid stock market	Positive	High	Compared to continental Europe, OK Compared to the US, behind
Inflow of capital to the VC industry	Negative	High	-
Investment timing	Positive	High	-
Existence of informal VC, i.e. business angels	Positive	Medium	Good situation
Favourable legal and fiscal environments	Positive	Medium	Good situation
Flexible labour markets	Positive	Medium	Good situation
University intellectual eminence and licensing policies	Positive	Medium	Information not available

* Sorted on Impact and then listed alphabetically.

** See Table II: "VC Performance Factor Studies". The impact ranges from *Some*, through *Medium* to *High* impact on fund returns.

2. INTRODUCTION

2.1. BACKGROUND

The US Venture Capital (VC) industry is envied throughout the world as an engine of economic growth. The US VC market, which has existed since the Second World War, grew into a significant industry between 1980 and 1990 and became the norm for how the European VC industry would evolve. Investor behaviour in the respective continents has been developing in parallel over the past ten years, e.g. in terms of growth in number of new investments, transaction

“Certainly, venture in the US is doing pretty well, but the US is a wildly different market compared to Europe, structurally, culturally and operationally. ... Ask an LP what he thinks of investing in European venture tech and he/she is likely to respond ‘what is European venture tech?’ ... Venture returns have been poor in Europe.”

European Venture Capital Journal, November 2004

volumes and number of exits. Despite this, on average, the financial performances of US VC firms seem to be far better than their European counterparts. According to EVCA (2004c), the European Venture Capital Association, and NVCA (2004), the National Venture Capital Association, the US VC industry generated a five-years rolling IRR (Internal Rate of Return) of 22.8% up to 2003. and thereby substantially outperforming the European VC market, which only reached an IRR of 2.3% for the same period. Although the average returns for the asset class reported in 2005 showed a significant decrease in performance for the US VC funds reaching a five-years rolling IRR up to 2004 of -1.2%, the US market was still performing better than the European reaching a rolling IRR of -2.3% for the same period (EVCA, 2005b). The UK early stage investment performance has also been disappointing. According to BVCA (2005a), the British Venture Capital Association, the UK early stage funds achieved an IRR of -10.3% in 2004 over five years¹.

Is it important to have a vital national VC industry? From a political macro economic aspect, the answer to that question is certainly “yes”, at least according to academic research showing VCs positive impact on product patenting, employment growth, fostering of innovative climates, etc. (e.g. Kortum and Lerner, 1998; Engel, 2002; Hellman and Puri, 2002; Romain and van Pottelsberghe de la Potterie, 2004b). The industry will however not survive in the longer run if financial returns to investors are not sufficiently attractive in relation to other asset classes. According to practitioners, European VC returns have reached such low levels that at least some fund investors are rethinking their current allocations and questioning whether further VC investments are financially justified.

In order to understand what factors cause the success or failure of VC fund investments, variables having direct as well as indirect effects on fund performance need to be analysed. Some researchers argue that differences in monitoring and control processes, levels of syndication and earlier performances are important differentiators for VC fund performance (e.g. Gompers and Lerner, 2001b; Hege, Palomino and Schwienbacher, 2003; Hsu, 2004). Other researchers suggest that more indirect institutional and environmental factors such as market rigidities, efficiency of initial public offerings (IPO) markets, government programs for entrepreneurship, or fiscal environments, explain a significant share of the cross-

¹ It is worth noting that the European buyout segment has outperformed the US in recent years (EVCA, 2005).

country variations of VC performances (e.g. Jeng and Wells, 2000; Marti and Balboa, 2001; Armour and Cumming, 2004). Some factors are to a high extent situation-based, such as business cycles or interest rate levels, and will vary over time. Other factors cannot be changed, e.g. the geographical size of a market. Factors that can be manipulated are obviously of primary interest to policy makers as well as to industry players, such as VC firms or VC fund investors, when seeking ways to improve the financial performances of local VC markets.

2.2. RESEARCH PURPOSE

The Small Business Service (SBS), a UK government agency, has been seeking to engage an academic researcher to undertake a desk-based research project on the following areas.

- Project 1: To identify from existing research studies those factors that may help explain long run differences in investment performance between US and UK early stage technology funds.
- Project 2: To identify from existing research studies those sources of information, decision factors and processes which influence the manner in which institutional investors determine whether or not to make an asset allocation to venture capital funds, and the subsequent scale of that allocation.

In undertaking the review, it was asked to consider, *inter alia*, whether any of the following factors have been identified as contributory factors to the differences in venture capital performance, and what their impact may be:

- Strength and depth of the technology sector in the US – are US researchers and entrepreneurs better at creating new technologies and seeing commercial potential in them?
- Sector specialisation – are there differences in the VC funded technologies in the US that make them more attractive investment opportunities?
- Ease of access to technology – are there mechanisms in the US that make it easier for investors to identify attractive VC investment opportunities and make investments in them?
- Availability of management – do US companies have a larger pool of experienced commercial managers and entrepreneurs who are willing to work with early stage high-technology companies?
- Expertise of fund managers – do US fund managers have a higher level of expertise, experience or specialist competences than UK fund managers?
- The stage of investment – do US VC investors in early stage technology companies put their money in at the same stage as in the UK? In particular, are they willing to invest pre-revenue and do they tend to invest alongside or after business angels and foundations?
- Risk/return – do US fund managers have different risk-return requirements or timescales for investment and exit that may have an influence on performance?
- Government support – is there a greater level of government or public sector support (financial and non-financial) in nurturing early stage, high-technology businesses?

- Government contracts – do US high-technology companies find it easier to secure early revenues from public sector contracts than UK companies?
- Size of market – how important are the relative sizes of the US and UK domestic markets for initial sales by early stage, high-technology companies?
- Clustering – does the US have more effective clusters than the UK? In what way?
- Exit opportunities – are large corporates more active collaborators and eventually trade purchasers of technology companies in the US than the UK? How important is NASDAQ as an IPO route compared with LSE/AIM?
- Exit valuations – are exit valuations (trade sale or IPO) higher in the US than the UK? If so, why? (and why does this apparent arbitrage opportunity persist?)
- Experience of institutional investors in VC investing – is this a factor (given the international nature of financial investing)?
- Are US VC funds better than their UK counterparts at communicating the case for investment in VC to institutional investors?
- Are US institutional investors more attuned to VC investment opportunities, in the US and the UK, than their UK counterparts (long term effect of 1979 ERISA changes, longer experience of VC etc)?
- Tax/regulation – do these play any part in explaining differences in returns?

2.3. RESEARCH METHODOLOGY

Although research interest in venture capital has increased remarkably during the last years, little is still known about the performance characteristics of the asset class. The majority of existing VC research is focusing on the North American markets whereby the US literature is the predominant source for this literature review, although available European research is included to a high extent when available. The research covers research published since 1990 with a special emphasis on more contemporary studies.

The major sources for collecting data about academically identified performance factors for VC funds are well known peer-reviewed international academic journals. Examples of journals are, in alphabetical order; American Economic Review, Economic Policy, Financial Management, Journal of Business Venturing, Journal of Corporate Finance, Journal of Economics, Journal of Finance, Journal of Financial Economics, Journal of Management, Journal of Portfolio Management, Journal of Private Equity, Rand Journal of Economics, Strategic Management Journal, The Journal of Small Business Finance, and Venture Capital. Also non yet published papers and reports from leading academic faculties and research institutes such as Babson College, CESifo Economic Studies, NBER - National Bureau of Economic Research, RICAFE – Risk Capital and the Financing of European Innovative Firms, etc., as well as academic working papers from leading European and north American universities are included in the review. Research and analyses in well known books within the VC discipline are used as well. Also non-academic sources have been valuable in order to understand trends and ongoing discussions within the VC community, for example, reports from the European Private Equity and Venture Capital Association

(EVCA), the National Venture Capital Association (NVCA), the British Venture Capital Association (BVCA), and Thomson Venture Economics as well as related business newspapers and magazines. A special focus and emphasis has been put on three areas; (i) academic journals focusing on the private equity field, e.g. Venture Capital and Journal of Private Equity, as well as more financial oriented journals such as Journal of Finance; (ii) published papers from leading academic faculties within the field, e.g. Babson College, NBER and RICAPE; and, (iii) academic researchers with a special focus on, and experience of, VC research in general or specific performance determinants, e.g. Cumming, Gompers, Lerner, Kaplan, Lockett, Manigart, Megginson, Sapienza, Schoar, and Strömberg. References from them to other articles and/or books have received a specific interest.

The main sources for the articles, papers and reports are the Stockholm School of Economics Electronic Journal Library, the largest source for economic and business administration research in Sweden, and Google Scholar, which enables search specifically for peer-reviewed papers, theses, books, preprints, abstracts and technical reports. Through reviewing reference lists in observed articles, papers, books, reports, etc., additional articles were found and the quotation function in Google Scholar provided information on subsequent research on similar topics.

For the first project, identifying factors that may explain differences in VC investment performance between US and UK, broad searches were initially carried out on Google Scholar on combinations of key words such as ‘venture capital’, ‘private equity’, ‘equity financing’, ‘early stage’, ‘seed’, ‘start-up’, ‘limited partners’, ‘portfolio company’, ‘return’, ‘IRR’, ‘risk’, ‘success factors’, ‘determinants’, ‘cross-country’, ‘US’, ‘Europe’, ‘UK’, and ‘differences’. After deciding to structure the studies influenced by Gomper and Lerner’s (1999b) venture capital life cycle model, additional key words such as ‘characteristics’, ‘fund’, ‘raising’, ‘specialisation’, ‘portfolio size’, ‘screening’, ‘syndication’, ‘network’, ‘reputation’, ‘experience’, ‘exit’, ‘IPO’, ‘bankruptcy’, ‘tax’, and ‘labour market rigidities’ was used. Citations and references to and from other articles have been significantly useful as well. The studies were then included or not included in the review mainly based on whether the research used financial performance of VC investments as dependent variables or not. Over 200 articles or books were found, where 60 unique studies, evaluating 140 sometimes overlapping performance factors, constitutes the review as presented in chapter 4 (see also Table II: “VC Performance Factor Studies”). For the second project, identifying decision factors influencing the manner in which institutional investors determine whether or not to make VC fund allocations, additional key words were used such as ‘institutional investor’, ‘alternative asset class’, ‘LP experience’, ‘diversification’, ‘allocation’, ‘investment decision’, ‘risk management’, ‘fund’, and ‘raising’. Close to 30 articles were found related to the topic, but only a few turned out to be useful for this review (see chapter 5 and Table II).

2.4. ORGANISATION OF THIS REVIEW

The review is organised as follows. Chapter 2 defines the asset class venture capital, provide some statistics about the UK VC market, and present evidence for claims that US VC funds outperform their European counterparts. Chapter 3 presents various venture capital research streams and drill down to the scope for this literature review. Chapters 4 and 5, also presented in Table II, provide the core results of the

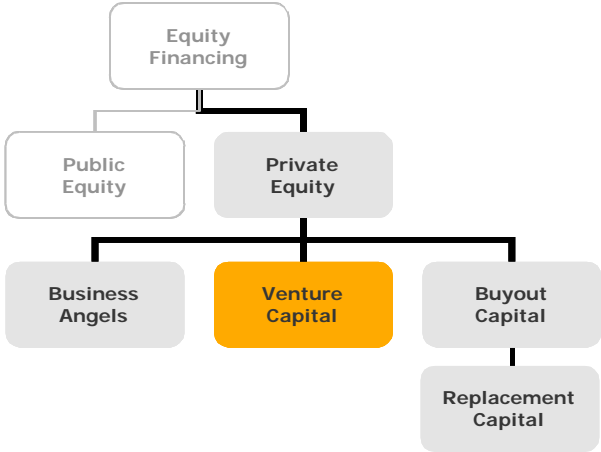
literature review. Chapter 6 summarises the findings of the literature review and draws conclusions. Chapter 7 contains some personal remarks.

3. VENTURE CAPITAL (VC) OVERVIEW

3.1. A BRIEF DESCRIPTION OF VC

The focus for this literature review is on *venture capital*, based on the definition set by EVCA (www.evca.com). Institutional or formal venture capital, hereafter referred to as venture capital or VC, is a financial intermediary investing primarily institutional capital in privately owned early stage companies, often technology related, with large growth potential. Since these companies generally are associated with high levels of uncertainty and non-liquid assets, other financing sources are not highly available. The venture capitalists are active investors that not only bring equity capital, but potentially also relevant knowledge, business contacts, networks, reputation, and strategic advice, to their investments. The company or entity into which a VC firm invests is usually referred to as *portfolio company* or *investee company*.

Venture capital is a subset within the *private equity* investment area. Private equity (PE) provides equity capital to enterprises not quoted on a stock market and can be used to develop new products and technologies, to expand working capital, to make acquisitions, to strengthen a company’s balance sheet, or to buy out other shareholders. Other categories of investments within private equity, except for VC, are *buyout capital*, *replacement capital*, and *business angel* investments. A buyout (BO) is a transaction in which a business, business unit or company is fully



Structure of Private Equity including VC
Based on EVCA definitions

or partly acquired from other shareholders and are typically applied to mature companies. The BO acquisitions often include leverage as a source of finance that provides debt to facilitate the buyouts, frequently alongside a right to some of the equity upside. Replacement capital is used to change the financial structure of a company, normally to buy out debt. Business angels, sometimes referred to as informal VC investors, are individuals who provide both funding and business expertise to investee companies. Buyout, replacement or business angel research will not be covered within this literature review unless it has an obvious impact on the scope for the review, namely VC performance factors.

There are several types of VC firms, but most mainstream firms invest their capital through closed-end funds. The VC funds are typically structured as limited partnerships in which the VC firm serves as the *general partner* (GP) and the investors as *limited partners* (LP). The LPs are mainly constituted of institutional investors and wealthy individuals who provide the bulk of the capital. In Europe, banks are the largest financing source for private equity funds, followed by pension funds, fund of funds and insurance companies (EVCA, 2005b). LPs increasingly invest on a global basis, where the US investors constituted the largest source of finance to the European private equity market during 2004. investing €5.6 billion (ibid). In most fund agreements, the LPs commit to disburse a certain amount of capital to the fund during a

predetermined time, i.e. not all at once but along the pace of making investments, whereby the LPs' money at risk is limited to the committed capital. A typical VC fund has a duration of ten years; four to six years to make investments and build up a portfolio, and the remaining time to realise it.

There is a range of players involved in VC investing, often for different reasons. Many VC firms are *independent*, owned by its management team, managing third party money with fully commercial objectives. Another type of organisation is as *public VC companies* listed on a stock exchange. Such funds normally are commercial as well, but are structured in a different way. VC firms may also be affiliates or subsidiaries of a bank, insurance company or industrial corporation, and make investments on behalf of the parent firm or its clients. These firms are typically called *captive VC firms*, with objectives often linked to the parent company's strategy. Other venture capital organisations may include government affiliated investment programs that help start-up companies either through state or regional funding or as *government funded VC firms*. These VC firms often put objectives related to national innovation and growth above commercial success.

The primary focus for this review is on independently managed VC firms organised as limited partnerships, given that most studies have been conducted in the US where this form dominates. However, the findings most likely largely apply to other VC organisation structures as well.

3.2. SOME INDUSTRY DATA ABOUT THE UK VC MARKET

The private equity industry in the UK has grown rapidly from the mid 1980s and is second only in importance globally to the USA. Although the gap has narrowed considerably in recent years, the UK private equity market is regarded as more mature compared to its continental European counterparts (Tannon and Johnson, 2005). The UK accounts for some 40% of the whole of the European market and as a percentage of GDP, the UK is the most significant private equity investor in Europe at a level of 1.10%. Out of this, however, only 0.21% goes into venture capital financing while the rest is invested in the buyout sector (EVCA, 2005b). The US is the predominant VC nation; in 2003, 74% of all venture capital investments among the G7 nations was made in the US, and VC financing as a percentage of GDP was at least twice as high in the US as in the UK (Bygrave and Hunt, 2004). The invested amount per company is also higher in the US than in any other country. In 2003, US VCs invested on average \$8.1 million per company, compared to \$1.19 million per company in the UK (ibid).

During 2004 the total amount of raised funds in Europe reached €27.5 billion where the UK contributed to 37% of these funds, i.e. €10.1 billion. Pension funds are the largest contributors to UK funds, representing 23 to 26% of raised capital during 2002-2004. Second largest contributors are fund of funds with 15 to 20%, followed by banks, contributing 15 to 16%. The UK private equity industry is highly international; around 50% of the private equity investments done by UK investors during 2002 through 2004 were allocated to investments outside the UK (EVCA, 2003; EVCA, 2004b; EVCA, 2005b).

The UK private equity investors tend to invest more in established businesses rather than in new technology ventures, as evidenced by the dominating buyout sector. Over 70% of all private equity goes into this segment (Martin, Berndt, Klagge, Sunley and Herten, 2003; EVCA, 2005b). Furthermore, early

stage investments have decreased substantially in the UK, where VC allocations to seed and start-up phases during the last few years account for only around 5% (EVCA, 2005b). And even though the volume of investments in high-technology companies in the UK increased tenfold between the early 1990's and 2001 (Martin et al., 2003), the technology VC investments as a percentage of GDP was only 0.08% in 2004 (BVCA, 2005b). In comparison, the US technology VC investments as a percentage of GDP in 2004 reached almost 0.15% (BVCA, 2005b). BVCA argues that the large gap in technology VC investments between the UK and the US is due to both cultural and structural differences. The US has been particularly successful in taking advantage of the positive effects resulting from clustering and university spinouts, and has found it easier to accept the risks involved in investing in technology companies. BVCA also suggests that the absence of a functioning pan-European stock exchange for early stage ventures hinders the development of early stage VC in Europe.

About 22 to 38% of the investments in the UK were syndicated, i.e. when a group of VCs jointly invest in a portfolio company, during the 2002 to 2004 period. Out of these, the international syndications represents around 6 to 10% (EVCA, 2003; EVCA, 2004b; EVCA, 2005b). Regarding the realisation of private equity investments, industrial trade sales has been the most common exit route for the UK VC firms during the last two to three years period, representing 20 to 27% of all exits. Since 2003 secondary sales, when one financial investor sells its stake in a company to another financial investor, have become the second most common exit alternative, today representing almost 15% of all exits. The percentage of IPOs has decreased from over 20% in 2002 down to 14% of the exits in 2004. At the same time, the number of write-offs has also decreased; from 23% in 2001 to a level of 8% in 2004 (EVCA, 2003; EVCA, 2004b; EVCA, 2005b).

In the UK, limited partnerships is the most common legal form of structuring VC funds (Mayer, Schoors and Yafeh, 2003). According to EVCA (2004a) the UK has, at least currently, one of the most favourable legal and fiscal environments in Europe for the development of the venture capital industry. One exception, however, is the unfortunate tax situation for university spin-out companies (EVCA, 2005b).

3.3. VC PERFORMANCE

3.3.1. VC performance and success – for whom?

In what terms should venture capital performance and related success be measured? The answer is that it depends on the observer. From a *political macro economic perspective*, contributions such as employment growth, number of new companies or technological breakthroughs, are of significant importance. Several academic VC studies claim for example that entrepreneurial activity fosters innovation, patenting and growth performances (e.g. Kortum and Lerner, 1998; Engel, 2002; Hellman and Puri, 2002; Romain and van Pottelsberghe de la Potterie, 2004b). From an *entrepreneurial perspective* VC firms' performances might be measured in terms of their ability to add value, in addition to capital infusions. Earlier research shows e.g. that VC firms play an important role in (i) professionalizing the firms in which they invest; (ii) connecting them with potential clients and suppliers; and (iii) attracting additional

funding (e.g. Sapienza, 1992; Rosenstein, Bruno, Bygrave and Tylor, 1993; Barney, Busenitz, Fiet and Moesel, 1996).

From an *investor perspective* the most important measurement, however, is financial returns from VC fund investments. A longer-term lack of competitive returns will force investors to avoid VC investments, or only invest in funds with proven track records. A vital VC market with satisfactory financial returns is thus the guarantee for its future survival.

The focus for this literature review is from an investor perspective, i.e. on academic research evaluating factors that influence the performance of VC funds as well as VC fundraising determinants.

3.3.2. How to evaluate VC returns

As private equity investments rarely are traded on secondary markets², or, at least the pricing of such transactions is not disclosed, researchers as well as practitioners usually rely on the cash flow history of a fund investment in order to determine its return. For that purpose, either Internal Rate of Return (IRR), a public market equivalent (PME), a profitability index or a multiple is used (Diller and Kaserer, 2005). IRR is calculated as an annualised effective compounded rate of return, using monthly cash flows and annual valuations for non-realised investments, which can be calculated in gross terms (at fund level excluding fees) or net to LPs (www.evca.com). During a fund's life, it is common to refer to the "interim" IRR, which is a theoretical exercise to estimate the current status and future potential of an unrealised VC portfolio, whereby realised and unrealised IRRs are calculated, the latter at fair market value using different assumptions. The PME is usually defined as the ratio of the present value of all cash distributions over the present value of all take-downs from LPs (Diller and Kaserer, 2005).

Given the generally accepted importance of the VC industry as such and the large amount of literature about venture capital, it may seem surprising that there are only a few papers analysing the returns of VC. However, an analysis of the profitability of investments in private equity is no easy task since information within the private equity industry is by definition "private", compared to e.g. public markets, and transparency requirements are limited. The common use of fund valuation data provided by two commercial vendors Venture Economics and Venture One, has been criticised by e.g. Ljungqvist and Richardson (2003) for having three principal shortcomings: (i) the data is available only in aggregate rather than in fund-by-fund format; (ii) performance data is largely provided by VC firms on a voluntary basis and thus potentially subject to selection biases; and, (iii) the data is based on unrealised as well as realised investments, which introduces noise and potentially biases due to subjective accounting treatment. Ljungqvist and Richardson (2003a) show that the IRR of the average fund does not turn positive until the eighth year of the fund's life (the so called "J-curve effect"), which means that it is only at the very end of a fund's life that excess returns are realised. In addition, external valuations of portfolio companies only exist in the events of IPO's, trade sales based on tradable securities or cash, additional financing rounds

² Diller and Kaserer (2005) points out that secondary markets for private equity investments though still small have grown rapidly over the last years. They refer to Alt Assets estimates showing that currently 3 to 5% of yearly private equity investments are traded in secondary deals. Hence, the degree of illiquidity of the private equity asset class is going to be reduced.

including third parties or if the company files for bankruptcy. Therefore, according to Ljungqvist and Richardson (ibid), the calculations of interim IRRs computed before a fund reaches maturity are not very informative. Cumming and Walz (2004) show that there are systematic biases in the reporting of interim IRRs which is explained in terms of cross-country differences in accounting standards, legality and proxies for information asymmetry between VC managers and their institutional investors. In addition, Woodward and Hall (2004) argue that reported returns from VC firms are too low in a rising market but too high in a falling market. Cumming and Walz (2004) show that experienced VC firms tend to report significantly lower valuation than their younger, especially early stage and high technology focused, counterparts. A final example of challenges when evaluating and comparing IRRs, is the unclear and inconsistent use of net and gross returns, i.e. whether the reported results include or exclude fees to the VC firms.

Comparing results from different analyses on VC performance is thus complicated. Having said that, there is a number of high quality academic studies which together with data from EVCA, NVCA and BVCA, provide a fairly good understanding of returns from venture capital investments, as described in the two following sections.

3.3.3. Academic studies of VC returns

What should be the expected and desired return from venture capital fund investments? Informational difficulties, illiquidity, large investment sizes, and high business risk in VC settings give that a higher overall return will be required *a priori* by those who invest in VC, than those investing in other asset classes (e.g. Manigart, Lockett, Meuleman, Wright and Landström, 2002b; Gottschalg, Phalippou and Zollo, 2004). Inflow of capital to, and consequently returns from, VC funds have been characterised by wide swings over almost the six decades since the formation of the modern VC industry (Gompers and Lerner, 2000). Although the 30 percent annual return was typical for US VC funds during the 1970s and early 1980s, such level of profitability was rarely achieved from 1984 to 1996 (Gompers and Lerner, 2001b).

There are few industries in which the gap between the best and the rest is as large as in private equity. According to The Economist (Nov 27. 2004), the top quartile VC funds in the US have produced an average annual IRR of 23% (1980-2001) while the bottom quartile earned the investors only 3%. Also Gottschalg et al. (2004) found that private equity funds' overall performance hides a great heterogeneity and skewness, as well as EVCA (2005b) showing that the top quartile venture funds outperform the IRR of all other venture funds by three times.

Huntsman and Hoban (1980), made one of the first structured attempts to analyse the risk-return trade-off of VC investments. They found the VC investments offer attractive returns, but that the rate of return on the investment portfolio is highly sensitive to the number of successful investments it contains.

More recent research on the US market has been done by e.g. Chen et al. (2002), Jones and Rhodes-Kropf (2003), Ljungqvist and Richardson (2003a), Emery (2003), Kaplan and Schoar (2003), Quigley and Woodward (2003) and Cochrane (2005). An overview of those academic analyses is presented in Table I: "VC Return Studies". Chen et al. (2002) examined 148 venture capital funds that had been liquidated

before 2000. They found an average annual return of 9.99%, with the highest annual IRR of 74% and the lowest of -72%. Jones and Rhodes-Kropf (2003) focused on portfolio company level and found in their analysis that the US VC funds have a value-weighted IRR of 19.3%. Ljungqvist and Richardson (2003a) analysed cash flow data of a single large US private equity investor, of which 15% had been in VC funds. They use excess IRR with respect to an SandP 500 investment and document an outperformance of five to eight percent per year on average. Emery (2003) report an average annual return difference between VC funds and the NASDAQ of 7.4% excess return for VC funds for the time period form 1986 to 2001. Kaplan and Schoar (2003) analysed 746 fund of the years 1980 to 2001 and found that average fund returns are about the same as the SandP 500 index and that fund returns are relatively persistent over time. Quigley and Woodward (2003) found gross real returns on VC investments of about 5% per semester, which is less than the SandP 500 and the NASDAQ for the same period. Cochrane (2005) measured performance on portfolio company level and showed a mean log return of 15% per year of VC investments.

As discussed above, studies evaluating private equity performance should not be compared. A precautionous conclusion of the research presented above, however, gives that the returns from US VC fund investments on average seem to be in line with or slightly above public indices such as NASDAQ.

3.3.4. Empirical evidence for claims that US VC outperforms EU VC³

The few academic analyses of European VC returns that were found are presented below as well as in Table I: “VC Return Studies”. Megginson (2002) and Hege et al. (2003) show that US VC firms as a rule reach significantly higher performances on average in terms of IRR than their European counterparts. A study carried out by Artus et al. (2004), on behalf of EVCA, indicated an IRR of 10.6% based on an analysis of European VC funds during the 1985-2002 period. Gottschalg et al. (2004) analysed the performance of a set of US and European private equity funds. They found an underperformance of the private equity funds with respect to the stock market of up to 20 percent in terms of net present value. The highest statistical significance was found for the proportion invested in Europe – these investments had strongly underperformed.

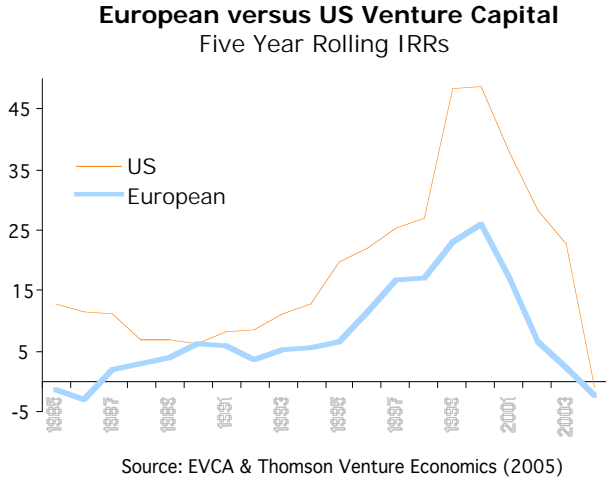
According to EVCA (2004c) and NVCA (2004), the US VC industry generated a five-years rolling IRR of 22.8% up to 2003, and thereby substantially outperformed the European VC market, which only reached an IRR of 2.3% for the same period. Although the average returns for the asset class reported in 2005 showed a significant decrease in performance for the US VC funds, reaching a five-years rolling IRR up to 2004 of -1.2%⁴, the US market was still performing better than the European reaching a rolling IRR of -2.3% for the same period (EVCA, 2005b). And the European IRR has always been lower than the US figure, or at least since 1985, according to EVCA statistics (ibid).

³ It is important to note that the geographical distinction discussed above is based on the location of the VC headquarters. Many VCs invest internationally, not least UK VCs. Therefore, it is important to point out that when references are made to e.g. geographical performance deviances between VCs, it refers to the location of the VC firms and not to the location of the portfolio companies or the fund's investors, i.e. the LPs.

⁴ Due to this steep down-turn in performance it will be interesting to monitor the future development of the US VC market.

The BVCA reports that early stage and technology VC funds performed considerably worse than all the FTSE indices in 2003 (BVCA, 2004) and 2004 (BVCA, 2005a). Early stage funds achieved just around -10.3% IRR in 2004 over five years, while the figure for technology funds was -9.6% IRR over the same period. This gave that the overall long-term net return to investors in early stage funds at the end of 2004 stood at -2.9% and technology investment at 0.9%.

Although there are a limited number of academic studies comparing returns of US and European VC funds, the results of the few studies that do exist are unified and clearly indicate that the European VC industry underperforms the US. In addition, reports published by national and international VC industry interest organisations, such as NVCA, EVCA and BVCA, arrive at similar conclusions. From a practitioner’s perspective, private equity investors in general are currently truly and openly concerned by the low returns from venture capital investments in Europe compared to the US.



Consequently, the conclusion of the financial performance comparisons outlined above, that the US market systematically and significantly outperforms the European VC markets, is a common understanding among academics, industry interest organisations, business press and practitioners. The question is why.

4. VC RESEARCH STREAMS AND SCOPE FOR THIS REVIEW

Only in the last two decades has VC received sustained academic attention. Venture capital research is a multifaceted topic, ranging from relationships between VC firms and LPs or entrepreneurs, through governance control and agreements, to valuation and performance of VC backed companies. One of the most comprehensive review books on venture capital research was published by Gompers and Lerner (1999b). Although the book summarises mostly the authors' own research, it covers almost all phases of the venture capital cycle from fundraising to returning the funds to the limited partners. The book was supplemented in 2001 with a more practitioner-oriented volume (Gompers and Lerner, 2001a). An earlier literature review of venture capital research has been put together by Wright and Robbie (1998).

In this section, the most frequent streams within the academic venture capital research field will be presented.

4.1. A BRIEF OVERVIEW OF VC RESEARCH STREAMS

The VC literature review below is categorised based on the unit of analysis applied, i.e. (i) portfolio company, (ii) VC firm, (iii) LP (i.e. fund investor), or (iv) market.

4.1.1. Academic research: Portfolio company level

VC value-added. Do venture capitalists add value other than money, and do they have a different role than traditional financiers? These questions have been a popular topic of VC research. This stream includes descriptive analysis of VC added-value as well as comparisons of added-value effects on different types of portfolio firms. Identified value-added factors include acting as sounding board, assistance in obtaining additional financing, recruiting of management and board, monitoring of financial and operating performance, and, providing access to networks and contacts. Examples of researchers in this stream are Gorman and Sahlman (1989), Sapienza (1992), Rosenstein (1993), Barney (1996), Fried et al. (1998), Gompers and Lerner (1999b), and Manigart et al. (2002a).

Performance of portfolio companies. This research stream focuses on the financial as well as non-financial performance of portfolio companies – often in relation to non-VC backed companies. An area that has gained special interest is studies of VC exits through initial public offerings, IPOs. The measurements for evaluating performance of portfolio companies are typically stock price development, employment growth, patent intensity or company survival rates. Academic studies focusing on the performance of portfolio companies has been done by e.g. Brav and Gompers (1997), Kortum and Lerner (1998), Jain and Kini (2000), Davila et al. (2000), Engel (2002), Hellman and Puri (2002), and Bottazzi and Da Rin (2003).

4.1.2. Academic research: VC firm level

VC investment process. Descriptions of the VC investment process have earned a significant academic interest. This research include analyses of the selection criteria (e.g MacMillan, Zemann and Narasimha, 1985), screening activities (e.g. Fried and Hisrich, 1994), monitoring of portfolio companies,

both formally through board positions and informally (e.g. Rosenstein et al., 1993), as well as exit activities (e.g. Gompers, 1995).

Governance and control. The monitoring of portfolio companies, overcoming information asymmetries between venture capitalists and portfolio companies, has received a lot of academic attention. A special interest seems to be on control mechanisms outlined in contracts, including e.g. staged financing, liquidation, and other control rights. The agency theory perspective on contracting is popular, typically assuming that the entrepreneur is an agent of the VC whereby conflict of interest may occur. Examples on this stream of research has been presented by Schwienbacher (2002), Cumming (2002), Hege et al. (2003), and Kaplan and Strömberg (2003).

Syndication and networks. Research on syndication activities of venture capitalists considers the rationales for an individual VC to syndicate, the network structures that syndication relationships create, and the implications of syndication. This stream also includes comparisons, between e.g. US and non-US VC syndication patterns. Research within this area has been done by e.g. Lerner (1994), Sorenson and Stuart (2001), Lockett and Wright (2001), and Manigart et al. (2002b).

Performance of VC investments. Relatively few studies have examined the performance of VC investments. The research has to some extent suffered from a lack of data (see section 2.3.2). The more finance oriented studies within this stream presents returns measured in IRR (or similar) and may include comparisons with e.g. stock market indexes or research on risk perceptions and risk-reduction strategies. The stream also includes less finance oriented analyses where e.g. measurements as the proportion of successful exits or VC survival rates are used to evaluate VC performance. Some of those studies examine determinants of VC performance which ranges from fund size implications, VC firm experience levels or geographical location to business cycle effects or public market performances. Examples of researchers focusing on evaluating the financial performance of VC investments are Cumming (2002), Ljungqvist and Richardson (2003a), Kaplan and Schoar (2003), Gottschalg et al. (2004), Jääskeläinen et al. (2003), De Clercq and Dimov (2003), Diller and Kaserer (2005), and Cochrane (2005).

4.1.3. Academic research: LP level

Relationship between VCs and LPs. This stream includes research on the organisation of VC activities and fundraising, contracting between LPs and GPs, and incentives for VCs to act in the interest of the LPs. Sahlman (1990), Gompers (1996), Black and Gilson (1998) as well as Gompers and Lerner (1999a) have done research within this area.

LP allocation decisions: Academic research on reasons for LPs to invest in venture capital funds appear to be limited. This stream includes decision factors for VC fund investments allocations, subsequent scale of allocation, and related decision processes for institutional investors. More financial oriented studies, evaluating allocation levels to alternative classes, have gained some interest (e.g. Schneeweis and Pescatore, 1999; Fender, 2003). Examples on research focusing on private equity allocations are Gottschalg et al. (2004) and Lerner et al. (2005).

4.1.4. Academic research: Market factors

Market determinants. Some research has focused on macroeconomic determinants of venture capital. The determinants can be divided into drivers for ‘venture capital demand’, such as supply of entrepreneurs, the science base, technical transfer from universities to industry or the ability of entrepreneurs to capture the fruits of their inventiveness; and drivers for ‘venture capital supply’, including presence of liquid stock market and legislatures. The majority of those studies examine factors on a cross-country basis. Examples on researchers focusing on these topics are Gompers and Lerner (1998), Jeng and Wells (2000), and Romain and van Pottelsberghe de la Potterie (2004b).

4.2. SCOPE FOR THIS LITERATURE REVIEW

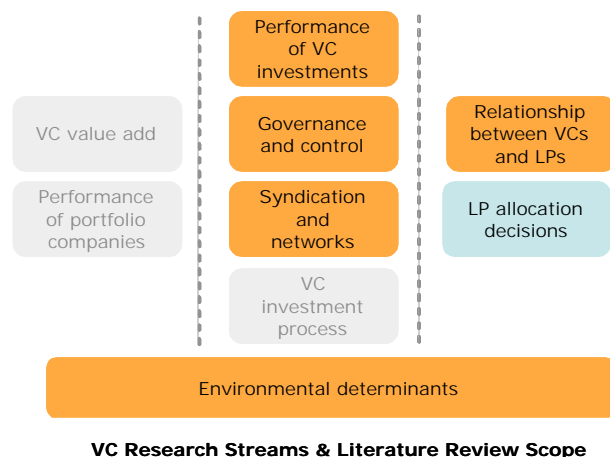
The purpose of this literature review is to identify from existing research factors that may explain differences in investment performances between US and UK VC funds. The focus is on VC firms, excluding buyout, replacement and business angel investments. Further, the primary target of research is on independently managed VC firms organised as limited partnerships with closed-end funds. The geographical focus refers to the location of the VC firms, i.e. not the location of the VC funds’ investors (the LPs), or the portfolio companies.

As outlined above, academic research comparing US versus UK VC fund financial returns and, based on that, identifying determinants explaining the differences hardly exist. For that reason, the scope of the review has been broadened to include identification of factors that on general appear to have an effect on VC fund returns. When available cross-country comparisons between US and European VC funds or, in more rare cases comparisons between US and UK funds, have been included.

There are two main areas that have implications on VC fund performance. (i) *Micro factors*, often related to the VC fund investors, the VC fund/firm itself, or to the companies the VC firms invest in. Such factors have proven to directly affect VC funds’ performances. Out of the different research streams presented above, studies within the ‘Performance of VC investments’ area include the most relevant research for this literature review. Nevertheless, some analyses within the areas ‘Governance and control’, ‘Syndication and networks’ and ‘Relationship between VCs and LPs’, also turned out to be very useful.

(ii) *Macro factors*. In order to develop and/or sustain a healthy and competitive VC industry, the economic environment, at least indirectly, contributes significantly to the performance of VC funds for which the stream of research covering ‘Environmental determinants’ is of particular interest.

The objective for the second part of the literature review is to identify decision factors that influence the manner by which institutional investors determine whether or not to make



allocations to VC funds. The research in this area is limited but will be found within the research stream of 'LP allocation decisions'.

The structure of the core of this document, the literature review presented in the next two chapters, is to some extent based on Gompers and Lerner's (1999b) 'venture capital cycle'-model. This cycle starts with the fundraising and establishment of a VC fund, proceeds through the phases of investing the fund in investee companies and building up a portfolio, continues to monitoring and adding value to this portfolio and thereafter realising it and distributing returns to the LPs, thereafter and thereby closing the cycle with the fundraising for the next fund. In addition, characteristics of portfolio companies and environmental factors are used as subsections as well. LPs investment patterns are for nature reasons covered in a separate chapter.

5. LITERATURE REVIEW OF VC PERFORMANCE FACTORS

This chapter, together with chapter 5, represents the core of the literature review. In this chapter, studies that evaluate determinants of VC fund financial performance are presented, structured in six categories; (i) Characteristics of Portfolio Companies, (ii) Characteristics of VC Funds, (iii) The Investment Process, (iv) The Management of Portfolio Companies, (v) The Exit Process, and finally, (vi) Institutional and Environmental Factors. The factors related to the categories (i) to (v) seem in general to have a direct impact on VC fund returns, while the factors presented in the category (iv) usually have more indirect effects. The Table II: “VC Performance Factor Studies”, provides an overview of the presented studies and includes further details on the used data. The table is structured in the same six categories, and then listed alphabetically based on the researchers’ names.

5.1. CHARACTERISTICS OF PORTFOLIO COMPANIES

What determines whether a particular portfolio company performs well or not? Obviously, performance will have a large idiosyncratic component, driven by technology risk, the quality of execution, market acceptance, competitor reactions and so on (Ljungqvist and Richardson, 2003b), which will not be covered in this review. However, portfolio companies in certain industry sectors, geographical areas or development stages, seem to yield better returns to investors than others.

De Clercq and Dimov (2003) found that VC firm’ specialisation in terms of *industry* focus has a strong positive effect on performance. Giot and Schwienbacher (2005) showed that companies within the biotech and internet sectors tend to have the shortest route to IPO. Internet companies are also quickest to get into liquidation, while biotech companies are the slowest. Das et al. (2003) also found that there is a high cross-sectional variation in the probability of an exit across different industries. The high-tech and biotech sectors, so called ‘new economy’ sectors, have a higher probability of successful exits relative to new ventures operating in other areas. Exit multiples also seem to vary, according to Das et al. (ibid), whereby companies in the communications, Internet and semiconductor industries generate the highest multiples, followed closely by ventures in the software and hardware segments. According to Mason and Harrison (2004a) there is a widespread perception amongst investors in the UK, as well as in the rest of Europe, that investments in technology focused VC firms involve greater uncertainty and hence higher risks. Their study, exploring the performance of investments made by business angels in technology and non-technology companies, however demonstrated that the overall return profiles of the two types of investments are not significantly different. The authors argue that the reason for this may be that business angels often are better equipped than mainstream VC fund executives to manage the risks involved in investing in early stage tech investing, given their typically solid industrial and entrepreneurial backgrounds. Alternatively, it may reflect the fact that the risks related to investing in technology-based companies have been overstated.

Investing in early phases are perceived to involve higher risks and thereby an unattractive risk-reward equation (Mason and Harrison, 2004a). Manigart et al. (2002a) show that *early stage* VC firms require a significantly higher return for an investment than companies focusing on later phases. Cumming

(2002) also found that early stage investments on average yield lower IRRs. This is supported by Hege et al. (2003) who show that a high rate of early stage VC fund investments, has a negative impact on the proportion of successful exits. Also Cumming and Walz (2004) show that later stage investments yield higher returns, and Murray (1999) concludes that the highest returns on the UK market have been generated by funds specialising on later stage investments. Finally, Das et al. (2003) support the same view showing that the probability of successful exits increases when moving from early to later stage investments. As much as 44% of the portfolio companies in later stage financing experienced a positive liquidity event, while only 34% of the early stage companies achieved a successful exit. According to Bottazzi and Da Rin (2002) European VC firms invest a larger share of their funds in early stage, compared to US VC firms. Schwiendbacher (2002) found that younger venture capitalists in Europe invest proportionally more in early stage than their more established colleagues.

De Clercq and Dimov (2003) found a negative correlation between *portfolio companies age* and performance, i.e. investing in older companies is associated with lower performance. In some sense, the findings support the theoretical claim made by Amit et al. (1990) that, because of VC firms preoccupation with limiting adverse selection in an environment laden with information asymmetry, the best companies would avoid applying for venture capital. Thus, the older companies in VC portfolios, i.e. those that better know their true worth, tend to be of lower quality.

There are, finally, clear indications that *geographical focus* should not be too narrow. Manigart et al. (1994) found that European VC firms with a local investment scope have a lower return than companies with a broad geographical investment scope. However, syndicating with local partners in non-home markets is a powerful strategy to expand a VC firm's geographical boundaries (Sorenson and Stuart, 2001).

5.1.1. Summary: Characteristics of portfolio companies

In summary, the research presented above outlines that focusing the VC investments on a limited number of industries has a positive effect on performance. At least until recently, VC investments in the 'new economy' sectors yielded the highest returns. Specialisation on early stages has, however, implied a negative effect on returns. The geographical investment focus should not be too narrow. European VC firms invest a larger share in early stage companies compared to their US counterparts, which in part could explain the performance differences between the continents. UK investors, however, seem to differ from other European VCs, placing a heavier emphasis on investments on later stage investments. The UK VCs tend to invest more in established businesses rather than in new technology. And finally, while a high proportion of all UK private equity is invested abroad, conclusions about the UK VC investors' international activities cannot be drawn from this review.

5.2. CHARACTERISTICS OF VC FUNDS

5.2.1. Partnership structure

According to Gompers and Lerner (1999b) the structure of venture capital organisations, in particular the reliance on limited partnerships of finite life with substantial profit sharing, has been identified as critical to VC success. This view is supported by McCahery and Vermeulen (2004), concluding that the limited partnership form, based on US experiences, offer substantial contracting benefits for investors and is crucial to the operation of a mature VC market. The structuring of VC firms seems, however, to vary between countries. According to Megginson (2002) European VC funds are less often organised as stand-alone limited partnerships sponsored by specialist VC firms staffed by technically trained professionals, as in the US model. Instead, funds are generally organised as investment companies under various national laws, and their approach to dealing with portfolio companies is much more akin to the reactive style of US mutual fund managers than to the proactive style of America's venture capitalists. According to Mayer et al. (2003) in the UK, however, limited partnerships is the most common form of VC organisations, which is in line with the findings of McCahery and Vermeulen (2004).

5.2.2. Specialisation

Specialisation seems clearly to have a positive effect on returns (see also section 3.1). Gupta and Sapienza (1992), Manigart (1994), and De Clercq and Dimov (2003) all found that VCs who specialise on a certain investment stage, e.g. early phase, and/or industry sector, build up a better understanding and thereby achieve a competitive advantage deriving from the accumulation of "hard to imitate" internal resources. According to Gupta and Sapienza (1992), a limited industry (or development stage) scope of investments, facilitates control over the VC management of these companies by the VC firm; i.e. it may be more difficult for portfolio companies to hide issues of management incompetence or other crucial information regarding company performance due to the VC firms more in-depth understanding of the industry (or development stage). Another reason why investments in similar types of portfolio companies may pay off is the increased possibility that subsequent investments lead to learning curve effects through the application of superior knowledge (e.g. Gupta and Sapienza, 1992; De Clercq, Goulet, Kumpulainen and Mäkelä, 2001). For instance, the ability to screen potential portfolio companies based on their likelihood of default, to structure a particular deal so as to minimize exposure to loss, to grasp the management problems related to a certain stage of development, or to understand the competitive specifics in a particular industry, may increase (e.g. Wright and Robbie, 1998). Or, VC firms may become more efficient in dealing with resource suppliers for specific types of portfolio companies, such as investment bankers, law firms, accounting firms, and management recruiting firms (De Clercq and Dimov, 2003).

5.2.3. Continuous success and importance of brand

The so called 'persistence phenomena', i.e. the expectation that the returns of subsequent private equity funds run by the same management team will be correlated, has been documented by several researchers (e.g. Kaplan and Schoar, 2003; Ljungqvist and Richardson, 2003a; Gottschalg et al., 2004;

Hochberg, Ljungqvist and Lu, 2004; Diller and Kaserer, 2005). According to Kaplan (2003) and Diller and Kaserer (2005), this is more pronounced for venture funds.

There is strong empirical evidence that *successful VC firms* outperform their peers over time (e.g. Kaplan and Schoar, 2003; Ljungqvist and Richardson, 2003a; Hsu, 2004; Laine and Torstila, 2004). That outperformance is not competed away indicates that experienced VC firms have core competencies that cannot be easily imitated (Fleming, 2004). Kaplan and Schoar (2003) show that VC firms who outperformed the industry benchmark with one fund are likely to outperform the industry with the next, and vice versa. Gottschalg et al. (2004) found in their study of European and US private equity funds that the funds' overall performance hides a great heterogeneity and skewness – while a quarter of the funds had returned less than a third of the capital invested another quarter had outperformed the public market portfolio.

Hsu (2004) evaluated the value of *VC brand*, and showed that better VC funds negotiate better deal terms, i.e. lower valuations. The author confirmed the proposition that entrepreneurs are willing to accept a discount on the valuation of their start-up in order to access the capital of VCs with better reputations. This implies that the VCs informal network and certification value may be more distinctive than their financial capital. Gompers and Lerner (1998) showed that VC firm performance and reputation positively impact the capacity to raise larger funds. Reputation concerns also affect the IPO timing decision of young VC fund managers (Gompers, 1996).

5.2.4. Fundraising

A common explanation for the stronger performances by US VC firms is the in average larger *fund sizes* in the US, allowing for larger initial investments and larger follow-on reserves. Many European VC firms, albeit run by capable teams and with strong portfolios, have suffered from having too small funds that have hindered them from following portfolio companies through, in an aggressive expansion phase, requiring significant funding. Laine and Torstila (2004) found that large fund management firms have significantly higher rates of exit success, perhaps due to a better reputation as quality certifiers, which is also supported by Hochberg (2004). Also Gottschalg et al. (2004) found that one of the main drivers for private equity fund underperformance are small fund sizes. However, the authors point out that larger VC funds may have more scope for opportunistic behaviours that does not benefit LPs. For example, large US venture funds are more likely to invest in certain buyout deals or in Europe to obtain a track record for these types of investments which brings both diversification and additional income to the VC firm at the cost of their LPs. An additional downside of running a larger fund is that it increases the difficulty of finding good deals (e.g. Gompers and Lerner, 1999b). There is also evidence that the best performing funds have limits for their growth. Given that most limited partners claim that the top funds are all highly oversubscribed, it seems likely that the better funds voluntarily choose to stay smaller (Kaplan and Schoar, 2003). Kaplan and Schoar (ibid) also found evidence that private equity fund returns decline when partnerships grow their fund abnormally fast. Top performing funds grew less than proportionally while still keeping an increase in performance. By growing relatively less rapidly than the market on a performance adjusted basis, top funds are able to avoid moving into regions of diminishing returns. According to

Bottazzi and Da Rin (2003) the US VC portfolio companies receive on average six times more funding than their European counterparts.

Related to fund size is the *number of investments* in a portfolio, where Schmidt (2004) shows that there is a high marginal diversifiable risk reduction of about 80% when the portfolio size is increased to include 15 investments. The author observe the real world average PE portfolio size to be somewhere between 20 and 28 investments. Jääskeläinen et al. (2002) show that the number of portfolio companies a venture capitalist manages and the total returns of the VC fund will exhibit a inverted U-shaped curve. Their data suggest that venture capitalists reach their respective optimum level slightly over 12 portfolio companies per partner of a VC firm (which makes it larger than is the actual number of investments per investment manager). They further show that syndication, however, moderates the relationship so that the higher the level of syndication, the higher the optimal number of portfolio companies per VC.

5.2.5. Summary: Characteristics of VC funds

The research presented above concludes that VC funds structured as limited partnerships are preferable to other legal structures, that specialised VC firms perform better than more generalist oriented, and that more established VC firms, with former fund success and developed brand recognition, as a rule achieve higher returns. It also appears that larger VC fund sizes correlate positively with stronger returns; however, the funds should not be too large or grow too fast. Empirical studies of the European markets show that the limited partnership structure dominates at least in the UK. Research furthermore shows that European VC fund sizes in general are smaller compared to US funds. To conclude, large fund size, LP structure, and years on the market all appear to correlate with a stronger VC performance and also signifies US VCs. This could, in part, explain the performance differential between European and US VCs. In terms of the variables investigated here, UK funds appear to end up about half way between the US and mainstream continental European.

5.3. THE INVESTMENT PROCESS

5.3.1. Deal generation

Deal flow, i.e. the generation of a continuous stream of high quality investment opportunities, is a critical concern for venture investors. It is crucial to obtain access to viable projects which can be funded at entry prices which will generate target rates of return. Ljungqvist and Richardson (2003b) show that holding periods are shorter and the corresponding success rates are higher following improvements in the availability of investment opportunities. Analogously, investments are held for longer, and are less successful, when competition for deal flow is tougher.

The difficulties faced by VCs due to increases in competition between VCs, serve to highlight the importance of a deal generation strategy argues Megginson (2002). According to Hall and Tu (2003), an international VC investment focus may be a part of a strategy to secure higher returns by investing in opportunities in markets where there is lower competition and hence the ability to invest on more

favourable deal terms. Investing in a successful firm with a high expected rate of return on equity is by no means equivalent to a high rate of return for the VC. If the high expected return is commonly expected, this implies that the VC has to pay a high price for a given number of shares, i.e. through this direction other than normal rates of returns are not possible (Cumming and Walz, 2004).

5.3.2. Due diligence and valuation

Due diligence evaluations, or screening, is a determinant that seems to have significant impact on financial return. It covers background check of the founders; competitive assessment of market players; market research into the size, composition, and potential growth of the firm's target market; investigations into the financial representations of the company's position; and so on (Jensen, 2002). According to Hege et al. (2003) the US VCs have sharper screening skills than their European counterparts which lead to higher success rates. According to Landier (2001), US VCs spend a large amount of time learning about the technological aspects of an investment both pre and post first-time financing. European VCs, however, are traditionally less "hands on" and less strategically involved than their American counterparts. This findings is in line with earlier research (e.g. Sapienza, Manigart and Vermeir, 1996).

Since the majority of VC portfolio returns are dependent on a few number of investments, Schmidt (2004) finds that high average portfolio returns are generated solely by the *ability to select* a few extremely well performing companies. Also Diller and Kaserer (2005) found that superior performance is caused by superior selection abilities.

An important step in the negotiation process is to determine the current *value of the company*. The valuation process is an exercise aimed at arriving at an acceptable price for the deal. Manigart et al. (2000) showed that the information used for the pre-investment valuation and valuation methods used by VC investors differs between countries due to corporate governance mechanisms or the level of development of the VC market. The most popular valuation techniques are prospective historic price/earning multiples in the UK, EBIT multiples in the US, while DCF calculations seem to be predominant in the Continental European countries.

5.3.3. Deal structuring

Appropriate structuring of VC investments seems to have significant implications on the VCs possibilities to earn their target rates of return. *Financial contracts* are written to assign cash flow, board, liquidation and other control rights between contracting parties, e.g. a private equity group and an entrepreneur. And VC firm skill in structuring shareholders agreements turns out to be important. Kaplan et al. (2003) show differences in the use of financial contracts in the US and non-US countries (primarily European) and found that those VCs who use US-style contracts fail significantly less often. They showed that none of the VC firms that had used US style contracts had failed, whereby 34% of the firms that didn't had not survived. More experienced VCs were able to implement US-style contracts regardless of country specific legal regime. Landier (2001) argues, however, that debt-like contracts provide the optimal contract form in Europe, while equity-like contracts is optimal in the US.

Staged capital infusion, i.e. the investment disbursed payments and conditioned on the fulfilment of negotiated mile stones, may arguably be the most potent control mechanism a VC can use, where e.g. Gompers and Lerner (1999b) mean that this mechanism keeps the entrepreneurs on a “tight leash”, creating a high degree of control for the VC firm. They show that companies that go public have received significantly more financing and a greater number of rounds than have companies that are acquired or liquidated. Staged financing is not only a very efficient way to minimize risk for the venture capitalist, it also gives the VC an extremely valuable option to deny or delay additional funding, it increases the expected value of the venture because less financial resources are wasted, but does not directly affect the ex ante probability of liquidation (e.g. Sahlman, 1990; Megginson, 2002; Schwienbacher, 2002). Also Hege et al. (2003) show that greater monitoring intensity through shorter time intervals between financing round increases the ratio of successful returns, which supports the idea of using staged capital infusions.

Hege et al. (2003) show that performance is positively correlated with the use of *convertible* securities, which is consistent with other academic VC research indicating that convertible preferred equity is the optimal security (e.g. Sahlman, 1990; Cumming, 2002; Megginson, 2002; Kaplan et al., 2003; Cumming and Walz, 2004). Kaplan and Strömberg (2003) identify the use of convertible preferred securities as a way for VC firms to maintain control rights without a majority ownership in the portfolio company. According to Megginson (2002), the primary rationale for using convertible securities is to give the VC firm a claim on the portfolio company’s earnings and market value in the event the firm is highly successful. Hege et al. (2003) find that VC firms in the US more systematically use convertible securities in order to also convey residual control in case of poor performance. According to Schwienbacher (2002) convertible securities are three times less often used by European VCs as compared to their US counterparts.

In the US, nearly 80% of private equity transactions employ convertible *preferred stock* (Kaplan et al., 2003). Lerner and Schoar (2005) find that investments in countries with a common law tradition with better legal enforcement are far less likely to employ common stock or straight debt, and more likely to use convertible preferred stock.

Yet another mechanism utilized by venture capitalists to influence managers and critical employees is to have them receive a substantial fraction of their *compensation* in the form of equity or options. The VC can also require vesting of stock or options over a multiyear period, so that the entrepreneur cannot leave the firm and take his shares. Similarly, the VC can significantly dilute the entrepreneur’s stake in subsequent financings if the first fails to realize its targets (Gompers and Lerner, 2001b).

Finally, higher *VC ownership percentages* increase the VC firms’ IRRs according to Cumming (2002). This is supported by Gottschalg (2004) showing that when a VC firm is often the main investor, its fund outperforms.

5.3.4. Syndication

Venture capital firms frequently engage in collaborative relationships with other venture investors because investment *syndication* is common in the industry. Syndicates are typically formed by a lead

investor who contacts other potential investors and records their commitments to invest. Syndication has turned out to have a positive impact on performance and serves multiple tools. (i) Risk diversification: Through syndication each VC firm can invest in more projects and thereby better diversify the portfolio and reduce firm-specific risks (e.g. Gompers and Lerner, 1999b; De Clercq and Dimov, 2003; e.g. Hege et al., 2003). (ii) Information sharing: Individual VCs tend to have investment expertise that is both sector-specific and location-specific where syndication helps diffuse information across sector boundaries and expands the spatial radius of exchange (e.g. Sorenson and Stuart, 2001). (iii) Improved screening: Involvement of another VC firm provides a second opinion (e.g. Lerner, 1994; Gompers and Lerner, 1999b; Hege et al., 2003). By checking each other's willingness to invest in potentially promising deals, VCs can pool correlated signals and thereby may select better investments in situations of often extreme uncertainty about the viability and return potential of investment proposals (Sah and Stiglitz, 1986). (iv) Deal flow: VCs invite others to co-invest in their promising deals in the expectation that such invitations will be reciprocated in the future (e.g. Lerner and Schoar, 2004). (v) Portfolio value add: Syndication networks may also help VCs add value to their portfolio companies, where syndication networks facilitate the sharing of information, contacts, and resources among VCs (e.g. Hellman and Puri, 2002; Lindsey, 2003). (vi) Image: Certification and reputation gains when syndicating with more experienced VCs (e.g. Hsu, 2004). (vii) "Window dressing": VC firms may make syndicated investments even if the financial returns to such investments are relatively low in order to show potential investors an exit record (e.g. Lakonishok, Schleifer, Thaler and Vishny, 1991; Lerner, 1994; De Clercq and Dimov, 2003).

According to Manigart et al. (2002b) young VC firms syndicate more than older, large VC firms syndicate more than smaller, and the more a VC firm is specialised in terms of industry sector, the higher its propensity to syndicate in general. Schwienbacher (2002), however, found in contradiction to the result presented by Manigart et al., that younger VC firms syndicates less often than older VCs. Jääskeläinen et al. (2002) showed that syndication frequency has positive effect on VC firm's performance. Also Cumming and Walz (2004) found that syndicated investments do yield significantly higher IRRs for the VCs. The *position in the syndication* seems, however, to matter. Taking the role of lead investors allows a VC firm greater access to information and better control over the portfolio company and is thus associated with lower required return in early phases according to Manigart et al. (2002a). Also Seppä and Jääskeläinen (2002) found evidence of a positive relationship between the centrality of a VC firm in its network of syndicate partners and its current and future performance. Deals that are less syndicated are more likely to remain longer in the portfolio of VC funds (Giot and Schwienbacher, 2005).

Fleming (2004) differentiates syndication between (i) making an initial capital infusion, and (ii) providing follow-on investments for an existing portfolio company. In the latter case, the initial VC firm might exploit the information asymmetries between itself and later investors, and overstate the entry price. Admati and Pfleiderer (1994) show that under such circumstances, the only way to reduce opportunism is to require the initial VC firm to maintain their equity share in the company. According to Lerner (1994), experienced venture capitalist primarily syndicate first-round investments to venture investors with similar levels of experience. In later rounds established venture capitalists syndicate investments to both their peers

and to less experienced capital providers and are significantly more likely to invest for the first time in later rounds when valuation have increased sharply, which supports the ‘window dressing’ phenomenon.

Hochberg (2004) argues that *better networked* VCs, at the time the fund is raised, subsequently enjoy significantly better fund performance measured by the rate of successful portfolio exits.

Manigart et al. (2002b) show that VC syndication strategies in Europe differ from North American strategies where European VC managers seem to be well aware of the financial benefits that syndication may yield, but underestimate the importance of additional benefits, such as getting access to additional resources, building strong networks and increasing deal flow. This supports earlier work on syndication in Europe by Lockett and Wrigh (1999). Manigart et al. (2002b) also report that the frequency of VC syndication is significantly higher in the US than in Europe, representing 60 versus 30 percent. This findings was supported by Schwienbacher (2002), although with slightly different numbers; 80% of the deals in the US was syndicated, compared to 54% on average in Europe.

There is, however, research that contradicts the overwhelming positive finding about VC syndications. Fleming (2004) examines returns to venture capital in Australia and found that syndicated investments generated lower returns, although the author maintains that the underdeveloped VC market might have significant impact. De Clercq and Dimov (2003) found that the degree of syndication at the initial investment round has a negative impact on investment performance. The authors however found, all else being equal, that the more co-investors are involved with a particular portfolio company across all investment rounds the higher investment performance.

5.3.5. Summary: The investment process

The research presented above indicates that access to a high number of viable investment opportunities has a crucial impact on performance. Whether US VC firms have a better deal flow in qualitative terms, compared to their European counterparts, cannot be determined based on the studies included in this review. However, given the longer history of the US VC industry, the location of many leading international high-tech companies in the US, and the close cooperation with universities (see section 4.6.5), US VCs are most likely exposed to a greater number of potential investment opportunities. Furthermore, VC firms’ screening capabilities seem to differentiate high from low performing funds. Screening capabilities evolve from experience, which naturally is a function of the number of opportunities the VC firm is exposed to, i.e. it is a function of deal flow and time in business. Consequently, given the longer history of VC investing on the US market in general, US VCs are likely to have also developed better screening capabilities. Professional structuring of investments, such as negotiating shareholders’ agreements including adequate control rights, appears to be important and also this is more developed in the US. The UK VC firms, however, to a large extent copy investment structures from the US. Taking the role as lead investor, controlling a significant part of the share capital, apparently have positive implications on fund returns as well. Finally, although syndication of deals seems to have a clear positive impact on fund performance, UK VC firms tend to syndicate considerable less frequently than their US counterparts (see section 2.2).

5.4. THE MANAGEMENT OF PORTFOLIO COMPANIES

5.4.1. VC experience and competence

An often discussed success factor is the skill set of VC firms' investment managers. The role as VC investor spans from a "supportive/advising" function to a "controlling/monitoring" function. Wright and Robbie (1998) have questioned whether the role of a VC manager should be primarily as value protector (i.e. seeking to minimise the downside risk) or value enhancer (i.e. seeking to maximise the upside potential). It is often claimed that European venture capitalists are less active and limit their value-adding to "making deals" (financial engineering) where their American colleagues are considered to add further value by more actively monitoring their portfolio companies.

Some researchers as well as practitioners conclude that the most important success factors are about *experience* and *competence* in several dimensions but not least when providing added value to portfolio companies. Investment experiences in a particular industry sector will over time increase VC firms' capabilities to support portfolio companies with e.g. extended contact networks, or sector specific competence. Rosenstein et al. (1993), Sapienza et al. (1996) and Manigart et al. (2002a) all found that experienced VC firms are perceived to add more value than inexperienced VCs to their portfolio companies. Gompers et al. (2004) show that the VC firms with the strongest hands-on industry experiences increase their number of investments the most when industry investment activity accelerates. Gottschalg et al. (2004) found that more experienced and skilled private equity firms survive and offer higher returns. Diller and Kaserer (2005) showed that VC fund returns are positively associated with VC management skills. It has often been noted, however, that VCs are intuitive decision makers, and that this intuition develops after making numerous venture investment decisions (e.g. Zacharakis and Shepherd, 2001). Megginson (2002) suggests that many senior partners at top US VC firms have become legendary for their skills in finding, nurturing, and bringing to market high-tech companies. Those partners and associates quite often are engineers or other technically trained professionals who themselves worked in high-tech companies before becoming full-time venture capitalists. Sapienza et al. (1996) showed that the Continental European VC industry in general is more financially orientated, i.e. the investors often have a financial or banking background, compared to their counterparts in the US and UK.

Shepherd et al. (2003) present an alternative argument that experience may not always improve the venture capitalists decision making processes. These authors show that experienced decision makers may rely upon various heuristics and short cuts, derived from a deep experience that means that higher returns are not always guaranteed. This is supported by Fleming (2004) who found that inexperience is not penalised in a developing market; experienced VC firms in Australia do not realise investments at returns different from inexperienced VC firms.

Lower *experience levels* and *youth* seem to have other effects as well. Compared to older ones, younger VCs tend to; invest more regionally, more in seed and start-up phases, use less convertible securities, less often replace former entrepreneurs, have less syndication partners and less often syndicates (Schwienbacher, 2002). De Clercq and Dimov (2003) found that VC firms age negatively effects performance. Gompers (1996) found that less experienced VC firms are more likely to "grandstand", i.e.

bring their portfolio companies to the public market as soon as possible in order to gain reputation within the investment community.

5.4.2. Replacement of entrepreneurs

A factor related to portfolio control is the possibility for VC firms to *replace portfolio companies' managements*. Hellman (1998) has shown that the VC firms' decision to replace the founding entrepreneur may be efficient. When VCs have control, they provide greater effort in finding professional managers that increase the value of the company. Hege et al. (2003) point to the fact that US VC firms, in comparison with European firms, more often take replacement decisions and terminate projects. The authors argue that more frequent CEO replacement decisions in Europe would have a positive impact on the number of successful exits. Schwienbacher (2002) shows that on average only 22% of former entrepreneurs were replaced in Europe prior to the VCs exit as compared to 34% in the US. In Europe, removing portfolio companies' managements are often more complicated, however, given stricter labour laws and regulations.

Finally, according to Gompers and Lerner (1999a) the impact of a VC fund's performance is not related to the *VC team's incentive* scheme.

5.4.3. Summary: The management of portfolio companies

The studies outlined above show that the VC firms' management skills are highly associated with fund performance and that older and larger VC firms generate significantly higher returns, as already pointed out in section 4.2.5. Replacement of portfolio companies' management also seems to have a positive effect on performance. The US venture teams focusing on early stage phases appear to be more senior compared to their European counterparts due to the country's higher maturity level in terms of technology VC investing. Managers at top US VC firms have often held senior management positions in relevant industry sectors before becoming venture capitalists. Recruiting investment managers to European VC firms with the same level of industrial experiences as in the US, given that the headquarters of the vast majority of targeted industries are situated in the US, is most likely more difficult. This goes for the recruitment of portfolio company senior management as well. European VC firms less often replace management teams of portfolio companies, compared to US VC firms.

5.5. THE EXIT PROCESS

There are five principle types of VC exits (Cumming and MacIntosh, 2003): (i) listing the company through an IPO, in which a significant portion of the firm is sold into the public market; (ii) an acquisition by industrial trade buyers, in which the entire firm is bought by a third party; (iii) a secondary sale, often financial buyout by other private equity firms; (iv) a buyback, in which the VCs shares are repurchased by the entrepreneurs; and, (v) a write-off, in which the VC walks away from the investment. Ideally, investments are realised through an IPO, an industrial trade sale, or a secondary sale. The latter exit route has recently increased significantly. The climate for realising investments through IPOs or trade sales has fluctuated over time (Gilson, 2003).

5.5.1. IPOs

There seems to be a general belief in the academic literature that *going public* is the most profitable and prestigious exit route for venture capitalists (e.g. Black and Gilson, 1998; e.g. Jeng and Wells, 2000; Barnes and McCarthy, 2002). In the VC industry, bringing a company public is a signal of success for the VC firm backing the issuing company. Apart from the obvious profitability measure, VCs typically measure their success in terms of the number of companies they have taken public (Barnes and McCarthy, 2002). Jeng and Well (2000) found that IPOs are the strongest driver of VC investing, although primarily for later stage VC investments. Black and Gilson (1999) state that US venture capital funds earned on average 60% annual return on investment in IPO exits, compared to 15% on acquisition exits. Schwienbacher (2002) shows that replacement of entrepreneurs, reporting requirements and staged financing seem to significantly effect the portfolio firm's likelihood of going public, while investments in seed and start-up stages induce higher liquidation rates.

According to Giot and Schwienbacher (2005), VC backed companies tend initially to exhibit an increased likelihood of achieving an exit through IPO. However, the possibilities of an IPO exit become increasingly small as time passes. This pattern is the strongest for biotech and Internet companies which tend to reach their plateau sooner than e.g. computer or semiconductor companies. For trade sales, the plateau is reached much later and tends to decrease slowly thereafter.

5.5.2. Trade sales

An IPO is normally limited to the 'most promising' ventures due to a selectivity bias, i.e. only highly promising companies can go public while *trade sales* is a more common exit route. There may also be particular characteristics of the portfolio companies or the market situation whereby a fund would prefer other exit routes than IPO, such as greater privacy, less external pressure on operating performance, or shorter time to liquidity, compared with most IPOs (Laine and Torstila, 2004). After the boom years in the late 1990s and beginning of 2000. the technology stock markets in many countries more or less broke down, whereby the IPO window practically closed and trade sales became the more common exit alternative. Schwienbacher (2002) made a survey of US funds and found that trade sale seems to be the preferred exit route, although VC firms still believed that going public may provide them with significant reputation benefits. The author reported the following exit frequencies: IPO (including sales of quoted equity) 30%, trade sale 30%, management buyout 2.0%, secondary sale/refinancing 5.0%, and liquidation (write-off), 33%.

5.5.3. Exit rates and VC firm characteristics

Manigart et al. (2002a) evaluated how *long an average investment* in a specific investment stage remained in a VC portfolio. Early stage ventures were estimated to take on average 6.2 years to mature, expansion stage ventures 5.1 years and buyout portfolio companies 4.7 years. Gottschalg et al. (2004) found that funds that keep their investments longer tend to under-perform, which was especially the case for European VCs. These findings indicate, again, that early staged funds generate lower returns. Hege et al. (2003) found quite striking results. The total length of a project is strongly negatively linked to

performance in the US, but almost as strongly positive in Europe. If VCs have a higher screening capacity, the most deserving projects get more attention and can be developed more rapidly than other projects. On the other hand, if the screening capacity is low then VCs learn about the quality of the projects over time, and stay longer involved with good projects, as seems to happen in Europe.

Gompers (1996) found that *younger VC firms* will prematurely exit portfolio investments in order to build a track record that will facilitate further fundraising efforts. New VC firms are willing to compromise on profitability by taking companies public before reaching maximum in terms of financial return, and earlier than an established VC firm would. Their study shows that younger VC firms hold smaller equity stakes at the time of the IPO and that the portfolio companies are more under-priced, which seems to have a negative impact on VC fund returns. This findings are supported by Barnes and McCarthy's (2002) analysis of the UK market, suggesting that portfolio companies backed by young venture firms are indeed younger at the time for the IPO than those backed by more established firms. However, inconsistent with Gompers (1996), the UK sample does neither suggest that young VCs bear significant costs of grandstanding, i.e. IPOs backed by young VCs are not significantly more under-priced relative to companies backed by established VCs, nor do young VCs hold significantly smaller equity stakes prior to issue (IPO).

Laine and Torstila (2004) found that *large funds* have significantly higher exit rates, which holds for both fund size and capital under management. The large fund management companies are, according to the authors, also the more established and reputable ones and may capitalize on reputation.

It is often argued, at least between practitioners, that US VC investors *abandon non-performing* portfolio companies sooner than their European counterparts. Giot et al. (2005) suggest that VCs should not hesitate to 'pull the plug' after a given predetermined number of years rather than to stick with potentially non-performing companies since, after having reached a plateau (2.75 - 4.0 years), investments that have not yet exited have fewer and fewer possibilities of exits as time passes.

And finally, success can be a matter not only of managerial skills and organisational ability, but also of *plain luck*. The exit markets are heavily cyclical, in particular the IPO market. A fund maturing in a good IPO year will find its exit plans much simpler to implement (Laine and Torstila, 2004).

5.5.4. Summary: The exit process

The results above show that bringing portfolio companies to the public markets does not only give higher returns due to its limitation to the 'most promising' ventures, but also enhances a VC firm's reputation within the investment community. The research also indicates that keeping investments longer has negative effects on returns, that portfolio companies of younger VC firms in general are more under-priced and, again, that larger funds have significantly higher exit rates. However, the findings for the UK indicate that younger VC fund investments are not significantly under-priced. Another important factor is the capability and discipline to abandon non-performing investments sooner rather than later, which seems to be done more often and earlier by US VCs than by their European counterparts. Statistics from EVCA

show that the number of IPOs in the UK is currently relatively low, which also seems to be the case for the US market for the moment.

5.6. INSTITUTIONAL AND ENVIRONMENTAL FACTORS

The institutional and environmental factors relate to areas outside VC firms or their portfolio companies. The vast majority of these factors such as state of stock markets, capital gains taxation, regulation of pension funds, the growth of market capitalisation, returns on investment in quoted companies, the rigidity of the labour markets, GDP growth, etc. influence the supply of or demand for venture capital. The effects on VC fund performance are therefore of a more of indirect nature.

5.6.1. National and international dependent macro factors

Some academics have analysed the VC performance in relation to overall business cycles (e.g. Kaplan and Schoar, 2003; Gottschalg et al., 2004; Romain and van Pottelsberghe de la Potterie, 2004a).

Kaplan and Schoar (2003) conclude that *market entries are cyclical*, whereby funds that are raised in boom times are less likely to raise follow-on funds, implying that these funds are likely to perform poorly. The dilution of overall industry performance in periods when many new funds enter is mainly driven by the poor performance of these new entrants, while the established funds seem to show only a small impact on their performance. The authors also found that first time funds tend to raise bigger amounts of capital when the private equity industry performs well, which they find interesting in the light of that first time funds perform markedly worse than established funds. Jeng and Wells (2000) also refer to the strong cyclical fluctuations of the VC market and argue that IPOs are the main force behind the cyclical swings in venture capital. The cyclical pattern is confirmed by Romain and van Pottelsberghe de la Potterie (2004a) who found that VC intensity is pro-cyclical and reacts positively and significantly to *GDP growth*.

Gottschalg et al. (2004) show that private equity funds performance co-varies positively with business cycles and *stock-market cycles*. The authors find that private equity funds are exposed to substantial left tail risk, which means that they deliver significantly higher losses during large market downturns but are not as sensitive to economic conditions in good times. Diller and Kaserer (2005), found that funds closed in years with above average stock market conditions generated lower returns. Similar evidence has been presented by Kaplan and Schoar (2003). Cumming and Walz (2004) showed that public market returns are statistically unrelated to VC firms' exit outcomes. This was supported by Diller and Kaserer (2005) arguing that private equity fund returns are unrelated to stock market returns and negatively correlated with the development of the economy as a whole.

In the case of VC it is also necessary to explicitly consider how VC co-evolves with the *industries it funds* (Avnimelech, Kenney and Teubal, 2004). For example, many of the technology VC success stories over the last ten years have been related to the Internet and surrounding technologies, services, etc. Since the Internet is a US invention, this for natural reasons provided the US VC firms with a definite lead whereby a majority of the large successful VC deals have to date taken place in the US (e.g. Bygrave and Hunt, 2004).

Gompers et al. (2004) found that differentials in success between the most experienced and the least experienced venture capital groups within an industry increases in hot markets.

5.6.2. Home market characteristics

One important explanation for the strong performance of the US VC market is the *country's size* and the large homogenous environment in which it operates. The US is an enormous country, with the world's strongest economy, one dominant language, culture, legal and fiscal system, etc. Mobility of work force, capital, technological understanding and research, etc, is relatively easy. The US in general and Silicon Valley in particular is the centre of a global network of high technology companies and VC firms. With the possible exception of mobile telephones, all of the major technology companies have a presence in Silicon Valley (Avnimelech et al., 2004)⁵. The European market, on the other hand, is highly fragmented, with a large number of languages, cultural differences, and legal systems, with a limited tradition of cross-border interactions.

It seems therefore that getting into the US VC market and thereby (i) receive access to potential strategic partners of portfolio companies, (ii) expand exit alternatives through NASDAQ IPOs or US industrial trade sales, or (iii) increase deal flow, is of high importance for many European VC firms. And many of the high valued VC firms in the world have some sort of presence in Silicon Valley.

Jeng and Wells (2000), however, showed that VCs tend to invest as well as exit their investments primarily in their *home markets*. This is supported by Sorenson and Stuart (2001) showing that the likelihood that a VC invests in a new venture declines sharply with geographic and "industry" distance and explain this finding inter alia by the fact that individuals prefer to interact with similar persons. Opportunities to interact are therefore more frequent among individuals in the same geographic area or in related industries. Yet, the propensity to invest locally is less pronounced for well-established and highly experienced venture capitalists. Hall and Tu (2003) found in addition that the willingness to invest overseas is directly related to the fund size and to VCs that have not specialized in an early stage phases. One way to reduce geographical obstacles is to syndicate according to Sorenson and Stuart (2001), showing that the probability that a VC firm will invest in a distant company increases if there is a syndicate partner.

5.6.3. Local VC market characteristics and situation

As discussed in previous sections, VC performance is obviously to be related to the status of the actual VC market's *maturity level*. In a more developed VC market, such as the US market, VCs are likely to be more experienced on average, e.g. resulting in better screening of investment opportunities and broader contact networks. The US VC market has been through VC cycles a few rounds already, the IPO, legal and fiscal systems are smooth, entrepreneurs are used to and comfortable to work with VCs, there is a tradition of creating university spin-offs in collaboration with VCs, industrial trade buyers are used to

⁵ One could argue that if geographical distance to major technology firms is a success factor for VC funds, then Nordic VC investments in mobile telephone related projects on general would have been successful. So far, with the exception for a few companies, it does not seem to be the case (AS comment).

dealing with VCs, there is a functioning secondary market, etc. Of the European countries, the United Kingdom appears to be most like that in the US (Sapienza et al., 1996), even though investments in early phases obviously lag behind the US levels. According to Avnimelech et al. (2004) only the US VC market has consolidated, which is a characteristic of industries getting into more mature phases.

A factor that seems to have a major impact on performance of VC markets is the *allocation and level of funds*. Gompers and Lerner (2000) show that portfolio firm valuation in a financing round is higher the more money poured into the VC industry over the year before the deal closed. An overheated market was according to the authors' one of the reasons for the very low returns generated by VC funds during the period of 1985-1990⁶. They argue that there is a limited number of favourable investments in the private equity industry giving way to the so called 'money chasing deals' phenomenon, which has been supported by several researchers (e.g. Ljungqvist and Richardson, 2003b; Hochberg et al., 2004; Diller and Kaserer, 2005). Diller and Kaserer (2005) find this especially true for VC funds, as they are more affected by illiquidity and segmentation than buyout funds. They show that an increase in the allocation of money towards a particular fund type has a significant negative impact on the performance of this fund type. Hochberg et al. (2004) also found that funds subsequently perform significantly worse the more money flowed into the VC industry in the year they were raised. Another effect of a overheated VC market is that VC funds are unable to invest up to their capacity, according to Mason and Harrison (2004b). This arises for two main reasons; (i) there is a high level of venture capital aversion amongst entrepreneurs, attributed to their failure to understand the role of VC firms as well as reluctance to surrender ownership and control, and, (ii) many of the businesses which do seek venture capital are not investment ready.

Ljungqvist and Richardson (2003b) point out that private equity funds normally tend to be sticky, i.e. it takes a longer time to adjust the capital invested in the industry to changed expectations or valuations compared to other asset classes. The authors therefore suggest that VCs with access to funds that are in a position to take advantage of the stickiness, e.g. receive a first mover advantage when investing in new promising areas, should earn excess returns.

Mayer et al. (2003) argue that country differences in the *composition of investors* who provide funds to VC firms result in different VC portfolio characteristics across countries with respect to stage, geography, and industry focus. Bank backed funds invest in later stage, domestic activities. Pension and insurance-backed funds invest in later stage activities in low technology sectors. Corporate and individual backed VC firms invest in early stage, high technology activities globally rather than domestically. And the sources of VC funds differ significantly across countries, e.g. banks are particularly important in Germany, corporations in Israel, insurance companies in Japan, and pension funds in the UK. Landier (2001) suggests that bank financing and bank-controlled VC firms may be prevalent in Europe because of the high stigma associated with bankruptcy, measured in terms of cost of credit for failed entrepreneurs. According to Schmidt (2004) the institutional investment pressure forces non privileged market participants without

⁶ And then, most likely, also for the period after the Internet bubble, which has had a major negative impact on the returns of the European VC funds (AS comment).

invitation to A-funds to invest in B-funds. As a result, the overall performance will be still modest and underperform the traditional markets.

The academic view on *stock markets* is unified – VC flourishes in countries with deep and liquid stock markets (e.g. Black and Gilson, 1998; Gompers and Lerner, 2000; Jeng and Wells, 2000; Megginson, 2002; Armour and Cumming, 2004). One of the greatest disappointments of European policy-makers wishing to duplicate the US success in high-technology development has been the continent's failure to establish a sustainable, large and liquid market for the stock of entrepreneurial growth companies. Megginson (2002) argue that although several technology stock markets do exist in Europe, they have not emerged as serious alternatives to America's NASDAQ. Jeng and Wells (2000) found it surprising that venture capitalists in countries with underdeveloped IPO markets do not avail themselves of the more developed IPO markets in countries like the US. This strategy has been pursued successfully by the Israeli VC industry (Avnimelech et al., 2004). As from July 2002, the European IPO market remains effectively closed to all but the most well-established and profitable companies, although a few European technology companies has been able to execute IPOs on the US markets.

Nowak et al. (2004) examined if *investment and divestment timing* have any impact on performance of VC funds. They found that investing in times with favourable market valuations seems to improve fund performance, but, less expected, that divestment timing does not show any significant influences on performance. Their analysis gives that due to difficulties in determining the true business value of immature potential portfolio companies, investment prices are often subject to market valuation levels. The elasticity of company valuation to variation in market prices can be assumed to be higher than those of more mature companies. To time favourable valuation is therefore essential for investing venture capital into immature companies. However, exit timing in accordance with high valuation levels is not as essential for performance. Exit prices are rather determined by real operation variables and individual quality of the business model. Of course, during the years of the technology bubble, selling VC backed Internet companies was pushing performance extraordinarily. In this situation, prices were not determined by real operation variables, but rather on the wrong future estimates of over-optimistic buyers (e.g. Nowak et al., 2004; Giot and Schwienbacher, 2005).

5.6.4. Legislatures and government

Governments play a number of roles that affect the private equity markets. First, they define both the legal and fiscal environments in which investors and entrepreneurs operate, providing various degrees of protection and/or taxation. Second, they sometimes intervene directly in the VC process by funding and managing government sponsored VC funds. Third, they provide incentives or impediments to private equity investments by regulated private companies such as banks, pension funds or insurance companies (Leleux and Surlemont, 2003). According to Jeng and Wells (2000), labour market rigidities, government programs for entrepreneurship and bankruptcy procedures explain a significant share of cross country variations in VC intensity.

Getting basic *legal and tax structures* in place, appears to be an important task in order to fertilize VC development, according to Jeng and Wells (2000), Gompers and Lerner (1999b), Megginson (2002),

and Armour and Cumming (2004). Jeng and Wells (2000) argue that through legal and tax environment, loss guarantees and direct expenditure, the government can play an important role of nurturing local VC markets. Cumming and Walz (2004) indicate that legal protections facilitate venture capital return, i.e. the more sound legal conditions, the higher the IRRs for VC funds. Megginson (2002) refers to the view that countries with English common law codes offer greater protection to investors and thus access to larger capital markets than countries with commercial codes based on e.g. German, French and Scandinavian law, which is in line with the findings of La Porta et al. (1998). Lerner and Schoar (2005) consistently find that firm valuations are significantly higher in nations with a common law tradition and superior legal enforcement and that private equity investing in common law countries enjoy higher returns. Armour and Cumming (2004) suggest that the road to establishing a Silicon Valley-like VC market outside the US is paved with favourable tax laws and legal structures that accommodate the establishment of VC funds, and temperate bankruptcy laws that stimulate entrepreneurship and increase the demand for venture capital. Concerning the impact of the capital gains tax rate (CGTR) on VC activity, Gompers and Lerner (1998) show that a decrease in CGTR has a positive and important impact on commitment to new VC funds. Decreases in CGTR may also have positive effects also on the supply of investment opportunities through providing workers with greater incentives to become entrepreneurs (Porteba, 1989).

Rigid labour market policies are considered to have negative effects on venture capital. Black and Gilson (1998) show that variations in labour market restrictions correlate with observed national variations in venture capital. E.g. Germany has strong layoff protections causing a limited VC market, while the US and UK have more flexible labour markets and also more active VC markets. Jeng and Wells (2000) argue that the more rigid the labour market is, the more difficult it will be to an individual who has failed in his venture to find new employment. The need for lowered rigid labour market policies has also been argued by Romain and van Pottelsberghe de la Potterie (2004b).

The implication of governments to seed the development of a venture capital industry by setting up *government or local authority sponsored* VC funds is debated and often accused for being counterproductive. Leleux and Surlemont (2003) list three reasons. First, public fund managers are often civil servants and government employees, and as such may not have the experience nor the drive necessary to select and support entrepreneurial companies. Second, the incentives structures these managers face often differ markedly from the traditional private fund arrangements, i.e. a performance linked bonus system. Third, if public funds forego some expected returns for their policy objectives, financing projects at below-market rates, they may end up attracting the best projects, leaving only “lemons” for private VCs to fund. Armour and Cumming (2004), in favour for these ideas, found that the presence of public funds tends to reduce overall industry return and “crowding out” private funds. According to Megginson (2002), both academic research and anecdotal evidence indicate that government efforts to promote a robust entrepreneurial sector would probably be better focused on eliminating regulatory roadblocks, lowering taxes, and providing a more favourable overall business climate than on attempting to directly identify and fund “sunrise” industries. On the contrary Leleux and Surlemont (2003) showed in a pan-European research, that public involvement does not crowd out private investors but instead causes greater amounts of money to be invested in the VC industry as a whole, which supports the result presented by Manigart

and Beuselinck (2001). Governmental funded VCs do not seed the industry and get it off the ground – their involvement appears to be in response to the industry development itself. Lerner (1996) found that government funded programs can yield favourable benefits. He examined the impact of the largest US public venture capital initiative, the Small Business Innovation Research (SBIR) program and showed that SBIR awardees grew significantly faster than a matched set of companies in terms of employment and sales. Manigart et al. (2002a) show that independent VC firms require a higher return than public or corporate VCs.

Also *regulatory changes* seem to have significant impact on commitments to VC funds. The US Department of Labor's clarification of prudent man rule, which enabled pension funds to freely invest in venture capital, had a generally positive effect on commitments to the industry by increasing the supply of funds (Gompers and Lerner, 1998). This has increased the level of pension fund allocations to the private equity industry (Marti and Balboa, 2001). According to Megginson (2002), a funded pension system with risk-tolerant institutional investors is an important success factor for a vital VC industry.

However, replicating the Silicon Valley-model is not an easy task. Sapienza et al. (1996), Manigart et al. (2002a), as well as Manigart et al. (2002b) argue that VC practices in North America might not be applicable outside that region due to economic, legal, institutional and cultural differences.

5.6.5. Universities and research

As discussed above, one of the more important factors influencing VC fund success is access to viable investment projects. For example, Megginson (2002) argues that a strong *R&D culture*, especially in universities or national laboratories, are important in order to nurture a growing VC industry. Powell et al. (2002) found that the US venture capitalists tend to locate themselves geographically close to research intensive areas. And the *university spinout* market is a growing area of interest in Europe. While several years behind the US, spin outs from universities have started to take off in the UK and some of the other larger European countries, according to Tannon and Johnson (2005). It seems, however, that some universities are better than others to give birth to new companies. Di Gregorio and Shane (2003) compared different explanations for cross-institutional variation in new firm formation rates, and the results show that intellectual eminence and licensing policies have significant impact on formation of new companies from universities. Neither venture capital availability nor the commercial orientation of research seemed though to have any impact on company start-up activity. The US universities are normally private and dependent on commercialising research in order to increase revenues, whereas European universities are normally state-owned and considered lacking a culture of commercialising research. A common view is that this fact has led to large differences in the number of university spin-offs in the US versus Europe.⁷ Goldfarb and Henrekson (2003) found suggestive evidence that the American university system whereby intellectual

⁷ According to international university rankings done by business press or independent organizations (e.g. Financial Times, Shanghai Jiao Tong University, U.S. News and World Report, Times Higher Education Supplement), the US universities normally hold the vast majority of the first twenty positions, with the exceptions of the UK universities Oxford and Cambridge. Rankings focused especially on research impact, are also to a high extent dominated by US institutions.

property is commonly awarded to universities is more effective in facilitating the commercialization of business ideas than the Swedish', and many of the central European countries', systems in which rights are awarded directly to the inventors.

Romain and van Pottelsberghe de la Potterie (2004a) show that indications of technological opportunities, such as growth rate of R&D investments, the available stock of knowledge and the number of value patents, influence significantly a country's investment in VC. Some of the most important factors affecting the demand of VC are the stock of knowledge, innovative outputs and the level of entrepreneurship.

5.6.6. Business angels

Another factor that seems to have implications on the formal VC markets is alternative sources of finance for innovative activity, mainly *business angels*. Mason and Harrison (2000) argue that a healthy informal VC market is required for the institutional venture capital to prosper, and present evidence for four types of complementarities between the two; co-investing in deals, sequential investing in ventures, business angels as investors in VC funds, and deal referring. The business angels' financial impact is significantly different in different geographies, where for example the total informal investments per year, 1997-2001, in relation to GDP was 1.31% for the US but only 0.30% for Sweden. In the UK, however, the level of informal VC investments, i.e. from business angels, are almost as high as in the US with a level of 1.20% of GDP (Bygrave, Hay, Ng and Reynolds, 2002).

5.6.7. Summary: Institutional and environmental factors

The institutional and environmental factors identified above generally have more indirect effects on VC fund performance, but are necessary in order to create and keep a vital VC industry alive. The most important factors for VC fund managers appear to be to reduce geographical and industrial obstacles through syndication, avoid raising VC funds in boom times and to interact more closely with universities. For policy makers the most significant measures are to nurture a deep and liquid local stock market, establish efficient legal and tax structures, increase incentives for investing by business angels or other private investors, and reduce labour market rigidities. The US universities are considered to generate more spin-offs and to be more effective in facilitating the commercialisation of business ideas compared to their European counterparts. The UK, although still lagging behind the US NASDAQ stock exchange, seems through AIM to be in the process of developing a competitive and efficient stock market for high technology companies. The UK also appears to have a large informal VC market and is considered to have one of the most favourable legal and fiscal environments in Europe.

6. LP'S INVESTMENT PATTERNS

6.1. ASSET ALLOCATION TO ALTERNATIVE ASSET CLASSES

Institutional asset management consist largely of collective investment vehicles such as pension funds, banks or insurance companies. All of these entities construct and maintain investment portfolios on behalf of their customers, which could include private individual investors and corporations. The management of these investments may either be performed in-house or be outsourced to external asset managers. The worldwide growth of institutional asset management, supported by demographic changes, financial liberalisation and technological advances, has been accompanied by a fundamental restructuring of the industry (Fender, 2003). There is a growing amount of literature in financial economics that seeks to understand the investment decision process of institutional investors and differences between the various types of investors. Gompers and Metrick (2001), for example, document that institutional investors prefer stocks with greater market capitalisations, that are more liquid with higher book-to-market ratios and lower returns in the prior year.

One important development in recent years has been the notable increase in the number of different asset classes offered to the investors. The overall increase in professionally managed assets, both in absolute terms and as a share of GDP, has gone hand in hand with a rising interest in non-traditional markets, e.g. in specialist funds focused on alternative investment classes, such as hedge funds, real estate or private equity.

In recent years, considerable theoretical as well as empirical research have been conducted which support the inclusion of a wide variety of alternative investment classes, in addition to traditional stock and bonds, as a part of a well diversified portfolio. Academic research has provided theoretical arguments that due to various market imperfections, related to information supply, market liquidity, and the like, alternative investments may offer unique risk and return opportunities not easily available through traditional asset investment (Schneeweis and Pescatore, 1999). The main reason for investing in alternative asset classes is the assumed low correlation with traditional investments. The appropriate allocation level set aside for alternative investment fluctuates from investor to investor and is usually a function of expected market conditions as well as internal portfolio diversification strategies. Yet, despite their recent growth, alternative investments continue to account for only a small overall fraction, around 1-3%, of institutionally managed portfolios (Fender, 2003). Reservation about investing in private equity may be caused by several factors. The low market transparency combined with the complexity of understanding both the market segment and the benefits of portfolio allocations to this asset class during a long time led to a certain reluctance to treat private equity as an investment opportunity (Schmidt, 2004). The allocation split between various asset classes is normally set by the institutional investors' Board of Directors for one to three year periods. Out of the alternative asset allocations, a certain percentage is normally dedicated to private equity.

6.2. ASSET ALLOCATION TO PRIVATE EQUITY FUNDS

6.2.1. Overall capital supply to VC funds

Various factors affect the overall level of LPs commitments to private equity investments, as discussed in section 4.6. Example of factors that are considered to increase the supply of venture capital are GDP growth, deep and liquid stock markets, lower labour market rigidities, decreases in capital gains tax rates and regulatory changes as the clarification of the ‘prudent man rules’ which enabled US’ (and other countries’) pension funds to freely invest in this asset class. Moreover, in times of prosperity the allocations to private equity funds tend generally to increase.

6.2.2. Motives for LPs’ VC allocation

As outlined above, the most important reason for investing in alternative asset classes, including private equity, is their expected low correlation with traditional asset classes.

Gottschalg et al. (2004) found, however, puzzlingly low returns for the illiquid private equity funds which, according to their study, did not seem to have particularly attractive hedging properties in relation to traditional asset classes. They questioned whether it is possible that LPs, who are supposed to be sophisticated institutional investors, have miss-priced this asset class and if so, what errors they have made. The authors provide a couple of different answers to the questions. First, numerous LPs invest in private equity for reasons other than performance. One example is LPs who want to establish a commercial relationship with GPs, e.g. carrying out consulting work or underwriting securities. This is in line with Hellman et al. (2004) suggesting that banks as limited partners might diverge from maximising returns on investments in order to maximize future banking income from the funds in which they invest. In addition, there is some evidence that certain LPs invest in private equity to stimulate the local economy. This behaviour is witnessed among pension fund managers in both the US and Europe. Lerner et al. (2005) argue that public pension funds face political pressures or constraints, which often negatively affects financial performance. According to Gottschalg et al. (2004), the problem is more pronounced in Europe than in US. Moreover, the European Union have invested substantial amounts in private equity funds via the European Investment Fund (EIF), which is “*committed to the development of a knowledge based society, centred on innovation, growth and employment, the promotion of entrepreneurial spirit, regional development and the cohesion of the Union*”. Such geographic delimitations diminish the investment opportunities for VCs, which can harm performance as discussed in section 4.3.1. Second, the fee structure of PE funds is such that LPs may underestimate the impact of fees when deciding to invest in private equity. Third, the asset class is relatively new, uncertainty is very high and payoffs are so skewed that even sophisticated investors may be prone to over-optimism or evaluation mistakes.

Sahlman (1990) reflected on how limited partners take decisions about which venture capitalist to back. For obvious reasons, filtering out the ‘good’ from the ‘bad’ is extremely important. Good VCs have the skill and intention to generate high risk adjusted rates of return for the limited partners. Actual rates of return will, however, also depend on factors such as the competition between VCs or the market for innovation (as discussed in previous sections). The limited partners, of course, spend resources on due

diligence, including reading investing memoranda and checking the venture capitalists' credentials. According to Sahlman (ibid) the governance structure, i.e. the limited partner structure, also helps the potential investors to distinguish between good and weak VCs. The basic argument is that good VCs are more likely than weak VCs to accept a finite life for each new partnership and a compensation system heavily dependent on investment returns. If they are not confident of performing well, or if they intend to neglect the interests of the limited partners, they will probably not agree to the basic terms of the contract.

According to academic research as well as experiences from practitioners, one of the most important issues for an LP is its ability to trace and invest in the best performing funds, since the spread observed between good and bad performers is significantly larger in private equity than in e.g. public markets (e.g. Gottschalg et al., 2004; EVCA, 2005a). According to Schmidt (2004), however, the institutional investment pressure to be present in the asset class forces non-privileged market participants without invitation to A-funds to invest in B-funds.

Experience from earlier venture capital investments and related returns, has obviously a considerable impact on LPs' future VC allocation decisions. Reinvestment decisions of LPs are particularly important in the private equity industry, where information about the quality of different private equity groups is more difficult to learn and is often restricted to existing investors (Lerner et al., 2005). Lerner et al. (ibid) show that LPs tend to reinvest in the next fund if the current fund has a high IRR and that funds in which LPs reinvested have significantly higher performance than those in which they did not reinvest.

The practitioner view is that herd mentality may be another factor influencing private equity allocation decisions. The herd mentality, i.e. following the same path as other investors, was one of the reasons behind the excessive investments in VC funds during the Internet bubble period, as well as the prevalent low interest for early stage VC fund investments. Consistent with the herding theory, Lerner et al. (2005) found that poor performance from private equity investments done by corporate pension funds and banks are predominantly driven by their investments in the 1995-1998 period, which is usually considered the beginning of the Internet bubble period. Today, there is a particularly strong interest for investing in European middle-sized buyout funds, facing a significant risk of the 'money chasing deal' phenomenon and potentially a new "bubble". The next 'hot' area, according to practitioners, might be private equity investments in emerging markets, such as Asia or Africa. And, after recent success stories such as the Swedish Skype, the French Kelkoo and the UK based Cambridge Broadband, one should not be surprised if the interest for early stage VC investments in Europe start to grow again.

6.2.3. Characteristics of LPs and related performance

Institutional investors are known to differ widely in sophistication levels when it comes to private equity investing. For example, according to Lerner et al. (2005), university and foundation endowments are often regarded as the most sophisticated investors, while public pension funds are considered the least. The authors argue that one reason for the difference is that many public pension funds offer compensation levels that are very modest in relation to the private financial services industry.

Different institutions have different investment focus (see also section 4.6.3.). Bank-sponsored funds tend to prefer domestic investments in later stage companies. Pension and insurance-backed funds often focus on later stage investments in low technology sectors. Corporate and individual backed VC firms invest in early stage, high technology ventures globally, rather than domestically (Mayer et al., 2003). Therefore, a differentiating factor between countries seems to be the origin of the VC funds' capital. Institutional investors, mainly pension funds, are by far the largest contributors to US VC funds, while investment banks dominate VC funding in Europe (Bottazzi and De Rin, 2002). In the UK, however, pension funds constitute the largest group of private equity fund investors, followed by fund-of-fund and thereafter banks.

According to Lerner et al. (2005), the returns that institutional investors realise from private equity differ dramatically between institutions. In particular, endowments' annual returns are nearly 14% greater than the overall average. On the other hand, performance is negatively correlated to the number of banks investing in a fund. The authors also found that follow-on funds raised by the same GP, in which endowments and, to a lesser extent, public pension funds decide to reinvest, show much higher performances than those funds that they decided not to reinvest. Corporate pension funds are more likely to reinvest in successor funds if the previous fund showed strong performance, although this often does not translate into higher future performance. They also found that LPs with higher average IRRs tend to invest in older funds and target a smaller selected number of GPs in their home geography compared to other LPs.

There could be different reasons behind the varying performances showed by different LPs. For example, many endowments invested in private equity funds before other institutional investors entered an asset class and may have built up close relationships with high quality VC teams and as a result have better access to established funds⁸. According to Lerner et al. (2005) this might explain some of the performance differences, but not all. An alternative explanation could be that performance differences between LPs result from differences in the objectives that LPs pursue when investing in private equity, and not necessarily their skills and technical abilities to invest, which confirm the findings by Gottschalg et al. (2004), Hellman et al. (2004), and Lerner et al. (2005) as discussed above.

6.2.4. Summary: LP's investment patterns

Institutional investors normally invest in alternative asset classes, including venture capital funds, in order to diversify their investment portfolios with non-correlated investments. However, there might be other reasons to invest in venture capital than those related to financial performance, such as desire to establishing contacts, herding mentality, or stimulating local economies. Non-performance related reasons seem to occur more in Europe than in the US, which could be an important reason for performance differences between the US and the UK/Europe. One of the most important determinants of an LP's decision to reinvest in venture capital or not seems, not surprisingly, to be their previous financial

⁸ It might be optimal for established LPs to invest in a number of younger funds even if the expected returns of these funds are low initially. The goal of this strategy could be the need to generate information about new classes of funds and to create a pipeline of new generation of GPs with whom they will have preferential relationships (Lerner et al., 2005).

performance in the asset class. And again, the possibility for LPs to get access to the best performing funds is probably more important than anything else in order to gain excess returns.

7. COMMENTS AND FINAL REMARKS

7.1. COMMENTS ABOUT THIS LITERATURE REVIEW

When putting together a literature review of existing academic research related to determinants of VC fund financial performance and VC fund raising, with the main objective of evaluating factors relevant to the UK market, a number of challenges occur. First and foremost, the number of such academic studies turns out to be limited, and even more so, the number of studies focusing on institutional investor preferences. Second, the existing empirical academic literature is almost exclusively focused on the US. The cross-country research that exists is mainly focused on environmental and institutional factors, such as supply and demand of venture capital, investment practices, or regulatory and legislative differences. For those reasons, many of the conclusions drawn in this review are based on indirect evidence. On the one hand, certain factors appear to be associated with financial performance while, on the other hand, other factors appear to be associated to differences between the US and the UK/Europe VC industries. Other types of challenges that occurred relates to the individual studies. First, background information for the studies do not always contain complete data on e.g. time periods, private equity fund focus, measurements used, etc. A rigorous evaluation of the reliability or validity of the individual studies has not been possible to carry out within the scope of this review. Second, the studies can rarely be directly compared, given different data sources, methods, etc. Third, many of the studies are exhaustive and comprehensive, whereby a simplified literature review like this will not always do the sources full justice.

A word of caution could also be in place. While this review shows that there is evidence pointing to a more favourable situation in the US that could potentially explain better performance among US VCs, it should be kept in mind that the alleged performance gap between the US and UK/Europe is based on aggregate mean differences. Given that the performance of VCs varies considerably in the US and in Europe and that some VCs constantly show superior performance, this geographical performance difference *may* be driven by a small number of well established VCs that constantly outperform all others.

7.2. FINAL REMARKS

Some of the questions raised in the specification of this review have not been answered at all, and others only partly. At least three reasons can be identified. First, some of the questions are time- or situation related and therefore normally receives less academic interest or attention. Those answers may be found, at least to some extent, in business reports from e.g. EVCA, NVCA, Thomson Venture, or similar interest organisations. Second, problems of getting access to data sometimes prevent detailed analyses. Third, the academic research within this field is limited. Areas that would be interesting to evaluate further are the following.

- *LPs investment determinants*

The complete area deserved far more research.

- *More international studies and cross-country analyses*

Although the number of international studies is growing, there is still a great need for studies examining national contexts other than the US. In addition, more cross-country analyses are needed, especially those evaluating determinants having direct effects on VC fund performances.

- *Serial entrepreneurs*

There is a clear gap in the literature covering the dynamic nature of the process. That is, there is a need to consider the possibility that venture capitalists may seek to reinvest in entrepreneurs who have exited from their existing portfolios.

- *Risk-return patterns*

Risk behaviour and attitudes likely have significant impact on VC fund performance. The practitioner view is that US VC firms, on the one hand, tend to put significant financial bets on potential star performers in their portfolios and, on the other hand, be quick to cut loose poor performers, while their European counterparts tend to be more conservative, both in funding potential stars and in letting go of poor investments. Academic studies in this field would be very interesting.

- *Access to and commercialisation of innovations*

Venture capital is aiming at funding companies with large growth potential, often based on radically new technology innovations. Furthermore, the whole VC investment model is based on the fact that only a few investments become stars, but very successful stars. But do European VC firms have the same access to such big innovations as their US counterparts, i.e. does Europe have similar innovation capabilities as the US? However much debated, patent filings are being viewed as a key parameter to measure the innovation output of countries and regions, where Europe often is accused of lagging behind the US. Or maybe it is about commercialising, as debated in Business Week Online (June 21, 2005), arguing that Europe has a long history of delivering successful inventions, but a poor track record of turning those inventions into successful companies. These questions are briefly touched upon in this review, but would deserve a much deeper analysis including empirical studies.

- *Sector specialisation*

Are there differences in VC funded technologies in the US that make them more attractive investment opportunities than those in Europe? Is the geographical distance so important that VCs, as a result, should primarily invest in industries with headquarters located in their home regions?

- *More detailed VC fund performance analyses*

The overall conclusion from the presented research gives that US VC funds' performances on average outperform the European funds. Some evidence of the great variance in performance across VC funds was also presented. Maybe the better performance by US VCs can be attributed to a few highly successful VC firms? If these firms were removed from the comparison, the significant difference between the US and Europe might disappear? If so, a more interesting question than the gap between geographic locations may be *why* these few firms are repeatable able to achieve such high returns on their investments.

8. TABLE I: VC RETURN STUDIES

The table below summarises the most cited academic studies evaluating the financial performance of venture capital investments using financial performance as dependent variable. More detailed presentations about this research can be found in the sections 2.3.3-4. The table is divided into two parts; the first section contains US only research while the second section contains academic studies comparing US and European VC performance. Studies appear in alphabetical order.

Author(-s):	Research reference
Period:	Time period covered by the analysis
Sample:	Number and type of objects represented in the sample. PE= Private Equity, BO=Buyout, VC=Venture capital, PF=Portfolio firms, LP=Limited partners
Origin of sample:	BE (Belgium), DE (Germany), EU (Europe), FR (France), NL (Netherlands), SE (Sweden), US, UK
Dependent variable:	Some of the more common performance measures are IRR (internal rate of return), PME (public market equivalent), (net) present value, other cash flow calculations, or some profitability index
Observed performance:	The return of PE or VC investment that was calculated

US Author(-s)	Period	Sample	Origin of sample	Dependent variable	Observed performance
(Chen et al., 2002)	< 2000	148 VC funds	US	IRR	9.99% annual average return
(Cochrane, 2005)	1987-2000	7 765 VC PF	US	Mean log return	15%
(Emery, 2003)	1986-2001	VC funds and NASDAQ	US	Excess annual returns	VC funds: +7.4% compared to NASDAQ
(Jones and Rhodes-Kropf, 2003)	1969-2002	1245 PE funds (70% VC)	US	Value weighted IRR	19.3%
(Kaplan and Schoar, 2003)	1980-1997	746 PE funds and SandP 500	US	IRR	PE funds: Same level as SandP 500
(Ljungqvist and Richardson, 2003a)	1981-2001	1 LP (73 PE funds) and SandP 500	US	Excess IRR	LP fund: + 5-8% average annual return compared to SandP 500
(Quigley and Woodward, 2003)	1987-2000	VC investments, SandP 500 and NASDAQ	US	Gross real return	VC: 5% per semester, i.e. less than SandP 500 and NASDAQ

INTERNATIONAL Author(-s)	Period	Sample	Origin of sample	Dependent variable	Observed performance
(Artus et al., 2004)	1985-2002	VC funds	EU	IRR	10.6%
(Gottschalg et al., 2004)	1980-1995 (-2003)	1208 PE-funds and stock market	US, EU	Net present value	PE funds: -20% compared to stock market Europe has significantly underperformed
(Hege et al., 2003)	- 2001	171 VC firms	BE, DE, FR, NL, SE, UK, US	IRR	US firms significantly higher IRR than European firms
(Megginson, 2002)	-2000, 2001, 2002	-	US, EU	Return	US firms continuously perform better than European firms

9. TABLE II: VC PERFORMANCE FACTOR STUDIES

The table below summarises all the studies that could be located that evaluate determinants having a direct or indirect effect of venture capital fund return as well as studies evaluating LPs investment patterns. The majority of those use financial performance of VC investments as the dependent variable. More detailed presentations about this research can be found in the chapters 4 and 5. The headings of the table correspond to the subsections of those chapters. Studies appear in alphabetical order.

Author(-s):	Research reference
Period:	Time period covered by the analysis
Data source:	Origin of data used. CONCEPTUAL indicates that the study is purely conceptual and does not present any empirical data
Sample:	Number and type of objects represented in the sample. PE= Private Equity, BO=Buyout, VC=Venture capital, PF=Portfolio firms, LP=Limited partners, BA=Business angels
Origin of sample:	AT (Austria), AU (Australia), BE (Belgium), CA (Canada), CH (Switzerland), CS (Czech Republic), DE (Germany), DK (Denmark), ES (Spain), EU (Europe), IE (Ireland), FI (Finland), FR (France), IL (Israel), IT (Italy), JP (Japan), NO (Norway), NL (Netherlands), PL (Poland), SE (Sweden), US, UK
Dependent variable:	Success measurement. Some of the more common performance measures are IRR (internal rate of return), PME (public market equivalent), (net) present value, other cash flow calculations, or some profitability index. Performance could also be measured in other measurements such as the number of successful exits or survival rate
Independent variable:	The variable that has an impact on the dependent variable
Conclusion:	Used for CONCEPTUAL or comparison based conclusions
Effect:	Positive, neutral or negative effect on the dependent variable
<i>IMP</i>	Impact, based on the interpretation of the findings from the literature review. X=some impact on fund performance, XX= medium impact on fund performance, XXX=high impact on fund performance

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	<i>IMP</i>
Characteristics of Portfolio Companies									
(Amit et al., 1990)	CONCEPTUAL						The most profitable ventures develop without VCs		X
(Bottazzi and Da Rin, 2003)	Listing prospectus and annual reports	1996-2001	2476 IPO prospects	US, EU			EU PFs receive less money than US		X
(Cumming and Walz, 2004)	Dataset collected by CEPRES	1971-2003	72 PE firms, 2211 PE funds	39 countries N. and S. America, EU, Asia	IRR	Later stage investments		Pos	XXX
(Cumming, 2002)	Hand collected data	2001-2002	132 PF	AU, BE, CH, CS, DE, DK, FR, IT, NL, PL	IRR	Specialization in early stage phase		Neg	XXX
(Das et al., 2003)	Dataset from VentureXpert	1980-2000	52' rounds, 700 VC, 250+ BO	US	Exit probability	Investment in high-tech, biotech and medical sectors		Pos	XX
(Das et al., 2003)	Dataset from VentureXpert	1980-2000	52' rounds, 700 VC, 250+ BO	US	Exit probability	Later stage investments		Pos	XX

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	IMP
(De Clercq and Dimov, 2003)	Dataset from VentureXpert	1990-2001	200 VC firms	US	Proportion of successful exits	Specialized knowledge in terms of industry		Pos	XX
(De Clercq and Dimov, 2003)	"	"	"	"	Proportion of successful exits	Increased PF age		Neg	XX
(Giot and Schwienbacher, 2005)	Dataset from VentureXpert	1980-2003	22042 rounds, 5817 VC firms	US (93%)	Faster IPO exit	Biotech and Internet firm investment		Pos	XX
(Hege et al., 2003)	Questionnaires sent to VC in EU countries and Dataset from VentureXpert	- 2001	171 VC firms	BE, DE, FR, NL, SE, UK, US	Proportion of successful exits	High rate of early stage investments		Neg	XX
(Manigart et al., 2002a)	Unique dataset collected through use of questionnaires	1995-1997	209 VC firms	BE, FR, NL, UK, US	IRR	Specialization in early stage phase		Neg	XXX
(Manigart, 1994)	Environmental factors	1970-1990	-	FR, NL, UK	Return	Narrow geographical focus		Neg	X
(Mason and Harrison, 2004a)	Dataset collected through use of questionnaires	1996	127 BA	UK			No significant difference in returns from tech and non-tech investments		XX
(Murray, 1999)	Statistics from EVCA, BVCA, Venture Economics, etc.	1998	-	UK	IRR	Later stage investments		Pos	XX
(Schwienbacher, 2002)	Unique dataset collected through use of questionnaires	2001	171 VC firms	BE, DE, FR, NL, SE, UK, US	Investments in early stage	Young VC firms		Pos	XX

Characteristics of Venture Capital Funds									
(Diller and Kaserer, 2005)	Dataset from Venture Economics	1980-2003	200 PE funds	EU	IRR for subsequent fund	High/Low returns in earlier PE fund		Pos/ Neg	XXX
(Fleming, 2004)	Data collected from Australian Venture Capital Journal's survey responses	1992-2002	129 PFs	AU	IRR for subsequent fund	Previous VC fund success		Pos	XXX
(Gompers and Lerner, 1998)	Dataset from Venture Economics	1969-1994	885 VC backed IPOs	US	Ability to raise new capital to VC funds	VC firm age and size		Pos	XX
(Gompers, 1996)	CONCEPTUAL						Reputation drives IPO decision		X
(Gottschalg et al., 2004)	Datasets from several sources containing cash flows to investors and from PE funds	1980-1995 (-2003)	1208 VC and BO-funds	US, EU	Profitability index (based on actual cash flows)	Small fund sizes		Neg	XXX
(Gottschalg et al., 2004)	"	"	"	"	Profitability index (based on actual cash flows) for subsequent fund	High/Low returns in earlier PE fund		Pos/ Neg	XXX
(Hochberg et al., 2004)	Dataset from Venture Economics	1980-2003	3 469 VC funds	US	Proportion of successful exits	Large VC fund sizes		Pos	XX
(Hochberg et al., 2004)	"	"	"	"	Proportion of successful exits	First time funds		Neg	XX
(Hsu, 2004)	Sample of E-Lab firms and data from Venture Economics	2000	149 PF	US	Entrepreneurs willingness to accept discount in valuation	VC reputation ranking		Pos	XXX
(J_skel_inen et al., 2002)	Dataset from Venture Economics	1986-1996	97 VC firms, 4755 PFs	US	Number of IPOs	Number of PFs per VC firm partner		Pos → Neg	XX

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	IMP
(Kaplan and Schoar, 2003)	Dataset from Venture Economics	1980-1997	746 PE funds	US	IRR	Fast VC fund growth		Neg	XXX
(Kaplan and Schoar, 2003)	"	"	"	"	IRR in subsequent fund	High return in earlier PE fund		Pos	XXX
(Laine and Torstila, 2004)	Sample of liquidated VC funds	1970-2002?	138 VC funds	US	Proportion of successful exits	Large VC fund sizes		Pos	XX
(Laine and Torstila, 2004)	"	"	"	"	Proportion of successful exits	Sole funds, i.e. funds that are not followed by another fund		Neg	XX
(McCahery and Vermeulen, 2004)	CONCEPTUAL						Limited partnersh. structure offer substantial benefits		XX
(Megginson, 2002)	Secondary data, based on e.g. data from Venture Economics	1974-2002		US, EUR, OTH			EU VC firms seldom organised in limited partnerships		X

The Investment Process									
(Cumming and Walz, 2004)	Dataset collected by CEPRES	1971-2003	72 PE firms, 2211 PE funds	39 countries N. and S. America, EU, Asia	IRR	Use of convertible securities		Pos	XXX
(Cumming and Walz, 2004)	"	"	"	"	IRR	Syndication		Pos	XXX
(Cumming, 2002)	Hand collected data	2001-2002	132 PFs	AU, BE, CH, CS, DE, DK, FR, IT, NL, PL	IRR	High VC ownership percentage		Pos	XXX
(De Clercq and Dimov, 2003)	Dataset from VentureXpert	1990-2001	200 VC firms	US	Proportion of successful exits	Degree of syndications over all investment rounds		Pos	XX
(Diller and Kaserer, 2005)	Dataset from Venture Economics	1980-2003	200 PE funds	EU	IRR, PME	Ability to select ideas		Pos	XXX
(Fleming, 2004)	Data collected from Australian Venture Capital Journal's survey responses	1992-2002	129 PFs	AU	IRR	Syndication		Neg	XXX
(Giot and Schwienbacher, 2005)	Dataset from VentureXpert	1980-2003	22042 rounds, 5817 VC firms	US (93%)	Longer investment duration	Less syndication		Pos	XX
(Gompers and Lerner, 1999b)	Dataset from Venture Economics	1961-1992	794 PFs	US	Increased IPO rate	More VC financing and greater number of financial rounds		Pos	XX
(Gottschalg et al., 2004)	Datasets from several sources containing cash flows to investors and from PE funds	1980-1995 (-2003)	1208 VC and BO-funds	US, EU	Profitability index (based on actual cash flow)	VC firm often in the role as lead investor		Pos	XXX
(Hege et al., 2003)	Questionnaires sent to VC in EU countries and Dataset from VentureXpert	-2001	171 VC firms	BE, DE, FR, NL, SE, UK, US	Proportion of successful exits	Screening competence		Pos	XX
(Hege et al., 2003)	"	"	"	"	Proportion of successful exits	Staged financing		Pos	XX
(Hege et al., 2003)	"	"	"	"	Proportion of successful exits	More syndication in Europe		Pos	XX
(Hege et al., 2003)	"	"	"	"			Syndication is more often used in the US than in EU		XX
(Hochberg et al., 2004)	Dataset from Venture Economics	1980-2003	3 469 VC funds	US	Proportion of successful exits	Better networked VC firms		Pos	XX

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	IMP
(J_skel_inen et al., 2002)	Dataset from Venture Economics	1986-1996	97 VC firms, 4755 PFs	US	Number of IPOs	Syndication frequency		Pos	XX
(Kaplan et al., 2003)	Data on 24 countries obtained from VCs and one LP	1992-2001	107 PFs, 70 VC firms	US, 23 non-US	VC firm survival rate	Use of US style contracts		Pos	XX
(Landier, 2001)	CONCEPTUAL						US VCs spend a large amount of time on technological aspects of investments		X
(Landier, 2001)	CONCEPTUAL						Debt-like contracts optimal for EU VC firms		X
(Lerner and Schoar, 2005)	Constructed sample collected from PE firms in developing countries	1987-2003	28 PE firms, 210 investm.	26 countries (0 EU, not US)			Common law countries uses preferred stocks		X
(Lerner, 1994)	Dataset from Venture Economics	1978-1989	651 rounds in biotech PFs	US	Invest first time in later rounds	Experienced VC firms (measured in age)		Pos	X
(Ljungqvist and Richardson, 2003b)	Dataset from one of the largest institutional investor in PE	1981-2001	1 LP – 3 800 PFs (15% VC)	US	IRR	Increased number of investment opportunities		Pos	XXX
(Lockett and Wright, 1999)	Questionnaire, identified using BVCA handbook	1987-1996	62 VC firms	UK			Finance perspective most important motive for syndication		X
(Manigart et al., 2000)	Unique dataset collected through use of questionnaires	1995-1997	209 VC firms	BE, FR, NL, UK, US			Info used for pre-investment valuation and methods differs		
(Manigart et al., 2002a)	Unique dataset collected through use of questionnaires	1995-1997	209 VC firms	BE, FR, NL, UK, US	IRR	Role as lead investor		Pos	XXX
(Manigart et al., 2002b)	Unique dataset collected through use of questionnaires	2001	317 VC firms	BE, DE, FR, NL, SE, UK,			Finance perspective most important motive for syndication		X
(Manigart et al., 2002b)	“	“	“	“	High rate of syndications	Young VC firms Large VC firms Specialised VC firms		Pos	X
(Meggison, 2002)	CONCEPTUAL						Staged financing – efficient way to minimize risk		X
(Meggison, 2002)	CONCEPTUAL						Use of convertible securities increase VC return in event of high success		X
(Sahlman, 1990)	CONCEPTUAL						Staged capital give VCs right to abandon failing projects		
(Sahlman, 1990)	“						Convertible pref. security shifts some costs of poor performance to the PFs		
(Sahlman, 1990)	Data from various sources including Venture Economics	1980-1988			Return	Role as lead investor		Pos	
(Schmidt, 2004)	Unique dataset	1980-2002	642 PFs	US	IRR	Ability to select ideas		Pos	XXX
(Schwienbacher, 2002)	Unique dataset collected through use of questionnaires	2001	171 VC firms	BE, DE, FR, NL, SE, UK, US			US VCs syndicates more often than EU VCs		XX

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	IMP
(Schwienbacher, 2002)	"	"	"	"			Convertible securities less used in EU		XX
(Schwienbacher, 2002)	"	"	"	"	Use of convertible securities	Young VC firms		Neg	XX
(Schwienbacher, 2002)	"	"	"	"	Frequent syndication	Young VC firms		Neg	XX
(Sepp_ and J__skel_inen, 2002)	Dataset from Venture Economics	1986-2000	54 700 investments	US	Share of IPOs	Centrality in a syndicate of investors		Pos	XX
(Sorenson and Stuart, 2001)	Dataset from Venture Economics	1986-1998	1025 VC firms, 7590 PF	US	Long distant VC investment	Syndication		Pos	X

The Management of Portfolio Companies									
(De Clercq and Dimov, 2003)	Dataset from VentureXpert	1990-2001	200 VC firms	US	Proportion of successful exits	Investing in older PF		Neg	XX
(Diller and Kaserer, 2005)	Dataset from Venture Economics	1980-2003	200 PE funds	EU	IRR, PME	Skilled VC firms		Pos	XXX
(Fleming, 2004)	Data collected from Australian Venture Capital Journal's survey responses	1992-2002	129 PFs	AU	IRR	Experienced VC firms		Neu	XXX
(Gompers and Lerner, 1999a)	Sample of VC firms	1978-1992	419 VC firms	US	Profits	VC firm incentives		Neu	XXX
(Gottschalg et al., 2004)	Datasets from several sources containing cash flows to investors and from PE funds	1980-1995 (-2003)	1208 VC and BO-funds	US, EU	Profitability index (based on actual cash flow)	Experienced PE firms		Pos	XXX
(Hege et al., 2003)	Questionnaires sent to VC in EU countries and Dataset from VentureXpert	- 2001	171 VC firms	BE, DE, FR, NL, SE, UK, US			US VC firms take more often CEO repl. decisions		XX
(Hellman, 1998)	CONCEPTUAL						VC in control provide greater efforts finding professional managers		XX
(Manigart et al., 2002a)	Unique dataset collected through use of questionnaires	1995-1997	209 VC firms	BE, FR, NL, UK, US	IRR	Experienced VC firms		Pos	XXX
(Meggison, 2002)	CONCEPTUAL						Partners at top US VC are often engineers/ technically trained		X
(Schwienbacher, 2002)	"	"	"	"	Proportion of CEO replacements	Young VC firms		Neg	XX
(Shepherd et al., 2003)	Data collected through use of questionnaires	1996	47 VC firms	AU	Reliability	Experienced VC firms		Neg	XX

The Exit Process									
(Barnes and McCarthy, 2002)	Data produced by BVCA	1992-1999	85 VC and BO backed IPOs	UK	Age of PFs at IPO date	VC firms age		Pos	XX
(Barnes and McCarthy, 2002)	"	"	"	"	Under pricing of PFs at the IPO date	VC firms age		Neut	XX

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	IMP
(Black and Gilson, 1998)	CONCEPTUAL (including data from EVCA, Venture Capital Journal, etc)			US, JP, EU			IPO is the most important exit route		X
(Giot and Schwienbacher, 2005)	Dataset from VentureXpert	1980-2003	22042 rounds, 5817 VC firms	US (93%)	IPO or trade sales exit	Long investment durations		Neg	XX
(Gompers, 1996)	Two datasets	1978-1987; 1983-1993	495 VC backed IPOs	US	Underpricing of PF at IPO	Younger VC firms		Pos	XXX
(Jeng and Wells, 2000)	Data from European VC Journal, Asian VC Journal, The Giza grup, McDonald and Ass, Venture Economics	1986-1995	-	US, 17 EU, 3 other			IPO strongest driver for VC investing		X
(Manigart et al., 2002a)	Unique dataset collected through use of questionnaires	1995-1997	209 VC firms	BE, FR, NL, UK, US	IRR	Shorter holding period of investments		Pos	XXX
(Meggison and Weiss, 1991)	Sample from Investment Dealers's Digest Corp. Database and Venture Capital Journal	1983-1987	320 PF firms, 320 non PF firms	US	Less under pricing of PF at IPO	Longer holding period of investments		Pos	X
(Schwienbacher, 2002)	Dataset collected through use of questionnaires	2001	171 VC firms	BE, DE, FR, NL, SE, UK, US	IPO rates	Replacement of entrepreneurs, reporting requirements and stage financing		Pos	XX
(Schwienbacher, 2002)	"	"	"	"	Liquidation rates	VC investments in early stages		Pos	XX

Institutional and Environmental Factors									
(Armour and Cumming, 2004)	Data from EVCA, Venture Economics and CVCA.	1990-2002	195 observ.	US, CA, 13 EU	Supply of VC	Deep and liquid stock market		Pos	XX
(Armour and Cumming, 2004)	"	"	"	"	Supply of VC	Favourable tax and legal environments		Pos	XX
(Armour and Cumming, 2004)	"	"	"	"	Supply of VC	Presence of government programs		Neg	X
(Black and Gilson, 1998)	CONCEPTUAL (including data from EVCA, Venture Capital Journal, etc)			US, JP, EU	Strong VC market	Active stock market		Pos	X
(Black and Gilson, 1998)	CONCEPTUAL (including data from EVCA, Venture Capital Journal, etc)			US, JP, EU	Strong VC market	Flexible labour markets		Pos	X
(Cumming and Walz, 2004)	Dataset collected by CEPRES	1971-2003	72 PE firms, 2211 PE funds	39 countries North and South America, EU, Asia	IRR	Public market returns		Neu	XXX
(Cumming and Walz, 2004)	"	"	"	"	IRR	Legal conditions		Pos	XXX
(Diller and Kaserer, 2005)	Dataset from Venture Economics	1980-2003	200 PE funds	EU	IRR, PME	Funds closed in years with above average stock market conditions		Neg	XXX
(Diller and Kaserer, 2005)	"	"	"	"	IRR, PME	Inflow of capital to VC industry		Neg	XXX

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	IMP
(Di Gregorio and Shane, 2003)	Panel data based on information from the Association of University Technology Managers	1994-1998	116 universities	US	Formation of new companies	University intellectual eminence and licensing policies		Pos	XX
(Gompers and Lerner, 1998)	Dataset from Venture Economics	1969-1994	885 VC backed IPOs	US	Contributions to the VC industry	Increase in capital gains taxes		Neg	XX
(Gompers and Lerner, 1998)	"	"	"	"	VC activity	Increase in state R&D		Pos	XX
(Gompers and Lerner, 2000)	Data from VentureOne database	1987-1995	4069 VC investm	US	Pre-valuation of PF firms	Inflow of capital to VC industry		Pos	XX
(Gompers and Lerner, 2000)	"	"	"	"	Strong VC market	Deep and liquid stock market		Pos	XX
(Gompers et al., 2004)	Dataset from Venture Economics	1975-1998	42 559 VC firms – PFs	US			Experienced VCs increase activity in boom times		XX
(Gottschalg et al., 2004)	Datasets from several sources containing cash flows to investors and from PE funds	1980-1995 (-2003)	1208 VC and BO-funds	US, EU	Profitability index (based on actual cash flow)	Market downturns		Neg	XXX
(Hall and Tu, 2003)	Data from BVCA's Directory of Members including information at websites	2000	123 VC firms	UK	Willingness to invest overseas	Size of VC investment funds and later stage focus		Pos	XX
(Hochberg et al., 2004)	Dataset from Venture Economics	1980-2003	3 469 VC funds	US	Proportion of successful exits	Inflow of capital to VC industry		Neg	XXX
(Jeng and Wells, 2000)	Data from European VC Journal, Asian VC Journal, The Giza grup, McDonald and Ass, Venture Economics	1986-1995	-	US, 17 EU, 3 other	Rate of VC investments	GDP growth		Pos	X
(Jeng and Wells, 2000)	"	"	"	"	Rate of VC investments	Deep and liquid stock market		Pos	X
(Jeng and Wells, 2000)	"	"	"	"	Rate of VC investments	Rigid labour markets		Neg	X
(Kaplan and Schoar, 2003)	Dataset from Venture Economics	1980-1997	746 PE funds	US	VC firm survival rate	Funds raised in boom times		Neg	XX
(Landier, 2001)	CONCEPTUAL						Bank financing prevalent in Europe due to stigma associated with bankruptcy		X
(Leleux and Surlemont, 2003)	Statistics from EVCA and information about European legal systems	1990-1996	PE	15 EU	Size of VC industry	Magnitude of public participation in VC industry		Neg	X
(Leleux and Surlemont, 2003)	"	"	"	"	Greater amounts invested in VC industry	Public fund involvement		Pos	X
(Lerner and Schoar, 2005)	Constructed sample collected from PE firms in developing countries	1987-2003	28 PE firms, 210 investments	26 countries (0 EU, not US)	Post-money valuation	PE investing in countries with common law tradition		Pos	X
(Lerner, 1996)	Data set compiled by the US General Accounting Office	~1983-1997	294 PF firms, 300 non PF firms	US	Employment and sales growth	SBIR funded PF companies		Pos	XX
(Ljungqvist and Richardson, 2003a)	Dataset from one of the largest institutional investor in PE	1981-2001	1 LP – 73 BO and VC (15%) funds	US	IRR	Inflow of capital to VC industry		Neg	XXX

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	IMP
(Manigart and Beuselinc, 2001)	Data from EVCA	1989-1999	-	BE, ES, FI, FR, IE, IR, IT, NL, NO, SE, UK	More funds supplied by governments	More private VC investments			
(Manigart et al., 2002a)	Unique dataset collected through use of questionnaires	1995-1997	209 VC firms	BE, FR, NL, UK, US			Independent VC firms require higher return		XXX
(Mason and Harrison, 2000)	Data based on interviews among BVCA members	1999	27 VC firms	UK			71% of VC firms received deal referrals from business angels		X
(Mayer et al., 2003)	Data from individual countries' VC associations	2000	508 VC funds	DE, JP, UK, IL	Differences in VC activities (i.e. stage, industry, geography)	Sources of VC finance			
(Meggison, 2002)	Secondary data, based on e.g. data from Venture Economics	1974-2002		US, EUR, OTH	Returns	Vital public stock market		Pos	X
(Meggison, 2002)	"	"		"	Venture capital investment	English common law		Pos	X
(Meggison, 2002)	CONCEPTUAL						Government efforts should focus on environmental factors		X
(Meggison, 2002)	CONCEPTUAL						Risk tolerant LPs important success factor for vital VC market		X
(Meggison, 2002)	CONCEPTUAL						Strong R&D culture important for vital VC industry		X
(Nowak et al., 2004)	Dataset derived from CEPRES.	1971-1998	70 PE funds	US, EU	IRR	Investment timing		Pos	XXX
(Nowak et al., 2004)	"	"	"	"	IRR	Divestment timing		Neut	XXX
(Romain and van Pottelsberghe de la Potterie, 2004a)	Panel dataset of 16 OECD countries	1990-2000	-	US, 12 EU, 3 other	Rate of VC investments	GDP growth		Pos	X
(Romain and van Pottelsberghe de la Potterie, 2004a)	"	"	"	"	Rate of VC investments	Lower labour market rigidities		Pos	X
(Romain and van Pottelsberghe de la Potterie, 2004a)	"	"	"	"	Rate of VC investments	Growth rate of R&D		Pos	X
(Schmidt, 2004)	Unique dataset	1980-2002	642 PF's	US			B-LPs invest in B-GPs		XXX
(Sorenson and Stuart, 2001)	Dataset from Venture Economics	1986-1998	1025 VC firms, 7590 PF	US	VC investment	Increased geographic distance and increased industry distance		Neg	XX

LPs investment patterns									
(Lerner et al., 2005)	Unique dataset and data from Asset Alternatives + PE Intelligence 2004	1991-2001+	417 LPs, 1398 PE funds	US	IRR	Number of endowments investing in a VC fund		Pos	XXX
(Lerner et al., 2005)	"	"	"	"	IRR	Number of banks and corporate pension funds investing in a VC fund		Neg	XXX

Author(-s)	Data source	Period	Sample	Origin of sample	Dependent variable	Independent variable	Conclusion	Effect	IMP
(Gompers and Lerner, 1998)	Dataset from Venture Economics	1969-1994	1294 VC funds	US	VC commitments	Decrease of capital gain taxes		Pos	XXX
(Gompers and Lerner, 1998)	"	"	"	"	VC commitments	Changes in ERISA's prudent man rule		Pos	XXX
(Gompers and Lerner, 1998)	"	"	"	"	VC commitments	GDP growth		Pos	XXX
(Sahlman, 1990)	CONCEPTUAL						Limited partnership structure helps filtering out VCs unable or unwilling to meet LPs expectations		

10. REFERENCES

- Admati, A. and P. Pfleiderer (1994). "Robust financial contracting and the role of venture capitalists." Journal of Finance, vol. 49(2), p. 371-402.
- Amit, R., L. Glosten and E. Muller (1990). "Entrepreneurial ability, venture investments, and risk sharing." Management Science, vol. 36(10), p. 1232-1245.
- Armour, J. and D. Cumming (2004). "The legal road to replicating Silicon Valley." Working Paper No. 281. ESRC Centre for Business Research, University of Cambridge.
- Artus, P., J. Teiletche, C. Kaserer and C. Diller (2004). "Performance measurement and asset allocation for European private equity funds." EVCA Paper, www.evca.com.
- Avnimelech, G., M. Kenney and M. Teubal (2004). "Building venture capital industries: Understanding the U.S. and Israeli experiences." Working Paper Series No. 1059. UCAIS Berkeley Roundtable on the International Economy, UC Berkeley.
- Barnes, E. and Y. McCarthy (2002). "Grandstanding in the UK venture capital industry." Working Paper, EFMA 2002 London Meetings.
- Barney, J., L. Busenitz, J. Fiet and D. Moesel (1996). "New venture teams' assessment of learning assistance from venture capital firms." Journal of Business Venturing, vol. 11(4), p. 257-272.
- Black, B. and R. Gilson (1998). "Venture capital and the structure of capital markets: Banks versus stock markets." Journal of Financial Economics, vol. 47(3), p. 243-277.
- Black, B. and R. Gilson (1999). "Does venture capital require an active stock market?" Journal of Applied Corporate Finance, vol. 11(4), p. 36-48.
- Bottazzi, L. and M. Da Rin (2003). "Financing entrepreneurial firms in Europe: Facts, issues, and research agenda." Working Paper No. 958. CESifo.
- Brav, A. and P. Gompers (1997). "Myth or Reality? The long-run underperformance of initial public offerings: Evidence from venture and non-venture capital-backed companies." Journal of Finance, vol. 52(5), p. 1791-1821.
- BVCA (2004). "BVCA private equity and venture capital performance measurement survey 2003." PriceWaterHouseCoopers and BVCA, www.bvca.co.uk.
- BVCA (2005a). "BVCA private equity and venture capital performance measurement survey 2004." PriceWaterHouseCoopers and BVCA, www.bvca.co.uk.
- BVCA (2005b). "BVCA report on investment activity." PriceWaterHouseCoopers and BVCA, www.bvca.co.uk.
- Bygrave, W., M. Hay, E. Ng and P. Reynolds (2002). A study of informal investing in 29 nations composing the Global Entrepreneurship Monitor (GEM). Frontiers of Entrepreneurship Research, 2002 XII, Babson College.
- Bygrave, W. and S. Hunt (2004). Global Entrepreneurship Monitor (GEM): 2004 Financing report. Frontiers of Entrepreneurship Research, 2002 XII, Babson College.
- Chen, P., G. Baiertl and P. Kaplan (2002). "Venture capital and its role in strategic asset allocation." Journal of Portfolio Management, vol. 28(2), p. 83-90.
- Cochrane, J. (2005). "The risk and return of venture capital." Journal of Financial Economics, vol. 75(1), p. 3-52.
- Cumming, D. (2002). "Contracts and exits in venture capital finance." Working Paper DC Meetings, University of Alberta.
- Cumming, D. and J. MacIntosh (2003). "A cross-country comparison of full and partial venture capital exits." Journal of Banking and Finance, vol. 27(3), p. 511-548.
- Cumming, D. and U. Walz (2004). "Private equity returns and disclosure around the world." CFS Working Paper No 2004/05.
- Das, S., M. Jagannathan and A. Sarin (2003). "Private equity returns: An empirical examination of the exit of venture-backed companies." Journal of Investment Management, vol. 1(1), p. 1-26.
- Davila, A., G. Foster and M. Gupta (2000). "Venture-capital financing and the growth of startup firms." Research paper No. 1667. Graduate School of Business, Stanford University.
- De Clercq, D. and D. Dimov (2003). A knowledge-based view of venture capital firms' portfolio investment specialization and syndication. Frontiers of Entrepreneurship Research, 2003 III, Babson College.

- De Clercq, D., P. Goulet, M. Kumpulainen and M. Mäkelä (2001). "Portfolio investment strategies in the Finnish venture capital industry; A longitudinal study." Venture Capital: An International Journal of Entrepreneurial Finance, vol. 3(1), p.41-62.
- Di Gregorio, D. and S. Shane (2003). "Why do some universities generate more start-ups than others?" Research Policy, vol. 32(2), p. 209-227.
- Diller, C. and C. Kaserer (2005). "What drives cash flow based European private equity returns? Fund inflows, skilled GPs, and/or risk?" Working Paper No. 015. RICAFE - Risk Capital and the Financing of European Innovative Firms.
- Emery, K. (2003). "Private equity risk and reward: Assessing the stale pricing problem." Journal of Private Equity, vol. 6(2), p. 43-50.
- Engel, D. (2002). "The impact of venture capital on firm growth: An empirical investigation." Discussion Paper No. 02-02. ZEW, Rheinisch-Westfälisches Institut für Wirtschaftsforschung.
- EVCA (2003). "EVCA Yearbook 2003 - Annual Survey 2002." www.evca.com.
- EVCA (2004a). "Benchmarking European tax and legal environments." www.evca.com.
- EVCA (2004b). "EVCA Yearbook 2004 - Annual Survey 2003." www.evca.com.
- EVCA (2004c). "Investment benchmarks 2004 European private equity." EVCA and Thomson Venture Economics, www.evca.com.
- EVCA (2005a). "EVCA Yearbook 2005 - Annual Survey 2004." www.evca.com.
- EVCA (2005b). "Investment Benchmarks 2005 European Private Equity." EVCA and Thomson Venture Economics, www.evca.com.
- Fender, I. (2003). "Institutional asset managers: Industry trends, incentives and implications for market efficiency." BIS Quarterly Review.
- Fleming, G. (2004). "Venture capital returns in Australia." Venture Capital: An International Journal of Entrepreneurial Finance, vol. 6(1), p. 23-45.
- Fried, V., G. Bruton and R. Hisrich (1998). "Strategy and the board of directors i venture capital-backed firms." Journal of Business Venturing, vol. 13(6), p. 493-503.
- Fried, V. and R. Hisrich (1994). "Toward a model of venture capital investment decision making." Financial Management, vol. 23(3), p. 28-37.
- Gilson, R. J. (2003). "Engineering a venture capital market: Lessons from the American experience." Stanford Law Review, vol. 55. p. 1067-1103.
- Giot, P. and A. Schwienbacher (2005). "IPOs, trade sales and liquidations: Modelling venture capital exits using survival analysis." Economics Working Paper No 0312006. Archive at WUSTL.
- Goldfarb, B. and M. Henrekson (2003). "Bottom-up versus top-down policies towards the commercialization of university intellectual property." Research Policy, vol. 32(4), p. 639-658.
- Gompers, P. (1995). "Optimal investment, monitoring, and the staging of venture capital." Journal of Finance, vol. 50(5), p. 1461-1489.
- Gompers, P. (1996). "Grandstanding in the venture capital industry." Journal of Financial Economics, vol. 42(1), p. 133-156.
- Gompers, P., A. Kovner, J. Lerner and D. Scharfstein (2004). "Venture Capital Investment Cycles: The Role of Experience and Specialization." vol. (Unpublished Working Paper).
- Gompers, P. and J. Lerner (1998). "What drives venture fundraising?" Brookings Papers on Economic Activity - Microeconomics, p. 149-192.
- Gompers, P. and J. Lerner (1999a). "An analysis of compensation in the U.S. venture capital partnership." Journal of Financial Economics, vol. 51(1), p. 3-44.
- Gompers, P. and J. Lerner (1999b). The venture capital cycle. The MIT Press: Cambridge, MA.
- Gompers, P. and J. Lerner (2000). "Money chasing deals? The impact of fund inflows on the valuation of private equity investments." Journal of Financial Economics, vol. 55(2), p. 281-325.
- Gompers, P. and J. Lerner (2001a). The money of invention: How venture capital creates new wealth. Harvard Business School Press: Boston, MA.

- Gompers, P. and J. Lerner (2001b). "The venture capital revolution." Journal of Economics Perspectives, vol. 15(2), p. 145-168.
- Gompers, P. and A. Metrick (2001). "Institutional investors and equity prices." Quarterly Journal of Economics, vol. 166(1), p. 229-259.
- Gorman, M. and W. Sahlman (1989). "What do venture capitalists do?" Journal of Business Venturing, vol. 4(4), p. 231-248.
- Gottschalg, O., L. Phalippou and M. Zollo (2004). "Performance of private equity funds: Another puzzle?" Working Paper, INSEAD.
- Gupta, A. and H. Sapienza (1992). "Determinants of venture capital firms: Preferences regarding the industry diversity and geographic scope of their investments." Journal of Business Venturing, vol. 7(5), p. 347-362.
- Hall, G. and C. Tu (2003). "Venture capitalists and the decision to invest overseas." Venture Capital: An International Journal of Entrepreneurial Finance, vol. 5(2), p. 181-190.
- Hege, U., F. Palomino and A. Schwienbacher (2003). "Determinants of venture capital performance: Europe and the United States." Working Paper No. 001. RICAFA – Risk Capital and the Financing of European Innovative Firms.
- Hellman, T. (1998). "The allocation of control rights in venture capital contracts." Rand Journal of Economics, vol. 29(1), p. 57-76.
- Hellman, T., L. Lindsey and M. Puri (2004). "Building relationships early: Banks in venture capital." NBER Working Paper No. W10535. National Bureau of Economic Research.
- Hellman, T. and M. Puri (2002). "Venture capital and the professionalization of start-up firms: Empirical evidence." Journal of Finance, vol. 57(1), p. 169-197.
- Hochberg, Y., A. Ljungqvist and Y. Lu (2004). "Who you know matters: Venture capital networks and investment performance." Working Paper, Johnson School of Management, Cornell University.
- Hsu, D. (2004). "What do entrepreneurs pay for venture capital affiliation?" Journal of Finance, vol. 59(4), p. 1805-1844.
- Huntsman, B. and J. Hoban (1980). "Investments in new enterprise: Some empirical observations on risk return, and market structure." Financial Management, vol. 9, p. 44-51.
- Jain, B. and O. Kini (2000). "Does the presence of venture capitalists improve the survival profile of IPO firms?" Journal of Business Finance and Accounting, vol. 27(9and10), p. 1139-1160.
- Jeng, L. and P. Wells (2000). "The determinants of venture capital funding: Evidence across countries." Journal of Corporate Finance, vol. 6, p. 241-289.
- Jensen, M. (2002). "Securing venture capital: Today's realities." Financial Executive, vol. 18(6), p. 43-46.
- Jones, C. and M. Rhodes-Kropf (2003). "The price of diversifiable risk in venture capital and private equity." Working Paper, Columbia University.
- Jääskeläinen, M., M. Maula and T. Seppä (2002). "The optimal portfolio of start-up firms in venture capital finance: The moderating effect of syndication and an empirical test." Frontiers of Entrepreneurship Research, 2002(XIII), Babson College.
- Jääskeläinen, M., M. Maula and T. Seppä (2003). "Allocation of attention and the performance of venture capitalist." Working paper C24. Helsinki University of Technology.
- Kaplan, P., F. Martel and P. Strömberg (2003). "How do legal differences and learning affect financial contracts?" Working Paper, University of Chicago.
- Kaplan, S. and A. Schoar (2003). "Private equity performance: Returns, persistence and capital flows." NBER Working Paper No. W9807. National Bureau of Economic Research.
- Kaplan, S. and P. Strömberg (2003). "Financial contracting meets the real world: An empirical analysis of venture capital contracts." Review of Economic Studies, vol. 70(2), p. 281-316.
- Kortum, S. and J. Lerner (1998). "Does venture capital spur innovation?" NBER Working Paper No. W6846. National Bureau of Economic Research.
- La Porta, R., F. Lopez-de-Silanes, A. Shleifer and R. Vishny (1998). "Law and finance." Journal of Political Economy, vol. 106(6), p. 1113-1155.

- Laine, M. and S. Torstila (2004). "The exit rates of liquidated venture capital funds." Working Paper, Forthcoming in *Journal of Entrepreneurial Finance and Business Ventures*.
- Lakonishok, J., A. Schleifer, R. Thaler and R. Vishny (1991). "Window dressing by pension fund managers." *American Economic Review*, vol. 81(1), p. 227-231.
- Landier, A. (2001). "Start-up financing: Banks vs. venture capital." Mimeo, MIT.
- Leleux, B. and B. Surlémont (2003). "Public versus private venture capital: Seeding or crowding out? A pan-European analysis." *Journal of Business Venturing*, vol. 18(1), p. 81-104.
- Lerner, J. (1994). "The syndication of venture capital investments." *Financial Management*, vol. 23(3), p. 16-27.
- Lerner, J. (1996). "The government as venture capitalist: The long-run impact of the SBIR program." NBER Working Paper No. W5753. National Bureau of Economic Research.
- Lerner, J. and A. Schoar (2004). "The illiquidity puzzle: Theory and evidence from private equity." *Journal of Financial Economics*, vol. 72(1), p. 3-40.
- Lerner, J. and A. Schoar (2005). "Does legal enforcement affect financial transactions? The contractual channel in private equity." *Quarterly Journal of Economics*, vol. 120(1), p. 223-246.
- Lerner, J., A. Schoar and W. Wong (2005). "Smart institutions, foolish choices? The limited partner performance puzzle." NBER Working Paper 11136. National Bureau of Economic Research.
- Lindsey, L. (2003). "Venture capital keiretsu effect: An empirical analysis of strategic alliances among portfolio firms." SIERP Discussion Paper No. 02-17. Stanford University.
- Ljungqvist, A. and M. Richardson (2003a). "The cash flow, return and risk characteristics of private equity." NBER Working Paper No. 9454. National Bureau of Economic Research.
- Ljungqvist, A. and M. Richardson (2003b). "The investment behavior of private equity fund managers." Working Paper No. 005. RICAFA – Risk Capital and the Financing of European Innovative Firms.
- Lockett, A. and M. Wright (1999). "The syndication of private equity: Evidence from the UK." *Venture Capital: An International Journal of Entrepreneurial Finance*, vol. 1(4), p. 303 - 324.
- MacMillan, I., L. Zemann and P. Narasimha (1985). "Criteria used by venture capitalist to evaluate new venture proposals." *Journal of Business Venturing*, vol. 2(2), p. 123-137.
- Manigart, S. (1994). "The founding rate of venture capital firms in three European countries (1970-1990)." *Journal of Business Venturing*, vol. 9(6), p. 525-541.
- Manigart, S. and C. Beuselinck (2001). "Supply of venture capital by European Governments." Working Paper, Universiteit Gent.
- Manigart, S., K. De Waele, M. Wright, K. Robbie, P. Desbrières, H. Sapienza and A. Beekman (2000). "Venture capitalists, investment appraisal and accounting information: a comparative study of the USA, UK, France, Belgium and Holland." *European Financial Management*, vol. 6(2), p. 389-403.
- Manigart, S., P. Desbrières, K. De Waele, M. Wright, K. Robbie, H. Sapienza and A. Beekman (2002a). "Determinants of required return in venture capital investments: A five country study." *Journal of Business Venturing*, vol. 17(4), p. 291-312.
- Manigart, S., A. Lockett, M. Meuleman, M. Wright and H. Landström (2002b). "Why do European venture capital companies syndicate?" Working Paper No. 2002/5. Lund University, Institute of Economic Research.
- Marti, J. and M. Balboa (2001). *The determinants of private equity fundraising in western Europe*. Social Science Research Network Working Paper, presented at the EFMA 2001 Lugano Meetings.
- Martin, R., C. Berndt, B. Klagge, P. Sunley and S. Herten (2003). "Regional venture capital policy: UK and Germany compared." *Anglo-German Foundation for the Study of Industrial Society*.
- Mason, C. and R. Harrison (2000). "Venture capital market complementarities: The links between business angels and venture capital funds in the United Kingdom." *Venture Capital: An International Journal of Entrepreneurial Finance*, vol. 2(3), p. 223-242.
- Mason, C. and R. Harrison (2004a). "Does investing in technology-based firms involve higher risk? An exploratory study of the performance of technology and non-technology investments by business angels." *Venture Capital: An International Journal of Entrepreneurial Finance*, vol. 6(4), p. 313-332.
- Mason, C. and R. Harrison (2004b). "Improving Access to Early Stage Venture Capital in Regional Economies: A New Approach to Investment Readiness." *Local Economy*, vol. 19(2), p. 159 - 173.

- Mayer, C., K. Schoors and Y. Yafeh (2003). "Sources of funds and investment activities of venture capital funds: Evidence from Germany, Israel, Japan and the UK." NBER Working Paper No. 9645. National Bureau of Economic Research.
- McCahery, J. and E. Vermeulen (2004). "Limited partnership reform in the United Kingdom: A competitive, venture capital oriented business form." European Business Organization Law Reviews, vol. 5. p. 61-85.
- Meggison, W. (2002). "Towards a global model of venture capital?" Journal of Applied Corporate Finance, forthcoming.
- Meggison, W. and K. Weiss (1991). "Venture capitalist certification in initial public offerings." Journal of Finance, vol. 46(3), p. 879-903.
- Murray, G. (1999). "Early-stage venture capital funds, scale economies and public support." Venture Capital: An International Journal of Entrepreneurial Finance, vol. 1(4), p. 351-384.
- Nowak, E., A. Knigge and D. Schmidt (2004). "On the performance of private equity investments: Does market timing matter?" Working paper, EFMA 2004 Basel Meetings Paper.
- NVCA (2004). "Private equity performance 2004." www.nvca.com.
- Porteba, J. (1989). "Venture capital and capital gains taxation". In Lawrence Summers (ed.) Tax Policy and the Economy. Cambridge: MIT Press.
- Powell, W., K. Koput, J. Bowie and L. Smith-Doerr (2002). "The spatial clustering of science and capital: Accounting for biotech firm-venture capital relationships." Regional Studies, vol. 36(3), p. 291-305.
- Quigley, J. and S. Woodward (2003). "An index for venture capital." Working Paper E03-333. Economics Department, University of California, Berkeley.
- Romain, A. and B. van Pottelsberghe de la Potterie (2004a). "The determinants of venture capital: A panel analysis of 16 OECD countries." Working Paper WP-CEB 04/015. Université Libre de Bruxelles.
- Romain, A. and B. van Pottelsberghe de la Potterie (2004b). "The economic impact of venture capital." Discussion Paper series 1. No. 18/2004. Studies of Economic Research Center.
- Rosenstein, J., A. Bruno, W. Bygrave and N. Tylor (1993). "The CEO, venture capitalists, and the board." Journal of Business Venturing, vol. 8(2), p. 99-113.
- Sahlman, W. (1990). "The structure and governance of venture capital organizations." Journal of Financial Economics, vol. 27(2), p. 473-521.
- Sapienza, H. (1992). "When do venture capitalists add value?" Journal of Business Venturing, vol. 7(1), p. 9-27.
- Sapienza, H., S. Manigart and W. Vermeir (1996). "Venture capitalist governance and value added in four countries." Journal of Business Venturing, vol. 11(6), p. 439-469.
- Schmidt, D. (2004). "Private equity-, stock- and mixed asset-portfolios: A bootstrap approach to determine performance characteristics, diversification benefits and optimal allocations." Working Paper No. 2004/12. CFS.
- Schneeweis, T. and J. Pescatore (1999). The handbook of alternative investment strategies: An investor's guide. Institutional Investor.
- Schwienbacher, A. (2002). "An empirical analysis of venture capital exits in Europe and in the United States." Working Paper, University of Amsterdam - Finance Group.
- Seppä, T. and M. Jääskeläinen (2002). "How the rich become richer in venture capital: Firm performance and position in syndication network." Frontiers of Entrepreneurship Research, 2002(XIII), Babson College.
- Shepherd, D., Z. Andrew and R. Baron (2003). "VCs' decision processes: Evidence suggesting more experience may not always be better." Journal of Business Venturing, vol. 18(3), p. 381-401.
- Sorenson, O. and T. Stuart (2001). "Syndication networks and the spatial distribution of venture capital investments." American Journal of Sociology, vol. 106(6), p. 1546-1588.
- Tannon, J. and R. Johnson (2005). "Transatlantic private equity: Beyond a trillion dollar force." Journal of Private Equity, vol. 8(3), p. 77-80.
- Woodward, S. and R. Hall (2004). "Benchmarking the returns to venture." NBER Working Paper No. W10202. National Bureau of Economic Research.
- Wright, M. and K. Robbie (1998). "Venture capital and private equity: A review and synthesis." Journal of Business Finance and Accounting, vol. 25(5-6), p. 521-569.

Zacharakis, A. and D. Shepherd (2001). "The nature of information and overconfidence on venture capitalists' decision making." Journal of Business Venturing, vol. 16(4), p. 311-332.

Author: Anna Söderblom
Stockholm School of Economics

Supervisor: Johan Wiklund
Jönköping International Business School

This document can be accessed online at www.sbs.gov.uk/analytical

Postal enquiries should be addressed to:
Analytical Unit, Small Business Service,
Level 1 St Mary's House, 9-11 London Road, Sheffield, S2 4LA

Email enquiries should be addressed to: research@sbs.gsi.gov.uk

The views expressed in this report are the authors' and do not necessarily reflect those of the Small Business Service or the Government.