

EIB SECTOR PAPERS

**FINANCING INNOVATIVE FIRMS THROUGH
VENTURE CAPITAL**



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EXECUTIVE SUMMARY

Venture capital is a specific type of finance well suited to the requirements of new technology based firms. The combination of research and development, intangible assets, negative earnings, uncertain prospects and absence of a proven track record, which are characteristic of start-up and pre-commercial initiatives, leads to an unacceptably high perception of risk for conventional financial institutions and debt financing. Venture capital addresses the consequent financing gap through equity participation.

Venture capital was conceived in 1946 in the US, but its growth only accelerated in the late 1970s. In Europe, venture capital only started in the 1980s. In the last two decades venture capital has grown to become a well-established sector with recognised conventions and practices, such as:

- Development of venture capital firms managing pools of capital predominantly structured as “limited partnership” venture capital funds with clear fees and incentives for the fund's performance;
- Specialisation of venture capital funds in terms of phase of company development and type of financing (seed, start-up, second-/third-stage, etc), sectoral and geographical focus, etc;
- Type of venture capital firm: run by private individuals (independent), subsidiary of a financial institution (captive), corporate entity (corporate venturing) or affiliated to public authority;
- Accepted principles for raising funds, assessing investment proposals (due diligence), monitoring (growing) the investments (investee companies) and planning the exits (investment realisation) from the early stages of an investment.

Venture capital can be seen to consist of a *demand* and a *supply cycle*. The former represents the demand for capital for the creation and growth of companies - by implication SMEs. The cycle starts with the necessity for seed capital, to fund an initial idea or basic research. It proceeds with the funding requirements of the successive stages of a company's growth, such as test marketing, product development, full-scale production through to final market rollout. The cycle closes with the exit, typically a private “trade sale” or “initial public offering” (IPO) on a stock market, and the reimbursement of the invested capital plus gains. Each stage is associated with a different level of risk during which the nascent SME requires sufficient and appropriate funding to sustain growth and avoid liquidity constraints, which may endanger its ultimate commercial success and access to conventional debt financing.

Similarly, venture capital firms can be viewed as representative of the *supply cycle*, starting with the creation of a venture capital fund, typically having a 10-year life span, raising the necessary funds from capital providers (investors) and marketing and investing the fund in “investee” initiatives and companies over the first 2-3 years. In subsequent years the fund managers play an active role in monitoring, advising and growing the value of investees so that in the later years of the fund's life, investments can be exited from successfully. The cycle renews itself with the venture capital firm launching a new fund.

In recent years venture capital has experienced phenomenal growth on both sides of the Atlantic: annual funds raised in the EU were close to EUR 25 billion in 1999 compared to just EUR 4.4 billion as recently as 1995; and in the US, EUR 45.5 billion and EUR 8.4 billion,

respectively. Data for the first semester of 2000 indicates that the dynamism of venture capital remains strong, in spite of the US and EU stock market corrections.

Any venture capital review must include a perspective of the US experience because of its historical lead-time and importance. The importance of US venture capital may be justified at least in part by lead-time (the longer period of growth). In addition, the comparison between the European and US venture capital market needs to be done on the basis of a harmonised definition of the notion of venture capital. EVCA, the European Private Equity and Venture Capital Association, defines venture capital as “*a subset of private equity investments made for the launch, early development or expansion of a business*” and private equity as “*equity capital to enterprises not quoted on a stock market*”. Frequently, EVCA’s overall figures for private equity in the EU tend to be quoted, without making a clear distinction of venture capital. Considering only investment in venture capital, the lag of EU compared to the US is yet starker.

The review of EU venture capital shows the following trends:

- a relatively high development in countries with an equity market culture, notably the UK and the Netherlands; a lesser development in France, Germany, Belgium and Sweden, though these are rapidly catching-up; and, a general lagging behind in the Southern countries;
- a potentially strong correlation between the development of venture capital and investment by pension and other institutional funds in venture capital;
- a tendency towards concentration of investment on later stages, particularly in the UK, probably driven by the perceived low(er) risk/high(er) return of private equity investments and the risk-averse nature of institutional funds; although, over the last three years, earlier stages in technology sectors have started coming into favour;
- contrary to the US, overall lower short-term returns on early- compared to later-stage investments, attributable to the associated higher risk profile, but a perceived convergence of the returns per stage in the longer-term;
- a progressive growth in the size of both venture capital funds and of individual investee deals, that could discriminate against the typically smaller investments of early stage technology sectors;
- also contrary to the US, a predominance of “trade sale”, as opposed to IPO, exit routes. However, IPOs are generally preferable on the one hand because of the expectations they create to investors for higher returns and, on the other, to investees management to retain greater independence, hence the incentive for investors to provide more capital and for investees management to perform.

The review largely confirms that venture capital, by stimulating the creation and growth of technology-based firms, helps translate the results of research and development into commercial outcomes. In doing so, it plays a catalytic role for innovation. Although further investigation is required, the perceived primary economic benefits of venture capital include:

- job creation, especially by companies in the initial start-up and early growth stages;
- creation of intellectual property and development of new technology applications;
- exports, driven by investees aiming to maximise sales;
- regional development, but mitigated by the risk of contributing to a clustering of technology activities and causing equity gaps and unbalanced development.

European national and EU policy makers have noticed the economic benefits attached to venture capital and have been further inspired by its expansion in the US and alleged impact

on US competitiveness. As a consequence, various policies have been introduced in recent years to boost the development of venture capital in Europe.

This study, in addition to reviewing venture capital in the EU and comparing it to the US experience, has considered the short, but impressive performance of venture capital in Israel. It has also looked at the characteristic needs of three typical technology sectors - biotechnology, information and communication technology (ICT), and audiovisual - to gain an understanding of the drivers behind the *demand* and *supply side cycles* referred to earlier and identify possible *market failures*.

On the *demand side*, factors affecting the expansion of venture capital include:

- **Fiscal:** reduction of capital gains tax, including attitude to stock options, which provides the underlying incentive for entrepreneurs to launch and expand companies;
- **Regulatory:**
 - labour market flexibility, which encourages the mobility of skilled people and allows start-ups to easily adapt their workforce to rapid changes of fortune and needs;
 - company law facilitating the creation of start-ups and removing the stigma associated with bankruptcy;
- **Infrastructure:** establishment of facilities, such as research centres, regional science and technology parks, and business incubator services, to encourage commercial applications from research output and to facilitate the interactions between entrepreneurs and venture capitalists;
- **Exits:** ensuring sufficient stock market liquidity through integrated European wide institutions with listing and reporting requirements well adapted to start-up needs, which encourage the preferred IPO exit route.
- **Cultural:** indirect measures, in particular education and training, to promote entrepreneurial spirit and risk-taking behaviour in the longer term;
- **Investee Management:**
 - to draw attention to and ensure funding for a robust business plan and revenue model is called for, based on real value-added of the product or service being offered and a clear path to profitability;
 - the investee's management team must prove “technical” excellence.

On the *supply side*, the following factors appear to drive venture capital:

- **Fiscal:** tax relief for private investors and business angels (experienced and wealthy individuals who directly invest in and advise start-ups) to encourage the channelling of capital to venture capital funds and individual initiatives;
- **Regulatory:**
 - measures to increase and diversify the supply of venture capital, such as the creation of state-sponsored venture capital funds and, similar to the US, the lifting of restrictions on pension funds to invest in venture capital which sparked its rapid growth in the 1980s;
 - measures to reinforce the protection of intellectual property rights (patents and copyrights), which, on the one hand, encourage investment in intangible assets - typical of technology sectors, and on the other, can help secure investment by providing collateral in the case of default;
- **Exits:**
 - stock market liquidity also has an impact on the supply side by the observed strong correlation between the public and private equity markets: a stock

market fall reduces the opportunities for successful IPOs and the subsequent recycling of available capital back into new venture capital funds;

- the reduction of liquidity may also generate a shortage of credit and lead to the bankruptcy of start-ups unable to finance their successive stages of growth.
- **Cultural:** promoting business angel networks and venture capital funds with adequate experience to facilitate investment in start-up and early stage technology sectors. There is more than circumstantial evidence that the best qualified fund managers are those who have themselves benefited from venture capital, also known as serial entrepreneurs;
- **Venture Capital Fund Management:**
 - thorough due diligence process of investees prior to investment, requiring fund managers to have specific technology expertise, to ensure a sectorally balanced supply of capital and avoid any “herding” behaviour where investment decisions mimic market trends rather than add value - as experienced in the recent past with the “dotcom bubble” to the detriment of biotechnology investments;
 - thorough monitoring of investees, requiring fund managers to provide commercial and managerial support, as well as to supply successive capital infusions adapted to the growth pattern characteristic of each sector and to the specific type of product or service under development;
 - congruence of the exit route and the characteristics of the investee's assets, including “platform building” to achieve critical mass and accelerate exit.

It is clear that the *demand* and *supply cycles* closely mirror each other in certain factors, notably stock market liquidity, which affect both. However, this approach may conceptually help focus actions addressing the perceived *market failures* along the following recommended lines:

1. support the balanced development of venture capital throughout the EU, primarily in the regional, sectoral and funding stage areas which have attracted less attention to date;
2. ensure any action is tailored to the targeted region's capacity and maturity of its financial market; similarly, ensure any action addressing a sector or funding stage is matched to well-identified market needs and does not reinforce herding behaviour;
3. the foregoing implies the selective support of venture capital firms with a proven track record and of (new) firms with a convincing capacity for investee due diligence and monitoring requiring sectoral, commercial and managerial expertise in the target areas;
4. encourage the debate for fiscal and regulatory reforms conducive to the development of venture capital; and, ensure public incentives are targeted and measures, such as state-sponsored venture capital funds, are short term and avoid “crowding-out” private enterprise;
5. back actions aiming at the diversity and liquidity of exit mechanisms, especially in periods of stock market slack, and encourage IPOs whenever appropriate.

The following topics could usefully be further investigated to provide a more complete understanding of EU venture capital:

- impact of venture capital on regional development and competitiveness;
- role of national and EU policies on the development of venture capital;
- analysis of the organisation of EU venture capital firms and comparison to successful US firms.

1. INTRODUCTION

Finance for innovation may come from the public sector, bank debt or from private equity finance sources. Which of these three is appropriate to a specific case depends on a number of factors.

For example, since the private sector may face difficulties in securing the full benefits from investments in basic research because of the need to publish, hence disseminate, the results, there is a tendency for underinvestment. Basic research, which constitutes up to 30% of overall R&D expenditure in certain OECD countries is, therefore, probably better funded by the public sector. However, as an idea, discovery or invention, emerges from the domain of basic research, it will require funding to progress through the successive R&D stages towards applied research and ultimately development to test its potential commercial viability. As the idea progresses, it becomes increasingly amenable to funding by the private sector because of the possibility to secure by patents the results of R&D and of developed processes and products.

Large, private sector corporates will typically dedicate a proportion of their annual sales revenue to R&D. The proportion will vary by the technology content of the sector the corporate is active in, from around 3% for low technology sectors (food, paper, textiles) through 6-8% for medium technology sectors (manufacturing, chemicals, professional goods) to up to 20% for high-technology sectors (information and communication technologies (ICT), aerospace, pharmaceuticals). In absolute terms this amounts to sizeable funding with leading pharmaceutical and ICT firms having annual R&D budgets of around EUR 2 bn or more.

Small- and medium-sized enterprises (SMEs) will typically invest much less, if at all, in R&D proportionately given limited human and financial resources. However, a fraction of SMEs, estimated at around 2%, essentially active in the high-technology sectors is a major source of innovation. The existence of such SMEs already was recognised in the 1970s which, devoid of the stifling influence that occasionally characterises large corporates, contributed to the emergence and rapid development of the microprocessor and biotechnology industries in the US. As a consequence, these companies were dubbed new technology based firms (NTBFs). But NTBFs, similar to many SMEs, constitute a class of company, which, in Europe at least, has difficulty in raising finance.

Capital markets are normally the preserve of quoted companies and large corporates, given the costs and information disclosure procedures involved. Therefore, banks have traditionally been the main vehicle for funding SMEs, with insurance companies and institutional investors playing a lesser role. However, SMEs often stand outside the parameters of what lenders might perceive as orthodox risk. Given that SMEs are likely to seek funds for expansion, they are probably less able to cope with the heavy initial debt burdens, a problem compounded by the fact that these frequently carry comparatively high interest rates in order to reflect lenders' perceptions of greater risk levels. In addition, smaller firms have difficulty finding the required levels of security demanded. It is easily concluded that if these lenders occasionally are unable to provide adequate, in particular long-term, funding for SMEs, they are even less likely to be the appropriate source of funding for NTBFs and smaller initiatives at the interface of R&D and commercial enterprises. The combination of technological innovation and absence of proven track record simply results in an unacceptably high perception of risk. Venture capitalists finance these high-risk, potentially high-reward projects, purchasing equity stakes while the firms are still privately held.

The opportunity to address this funding gap was realised in the US as early as in the immediate post World War II years, when the first venture capital operations started. It is also during this period that the Industrial and Commercial Finance Corporation (ICFC) was set-up in the UK, the precursor of what became 3i in 1983¹. Venture capital has grown on both sides of the Atlantic, though much of the European venture capital industry was formed during a period of rapid growth commencing at the beginning of the 1980s. In spite of a hiatus attributable to the recession in the early 1990s, the growth

¹Coopey R. and Clarke D. (1995).

of venture capital has largely paced the development of the microprocessor and biotechnology industries over the last two decades. As a consequence, venture capital has become closely associated with the high-technology sectors and is often seen as a cornerstone of innovation.

2. Venture capital funds

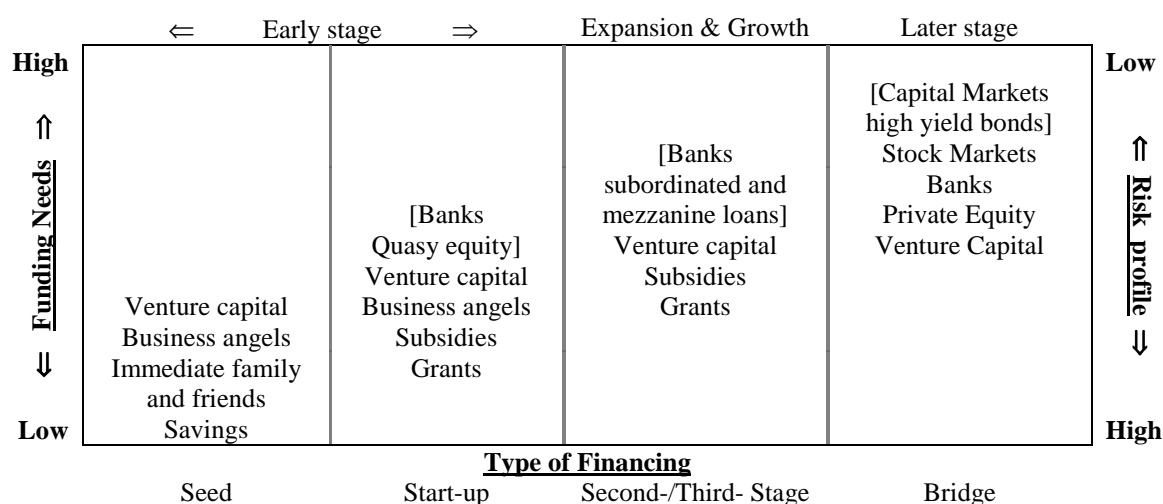
2.1 Introduction

In the early days of venture capital, the perception was of high net worth individuals stepping in to provide the capital required for developing an idea, discovery or invention of a person who would either have insufficient own funds or banks would consider unacceptably risky to support. In fact, venture capital is still frequently referred to as risk capital. However, as venture capital operations grew they became more formalised and venture capital firms managing pools of capital or “venture capital funds” organised as partnerships were created. Over the years, the more generic term of “private equity investing” was coined to encompass a wide range of transactions relating to investments in companies providing high return opportunities.

In 1983, the European Venture Capital Association was established, since then having been renamed the European Private Equity and Venture Capital Association (EVCA). The definition EVCA accords to **private equity** operations is of funds used to provide “equity capital to enterprises not quoted on a stock market”. It goes on to explain that private equity can be used to develop new products and technologies, to expand working capital, to make acquisitions or to strengthen a company's balance sheet. Private equity can also resolve ownership and management issues – a succession in family-owned companies, or the buyout or buyin of a business by experienced managers may be achieved using private equity funding. EVCA defines **venture capital** as “a subset of private equity investments made for the launch, early development, or expansion of a business”².

Figure 1 illustrates the successive phases of a business from its genesis and as it grows until it is floated on a stock market and becomes a fully fledged publicly owned (quoted) company. It also qualitatively indicates the level of funding needs and the degree of volatility at each phase, the type of financing and the most likely source of finance³. The EVCA and NVCA⁴ definitions of the successive phases and type of financing are provided in Appendix 3.

Figure 1: Company Development Phases



Source: Adapted from Mackewicz & Partner

² EVCA 1999 Yearbook

³ see also Berger A. and Udell G. (1998)

⁴ The National Venture Capital Association (US equivalent of EVCA)

As indicated in Figure 1, venture capital is perceived to play a leading role in the early and expansion stages of a company's development, with its importance tailing off in the later stages where private equity and other forms of funding will progressively gain in importance. Currently, venture capital firms are the dominant vehicle for the provision of seed and start-up finance, but individuals, known as “business angels”⁵, continue to play a significant role by mentoring and providing base capital, especially in the early stages of a company's life cycle. Business angels are wealthy individuals who invest in entrepreneurial firms. Although angels perform many of the same functions as venture capitalists, they invest their own capital rather than that of institutional and other individual investors. This capital can complement venture capital investment by providing smaller amount of finance at an earlier stage than most venture capital firms are able to invest.

2.2 The role of venture capital

A person with an idea, discovery or invention – the budding entrepreneur – will first commit his savings to test his concept. Failing this, or when extra funding is required, he will turn to his immediate family and friends with a request for financial support. However, funding needs are likely to rapidly exceed the entrepreneur's own and immediate entourage resources, especially if his concept proves worthy of further development. This is the phase where **seed finance** is required.

Seed finance from a venture capital fund or a business angel might typically be in the range of up to a couple of hundred thousand euros to support the development of an innovation. The entrepreneur will use the funds to prove and develop his concept, to research the market potential and to prepare a business plan. If successful, the entrepreneur will also have to start building a management team, probably with the assistance of the capital provider. This is important because the entrepreneur – possibly a scientist or engineer – is unlikely to have the marketing, financial and other managerial skills necessary to bridge the forthcoming “commercialisation gap”.

The nascent company will require more capital to prepare for and initiate commercial operations. By this phase the company will have completed market studies, assembled the key management, developed a business plan and be ready to do business. However, in the absence of any sales revenue, let alone profits, the company will be relying upon **start-up and early-stage finance** to progress.

Start-up and early-stage finance can range up to several million euros. In the absence of a track record by which to judge the company, the venture capital fund in deciding whether to provide capital will rely on its perception of the company's ultimate success and, therefore, on the thoroughness of the business plan and the experience and robustness of the company's management. The venture capital fund will seek to protect its investment, usually provided in the form of an equity participation in the company, by imposing certain conditions, such as vetting or appointing key management and being represented on the company's board.

As the company expands, its needs for capital will commensurately grow. Capital may be required to increase production capacity, develop products and markets or to provide additional working capital. By this stage, the company will have sales revenue and probably will be generating a profit, which, however, may be insufficient to fund its expansion. It may, therefore, revert to its capital provider for **second-/third-stage finance**.

Depending on the sector of the company's activity and its phase of development, second-/ third-stage finance may range well above ten million euros. By now, the company will have a track record to assist the venture capital fund in deciding whether to provide capital. However, largely the same criteria and conditions for providing start-up and early-stage finance would apply. Additionally, the venture capital fund is likely to limit its exposure to a particular company by syndicating its investment with other funds.

Ultimately, a successful company will reach a development phase when it will be ready for an initial public offering (IPO) on a stock market and become a fully fledged public (quoted) company. Depending on the sector, IPOs are made before the company is profitable, like in the biotechnology

⁵ For a comprehensive analysis of business angels, namely the different behaviour of business angels and venture capitalists in financing entrepreneurship, see van Osnabrugge and Robinson (1999a) and European Commission (2000a).

sector. Alternatively, it may require a restructuring of major shareholder positions, such as early investors wishing to reduce or liquidate their positions, or new management might wish to buyout existing management, former relatives, associates, etc. At this later stage the company, to accomplish any of the foregoing transactions, is likely to require **bridge finance**.

Similar to second-/third-stage, bridge finance may involve considerably sums of capital. The company is likely to be known and have a discernible risk profile for the venture capital firm to assess its capital contribution. However, transactions at this phase of a company's development are already moving beyond the more conventional understanding of **venture capital** operations and are better classed under the category of **private equity** investments.

The inherent risks of entrepreneurial start-up firms decreases as these ventures grow as described in the Table 1.

Table 1: Stage of investments and associated risks

<i>Start-up and early-stage investment characteristics</i>	<i>Later-stage and MBO characteristics</i>
<ul style="list-style-type: none"> • An idea • No income, only uncertain costs • Customers and competitors unclear • Commonly high-technology • One person or team with “vision” • Complex due diligence • Pricing very difficult • “Hands-on critical” • Illiquidity • Research & monitoring costs/deal size ratio high • Historically poor rates of return in Europe • More investments needed to spread fund risk • Smaller deal sizes so more investment needed to invest total VC fund • Long-term investment horizon • Outright failure frequent 	<ul style="list-style-type: none"> • Established business • Predictable cash flow • Customers and competitors known • Proven technology • More experienced management team • Due diligence • Pricing possible • “Hands-off” venture capital style • Potential liquidity • Research & monitoring costs/deal size ratio low • Historically favourable rates of return in Europe • Fewer investments needed to spread fund risk • Larger deal sizes so fewer investment needed to invest total VC fund • Short-term investment horizon • Outright failure rare

Based on Van Osnabrugge and Robinson (1999b)

As indicated in Table 1, the risk profile of the various stages is different. It is apparent that venture capital funds and business angels are instrumental in helping entrepreneurs realise their concepts and in creating and developing companies. This is especially true of cases which either because of a concept's lack of maturity, or of a company's critical development phase or targeted sector, may represent an unacceptable risk for a bank to lend. The venture capitalists need to have a sufficient expertise in high-technology sectors to be able to back start-ups. In supporting an early-stage investment a venture capital fund will accept the risk and intervene by taking an equity participation, thus becoming part-owner of the concept or company. In so doing, the venture capital fund agrees to no security for its investment and demands no interest payments, instead it expects to achieve a return on its investment by the concept's or company's eventual success and the consequent growth of the capital invested.

From the entrepreneur or company's side, it must accept a loss of control proportional to the venture capital fund's voting participation. Normally this will not exceed 30% as it might stifle initiative, but the venture capital fund usually will impose conditions to take control in certain circumstances. Additionally, the gains in the value of the concept or company, when realised, will have to be proportionately shared and a company will have to concede representation of the venture capital fund on its board. On the positive side, the entrepreneur or company will benefit from professional input in key marketing, financial and other managerial support, as well as from the strict financial discipline which the venture capital fund will demand to keep track of its investment's performance.

2.3 Type of venture capital firms

Venture capital firms or venture organisation typically raise their capital not on a continual basis but rather through periodic funds. Venture capital firms have to main relationship with investors who provide them with capital. VC firms can be “independent”, run by teams of private individuals, or can be “captive”⁶, a subsidiary of a financial institution, such as a bank or insurance company, or of other corporate entities making investments on behalf of the parent group, its clients, as well as external investors. Independent venture capital firms raise capital from various outside sources, normally institutional sources, on a competitive basis. As a consequence, the financial inflows might be more dependent upon their success, making it essential for independent venture capital firms to obtain superior investment returns to signal their competence. It could affect their investment strategy, making them more prone to invest in later-stage firms in order to avoid making too many high-risk technology investments and to have an acceptable risk diversification. While high-technology investments are especially unattractive to risk-averse investors (even if they can offer high-return with a long-term horizon), more secure non-technology intensive investments may offer better returns in a short-term horizon.

Special types of venture capital firms are those affiliated to government, local authorities or other state enterprises having a mission to promote particular policies, such as innovation, regional development, employment etc. The venture capital firms would contribute to the implementation of these policies by supporting specific initiatives and the creation of companies in the sector or region of interest.

Corporate venturing is still another type of venture capital operation, where the venture capital firm, a subsidiary of a corporate, seeks to invest in technologies or companies perceived to help the corporate fulfil its strategic objectives. In corporate venturing, the criteria for investment are primarily driven by the aim to keep in touch and potentially influence technological development or obtain operational synergies, rather than to maximise direct investment returns.

Firms managing venture capital funds can range from the single person business angel up to teams of a varying, but typically restricted number of investment managers – rarely exceeding 10 and more frequently around 5 or less. Evidently, the investment managers will be assisted by analysts and support staff that may double or triple the overall complement of a firm, which, however, would still be a lean organisation preserving the business flair of the senior managers.

Firms also differ by the number of funds and amount of capital under management, although this is likely to be a function of the time a firm has been in existence. A firm will typically raise a first fund of EUR 50 – 100 m and, once this has been invested perhaps over a 2-3 year period, the firm will consider raising a larger amount of capital for a second fund. This recently created firm will have a few tens of millions of euros under management in one or two funds, whereas longer established firms will possibly have over a billion euros invested in several funds.

The degree of focus of a venture capital firm will vary according to its investment strategy. Some firms may be generalist, investing in different sectors, company development phases and geographical regions. Alternatively, others will be selective and focus their investments on specific industry sectors, such as high technology; company development phases, such as early stage; and, geographical regions, frequently limiting their investments to an area that is accessible within a day's travel from the firm's base. Additionally, firms may change their investment strategy focus from one fund to another under their management.

A common feature of venture capital firms and, in particular, of investment managers is the active interest they must take in their investments to maximise the likelihood of success and the consequent return on their investment. This is needed throughout the life cycle of an investment and should aim at providing the necessary professional input, advice and guidance to add value and grow the concept or company they have invested in. Venture capital firms with a focus on seed and start-up financing are perceived to have a key role to play in transferring their experience and providing managerial support.

⁶ An hybrid form of the two types of venture capital firms are the semi-captive firms, which invest for a parent firm and raise outside institutional funds.

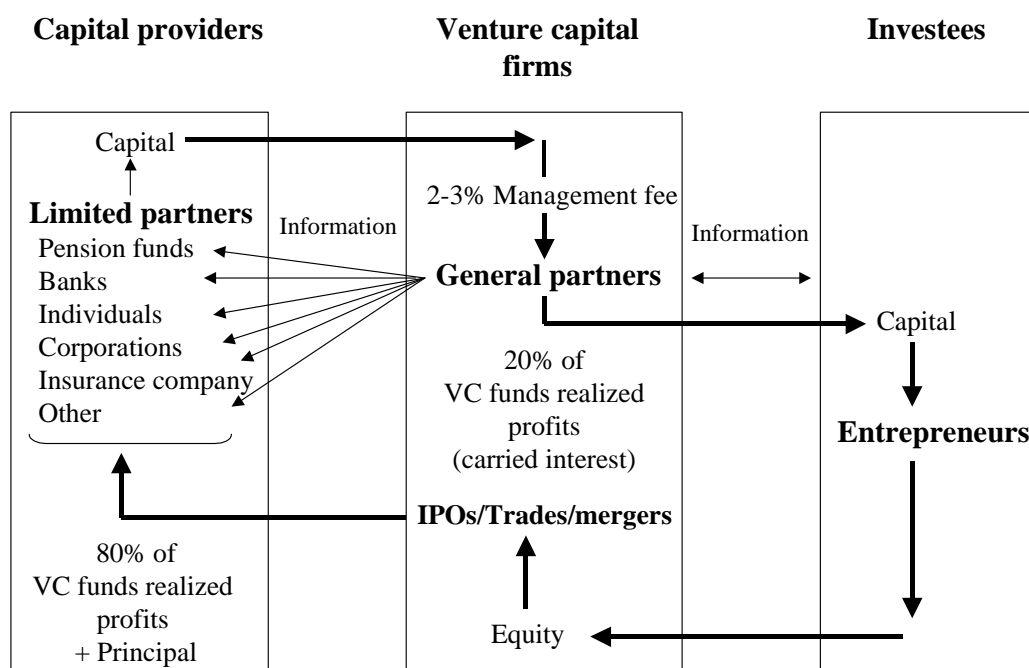
2.4 Structure of venture capital funds

Venture capitalist will raise capital from a number of investors and in turn invest it through a fund most likely structured as a “limited partnership”. In this structure, investors, “the partners”, subscribe to the fund and commit to advance up to a certain amount during the fund's lifetime. The venture capital firm or a team of investment managers will be the fund manager, referred to as “the general partner”. The fund manager will draw down the capital the investors have committed as needed to make investments and cover costs, expenses and its own management fees. A fund will typically take 2-3 years to be fully drawn down and to make 10 – 20 investments (deals). A fund's life is limited usually to 10 years, in which time the manager must have realised (exited) all investments, with the possibility of extending the fund's life by 2-3 years if the majority of partners agree.

In the above structure, capital is not held by the fund manager. It is immediately invested after drawdown and when returns on investments are realised, such as from dividends or sales, these are distributed to the investors. In this respect the fund is “self-liquidating”. Alternative structures, such as “evergreen” funds, where proceeds are held by the fund manager and reinvested, and “parallel” investment arrangements, where the fund manager makes investments on behalf of investors directly in underlying companies, as well as a multitude of others exist to meet varying investors' needs.

However, most funds will be adaptations of the following simple fund structure:⁷

Figure 2: Venture capital funds structure



The structure of a venture capital limited partnership reflects the existing contractual mechanisms (compensation, covenants and restrictions) required to align the incentives of the venture capitalists with those of the investors. A venture capital firm in structuring a fund will aim to make it attractive to investors by addressing their needs and concerns:

- limit the liability of investors to the amount of their investment, as they will not have any active involvement in the management of the investments;
- avoid a “double charge” of taxation - once when returns on investments are realised by the fund and a second time when the investors receive the proceeds of their investment from the fund;
- ensure efficiency of administrative costs, management fees and incentives;

⁷ Bygrave W. D., Hay M. and J. B. Peeters (1999).

- make the fund suitable to investor entities of a broad range of jurisdiction - financial institutions, corporates, private individuals, etc - and countries of origin;
- aim for simplicity of administration to the extent that it is consistent with the foregoing aims.

In setting-up a fund, a venture capital firm will define the applicable principal terms and conditions including:

- the management fee, rarely exceeding 2.5% of committed capital and normally less for large funds. The management fee is paid on a quarterly basis and normally reduces after the drawdown period (see next item) in function of the amount invested and also tapers with the progress of a fund's life as investments are realised and distributed to the investors;
- the drawdown period usually extends to five years with a percentage of commitments, typically around 20%, retained for later drawdowns to finance the second-/third-stage expansion and growth of the original investee companies. Frequently there are provisions for reinvesting realisations made in less than a year, though such short realisations are more typical of funds having a focus on later stage, bridge finance deals;
- the expenses for setting-up the fund (e.g. legal costs), around 1% of the committed capital, and subsequent running expenses (e.g. custodian and audit costs, production costs of annual reports and meetings of investors, costs of any specialist external consultants, etc.). However, there is increasing pressure by investors to limit the costs borne by the fund and ensure these are covered by the management fee;
- the incentive, or “carried interest” (carry), for the fund management team to maximise the fund's performance and remuneration for the team's responsibility and expertise in managing the investment. The carry corresponds to a share, typically 15 – 20%, of the fund's realised profit and is usually paid after the investors have recovered their initial investment and achieved a predetermined “preferred return”, representing a “performance hurdle”. There are many variations in the structure and calculation of carry (e.g. it can be applied on a “fund as whole” or on a “deal-by-deal” basis; it can be stepped, so that the fund manager's share increases with the return the investors obtained; it can be subject to “catch-up”, whereby first the investors achieve their return and then the fund manager catches-up with its carry, etc.). Additionally, to avoid dilution of the incentive, investors frequently require that the carry predominantly benefits the individual members of the fund management team, as opposed to the venture capital firm;
- the changes, including termination, of the fund management team is usually allowed for by a majority, usually above 70%, voting of the investors with corresponding compensation of the team, in case of absence of negligence or disregard of duties, or limitation of carry, in case of departure of part of the team.

2.5 Operation of venture capital funds

The operation of a venture capital fund can be viewed as a “cycle”⁸. The cycle starts with the “fund raising” process; proceeds through the investment in, monitoring of, and adding value to firms; and concludes as the management team exits successful deals (see section 2.6) and returns capital to their investors. The cycle renews itself with the management team raising of a new fund.

The “fund raising” process may take up several months during which the management team seeks commitments from investors. To do this the management team prepares an Information Memorandum, which, in addition to the principal terms and conditions outlined above, will provide information on:

- the fund's investment strategy, focus (stage, sector, geographical region, etc) and rationale;
- the target size of the fund and its minimum size for first closure, with respective closing dates;
- the “market” of potential investee companies and the proposed “marketing” strategy to generate “deal-flow”;

⁸ See Gompers and Lerner (1999, 2000)

- the management team's experience and capacity to assess the proposed deals – to perform the required “due diligence”;
- the decision-making process to ensure the fund is soundly invested;
- the expected number, individual size and relative importance to the size of the fund of the deals;
- the management team's attitude to investee companies (e.g. hands-on management, board participation, etc) and ability to add value, grow the companies over a period of time and realise the investments (“exit”);
- the reporting to investors (annual reports, meetings...) and the envisaged investor relation committees and advisory board.

Already during the fund raising process, the management team will have started “marketing the fund” to identify and attract investment opportunities. Established venture capital firms and teams, with funds under management, may regularly be receiving requests from earlier contacts and require less active marketing. Depending on the focus and investment strategy of the venture capital firm, the contacts may be oriented towards academia and R&D foundations (seed and start-up financing). Otherwise, contacts would be in the area of conventional financial institutions (growth and later stage). In any case, the venture capital firm will seek to expand continuously its network of contacts, also by relying on the due diligence of previous and current deals. Of course marketing through contacts will be supplemented by normal advertising of the fund in the specialist press and by participation and presentations in conferences and fairs.

With the fund closed and marketing under way, deals will start flowing to the management team for assessment and, depending on the outcome of the “due diligence”, possible financing. Figure 3 summarises the investment process of an European venture capital firm established in 1982 with, currently, four funds under management representing a total amount of EUR 726 M.

Figure 3: Investment process / “Due diligence”

Stage	New Request	Active Request	Project	Approved Investment
No. / year	300	100	30	10
Time to respond	< 5 days	< 14 days	1 – 2 months	2 weeks
Actions	first analysis; initial issue identification	visit to company and management; issue identification; initial upside analysis	in depth company analysis; market/technology; upside factors; syndication	term sheet; contracts
Outcome	Fact Sheet	Project Proposal	Investment Proposal	Deal

Source: Gilde Investment Management

As indicated in Figure 3, “deal-flow” can require investment managers to screen numerous proposals every week. Screening is normally a desk review by the investment manager of the entrepreneur's or prospective investee company's proposal, usually in the form of a business plan, and the investment manager's judgement of the proposal's potential for success (market, technology, originality...). Should the proposal retain the investment manager's interest, he will perform a more detailed assessment of the proposal by meeting the investee's management, seeking references and carrying out added research to gain an overall deeper understanding of the proposal. At this stage the manager or fund will probably have to sign a confidentiality letter. If the outcome of this more detailed assessment is still positive, an understanding will be reached with the investee for an eventual financing subject to a full assessment, or “due diligence”, of the proposal.

During the due diligence process, the investment manager will fully test the viability of the proposal, possibly with the help of external consultants. For example, in the case of a seed or start-up proposal in a high technology sector, the investment manager is likely to have recourse to external experts from universities, patent agents, market research consultants, etc.

As management is probably the single most important element for the success of a proposal, due diligence will strongly focus on the inherent management skills of the investee. In the absence of the requisite skills, the investment manager will sound the receptiveness of the investee to the fund providing the technical, marketing and financial input, as necessary, either directly or by recruiting appropriately skilled and motivated individuals. At this stage the investment manager will need to consider the appropriate incentives, security and exit rights of the investee's management, as well as the fund's representation on the investee's board, possible veto rights etc.

Due diligence will also involve extensively reviewing, frequently to the extent of rewriting, the business plan, in cooperation with the investee. The required initial, as well as subsequent, injections of capital will be estimated in order to cover R&D, operational costs and other capital outlays throughout its critical development phases until the investee can reasonably expect revenues and become viable.

At this stage the investment manager will attempt a valuation of the investee. In the absence of a track record, such as with established companies with revenues allowing a valuation on, say, price/earnings (p/e) ratio, an alternative valuation method relevant to the investee's sector will be used e.g. in high-growth technology sectors valuation is usually based on a multiple of forecast sales. The investment manager will also estimate the appropriate initial, likely second and possibly third round of investment the fund will need to make to ensure the investee's funding needs. Should the required investment exceed the fund's terms and conditions for individual deals, the investment manager will seek to syndicate the deal with other funds. Finally, the investment manager will estimate the expected IRR of the investment and relative risk/reward of the deal. Generally, the earlier the stage of the investee the higher the expected return:

Table 2: Target-returns by investment stages

<i>Investee Development Phase</i>	<i>Expected Return (% p.a.)</i>
Early Stage (seed / start-up)	IRR > 60
Early stage (first-stage)	IRR > 50
Expansion & Growth (second-/third-stage)	40 > IRR > 35
Later Stage (bridge, MBO/MBI)	IRR > 30

Source: Bygrave W. D., Hay M. and J. B. Peeters (1999)

The due diligence process is frequently performed as a team effort with more than one of a fund's investment managers meeting and interviewing the entrepreneur or prospective investee company's managers. This is because a positive outcome of the more formal due diligence aspects provides only limited comfort for the eventual success of a proposed deal, which ultimately rests on the entrepreneurial capacity, flair and management capability of the investee.

Evidently, the successive due diligence stages will involve an increasing commitment of human and financial resources by the fund without any certainty of a positive outcome and structuring of a deal. A venture capital firm will, therefore, have an internal process to approve the progress of due diligence from one to the next stage, as illustrated in the table on the previous page. In the case of firms consisting of 2-3 investment managers, unanimity will normally be required. Larger firms will have a board of senior managers whose approval would be sought in the latter and more costly due diligence stages.

Following a positive outcome of the due diligence and the internal approval of a deal, the venture capital firm will issue a “term sheet” setting out its terms and conditions to the investee – form and amount of capital injection; management changes; management incentives; board representation; veto rights; reporting and approval of budget; control over the exit process; etc. The investee will be given a fixed time within which to respond to the offer. The venture capital firm will be unlikely to (re)negotiate with the investee at this final stage because all issues should have been exhaustively addressed and resolved during the due diligence. In fact, difficult and potentially conflictual issues should have been addressed as early as possible in the due diligence to avoid later tensions and save time and costs. Provided the venture capital firm's term sheet is accepted, legal documentation is drawn up, signed and the deal is concluded.

After conclusion of a deal and depending on the venture capital firm's declared attitude to investees in the Information Memorandum, it will adopt a “hands-on” or “hands-off” approach. Generally, the earlier the development phase of the investee, the greater the interest and involvement of the investment manager. This is because an investee in the earlier development phases is more likely to lack sufficient managerial experience and business flair. In fact, in accepting to share its ownership with the venture capital firm the investee frequently does so with the expectation that the investment capital firm will provide assistance and help cover managerial deficiencies as well as needs for capital. Additionally, an investee in the earlier development phases will invariably represent a higher risk profile because of the potential managerial deficiencies than an established one in its expansion or later phase, hence the greater involvement of the investment manager will reflect his interest to protect the investment.

In monitoring the investee, the investment manager will weigh the potential agency⁹ and monitoring costs and re-evaluate the justification and frequency of successive rounds of capital infusion (cf. 2nd-3rd stage financing). Re-evaluations are potential cause of conflict between investment manager the entrepreneur as they are tied to the nature of the investees assets, the level of R&D, marketing and other expenditures – collectively known as “burn rate”. More tangible assets offer the investment manager a higher likelihood of capital recovery in case of liquidation, and may reduce the need for monitoring and frequency of capital infusion.

2.6 Exit routes

In the cycle of venture capital, successful exits are critical to ensuring attractive returns for investors, and in turn, to raising additional capital. Indeed, a crucial element of limited partnership agreement in venture capital is the contractual mechanism to end the partnership and repay the limited partners within a specified period of time.

Various exit routes are available:

- Trade sales;
- Initial Public Offerings (IPO)¹⁰;
- Share buy backs;
- Mergers;
- Platform building.

A trade sale is one of the most common exit routes in Europe. Trade sale appears relatively attractive for both the limited and general partners since it provides payment in cash or marketable securities and ends the partnership's involvement with the firm. Compared to IPO, trade sales are viewed as quicker and cheaper. Large companies, particularly those with mature products and steady cash flows, are more interested in buying profitable start-ups rather than building up businesses from nothing. Indeed, starting new entities is expensive, especially if the management uses equity to fund the start-up, and

⁹ Two major agency costs have been identified when dealing with entrepreneurial firms (Gompers and Lerner, 2000). First, entrepreneurs might decide to invest in strategies, research or projects providing high personal benefits but low expected returns to investors. For instance, in the biotechnology sector, entrepreneurs may invest in research bringing them recognition from the scientific community but little prospects of returns for the venture capitalist. Second, since entrepreneurs equity stakes are essentially under the form of call options, they have incentives to pursue highly volatile strategies, such as rushing a product to a market when further testing may be warranted.

¹⁰ The impact of an IPO market of the development of the venture capital market is addressed in section 4.1.

more risky. As a consequence, the acquisition of a start-up could be a viable strategy for several reasons: (i) acquiring people, skills or intellectual property (particularly in the high-technology sectors); (ii) ability to integrate the start-up into other operations; (iii) desire to inject new life into the business through different management, investment or processes; (iv) a competitor desiring to increase market share and gain critical mass; (v) customers wishing to move upstream in the supply chain to ensure supply and reduce costs; and (vi) suppliers moving downstream wishing to control market share.

This exit route presents an important disadvantage for the company's management since it will lose its independence when being acquired by or merged with a larger company. Agreement could be implemented to ensure that the entrepreneur will stay in the firm after the sale of the shares, leading to an adjustment in the share price. Even if trade sale is the only available exit route for a lot of small firms, the lack of trade buyers in some countries may affect the process.

Trade sale is usually the sale of a business to an industrial purchaser or alternatively to a financial buyer. The following advantages have been identified¹¹. A trade sale is perceived to offer the advantage of refinancing at the end of a closed end fund by a new investor whilst also providing an independent valuation. Additionally, it allows the investee's management to stay in when an IPO is not an option and enables a business to re-leverage.

Platform building is a strategy of putting together start-ups active in the same sector in order to achieve a critical mass of assets.

An Initial Public Offering (IPO) occurs when a security is sold to the general public for the first time, with the expectation that a liquid market will develop¹². If a young company prospers and needs additional equity capital, it could be desirable to "go public" by selling stock to a large number of diversified investors. Once the stock is publicly traded, this enhanced liquidity allows the company to raise capital on more favourable terms than if it had to compensate investors for the lack of liquidity associated with a privately-held company.

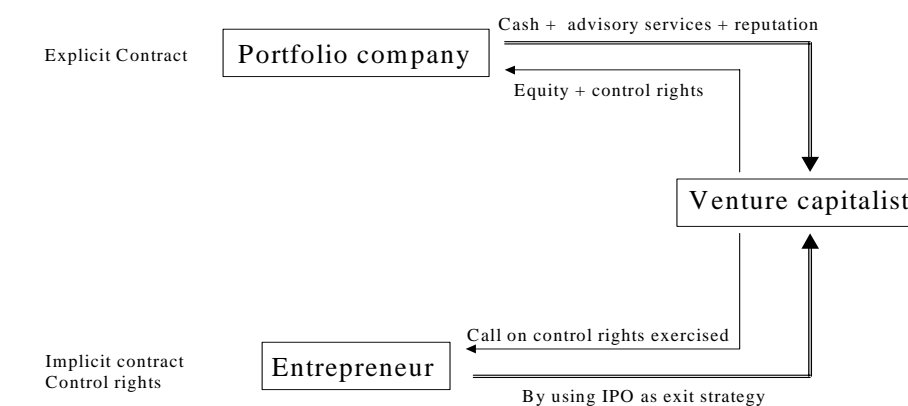
This exit route is often the preferred one since generally, it results in the highest valuation of the firm while preserving the independence of the firm's management. Some costs are also associated with the IPO. Ongoing costs are associated with the need to supply information on a regular basis to investors and regulators for publicly-traded firms. Additional direct and indirect on-time costs have also to be taken into consideration: (i) direct costs including the legal, auditing and underwriting fees, and (ii) indirect costs corresponding to the management time and effort devoted to conducting the offering and to the dilution associated with selling shares at an offering price, on average, below the price prevailing in the market shortly after the IPO.

The potential to exit through an IPO allows the entrepreneur and the venture capital fund to enter into a self-enforcing implicit contract over control, in which the venture capital fund agrees to return control to a successful entrepreneur by exiting through an IPO, assuming that the entrepreneur retains control on a sufficient block of shares.

¹¹ Wall J. and Smith J. (1999).

¹² Ritter J. (1997).

The process is described in the following figure:

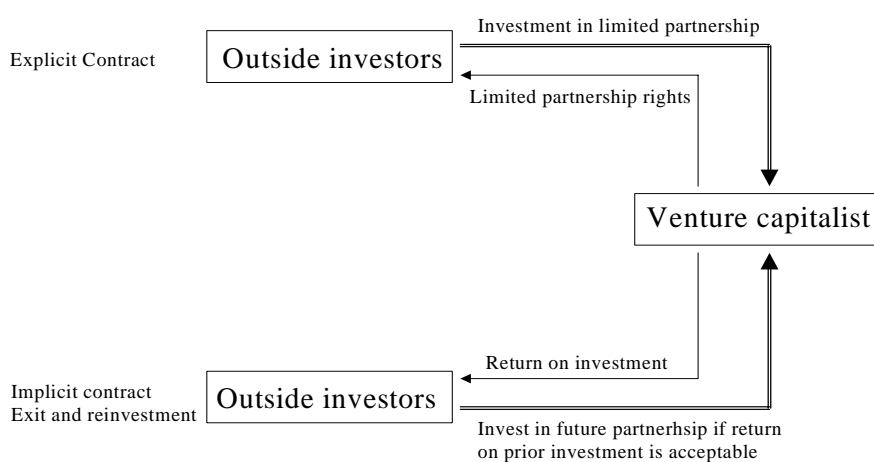


Source: Black and Gilson (1998)

Through the IPO, the venture capitalist's percentage stake is reduced and the public firm is no longer depending on staged funding by the venture capitalists. The IPO reduces the liquidity constraints of the entrepreneur and the stock market reduces the need for intensive monitoring by the venture capitalist. Finally, the explicit contract between the venture capitalist and the portfolio company ensures that important control rights that were initially given to the fund disappears on an IPO whether or no the fund sells any shares.

In other words, the IPO-exit mechanism provides the entrepreneur with a call option on control, contingent on the firm's success, increasing its incentive to increase the value of the firm. This implicit contract cannot readily be duplicated in a bank-centred capital market like in Germany or France. An option in a bank-centred system is to have recourse to trade sales-exit with the risk of unattractive valuation, providing at least a transparent mechanism for the entrepreneur.

The exit mechanism is also crucial in the relationship between the venture capitalist and the providers of capital. To evaluate the skill of venture capital funds and the profitability of venture capital relative to other investments, the investors will use the exit performance as a benchmark¹³. This situation can adversely affect the IPO timing decisions of young venture capital fund managers due to reputational concerns, since a fund's performance record is the main instrument to raise new funds from capital providers. The limited partnership agreement setting a maximum term for the partnership provides an explicit contract between the capital providers and the venture capitalist. Payment of the exit proceeds allows the capital providers to recycle funds from less successful to more successful venture capital managers. However, this contractual agreement is supported by an implicit contract between the venture capitalist and the capital providers as described in the following figure.



Source: Black and Gilson (1998)

¹³ Gompers (1996)

The implicit contract assumes that capital providers are expected to reinvest in future limited partnerships.

The third exit route is buy back or redemption by co-investors or management. This mechanism is considered as a backup exit route and is used primarily when the investment has been unsuccessful. In the case of minority investments, a guaranteed buyout provision is essential, as it is the only means by which the partnership firm can be assured of liquidity.

The design of the exiting strategy is a key issue. In a survey of the exit mechanisms¹⁴, the following causes of failure of exit have been identified:

- Stock market sentiment;
- Lack of institutional buyers for IPOs;
- Lack of trade buyers for a particular investment;
- Uncooperative management or co-investors;
- Due diligence results;
- Poor performance by the business.

In order to avoid these pitfalls, the exit mechanism has to be planned properly from an early stage in the life of the investment. Depending on the exit routes chosen, various steps are required: the preparation for sale or IPO, marketing of the business to trade buyers, or selection of the advisers for an IPO. This planning process is particularly important to align the incentives of the management and of the venture capitalists.

Concerns about exiting may also adversely affect firms once they are financed by venture capitalists. Less scrupulous investors may occasionally encourage companies in their portfolio to undertake actions that boost the probability of successful IPO, even if they jeopardize the firm's long-run health, e.g. increasing earnings by cutting back on vital research spending. In addition, many private investors appear to exploit their inside knowledge when dissolving their stakes in investments. While this may be in the best interests of the limited and general partners of the fund, it may have harmful effects on the firm and on the other shareholders.

Finally, expectations about the ability to exit could also affect the functioning of the venture capital market. If a private equity investor cannot foresee how a company will be mature enough to make public or to sell at the end of a decade, he is unlikely to invest in the firm. If it were equally easy to exit investments of all types at all times, this might not be a problem. But interest in certain technologies by public investors seems to be subject to wide swings. For instance, in recent years "hot issue markets" have appeared and disappeared for computer hardware, biotechnology, multimedia and Internet companies. Concerns about the ability to exit investments may have led to too many private equity transactions being undertaken in these "hot industries". At the same time, insufficient capital may have been devoted to industries not in the public limelight.

3. EVOLUTION OF PRIVATE EQUITY AND VENTURE CAPITAL MARKET¹⁵

The venture capital industry started in the US after World War II¹⁶. The first modern venture capital firm, American Research and Development, was formed in 1946 by MIT President Karl Compton, Harvard Business School Professor Georges F. Doriot, and local business leaders who sought to commercialise the technologies developed for World War II, particularly innovations undertaken at

¹⁴ Wall and Smith (1999)

¹⁵ As already stressed in section 1, the terms "private equity" and "venture capital" have a different meaning in the US and in the EU. In order to compare the American and European private equity and venture capital market and to have a minimal harmonisation of data, the definition of venture capital used in this section comprises seed, start-up and expansion investment, while private equity includes in addition replacement and buyout investments.

¹⁶ The development of the American venture capital industry had its origin in the family offices that managed the wealth of high worth individuals (such as the Phippes, Rockfellers, Vanderbilt...) in the last decades of the nineteenth century and the first decades of the 20th century (Gompers and Lerner, 2000). Step by step, these families began involving outsiders to select and oversee these investments.

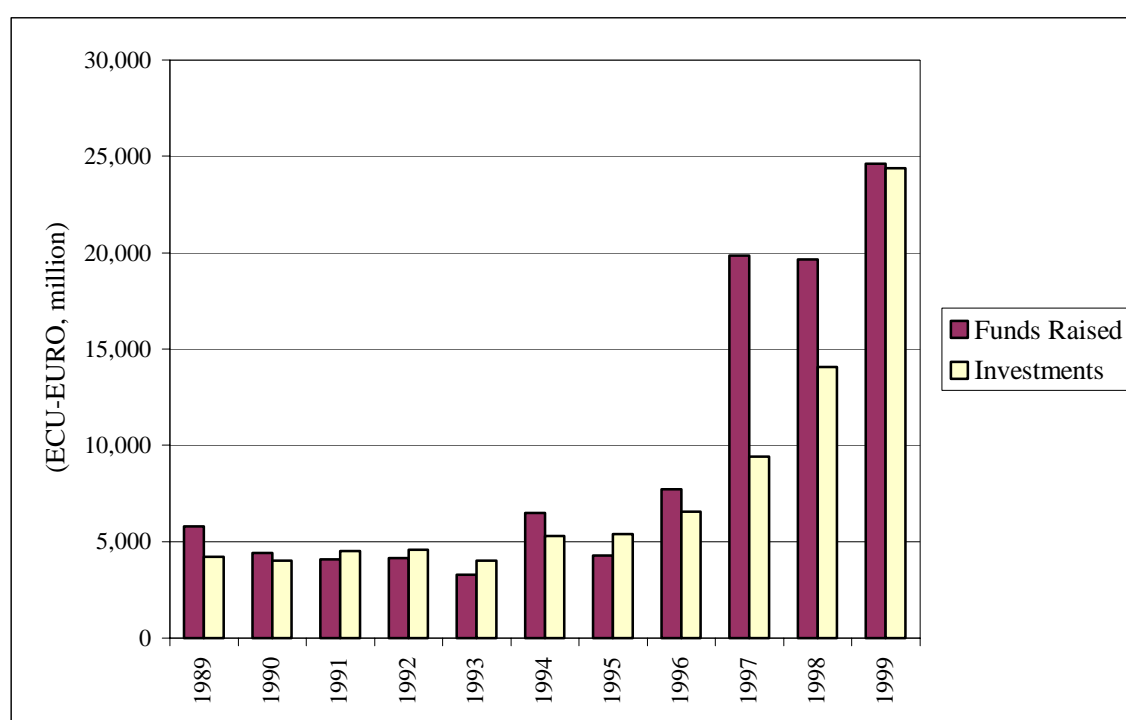
MIT¹⁷. The development of the venture capital market has been important in the US, leading to important economic successes of venture-backed firms, such as Intel, Microsoft, Genentech, Thermo Electron, and Cisco systems.

Venture capital started in Europe only in the 1980s and this market is relatively new compared to the formal US venture capital market. In recent years, a new dynamism has appeared in the European venture capital market.

3.1 The private equity and venture capital market in Europe¹⁸

The development of the venture capital market has been considerable during the 1990s. Chart 1 illustrates the evolution of new funds raised and investments in the EU¹⁹ between 1989 and 1999. While progressing slowly until the mid-1990s, the annual amount of new funds raised exceeded EUR 20 billion in 1999. The level of disbursement, or investment into deals, reflected the amount of new funds raised. Investment grew significantly in 1997 and the pace of disbursements accelerated in 1999, close to the inflow of new capital. This evolution could indicate a reduction in the liquidity of private equity investors. Since the venture capital industry is relatively cyclical, as demonstrated by the US market, a decline in fund raising could be expected in the future. The positive trend observed in the EU reflects the improvement in the political, fiscal and entrepreneurial environment, since the growth of SMEs, especially in the high technology sectors, has been perceived as a key ingredient to sustain the competitiveness of the European economy. Several governments and European institutions have introduced schemes to promote venture capital in order to attract investment in this category of firms (see section 6).

Chart 1: Evolution of new funds raised and investments in the EU, 1989-1999



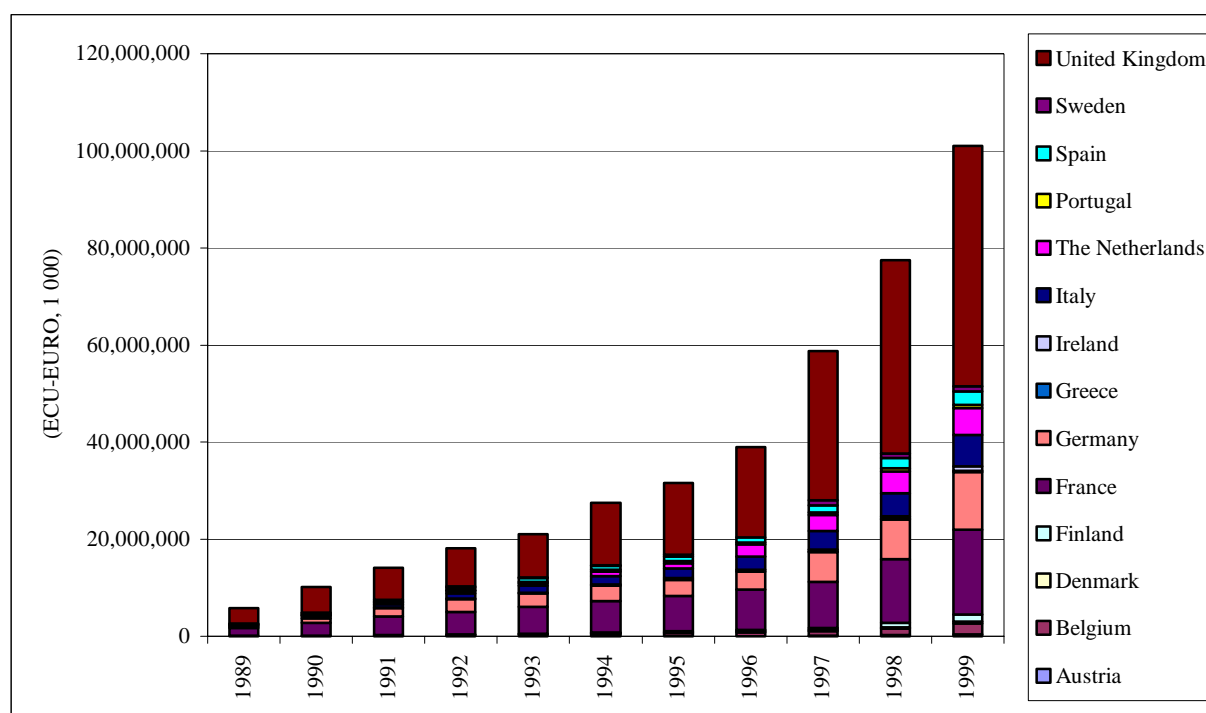
Source: Authors' calculations based on EVCA data

Private equity is unevenly spread across Europe, and the industry has found it easier to raise finance in some countries than others. Chart 2 illustrates the evolution of the total cumulative funds raised by country between 1989 and 1999.

¹⁷ See Fenn and al. (1997) for more development of venture capital in the U.S.

¹⁸ For a more detailed analysis of the European venture capital market, see Yli-Renko and Hay (1999a)

¹⁹ European Union, without Luxembourg. Data are not available for this country.

Chart 2: Cumulative private equity funds raised in the EU, 1989-1999

Source: Authors' calculations based on EVCA data

In cumulative terms, the UK market represents half of the private equity funds raised in the EU. France and Germany are the two other largest markets in the EU. In general, a dichotomy is identified between equity-oriented countries having generally a more developed venture capital market (like the UK or the Netherlands) and debt-oriented countries with a less-developed venture capital market, like Germany, France or Italy.

Even if the UK is still the dominant private equity market, the growth rate of funds raised has been particularly high in Germany, the Scandinavian countries, Austria, Belgium, France, Italy and Spain over recent years.

The comparative size of the private equity markets in the EU is better illustrated comparing the annual amount of private equity and venture capital investment to the gross domestic product and to the population in 1989 and 1999, as described in Table 3. In terms of share of GDP and of amount invested in private equity per inhabitant, the UK ranks first in the European Union in 1989 and in 1999. In one decade, the investment in private equity capital has significantly increased in the UK and in several member states but the discrepancy between the various member states in terms of development of the private equity market, and by consequence of the venture capital industry, is still wider in 1999 than in 1989.

The UK is followed by Sweden, the Netherlands and Belgium. Looking at the full sample of countries, Table 3 shows that smaller countries have proportionally larger private equity sector than France, Germany and Italy, which are major markets in absolute terms. This picture of the European private equity comes out from the analysis of two types of indicator: private equity investment expressed as a percentage of GDP or per inhabitant.

Table 3: Private equity and venture capital investment as a percentage of GDP and per inhabitant, 1989 and 1999

	<i>Private Equity investment</i>				<i>Venture Capital investment</i>			
	<i>as % of GDP</i>		<i>per inhabitant (EUR)</i>		<i>as % of GDP</i>		<i>Per inhabitant (EUR)</i>	
	<i>1989</i>	<i>1999</i>	<i>1989</i>	<i>1999</i>	<i>1989</i>	<i>1999</i>	<i>1989</i>	<i>1999</i>
<i>Austria</i>	0.01%	0.05%	0.97	11.06	0.01%	0.03%	0.97	6.78
<i>Belgium</i>	0.06%	0.29%	7.94	66.15	0.05%	0.26%	6.71	57.77
<i>Denmark</i>	0.02%	0.07%	3.66	21.95	0.01%	0.05%	2.44	15.78
<i>Finland</i>	0.01%	0.21%	1.55	48.35	0.01%	0.11%	1.28	25.77
<i>France</i>	0.10%	0.21%	15.21	48.06	0.05%	0.12%	8.46	27.14
<i>Germany</i>	0.02%	0.16%	3.73	38.50	0.01%	0.13%	2.20	31.49
<i>Greece</i>	0.00%	0.06%	0.16	6.79	n/a	0.06%	n/a	6.14
<i>Ireland</i>	0.12%	0.13%	10.52	28.71	0.05%	0.09%	4.15	21.49
<i>Italy</i>	0.03%	0.17%	4.58	30.93	0.02%	0.05%	3.25	9.40
<i>The Netherlands</i>	0.08%	0.48%	11.86	109.58	0.05%	0.25%	7.76	57.97
<i>Portugal</i>	0.03%	0.12%	1.37	11.92	0.02%	0.05%	1.20	5.10
<i>Spain</i>	0.02%	0.14%	2.17	18.38	0.02%	0.09%	1.56	12.23
<i>Sweden</i>	0.02%	0.60%	4.46	144.35	0.02%	0.19%	3.56	46.77
<i>United Kingdom</i>	0.33%	0.89%	42.29	194.90	0.13%	0.20%	16.83	43.00
<i>EU</i>	0.08%	0.30%	12.25	65.25	0.04%	0.12%	6.04	27.03
<i>US</i>	n.a.	n.a.	n.a.	n.a.	0.11%	0.59%	21.44	170.23

Source: Authors' calculations based on EVCA, NVCA, OECD data

The picture is quite different for the venture capital investment properly said. Even if the UK ranks first in 1989 in terms of venture capital investment as a share of GDP or per inhabitant, Belgium and the Netherlands invested more in venture capital in 1999, given their respective level of wealth and the size of the population. Sweden and Germany have significantly reduced the gap with the UK during a decade. Southern countries of Europe are still lagging behind.

While the level of investment in venture capital in the UK was close to the US in 1989, the situation is different in 1999: the US invests around 0.6% of the wealth created during a year in venture capital while the UK is only investing 0.2%. The other indicator shows that each inhabitant in the US is investing EUR 170 per year in venture capital for only EUR 43 in the UK. The discrepancy is even more striking between the EU and the US: while the ratio between the level of investment in venture capital per inhabitant in the US and the EU was equal to 3.5 (i.e. 21.44/6.04) in 1989, it increases up to 6.3 in 1999.

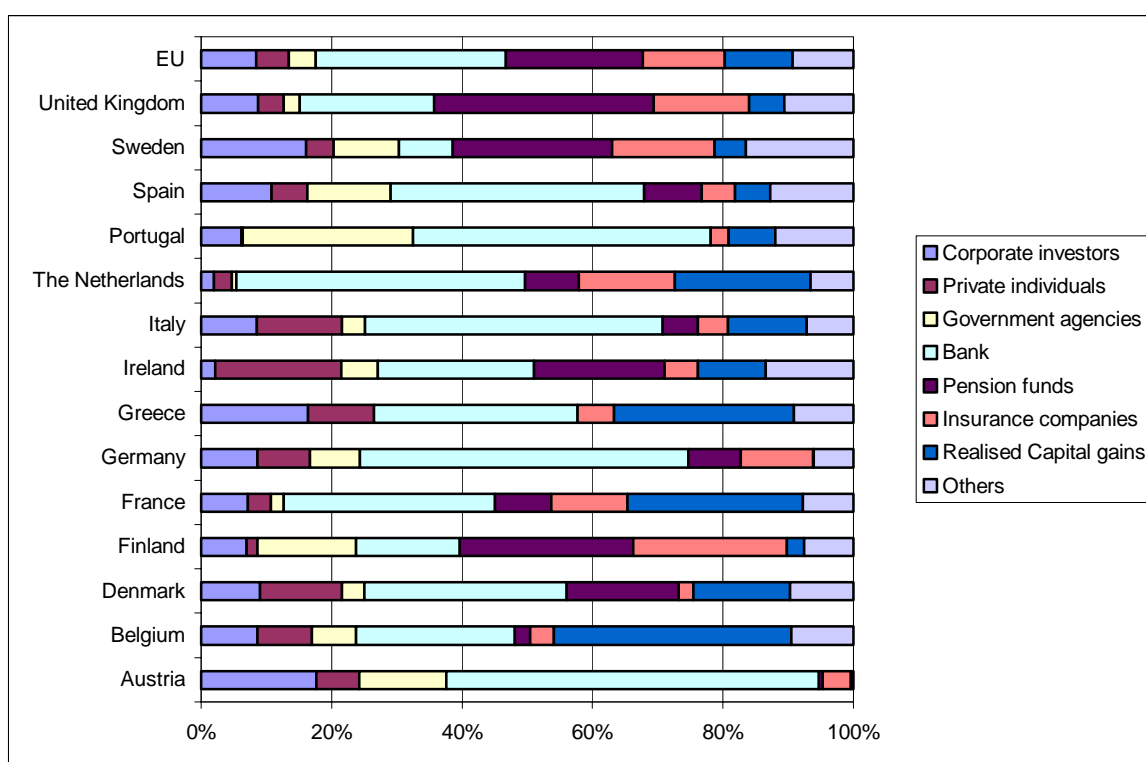
3.1.1 Evolution by sources of funding and stages

Chart 3 investigates the major sources of private equity funds by country over the period 1989-1999. At the level of the EU, the major sources of funds are banks, pension funds and insurance companies. Capital gains reinvested are also an important source of funding. The increase in pension funds and insurance fund investment is quite recent. The rise of corporate investors has been relatively significant in the recent years. The determinants of this increase were various. First, corporations were rethinking the way the innovation process was internally managed. Rather than relying on central R&D laboratories for new product ideas, they were exploring new organisational patterns including joint ventures, acquisitions and university-based collaborations. Indeed, managers realized that management difficulties led to corporations extracting only a small amount of the value from centralized R&D facilities. Many of the best ideas were, for instance, commercialised in new firms founded by defecting employees. In addition, the rapid growing pace of technology firms such as Cisco systems relying on acquisitions rather than internal R&D for the development of new ideas has led to a process of reconsidering conventional ways of thinking. Other factors have also contributed to

the development of corporate venturing²⁰: the willingness to replicate the organisational structure which had led to successful venture investment, the perception of corporate venturing being an efficient organisational option to integrate the Internet into organisation that had few internal resources to address the new communication technology (see section 7.2.1).

Among the member states, vast disparities can be identified. In the UK, most of the funds raised came from pension funds and banks, whereas for France the two largest sources of funds were banks and insurance companies. As expected, banks are the main source of funding in Germany and in Austria. Pension funds and insurance companies are less active in the Southern countries of Europe. Government agencies represent a substantial source of funds in Portugal, Spain and to a lower extent in Finland and Sweden, and are otherwise marginal.

Chart 3: Distribution by sources of cumulative funds raised in the EU (1989-1999, as % of total over the period)



Source: Authors' calculations based on EVCA data

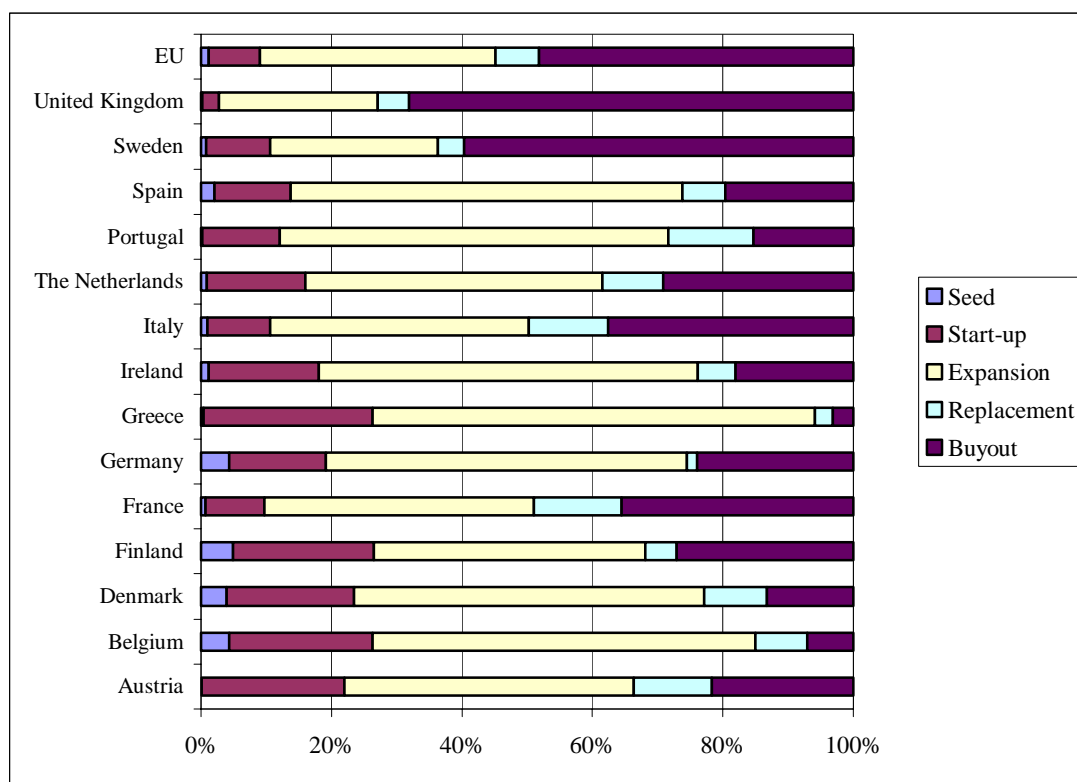
The distribution of investments by funding stage is described in Chart 4. As a whole, European venture capital funds favour later stage financings, with seed and start-up stages collecting only a small percentage of funds invested. Classical venture capital focuses on very young enterprises with a high but risky potential for substantial sales and profit growth. On the contrary in the EU, investors have been attracted by the later stages, where buyouts for instance offer easy and faster opportunities to achieve returns than the earlier stages of funding. The expansion stage also attracts a substantial amount of funds, even if a shift to buyout has been observed in recent years.

Significant differences exist between the Member States regarding the stage of investment. Among the major markets, Germany and the Netherlands have a high proportion of early stage investment, with seed and start-up investments accounting for 19% and 16% of cumulative disbursement between 1989 and 1999. Early stages also represent an important share in smaller markets like Austria, Belgium, Denmark, Finland and Greece. UK, Sweden and Italy have the lowest percentage of early stage investments.

²⁰ In the US, as stressed by Gompers and Lerner (2000), a new process of greater collaboration between corporates and independent venture capital firms is emerging. This evolution is the result of greater competition on the US venture capital market.

A correlation appears between the funds raised by pension funds and the allocation of investment to latter stages (Correlation coefficient between pension funds share and buyouts equal to 0.7), reflecting the greater risk-aversion of pension funds. The penetration of the pension funds into the private equity market favours the development of buyout, which is a less risky stage of financing.

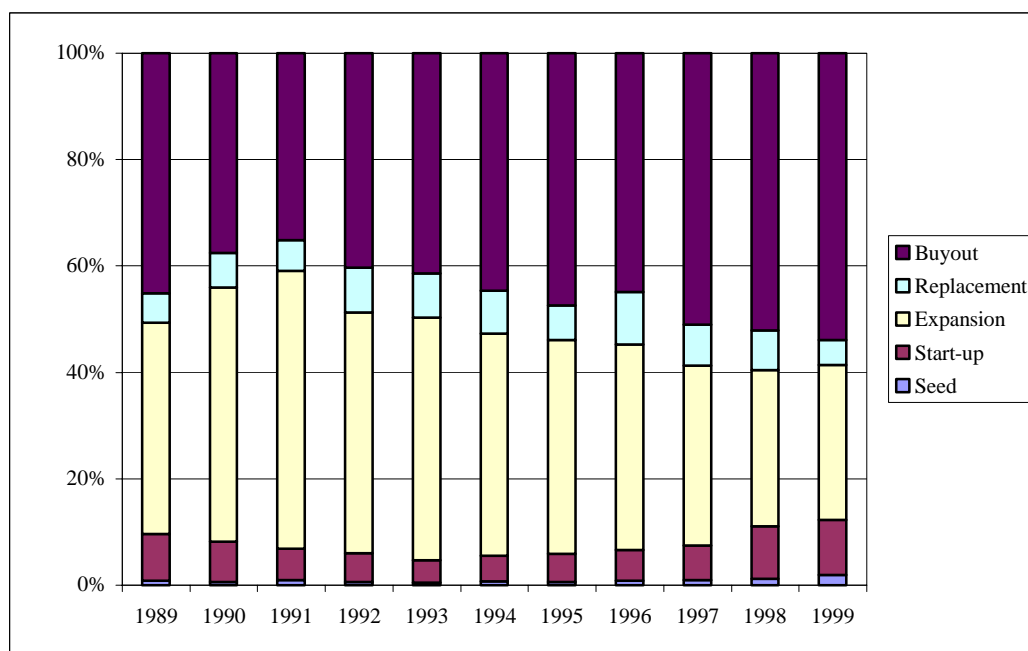
Chart 4: Distribution of cumulative investments by stages in the EU, 1989-1999



Source: Authors' calculations based on EVCA data

However considering the distribution of funds in the EU between 1989 and 1999 as described in chart 5, early stages, i.e. seed and start-up, have increased their share since 1993 – albeit only back to the level of 1989.

Chart 5: Evolution of investment by stages in the EU, 1989-1999



Source: Authors' calculations based on EVCA data

Even if in cumulative terms, the provision of seed and start-up investment still accounts for a small share, this can be the signal of a change in stage investment in the European private equity market.

Table 4 highlights the low level of early stage financing in the EU in average compared to the USA and the heterogeneity among the member states. While Sweden, the Netherlands, Belgium and to a lower extent Finland and Germany have reached the same level of investment in early stages than the USA in 1999, various countries allocate a very low share of their wealth to sustain the development of start-ups. The low concentration of investment on start-up and early stage business between 1989 and 1999 is particularly striking for the UK industry and for the Southern European countries (i.e. Greece, Italy, Spain and Portugal), although in absolute terms, some of those countries are performing relatively well (see Chart 4).

Table 4: Early stage investment as a percentage of GDP and per inhabitant, 1989 and 1999

	<i>Early stage investment</i>			
	<i>as % of GDP</i>		<i>per inhabitant (EUR)</i>	
	<i>1989</i>	<i>1999</i>	<i>1989</i>	<i>1999</i>
<i>Austria</i>	0.006%	0.007%	0.89	1.75
<i>Belgium</i>	0.015%	0.093%	2.20	20.76
<i>Denmark</i>	0.009%	0.019%	1.76	5.80
<i>Finland</i>	0.003%	0.057%	0.56	13.20
<i>France</i>	0.009%	0.039%	1.44	8.86
<i>Germany</i>	0.004%	0.051%	0.71	12.20
<i>Greece</i>	n.a.	0.017%	n.a.	1.89
<i>Ireland</i>	0.002%	0.048%	0.17	11.08
<i>Italy</i>	0.002%	0.014%	0.30	2.56
<i>The Netherlands</i>	0.006%	0.096%	0.89	21.92
<i>Portugal</i>	0.004%	0.008%	0.20	0.85
<i>Spain</i>	0.009%	0.018%	0.77	2.36
<i>Sweden</i>	0.004%	0.113%	0.89	27.28
<i>United Kingdom</i>	0.023%	0.020%	3.00	4.32
<i>EU¹</i>	0.008%	0.036%	1.18	8.00
<i>US</i>	0.027%	0.056%	5.23	16.15

1. US : 1989 and 1998

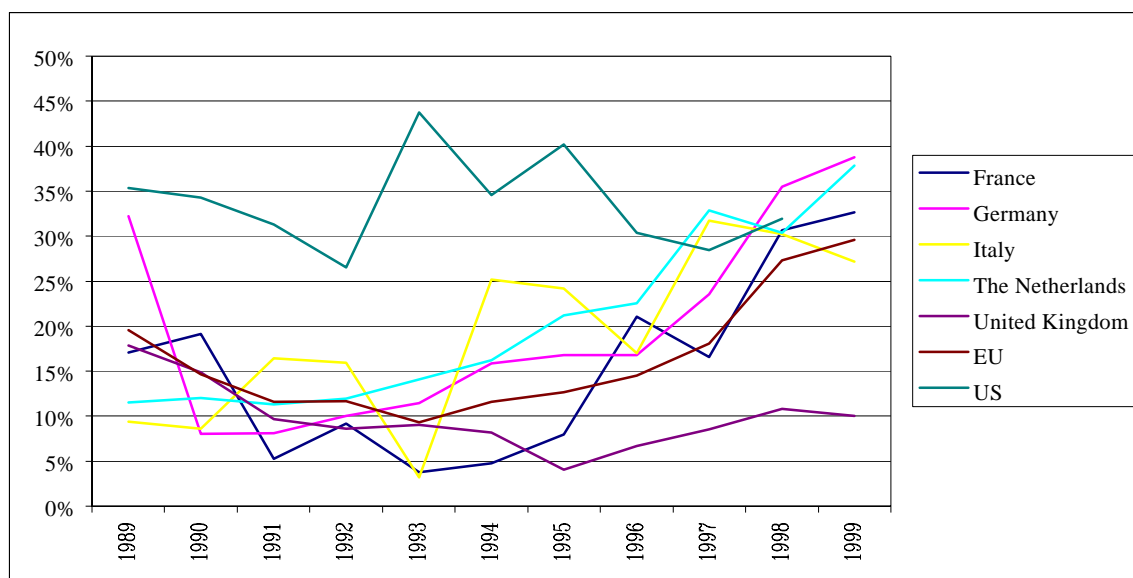
Source: Authors' calculations based on EVCA, NVCA, OECD data

To complete the analysis of venture capital investment by stage, Chart 6 describes the evolution of the share of early stage investments in venture capital investment in the major European market (in absolute terms), with the American situation as a benchmark²¹.

The trend confirms, with the exception of the UK, a move since 1993 towards a greater proportional involvement in early stage and hence technology based investments (see also Chart 5). Early stages corresponding to seed and start-up investments mean largely investments in new technology-based firms. This category of enterprises defined by their high levels of investments in R&D as a percentage of sales and by the predominance of “knowledge workers” is particularly important in terms of economic development due to the high expected positive effects on employment creation, innovation, export sales and growth and regional development. Those types of investment correspond to the real business of venture capital investors: high level of risks and uncertainties of the new technology but highly attractive prospects if successful.

²¹ The comparison with the US allows to put the development of the European venture capital market into a broader perspective, since the US venture capital market appears as the most mature one. However, given the fact that the European venture capital industry is relatively “young”, the comparison between the two markets has to be qualified since US venture capitalists have been active for a long period and gained experience and knowledge.

Chart 6: Share of early stage in venture capital investment for the major European venture capital markets and for the US



Source: Authors' calculations based on EVCA, NVCA data

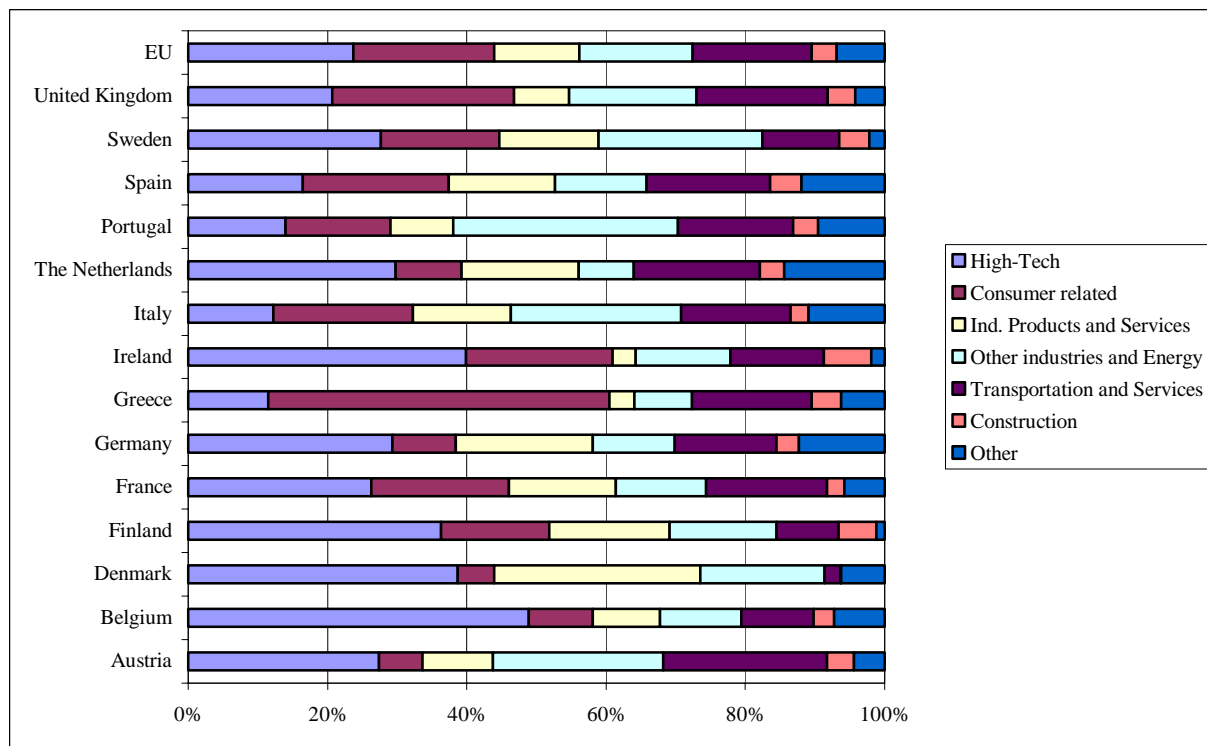
3.1.2 Evolution by sector

Chart 7 describes the distribution of cumulative private equity investments by sectors for the various member states. Consumer-related products and services account for a substantial share of total investment between 1989 and 1999 in a lot of European countries. However, the combined technology-based sectors²² represent around 25% of cumulative private equity investments in the EU.

This amount hides important disparities between countries (and even more between regions), the southern countries of Europe investing a low share of funds in high-tech sectors (Greece: 11%; Italy: 12%; Portugal: 14% and Spain: 16%). As shown in chart 8, the increase in the share of high-technology sectors has started in the middle of the nineties, mimicking a similar long-term trend observed in the US, where investment into technology-based sectors has been steadily increasing.

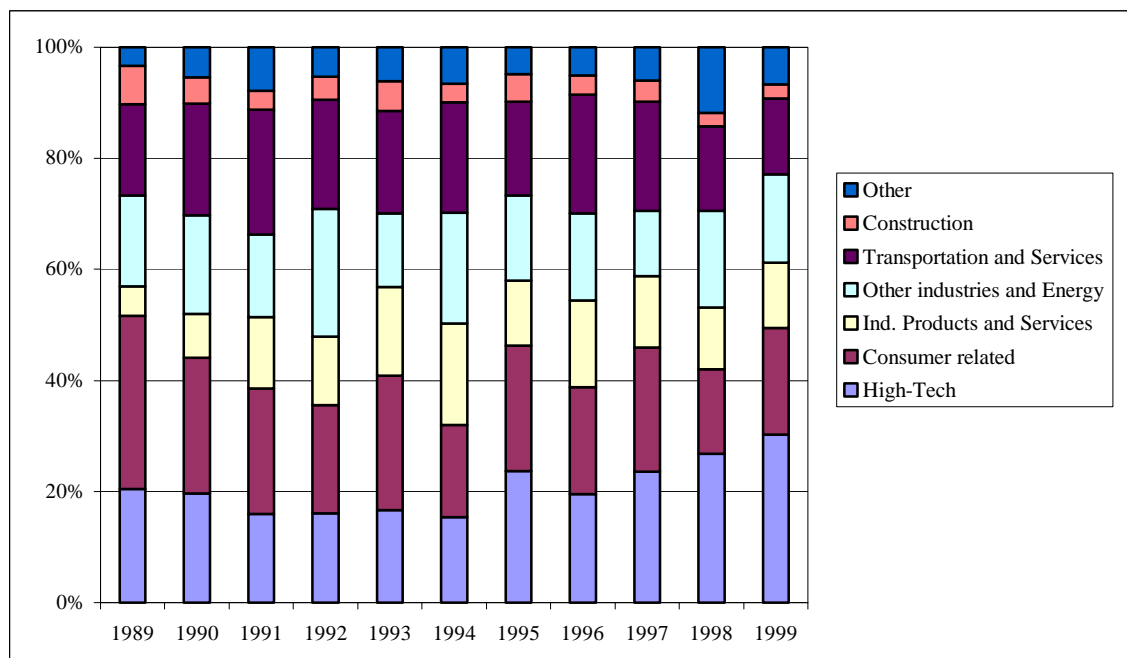
The expansion of investments in high-technology sectors has been organised around a leading university in a lot of countries. Examples of European technology clusters include the biotechnology concentration in Cambridge, the telecommunications concentration in Sophia Antipolis near Nice and in Oulu, in Northern Finland.

²² High-technology sectors include communications, computer related sectors, other electronics related sectors, biotechnology and medical/health related sectors.

Chart 7: Distribution of cumulative investments by sectors in the EU, 1989-1999

Source: Authors' calculations based on EVCA data

However, most of the European clusters are still dominated by the R&D divisions of major corporations, not young start-ups²³.

Chart 8: Evolution of investment by sectors in the EU, 1989-1999

Source: Authors' calculations based on EVCA data

The increasing share of high-tech investments does not mean the emergence of new technology-based firms, with the same entrepreneurial dynamism present in the Silicon Valley.

²³ Yli-Renko and Hay (1999a)

Considering the evolution of investments by sectors between 1989 and 1999 in the EU, significant differences are observable: expansion of high-technology sectors, contraction of investments in consumer related products and services, stabilisation of the share of the other sectors.

Consumer related products and services and high technology sectors account for more than half of total investment in private equity.

3.1.3 Size of the investment

The average deal size has increased during the last years. In 1989, the average deal size was around EUR 0,79 M in Europe. In 1999, the deal size is equal to EUR 2,27 M in the EU, i.e. an increase of 82%. This increase in deal size is particularly striking for buyout investments, even if a notable increase in investment size within each financing stage is observed. The increase in the average size of the deal could reflect the fact that private equity funds do not have time and expertise to evaluate and monitor a relatively large number of small investments. This evolution could affect more particularly early stage financing, where the size of deal for seed and start-up investments is much smaller. In other words, this Table 5 illustrates the higher transaction costs associated with early stage financing deals.

Measured by the number of companies invested in, the venture capital investments in seed, start-up and expansion represent around three-quarters of total investments. Obviously, investments in early stages are much smaller in size, averaging EUR 1,27 M in 1999 per company for seed financing, EUR 0,97 M per company for start-up financing. Since the beginning of the nineties, the average deal size per company has increased regardless of the stage of financing.

Table 5: Size of investments in the EU, 1997-1999

	<i>Amount of investments</i>	<i>Number of investments</i>	<i>Average size (EUR M)</i>	<i>Number of Companies</i>	<i>Average size (EUR M)</i>
1997					
<i>Seed</i>	85,118	263	0.32	230	0.37
<i>Start-up</i>	618,557	1,125	0.55	928	0.67
<i>Expansion</i>	3,188,329	3,025	1.05	2,301	1.39
<i>Replacement capital</i>	723,550	452	1.60	337	2.15
<i>Buyout</i>	4,809,573	1,116	4.31	731	6.58
Total	9,425,127	5,981	1.58	4,527	2.08
1998					
<i>Seed</i>	169,270	260	0.65	185	0.91
<i>Start-up</i>	1,384,063	1,950	0.71	1,686	0.82
<i>Expansion</i>	4,129,573	2,996	1.38	2,498	1.65
<i>Replacement capital</i>	1,042,456	498	2.09	407	2.56
<i>Buyout</i>	7,333,081	1,557	4.71	1,136	6.46
Total	14,058,443	7,261	1.94	5,912	2.38
1999					
<i>Seed</i>	455,372	568	0.80	359	1.27
<i>Start-up</i>	2,535,853	3,395	0.75	2,626	0.97
<i>Expansion</i>	7,113,180	4,397	1.62	3,430	2.07
<i>Replacement capital</i>	1,128,739	631	1.79	502	2.25
<i>Buyout</i>	13,154,319	1,745	7.54	1,171	11.23
Total	24,387,463	10,753	2.27	8,100	3.01

Source: Authors' calculations based on EVCA data

Considering the average size of the deal per investment and per company, high-technology sectors are characterised by low size due to the fact that it corresponds to early stage investments. Among those sectors, biotechnology is the smallest, averaging EUR 1,11 M in 1999 per investment and EUR 1,54 M per company. According to the number of companies invested in, high-technology sectors have increased their share, from 25% in 1997 to 33% in 1999. This evolution is the result of the high growth of the number of deals in communications and computer related companies.

3.1.4 Divestments or exit

Divestment²⁴ by exit mechanism can take different forms: IPOs²⁵, trade sale, write-off or other²⁶ (see Section 2.6). Trade sales is still the dominant exit mechanism for private equity investors in Europe even if the total amount of divestment by trade sales has significantly decreased in 1999, public offering is becoming a more significant divestment route. Divestments have grown over recent years, mainly as a result of a large increase in divestment by repayment of preferential shares and principal loans (the UK amounting for a large share in 1999, i.e. EUR 1.1 billion for a total amount of EUR 1.5 billion) and a sustained growth of divestment by IPO. The average size of a divestment has increased over the recent years.

Table 6: Divestments in the EU (% and EUR x1.000), 1997-1999

	<i>Amount of divestments</i>	<i>Number of divestment</i>	<i>Average size (EUR M)</i>
<i>1997</i>			
<i>Trade sale</i>	48.9%	1,411	1,982.2
<i>Public offering</i>	14.4%	351	2,338.5
<i>Write off</i>	11.7%	765	873.6
<i>Others</i>	25.1%	1,746	820.5
Total	5,718,552	4,273	1,338.3
<i>1998</i>			
<i>Trade sale</i>	54.8%	1,032	3,507.7
<i>Public offering</i>	16.4%	806	1,343.1
<i>Write off</i>	5.7%	710	534.1
<i>Others</i>	23.0%	2,316	656.5
Total	6,602,262	4,864	1,357.4
<i>1999</i>			
<i>Trade sale</i>	36.7%	1,475	2,112.1
<i>Public offering</i>	20.1%	983	1,735.3
<i>Write off</i>	6.4%	885	612.9
<i>Others</i>	36.9%	2,274	1,378.9
Total	8,499,206	5,617	1,513.1

Source: Authors' calculations based on EVCA data

The recourse to exit mechanisms differs among the European countries. In the UK, trade sales remained the most important exit route until 1998. In 1999, the 347 divestments through trade sales accounted for 22% of total divestment at cost and 28% of the total number of divestments. The 1999 picture seems to reflect a change in the market since the share of exit by trade sales dropped from 51% in 1998 to 22% in 1999. The UK has the highest level of exits through public offerings²⁷. The total value at cost of these was EUR 593 millions. This exit route is the second largest one in 1999, after repayment of preference shares and loans. This evolution might reflect the recent development of the specialised stock markets for high-growth companies in the UK, i.e. AIM and techMark. In 1999, 20 venture-backed companies were floated on the London Stock Exchange. IPOs could also take place on other markets, such as EASDAQ, NASDAQ and OFEX. In France, the trade sale is the most significant exit route. In 1999, trade sales accounted for 58% (after having reached 72% in 1998) of total divestment at cost and 29% of the total number of divestments. Divestment by public offering is the second highest level in the EU, after the UK. Although this evolution could reflect the beneficial effect of the Nouveau Marché of the Paris Stock Exchange, the share of sales of quoted equity

²⁴ Divestment is measured "at cost" and does not reflect the returns realised in relation to the amount invested.

²⁵ The term "IPO" will be used even if EVCA statistics until 1997 do not monitor whether an exit taking place through a public offering is in fact an initial public offering (IPO) or a new offering by an already publicly listed company. However, as stressed by Yli-Renko and Hay (1999b), the majority of venture capital exits through public offering are IPOs.

²⁶ It covers mechanisms such as buy-backs, sales to another venture capitalist and to a financial institution

²⁷ IPO concerns 33 divestments in 19 companies, representing 68% of total divestment by public offering at cost.

accounts for more than 90% of public offering, IPO representing only 10%. This phenomenon might be explained by the expiration of the “lock up” period, i.e. a provision in the underwriting agreement between an investment bank and existing shareholders that prohibits corporate insiders and private equity investors from selling shares at the time of the offering. Exit by selling to another venture capitalist has significantly increased in 1999, which is explained by the rise in the number of divestments by means of a second LBO, as well as exit by management-buy-backs. In Germany, the most common methods for exits are trade sales and management-buy-backs. In 1999, trade sales accounted for 24% of total divestment at cost and 13% of the total number of divestments. An interesting feature in the type of exit mechanism used in Germany is the increasing share of divestment by public offerings, amounting for 18% of total divestment at cost in 1999. Among 75 exits by public offerings, 47 exits are through IPO amounting for 77% of total divestment. This strong growth of IPO reflects the dynamism of the “Neuer Markt” established in Frankfurt in March 1997 to enable young, fast-growing companies to float more easily. In Italy, trade sales remains the dominant exit route, representing 37% of divestment at cost in 1999 and 46% of number of divestments. The share of trade sales has been decreasing since 1997 in favour of exits by repayment of principal loans and sales to financial institution. Public offering, and IPO, is becoming a more important exit route for private equity investors. Starting more or less from scratch in recent years, eight exits through IPOs took place in 1999. The Italian Stock Exchange has gone through significant reforms, leading to the creation of the “Nuovo Mercato” in June 1999, in the framework of the EURO.NM network, to sustain the flotation of NTBFs. Finally, in the Netherlands, trade sale remains the dominant exit route amounting for 52% of total divestment at costs and 32% of the number of divestments. The other exit routes are repayment of principal loans and management-buy-back. IPOs remain a marginal exit mechanism even since the development of the “Nieuwe Markt Amsterdam”.

This short review of exit routes in the major private equity market in the EU shows the prevalence of trade sale (i.e. mergers and acquisitions) as the dominant exit mechanism. National and European public authorities have favoured the emergence of specialised stock markets for NTBFs (see Table 7 and Appendix 1). While regulated by their respective national exchanges, these markets had less constraining listing conditions and more benign on-going reporting requirements. In line with the experience on the American venture capital market, the ability for private equity investors to exit through IPO appears as a crucial factor (see Section 2.6, 3.2.1 and 5.1).

Table 7: Main markets specialising in SME financing as at 30 June 2000²⁸

	<i>Euro.NM</i>					<i>EASDAQ</i>	<i>AIM</i>	<i>TechMARK</i>	<i>NASDAQ</i>
	<i>Le Nouveau Marché</i>	<i>Neuer Markt</i>	<i>NMAX</i>	<i>Euro.NM Belgium</i>	<i>Nuovo Mercato</i>				
<i>Launch</i>	Mar 96	Mar 97	Mar 97	Mar 97	June 99	Nov 96	June 95	Nov 99	Feb 71
<i>Number of companies listed</i>	467					62	429	220	4,843
	140	281	15	16	15				
<i>Market capitalisation (billion €)</i>	240					50	22.6	1,006	5,818
	27	191	1.7	0.5	20				
<i>Capital raised (current year, billion €)</i>	13.4					0.3	1.6	3.1	33.2
	1.2	9.5	0.4	0	2.3				
<i>Average capitalisation per company (million €)</i>	513					806	53	4,574	1,201
	192	678	116	31	1,340				
<i>Capital exchanged (million €/day)</i>	537					32	48	3,633	76,680
	37	442	5	0.2	53				
<i>Performance of index since 1 December 1999</i>	+17%					-8%	-11%	-8%	-3%
	+26%	+17%	+4%	+14%	+2%				

Source: EC (2000b)

Indeed, public equity markets provide a critical source of capital for the high-tech, high-potential firms with common characteristics like limited and/or intangible asset base, low or negative cash flows, high

²⁸ The table does not reflect the recent evolution on those various stock markets. The stock market fall has been stronger over the last months in Europe and in the US.

burn rates, etc. Those markets provide attractive exit routes for early-stage equity investors, for which harvesting opportunities are critical to realising the rates of return necessary to justify investments in risky ventures. They also offer founders and initial investors the ability to liquefy their investments and rebalance their personal portfolios. The development of those European stock markets for NTBFs is relatively new and remains fragmented across countries. Their future attractiveness will mainly rest on their ability to maintain liquidity and fund-raising capabilities through the ups and downs of the economic activity. Considering Table 7, the “Neuer Markt” and to some extent the AIM appear as the most dynamic market (in terms of number of listed firms, market capitalisation and volume traded) while the EASDAQ does not seem to be a credible pan-European stock market. Among the challenges identified for the development of a pan-European market²⁹, there are: (i) getting name recognition and building credibility; (ii) proving effectiveness in raising money year after year; (iii) creating quality analysts; (iv) attracting retail and institutional investors; and (v) bringing in attractive companies in competition with US markets.

3.1.5 Private equity and venture capital performance

Since the European private equity industry is relatively young, not reaching a critical mass of investments until approximately the mid 1980s, evaluation of the performance of the common form of 10 year closed funds has not been available until the last couple of year. The EVCA, in collaboration with Venture Economics and Bannock Consulting, has developed a Pan-European private equity performance analysis.

Returns by stage are provided in Table 8. Given the life cycle of the development of a young company, returns should be related to investment horizons through liquidity preference (see section 2.6). It assumes that longer time horizon (seed and early stage) are more risky investment and should have a higher rate of return reflecting a risk premium. Investments with shorter time horizon (later stage or buyouts) are considered less risky and therefore the return expectation is lower. In addition, since a longer time period is required before distribution for seed and start-up funds, i.e. early stage funds beginning to pay back around seven years and even more later for the sub-category of seed fund, interim results are not really comparable with other stage categories.

Table 8: Cumulative net IRRs³⁰ of European mature private equity funds

<i>Fund type</i>	<i>Cumulative IRR (%) from inception to 31st December 1996</i>				<i>Cumulative IRR (%) from inception to 31st December 1999</i>			
	Number of funds	Pooled	Median	Top quarter	Number of funds	Pooled	Median	Top quarter
<i>Early stage</i>	27	5.7	4.5	27.2	62	10.8	9.2	42.9
<i>Development</i> ¹	60	7.3	5.4	18.7	139	11.9	7.2	29.8
<i>Buyout</i>	67	17.6	15.5	41.9	131	19.6	12.6	43.9
<i>Generalist</i>	48	19.4	1.3	22.9	91	12.4	6.0	22.6
<i>All private equity</i>	202	18.6	6.6	29.1	423	14.5	8.8	33.9

1. Development funds include balanced venture funds, which also make some early-stage investments.

Source: EVCA and Venture Economics

Even if those results need to be considered with caution, these fund performance figures indicate that the returns to early stage investments have been poorer than those allocated to later stage, and less risky, alternative, particularly buyout deals. This result quite possibly explains the attraction of this

²⁹ Leleux and Muzyka (1999)

³⁰ The internal rate of return measures interim cash-on-cash returns earned by funders from the fund’s activity from inception to a stated date or for a given horizon period of a stated date. The median IRR is the value halfway between the highest and lowest individual fund IRRs in the data set. Pooled IRR is calculated by taking cash flows from inception and residual valuations for each fund and aggregating them into a pool as if they were a single fund. Top quarter IRR is the pooled IRR for those funds in the top quartile of performance as measured by the table ranking individual funds IRRs. Mature funds means funds started before January 1998 for the returns on the 31st Decembers 1999. For more details on the methodology, see “2000 Investment Benchmarks Report: Private Equity”, Venture Economics and Bannock Consulting Group.

type of deal for European venture capitalists. However, a reduction in the gap between the median returns of the early stage funds and buyout funds is observed in Europe.

This convergence in the rates of return is confirmed by the pooled results for the last few years showing that all mature funds on a rolling five-year basis have increased rates of return for all stages of investment with IRRs of 24.1% for venture (i.e., early stage and development), 26% for buyouts and 20.7% for generalists.

It is also important to note the divergence between the performance of the different venture capital funds, as demonstrated by the gap between the median and the top quarter IRRs for the industry. A median return around 9% for all private equity emphasise the strong performance of the most successful firms. Disregarding the argument that private equity may be counter-cyclical and so provide a means of risk diversification for investors, this means that institutional investors may only be interested in investing in a fund if its management team has a solid top quartile background.

Table 9: Mature private equity and comparators (EUR-based), Net investment horizon returns to 31st December 1999

	1 Year	3 Years	5 Years	10 Years
Early stage				
<i>European Venture Capital</i>	17.6	19.9	19.6	15.0
MSCI Equity	28.8	29.8	24.9	16.9
HSBC Small Cap	81.4	33.2	24.6	15.4
JP Morgan Bond	-1.9	7.1	10.2	7.9
Development¹				
<i>European Venture Capital</i>	56.0	35.1	27.0	15.8
MSCI Equity	29.2	30.4	25.3	15.6
HSBC Small Cap	83.6	35.3	25.8	13.6
JP Morgan Bond	-2.1	6.9	10.1	7.5
Buyout				
<i>European Venture Capital</i>	65.0	31.4	25.2	17.5
MSCI Equity	28.7	27.9	24.3	18.1
HSBC Small Cap	83.6	33.7	26.4	18.4
JP Morgan Bond	-3.0	4.7	7.3	6.3
Generalist				
<i>European Venture Capital</i>	12.1	6.0	14.6	9.5
MSCI Equity	29.6	29.8	24.8	16.7
HSBC Small Cap	85.5	36.6	26.4	15.7
JP Morgan Bond	-2.0	5.9	9.3	7.2
All equity				
<i>European Venture Capital</i>	54.3	29.5	24.9	16.3
MSCI Equity	29.0	28.9	24.7	17.0
HSBC Small Cap	83.8	34.5	26.1	16.4
JP Morgan Bond	-2.6	5.4	8.4	6.9

1. Development funds include balanced venture funds, which also make some early-stage investments.

Source: EVCA and Venture Economics

The performance of the European venture capital market could be also evaluated by comparing the performance of private equity with other public asset classes³¹. In other words, it allows the investor

³¹ The computation of the IRR returns is done by assuming that the same pattern of cash flows over time as in the private equity data set is invested in, and divested from, a representative total-return index for the asset class in question. The analysis has been applied to both cumulative returns since inception and to investment horizon returns. For more details on the methodology, see “2000 Investment Benchmarks Report: Private Equity”, Venture Economics and Bannock Consulting Group.

to put his expected returns on the private equity market in perspective with the ones of publicly quoted stocks. Compared to the other asset classes, the European venture capital industry performs relatively well (Table 9). Development and buyout stages perform strongly, especially for the one-year period, while the ten-year returns of early-stage funds are similar to the performance of the other indexes. This is the period over which most investors using closed funds will be asked to commit. More generally, a convergence in terms of returns is observed between private and public returns at the ten-year horizon.

3.2 The European private equity and venture capital market in perspective: the American and Israeli market

3.2.1 The American venture capital market

The recent development in the European venture capital industry needs to be compared with the American venture capital market³². The evolution of the American venture capital industry has been in response to developments in technology, entrepreneurial need, capital availability, and the appropriate legal framework. The major steps in the evolution of the venture capital market in the US are:

- Creation in 1946 of the American Research and Development Corporation (ARD), a publicly traded closed-end investment company, with the purpose of providing a private-sector solution to the lack of financing for new enterprises and small businesses and managerial expertise in addition to the financing.
- Creation in 1958 of the Small Business Investment Company (SIBC) programme, managed by the Small Business Administration, to foster new company formation by augmenting more traditional sources with new sources of venture investment capital. The SIBCs were allowed to borrow \$4 from the Small Business Administration for each \$ of equity they raised. Despite several difficulties (Fenn, Liang and Prowse (1997)), SBICs channelled record amounts of equity financing to new small fast-growing companies.
- Slowdown of the venture capital market in the US during the 1970s due to the following factors: economic recession, lack of qualified entrepreneurs to run start-up companies, tax changes making stock-based compensation less attractive, weak stock market conditions leading to a quasi-disappearance of the IPO for smaller firms. The low level of activity of the market has allowed experienced venture capitalists to allocate more time to their firms' portfolio, yielding very high returns on average, paving the way for the industry's explosive growth in the 1980s.
- Regulatory and tax changes at the end of the 1970s to revitalise the venture capital industry, namely the 1978 Employee Retirement Income Security Act's (ERISA) "Prudent Man" rule allowing pension funds to invest in higher-risky investments, including venture capital funds. Two more law and regulation changes in 1980 also contributed to the evolution of the market: the Small Business Investment Act of 1980 reducing the reporting requirements for venture capital firms by redefining them as business development companies as opposed to investment advisers; the ERISA "safe Harbour" in 1980 reducing the legal oversight and potential liabilities of venture capitalists by legally defining pension funds as limited partners.
- Development of limited partnership in the 1980s as the predominant form of venture capital funds. Huge expansion of the market during the 1980s.
- Reduction in fundraising during the 1990-1991 recession reflecting reduced demand for venture capital but also lower asset-quality of a number of large institutional investors, notably banks and insurance companies.

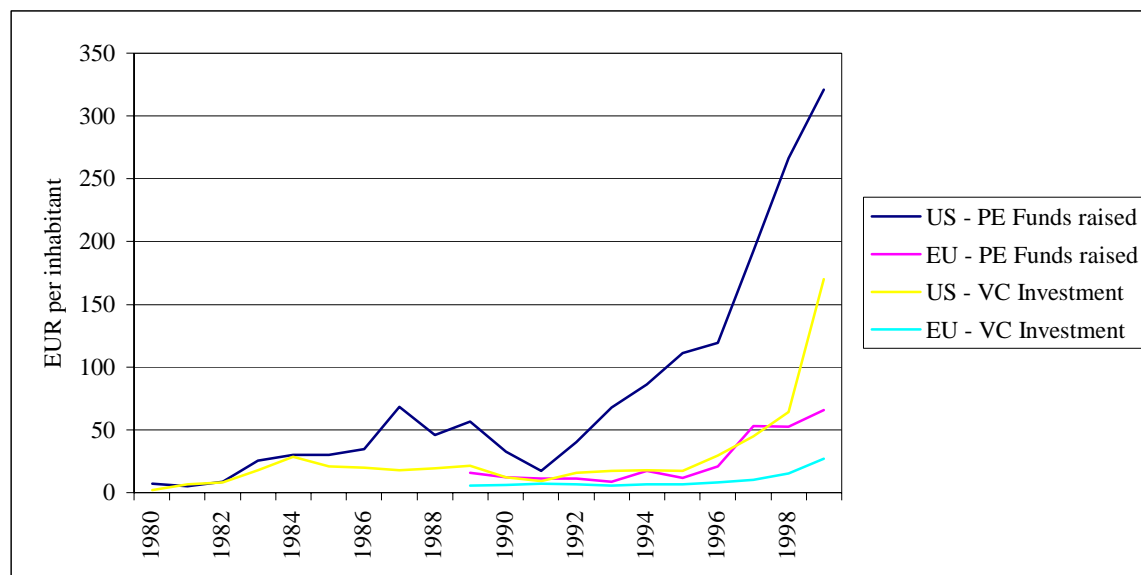
The evolution of the venture capital industry in the US has been affected by macroeconomics shocks, regulatory and legal changes, entrepreneurial ability. The cyclical evolution of the private equity

³² The purpose of this section is not to review in detail the American venture capital market. More information on the venture capital industry can be found in Fenn, Liang and Prowse (1997), Gompers and Lerner (1999)...

market in the US appears in Chart 9, weighting funds raised by the level of population: slowdown of fundraising in 1990 and 1991 and rapid recovery of the market since 1992.

In 1999, the American market recorded a new record – EUR 45.5 billion of funds raised, where for the first time since 1985, venture capital fundraising represented a larger percentage of total private equity fundraising than buyouts. Since the mid 1990s, the gap between the amount invested in venture capital per inhabitant in the US and in the EU has been increasing.

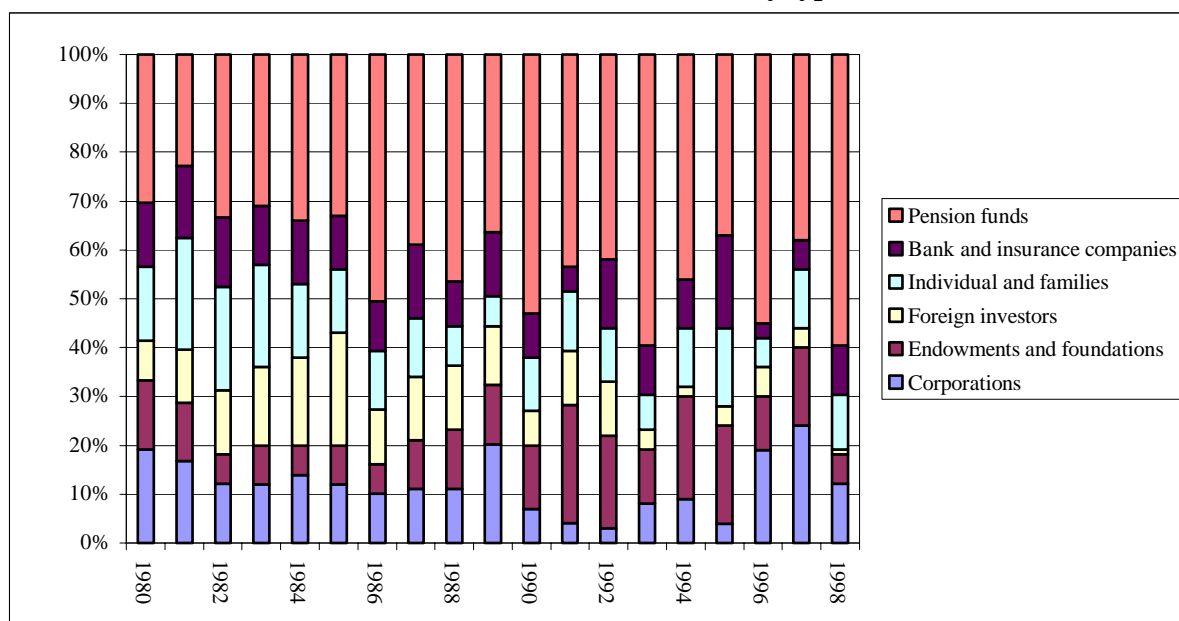
Chart 9: Private equity funds raised and investment in the US and in the EU, expressed per inhabitant



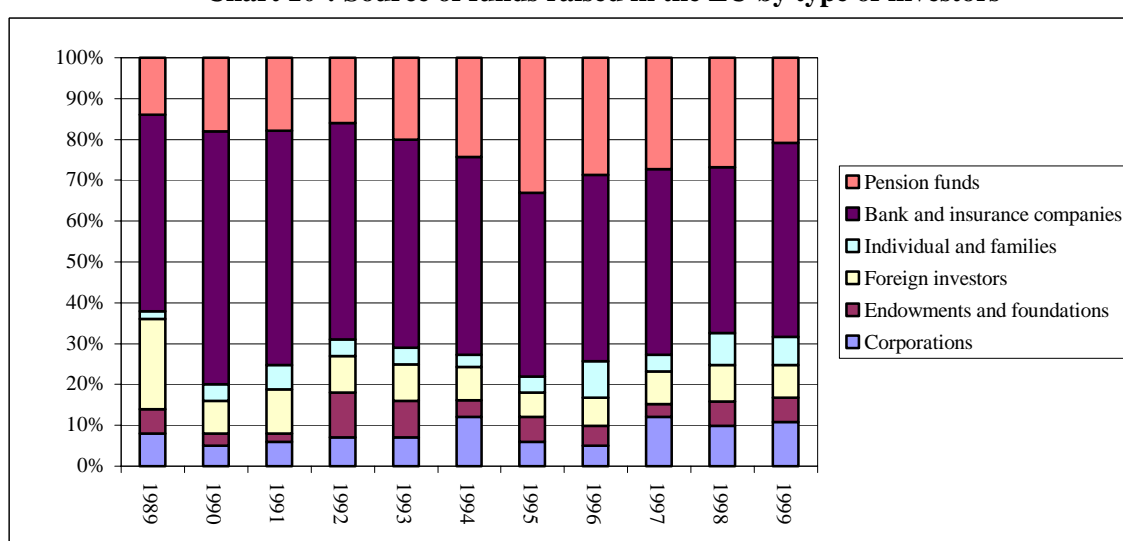
Source: Authors' calculations based on EVCA, NVCA and OECD data

Even if a real start in the venture capital industry has been observed in the EU since 1995, the level of development of this industry is similar to the American situation in the mid 1980s. In 1999, major increase in fundraising and venture capital investment was observed in the US.

The following two charts illustrate the fundraising by type of investors in the US (venture capital only) and in the EU (private equity). The share of funds committed by pension funds has doubled between 1980 and 1998, amounting to sixty percent in 1998. This evolution reflects the regulatory modification achieved in 1968, opening up a large source of venture capital funds. Corporations ranked second in 1998, before “individual and families” and “bank and insurances companies”.

Chart 10: Source of funds raised in the US by type of investors

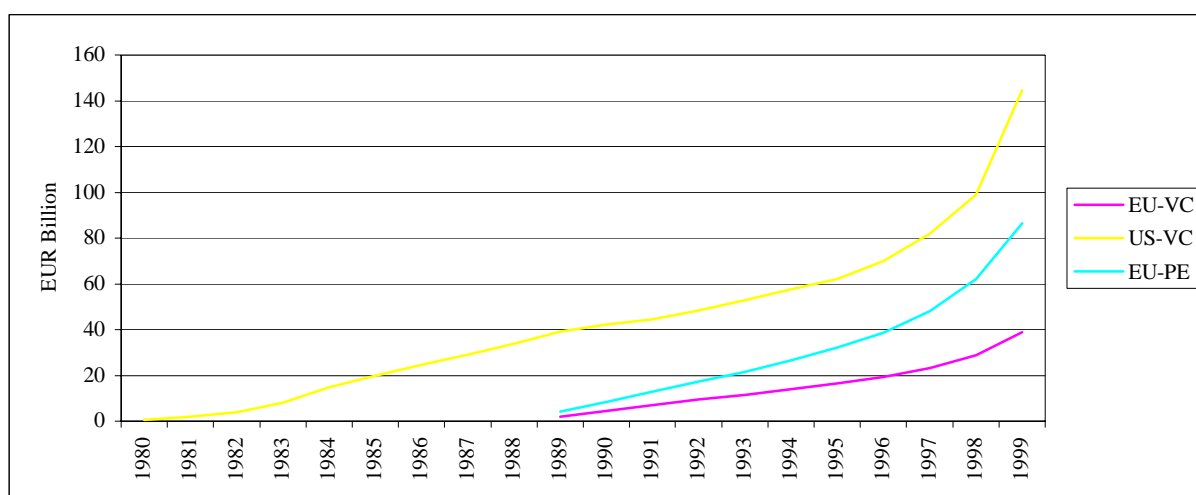
Source: Authors' calculations based on NVCA data

Chart 10': Source of funds raised in the EU by type of investors

Source: Authors' calculations based on EVCA data

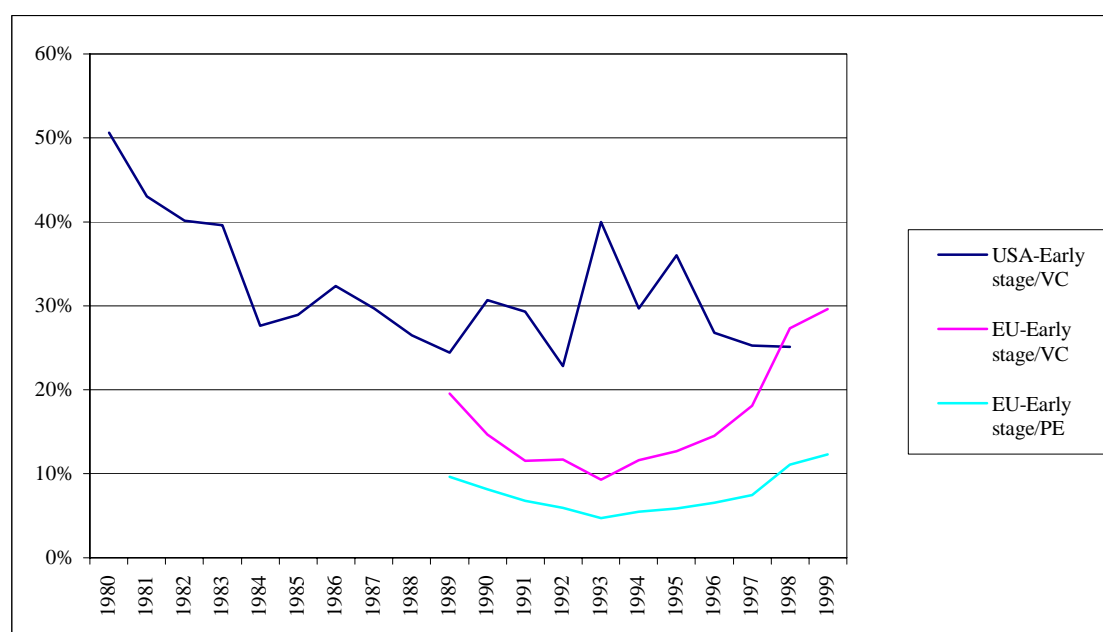
Although the data for the EU covers the private equity market and not only the venture capital one, the contribution of the different types of investor seems to be quite different in the EU. While pension funds have increased their share in a decade, from 14% in 1989 to 21% in 1999, bank and insurance companies are the main contributors to the private equity market, the banks providing more than two times the contribution of insurance companies. Corporations have slightly increased their share. Compared to the US, the contribution of foreign investors (essentially American investors) is not negligible, even if their share has remained stable since 1992.

Chart 11 describes the cumulative funds invested in venture capital and private equity in the EU and in venture capital in the US. Although the European venture capital market is becoming more and more active, the gap with the American market increased during the late 1990s.

Chart 11: Evolution of private equity and venture capital investment in the US and in the EU

Source: Authors' calculations based on EVCA and NVCA data

In 1999, venture capital investment in the USA reached a new record: EUR 45.5 billion. Internet-related companies³³ have attracted more than two-thirds of the funds.

Chart 12: Evolution of early stage investment in percentage of private equity and venture capital investment in the USA and in the EU

Source: Authors' calculations based on EVCA and NVCA data

The sub-category “e-commerce and Web content” companies have attracted a substantial share of funds, in response to the demand for large investments to be able to quickly create name recognition and a leadership position in their respective areas. At the same time, investment in biotechnology, medical devices and pharmaceutical companies recorded a strong increase during 1999.

In Europe, high-technology sectors have attracted more funds during the last two years. Chart 12 describes the share of early stage in venture capital investments. It reflects the higher focus given to high-technology sectors in Europe, reaching at the end of the 1990s a share similar to the American one (even if the difference remains significant in absolute terms). This evolution denotes the greater

³³ Internet-related describes companies that provide content, e-commerce, hardware or services to the Internet economy and such companies are found in all industry sectors.

attention for venture capital by policy-makers in Europe, as an important financing instrument to support the development of innovative small firms. In absolute terms, the amount allocated to early stages in the US is still much larger. The Internet sectors have attracted a lot of high-technology investment in Europe and in the US. If the investment strategy is too focused on one particular area without sufficient spread, it could generate difficulties in a couple of years for some venture capital funds, especially if the market is characterized by important ups and downs.

In terms of performance, the venture capital market in the US reached a new record in 1999, one-year horizon returns for all venture capital funds achieved a 146.2% returns as of 12/31/1999. Short-term performance are not really relevant since investments are highly illiquid. Private equity funds performance is best measured in the long run. With 271 venture-backed companies completing IPO's in 1999, early/seed stage venture funds made the most spectacular gains.

As shown in Table 10, in the long term through December 1999, the average return was around 20%, early/seed stage funds performing better. In the long run, the overall return of the US venture capital industry has been 15-20% since inception³⁴. The very high short-term rate of returns observed in the American venture capital market is related to the very high performance of the IPO market. However, the recent market turbulence seems to have dampened company valuations, especially for those firms reporting losses, and distributions of proceeds back to investors. The market correction has been particularly important for the Internet or dot.com industries.

Table 10: US private equity funds' pooled IRR by stage of investment

<i>Fund type</i>	<i>Net IRR (%) to Investors for investment horizon ending 31st December 1999</i>				
	1 Year	3 Years	5 Years	10 Years	20 Years
<i>Early/seed focused</i>	247.9	75.6	63.2	31.5	22.7
<i>Balanced focused</i>	122.0	46.8	39.8	21.9	16.9
<i>Later stage focused</i>	70.2	33.8	36.4	26.5	18.7
All venture	146.2	53.8	46.4	25.2	18.8
<i>Buyouts</i>	25.9	19.0	18.6	16.6	20.0
All private equity	61.1	31.4	28.5	20.3	19.3

Source: Venture Economics

However, the long term returns to US venture capital funds demonstrates the relatively superior performance of seed and early stage investments compared to the EU situation (see Table 6).

In terms of exit mechanisms (see also section 2.6), the US venture capital investors have generally recourse to IPO or trade sales. Between 1991 and 1996, the US venture capital market has been characterized by its strong IPO market³⁵. After a slowdown in venture-backed IPOs during 1997 and 1998, venture-backed companies completing IPOs has reached a new record in 1999: raising USD 23.6 billion for 271 companies (see Table 11). In 1999, the number of IPOs for venture-backed companies represents more than 50% of total IPOs in the US. Venture funds distributed more than USD 17 billion in stock and cash back to investors contributing to the record-breaking performance of venture funds³⁶.

In 2000, although the attraction for venture-backed IPOs remained strong in the first quarter with a total IPO offering of USD 8.5 billion, stock market turbulence reduced company valuations and distributions of proceeds back to investors, leading to the postponement of public offering. The correlation between the performance of the IPOs and venture capital market has been quite often identified as a main feature of the success of the US venture capital industry.

³⁴ NVCA (1999)

³⁵ Ritter (1998), Gompers and Lerner (1999), NVCA (1999)

³⁶ Venture Economics (2000)

Since 1998, venture stocks perform relatively well on the market, with some venture-backed IPOs producing astonishing result, e.g. eBay produced a 1,240% return from IPO date (Sept. 24, 1998) to year-end. However during 1999, only 25% of firms going public were profitable at the time of the IPO compared with an average of 68% during the past 15 years³⁷.

Table 11: Evolution of IPOs in the US between 1980-1999

	<i>Number of offering</i>		<i>Capital raised (USD Million)</i>	
	<i>Total¹</i>	<i>Venture-backed companies</i>	<i>Total</i>	<i>Venture-backed companies</i>
1980	78	59	962	658.5
1981	202	99	2,386	1,100.3
1982	83	39	1,081	576.9
1983	523	197	12,047	3,783.7
1984	227	86	3,012	1,041.6
1985	215	77	5,488	1,340.6
1986	464	224	16,195	3,215.2
1987	322	129	12,160	2,641.1
1988	121	56	4,053	890.3
1989	113	64	5,212	1,219.6
1990	111	70	4,453	1,448.7
1991	287	164	15,765	5,082.3
1992	396	202	22,198	7,723.9
1993	503	229	29,232	6,999.7
1994	412	171	18,103	4,652.6
1995	464	206	28,866	8,265.2
1996	664	280	41,916	12,217
1997	483	138	33,216	4,950.8
1998	319	78	34,856	3,841.4
1999	485	271	64,752	23,600

1. Number of offerings excluding IPOs with an offer price of less than \$ 5.00, ADRs, best efforts offers, unit offers, Regulation A offerings, real estate investment trusts, partnerships, and closed-end funds.

Source: NVCA (1999), Ritter (1999)

By comparing the well-developed IPO market in the U.S. with the existing one in Europe, the contrast is striking. Part of the difference is cultural: the willingness of U.S. employees to work for young, unstable companies makes it easier to start a firm. Venture capitalists are willing to finance these firms, knowing that an active IPO market will allow them to cash out if the start-up firm succeeds. Because of the immense number of U.S. IPOs, a large infrastructure has developed to create and fund young companies, especially in the high technology sector. In addition to a liquid labour market, the large volume of IPOs in the U.S. can be partly attributable to the protection provided to minority investors by the legal system. Finally, the willingness of U.S. investors, on average, to overpay for IPOs has contributed to the development of the market. In the choice between an additional round of venture capital financing and going public, firms have some success at choosing periods when the public market is willing to pay the highest valuations. As a result, when the IPO market is most buoyant, investors frequently receive low long-run returns³⁸.

The trade sales exit mechanism is evolving in parallel to the IPO market: poor (good) performance on the IPO market increases (reduces) the interest of trade sales as an exit option for venture capital investors. As a consequence, trade sales increased during 1997 and 1998, with a total value of USD 7,9 Billion in 1998 for 184 venture-backed companies. The computer and communications sectors were the ones with the highest number of deals in 1998.

³⁷ Ritter (2000)

³⁸ Ritter (1998)

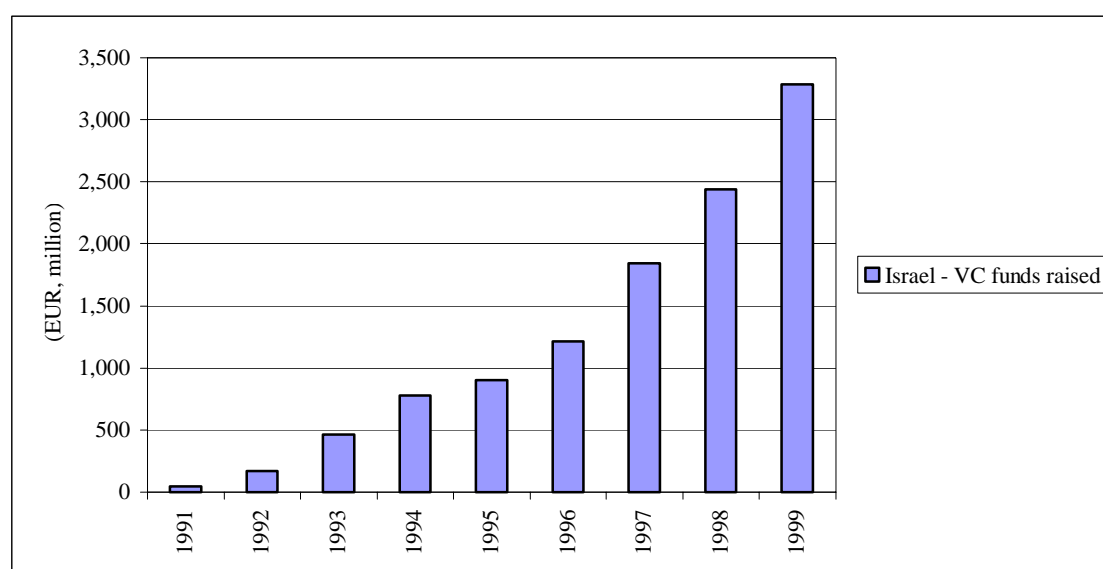
3.2.2 The Israeli venture capital market³⁹

Until 1992, the venture capital industry in Israel was still in its infancy with only one active venture capital fund of USD 30 M: the major suppliers of capital to high-technology companies were large established investment companies belonging to holding groups such as Hapolain, IDB, Leumi, Israel Corp., Koor, Clal and Elron groups.

A major change in the market was implemented by the government in 1992, setting up the Yozma venture capital programme to provide financing for venture capital funds and to invest directly in companies. Yozma also encouraged foreign and local corporations to coinvest in high technology start-ups. In 1993, Yozma provided USD 100 M to establish nine venture capital funds. By 1996, the government decided to exit the market: the venture capital industry has raised more than one billion EUR in 1996 (see Chart 13).

The strong growth of the Israeli venture capital market was sustained by a favourable tax legislation: foreign venture funds which had tax-free status in their home country were granted tax exemption on their investments in Israeli venture capital funds as of late 1996. In addition, the government has implemented favourable taxation laws for individual investors. For instance, persons who are not active in the business of trading securities are exempt⁴⁰ from capital gains taxes in Israel for the sales of securities on the Tel Aviv Stock Exchange (TASE) or for the sales of securities of Israeli companies listed on recognised foreign stock markets.

Chart 13: Cumulative venture capital funds raised in Israel, 1991-1999



Source: Authors' calculations based on IVC-Online/GIZA data

Chart 14 highlights the dynamism of the Israeli venture capital compared to the US venture capital market and European private equity market, by weighting funds raised by population. Expressed with respect to GDP, funds raised by venture capital funds amount to around 0.85% in Israel in 1999 (compared to 0.30% in the EU including all private equity, and 0.57% in the US). The growth of the venture capital market has been particularly sustained during recent years: the first semester of 2000 set a new record in terms of funds raised for high-technology companies.

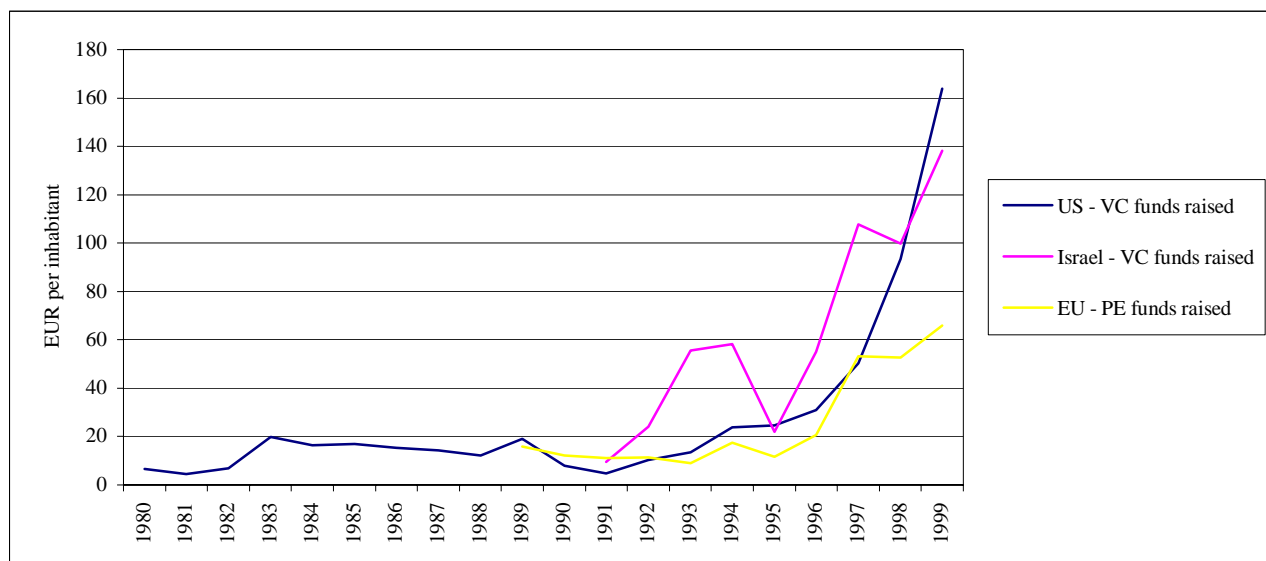
A contributing factor to the increase in the overall venture capital investment is the entry to the market of new venture firms beginning operation in 2000. Those new entrants are major American venture capital funds, reflecting a trend of globalisation of venture capital, mainly due to the intense

³⁹ This section is based on Jeng and Wells (2000) and statistical information found on the web site of IVC-Online/GIZA. Additional factual information can be found in a special report of "Red Herring" about high tech in Israel.

⁴⁰ Individual residents and foreign investors also benefit from favourable conditions on dividends and interest taxation.

competition and oversupply on the US market⁴¹. The entry of major American investors reflects the very strong links of the Israeli market with the US one.

Chart 14: Venture capital market in the US and private equity market in EU compared to Israel



Source: Authors' calculations based on IVC-Online/GIZA

Currently, there are around 46 active funds (with a minimum USD 3 M available for investment) and of the total amount of funds raised between 1991 and 1998 (i.e. around EUR 2.5 Billion – see Chart 13) around 60% have been invested. The recent evolution of the market has shown an increase in the investment made by venture capital funds per round. Most portfolio companies in Israel's venture capital funds are in the early stage with an average company age of approximately 1.5-2 years. Funds have been invested essentially in the high-technology sectors. The start-ups have been quite often created by scientists and engineers who left their previous jobs to start their own companies. In addition, significant immigration flows of skilled scientists and researchers from the former Soviet Union have contributed to Israel's boom in technology research. However, for a few years ago there has been a shortage of high-tech workers, partially due to an emigration of start-ups to the US. The government also plays a role in the attraction to R&D start-ups by venture capital investors, since many of these new enterprises received grants from the Office of the Chief Scientist (OCS) of the Ministry of Industry and Trade. Finally the Binational Industrial Research and Development (BIRD) foundation promotes US/Israeli corporate partnership investments in Israeli high technology start-ups. The average budget is USD 1 M over a 12-15 month period, the BIRD financing half of the R&D expenses but not taking an equity position. Instead, BIRD receives 150% repayment from successful projects.

The Israel's venture capital market is also characterised by the use of the IPO as one of the most important exit mechanism. In addition to the dynamism of their own capital market (TASE), IPO of Israeli venture backed company have been done primarily on the NASDAQ⁴² (e.g., Check Point Software Technologies Ltd and VocalTec Ltd in the Internet sector, Galileo Technologies Ltd in the advanced digital semiconductor devices, ESC Medical Systems in medical equipment) and to a lower extent on the EURO.NM stock exchange market which has attracted more companies recently (e.g., Astra Technological Investments). Finally, trade sales have also become a successfully used by young Israeli high tech companies by focusing on developing technologies attractive to world leading companies. For instance, during 1998, America On Line acquired Mirabilis, a Internet software start-

⁴¹ See *Red Herring*, July 2000.

⁴² Between 1993 and 1998, the number of Israeli venture-backed companies going public in the US was equal to 35, raising USD 1,198 M.

up company for USD 407 M; and GE Medical and UK's Picker acquired two principal divisions of Elscint – MRI and Nuclear Medical division – for USD 370 M.

In short, the development of the Israeli venture capital market is the mix of strong government support, favourable tax legislation and cultural factors like the contribution of the Israeli military elite to the technological development of the country.

4. ECONOMIC IMPACT OF VENTURE CAPITAL

SMEs and among this class of firms, the NTBFs, are playing a significant role in the economic prosperity of European countries. The development of the information and innovative technology stresses the economic importance of small entrepreneurial firms.

Table 12 provides an overview of the stock of businesses in the European Union between 1993 and 1997. The bulk of the business population, by number, is accounted for by business with less than 50 employees. Such firms accounted in 1997 for 53% of total employment and 35% of total business turnover.

Table 12: Stock of businesses in the European Union, 1993-1997

	<i>Micro (0-9)</i>	<i>Small (10-49)</i>	<i>Medium (50-249)</i>	<i>Large (250+)</i>	<i>Total (x 1,000)</i>
<i>Number of firms (%)</i>					
1993	92.8%	6.1%	0.9%	0.2%	17,453.691
1994	92.8%	6.1%	0.9%	0.2%	17,698.996
1995	93.1%	5.9%	0.8%	0.2%	18,273.461
1996	93.1%	5.9%	0.8%	0.2%	18,427.443
1997	93.1%	5.9%	0.8%	0.2%	18,802.423
<i>Annualised rate of net firms creation/closure</i>	196.2%	109.7%	-134.0%	103.1%	187.8%
<i>Employment (%)</i>					
1993	32.1%	18.7%	14.1%	35.1%	111,212.836
1994	33.1%	19.0%	13.8%	34.1%	110,548.396
1995	34.4%	18.9%	13.2%	33.5%	110,393.381
1996	34.4%	18.8%	13.1%	33.8%	111,835.327
1997	34.3%	18.8%	13.0%	34.0%	112,719.704
<i>Annualised rate of net job gains/losses</i>	201.7%	36.4%	-166.2%	-48.4%	33.7%
<i>Turnover¹ (%)</i>					
1993	16.9%	16.7%	21.0%	45.3%	15,918.401
1994	17.7%	18.5%	20.5%	43.3%	16,106.883
1995	17.5%	16.9%	19.8%	45.7%	17,272.629
1996	17.8%	16.8%	19.5%	45.8%	17,358.548
1997	17.7%	17.1%	18.1%	47.1%	18,399.212

1. Turnover in EUR M

Source: Authors' calculations based on Eurostat, NewCronos database

Net job creation rates⁴³ tend to decline drastically with firm size, such that they are negative for large firms while becoming positive for small firms. In other words, SMEs have a higher probability of net job creations than larger firms. The combined effect of a comparatively high net job creation and a large share in total employment results in a significant contribution of SMEs to total job gains and relatively smaller contribution in total job losses. Considering the rate of net businesses

⁴³ This indicator (and the rate of net businesses creation closure) needs to be interpreted with caution, especially at an aggregate level, and only provides an indication.

creation/closure, the SMEs are the most entrepreneurial segments. However, jobs in SMEs are less stable and there is much more turmoil caused by births and deaths than in bigger firms.

Different types of SMEs exist⁴⁴: (i) “life-style firms” with limited growth potential which will only provide a reasonable living for their founders (i.e., the majority of firms); (ii) “middle market firms” with growth prospects of less than 20% annually and funding growth primarily internally and (iii) “entrepreneurial firms” with a vision for growth and having the greatest ability to generate jobs and high returns. Entrepreneurial firms are most likely to fund their growth by seeking venture capital financing.

The challenge for venture capitalists is to identify of the entrepreneurial firms with the highest growth potential⁴⁵. As explained before, fast-growth firms have difficulty locating funding, particularly from more conventional sources like banks.

Venture capital is therefore crucial to sustain the development of SMEs, particularly in their start-up and early-stage phases, and can generate benefits in the following areas:

1. Employment creation
2. Innovation and competitiveness
3. Investment and export sales growth
4. Regional development

4.1. Employment creation

The impact of venture capital on employment creation in Europe and in the US has been addressed in various studies⁴⁶. In Europe, in a survey conducted by Coopers & Lybrand on the basis of 2190 venture-backed companies, the average annual growth of employment has been estimated at 15% between 1991-1995, more than 7 times faster than the top European companies. This result identified at a European level has been confirmed by a study supported by the BVCA for the UK. Between 1993/94 and 1997/98, venture-backed company increased staff levels by an average of 24% p.a. compared with a national growth rate of 1.3% p.a. This growth rate is substantially higher than the evolution for the FTSE 100 (and mid-250) companies. Performance in terms of job creation of companies quoted on the European growth-company markets provides additional insights⁴⁷. On the Neuer Markt, the 63 companies quoted end 1998 created some 21,000 jobs between 1996 and 1998 (i.e. an average employment growth of 40% per year). For companies quoted on the Nouveau Marché, the average employment growth over the last three years was around 47%.

The same effect has been observed in the US. The 1998 NVCA annual study showed that between 1992 and 1996, venture-backed companies increased their staffs on average by 40% p.a. which outperformed Fortune 500 companies (on the same period, staffs have been reduced by 2.5% per year). In addition, since those companies are often active in high technology sectors, they contribute directly to the creation of high skilled jobs, over four times the percentage of similar positions in the US economy as a whole (1998 NVCA survey).

In a recent survey of UK high technology venture capital, more detailed information has been provided on the potential job creation by sector and for different stages (see Table 13).

⁴⁴ Van Osnabrugge and Robinson (1999a)

⁴⁵ See Schreyer (2000) for an analysis of high-growth firms in a limited sample of countries and OCDE (2000).

⁴⁶ e.g. EVCA study made by Coopers & Lybrand Corporate Finance (1996), BVCA study made by PriceWaterHouseCoopers (1999), NVCA study made by Coopers & Lybrand/VentureOne (1998)

⁴⁷ European Commission (1999b)

Table 13: Average employee growth* per Company in the UK

	<i>Total</i>	<i>Early stage</i>	<i>Expansion</i>
<i>Biotech/Healthcare</i>	38	46	21
<i>Communications</i>	27	28	27
<i>Electronics & Engineering</i>	11	26	8
<i>IT</i>	35	42	29
<i>Total</i>	30	41	22

Source: BVCA (1999)

*: The average employee growth per company has been calculated taking into account the number of employees at the point of investment and the number of employees at the time of exit or as at 30 June 1998 if an investment is not exited.

The highest job creation rate appears in early stage financing of biotechnology/healthcare firms and of information technology firms. Indeed, the hiring of knowledge workers is directly associated with the amount of funds committed to R&D. Those results have been confirmed by other UK studies⁴⁸ showing that it is the small share of high-technology or innovative start-ups, probably 3-4% of all start-ups, which will provide 50% of employment out of all surviving firms in ten years' time. Similarly in the US, these entrepreneurial firms represent about 4-8% of the one million start-ups per year and have accounted for 70-75% of net new jobs⁴⁹.

4.2. Innovation and competitiveness

Venture-backed companies directly contribute to the development of new technology. In the 1998 NVCA survey, over 80 percent of the venture-backed companies develop technology-based products and services, especially in electronic, biotechnology and healthcare. These companies grow their annual R&D budget by over 30 % p.a., about three times the rate of Fortune 500 Companies. In addition, venture capital backed-SMEs have the flexibility rapidly to change direction as technologies develop, and provide a more supportive environment for R&D. Through IPOs or trade sales they help fill the pipeline of new products of large companies.

A recent study⁵⁰ investigates the relationship between venture capital, R&D and innovation in the US. Having corrected for causation problems in the relationship between venture capital investment and innovation, the analysis of patenting pattern across industries over a three-decade period suggests that the effect of venture capital on innovation is positive and significant. They infer from their analysis that "a dollar of venture capital appears to be three to four times more potent in stimulating patenting than a dollar of traditional corporate R&D". Although venture capital only represents less than 3% of corporate R&D between 1983 and 1992, it is responsible for around 10% of U.S. industrial innovation. The acceleration of venture capital investment implies that in 1998 venture funding accounts for about 15% of US innovation activity, assuming the same potency to promote innovation as from 1983 to 1992.

The contribution of venture capital to innovation in other countries can also be assessed by looking at the allocation of funds by sector. The development of venture capital in Israel seems to have boosted innovation. The two programmes initiated by the government in 1991 to promote venture capital have boosted investment by foreign high-technology companies in Israeli R&D and manufacturing facilities (see section 3.2.2).

To have a first assessment of venture capital investment on innovation, Chart 15 examines the relationship between the average annual growth of the inventiveness coefficient⁵¹, defined as the number of resident patent applications per 10 000 inhabitants, and the average annual growth rate of venture capital per inhabitant in the EU and in the US between 1989 and 1999. A positive relationship

⁴⁸ Storey (1994)

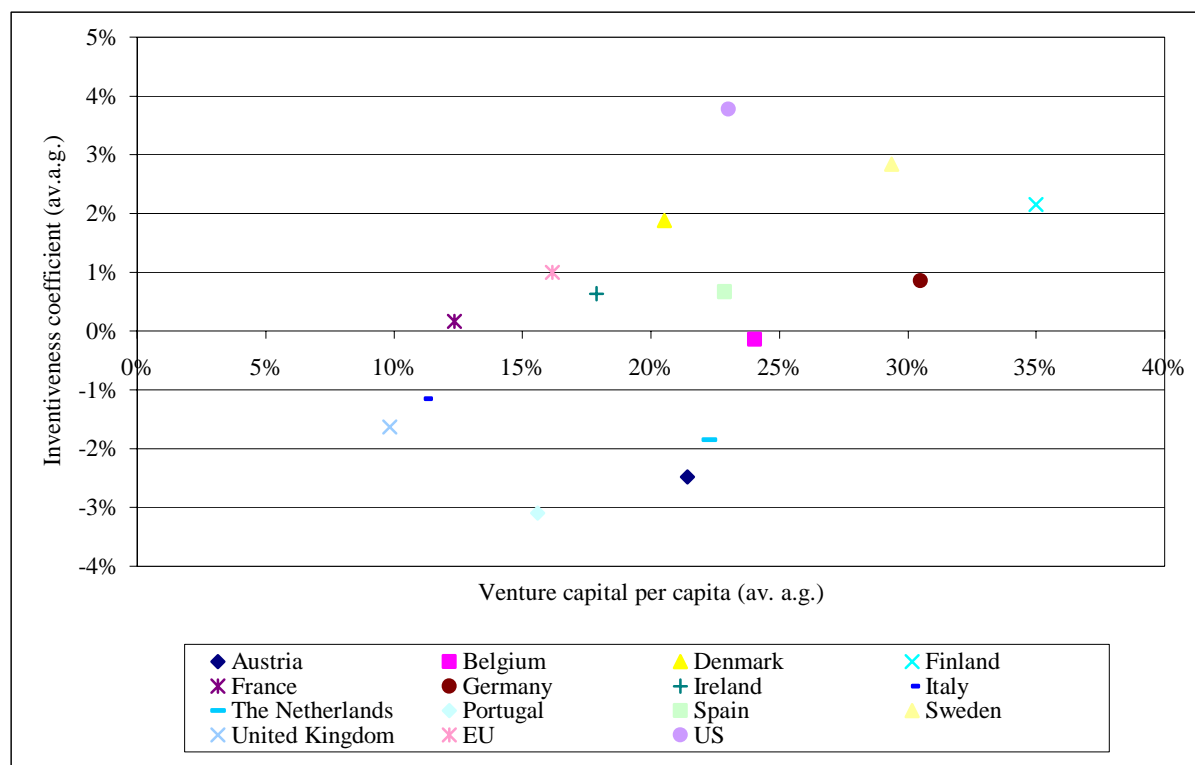
⁴⁹ Van Osnabrugge and Robinson (1999a)

⁵⁰ Kortum and Lerner (2000)

⁵¹ The data concern the number of patents applied for, via national, European and other international procedures, by residents of the country concerned. This gives an idea of the production of technology and allows the derivation of indicator like the 'inventiveness' coefficient.

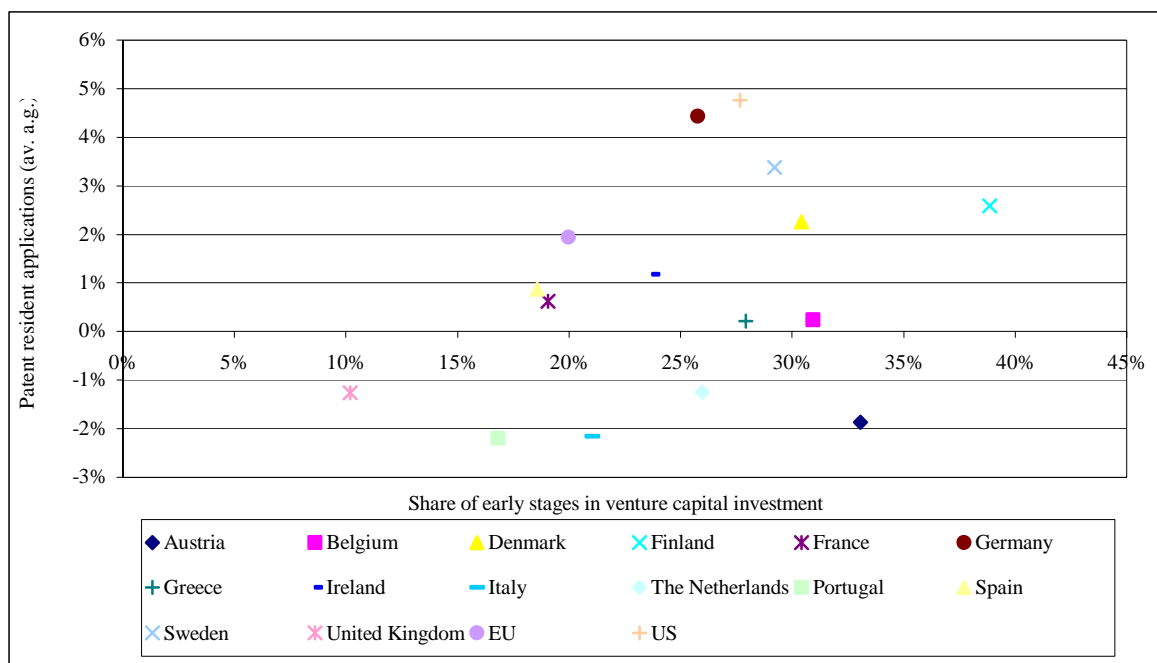
exists between the amount invested in venture capital and the innovation capacity of a country. The UK, allocating a low proportion of private equity to venture capital, has a low level of performance in terms of innovation while for the US and the Nordic countries, the reverse applies. However, Austria, the Netherlands and to a lesser extent Belgium, have a relatively high level of venture capital investment without inducing a positive effect on innovation.

Chart 15: Venture capital and innovation



Source: Authors' calculations based on EVCA and OECD-MSTI data

Considering the relationship between the share of early stages in venture capital investment (in cumulative terms) and the average annual growth of patent resident applications, the results are relatively similar, with the exception of Germany where a strong positive relationship between early-stages investment and innovation appears (see Chart 16).

Chart 16: Early stages investment and innovation

Source: Authors' calculations based on EVCA, OCDE-MSTI data

Among the countries which do not achieve high performance in terms of innovation, the UK, Portugal, Italy are also allocating a lower share of venture capital investment to the early stages.

This simple analysis⁵² seems to demonstrate the potential contribution of venture capital investment, especially in technology-intensive ventures, to innovation and by extension, to the level of competitiveness of a country.

4.3. Investment and export sales growth

Venture-backed companies also demonstrate high performance in investment and export sales. In the EVCA study, they show that general investments and export sales of venture-backed company grew, respectively, at an average rate of 25% and 30% per year. The same observation was made for the UK.

In the US, the 1998 NVCA survey reports an average growth of sales of 66.5 % p.a. between 1992 and 1996, compared to only 4.9 percent for the Fortune 500 Companies. Since venture-backed companies try to quickly reap the benefit of their technological breakthrough and to maximise revenues over a technology product's increasingly short life, they have an incentive to turn to international markets relatively quickly. Between 1992 and 1996, annual growth of export sales was estimated around 165 percent.

4.4. Regional development

Venture capital has been often considered as an efficient financing instrument in regional policy to favour high-technology industries and regional growth. Specific instruments based on early, targeted financing have been put in place by regional authorities, like in Munich, to attract and nurture companies in fast-moving business.

The agglomeration processes of high-tech firms in a region are the result of two main opposing forces: concentration and dispersion⁵³. Agglomeration forces, because of increasing returns, cause economic activity to cluster, whereas centrifugal (or congestion) forces push economic activity outward. Factors attracting high-tech firms are, in addition to the "cost-of-doing-business" measures (like tax rates and incentives, land and office space costs, energy costs):

⁵² The analysis need to deepen, namely to evaluate the potential correlation between patent applications and venture capital investment.

⁵³ See the development of the new economic geography.

- Access to trained/educated workforce;
- Close proximity to high quality educational facilities and research institutions; existing network of suppliers;
- Availability of venture capital;
- Climate and other quality-of-life factors including cost of living.

Clustering of high-tech firms and venture capital result from the existence of knowledge spillovers, specialized labour markets and the presence of critical intermediate producers (venture capitalists, lawyers and accountants). Indeed, venture capital firms are clustered in areas characterised by both established financial centres and high concentration of economic activity. In the US (Silicon Valley, Route 128 (Boston), Austin) as well as in Europe (London, Düsseldorf region, Paris, Stuttgart region, Cambridge, SiliconGlen, Munich region, Stockholm), a regional concentration of venture capital has been observed. This trend results from the information and governance advantages of a close proximity between investors and investees.

However, this geographical concentration induces a regional equity gap. For instance, in the UK, depressed regions in the Midlands and northern England are net exporters of equity finance to the most successful southern regions, such as Cambridge-shire in East Anglia⁵⁴.

5. DETERMINANTS AND CONDITIONS FOR THE DEVELOPMENT OF VENTURE CAPITAL MARKET

Venture capital markets in the US and in Europe differ substantially both in terms of size and substance. If the economy is growing quickly, more attractive opportunities exist for entrepreneurs to start new firms and hence, more investment opportunities for venture capitalists. In addition to the macro-economic environment, different factors and conditions affect the development of venture capital market. The venture capital industry adjusts to shift in the supply of capital or/and the demand for financing. Various factors could favour the emergence of dynamic venture capital market in the EU and explain the difference observed between the US and European venture capital markets.

5.1. Exit mechanism and stock markets

When investing in a company, venture capitalists receive both a residual interest in the firm's value (in the form of convertible preferred stock or debt) and significant control rights (explicitly, e.g. by the right to remove the executive, and implicitly, e.g. by the staged funding process). The intervention of venture capitalists to sustain start-ups is not limited to the provision of funds. The relationship between venture capitalists and entrepreneurs includes other monitoring and control arrangements: management assistance, intensive monitoring of performance and reputational capital⁵⁵ (see section 2.3). The provision of financial and non-financial services by venture capitalists loses its efficiency advantages as the portfolio company matures. The ability for the venture capitalists to recycle its non-financial contributions requires an appropriate exit mechanism.

The efficiency of the IPO as an exit mechanism has been identified by various authors⁵⁶ and in the UK and in the US, a correlation has been observed between the level of IPO activity and the value of venture capital funds raised⁵⁷. The growth of the American venture capital industry in the early 1980s was mirrored by a similar growth in venture-backed firms going public⁵⁸. The decline in fundraising in the late 1980s was actually preceded by a decline in the initial public offering market. The same

⁵⁴ Murray (1998)

⁵⁵ Jeng and Wells (2000), Black and Gilson (1998)

⁵⁶ Gompers (1995) shows that venture capital funds earn an average 60% annual return on investment in IPO exits, compared to 15% in acquisition exits. In a Venture Economics study, they show that 1\$ invested in a firm that eventually goes public yields a 195% average return for 4.2 year average holding period. The same investment in a acquired firm only provides an average return of 40% over a 3.7 year average holding period.

⁵⁷ Bank of England (2000)

⁵⁸ Gompers (1998)

pattern was observed during the 1990s and the recent shut down of the IPO market (second quarter of 2000) could be the signal of a reverse trend in the fundraising of venture capital in the US.

This evolution reinforces the linkage between the public and private equity markets and hence the correlation between the returns obtained on those two markets. Different patterns of evolution have been observed in the U.S. and in Europe in terms of recovery of the public market. While the U.S. market recovered in the early 1990s, the European market remained depressed. Consequently, European private equity investors were unable to exit investments by going public. They were required either to continue to hold the firms or to sell them to large corporations at often unattractive valuations. While U.S. private equity investors – pointing to their successful exits – were able to raise substantial amount of new capital, European private equity fundraising during this period remained depressed. The influence of exists on the rest of the private equity cycle suggests that it is a critical issue for funds and their investors. As a consequence, any substantial correction on stock markets will have serious consequences on the dynamisms of the private equity market.

In addition, the IPO-exit route will affect the demand (entrepreneurs and investees) and supply of venture capital funds (investors). On the demand-side, the higher probability for the entrepreneur to regain control of the firm will increase the incentive to start a new business. Trade sales of a start-up company to a larger company entail a loss of control for the initial entrepreneur. In other words, the structure of the capital market will sustain greater entrepreneurship. On the supply-side, the IPO mechanism will provide an efficient mechanism for the capital providers in order to assess the efficiency of funds manager and to screen between the various venture capital funds.

5.2. Regulatory environment

The development of the venture capital industry is affected by regulatory changes in terms of capital gains taxation, prudential rules for pension funds, labour market flexibility and property rights protection.

The effect of capital gains taxation on commitments to the venture capital industry in the US has been analysed by various authors⁵⁹. Reduction of capital gains taxes is expected to have supply-side effects, especially for informal venture capitalists. Indeed, up-front tax relief is cited by a great proportion of active business angels as having a significant effect on encouraging investment. In Europe, savers do not have the same self-determination as in the US, since small savers do not have access to the same tax breaks enjoyed by big funds, like pension-fund tax breaks.

On the demand-side, reduction in capital gains taxes can induce more corporate employees to become entrepreneurs. Indeed, as most of the reward from being an entrepreneur is in the form of capital appreciation on the equity of the company compared to salary and cash bonuses for managers which are taxed at the ordinary income tax rate, the capital gain tax rate is a crucial variable⁶⁰. Additional effects on the demand-side could be achieved by lowering the small company tax rate and introducing R&D credits to establish a favourable tax environment. In the UK, various initiatives have been taken in order to reduce the rate of the capital gains tax⁶¹.

The modification by the U.S. Department of Labour of the Employment Retirement Income Security Act's (ERISA) "prudent man rule" in 1978 has affected the fundraising for venture capital. Indeed, this regulatory change has allowed pension funds to invest in venture capital. It provides various advantages for venture capitalists⁶². First, venture capitalists are able to raise quickly a large amount of capital by approaching a few large pension funds. Second, by reducing the number of investors, it reduces the time spent by venture capitalists to keep their investors informed of activities. In various European countries, pension funds are not active players in the venture capital market. Only four of the Member States (Finland, Ireland, the Netherlands and the UK) have no legal restrictions – beyond

⁵⁹ Poterba (1989), Gompers and Lerner (1998)

⁶⁰ Poterba (1989)

⁶¹ Bank of England (2000), p. 70

⁶² Jeng and Wells (2000)

a general requirement for prudence – on investment in equities by pension funds⁶³. The reticence of “risk-averse” pension funds investing in venture capital needs to be overcome, especially for early-stage investment.

Regulation on the labour market could also affect venture capital growth. For instance in Germany, employees have strong layoff protections. The same argument is used to explain the low development of venture capital in Japan⁶⁴. Labour market rigidity should impact the demand for venture capital funds negatively. Reduced mobility of workers due to strict labour laws or internal seniority rules impose costs on start-up businesses and thus discourage their formation. The impact of this constraint on the vitality of the venture capital market has to be qualified by distinguishing between low and high-skilled workers, who have a different propensity to mobility.

Finally, the degree of intellectual property rights protection is a key issue in the development of a venture capital market oriented to high-technology sectors or early stage investment. Indeed, by allowing venture capitalists to secure investment, by at least patenting results of R&D (like in biotechnology) or having copyright protection (like in content industries), intellectual property rights offer a collateral in the case of default.

5.3. Cultural differences in entrepreneurship

An additional factor often quoted to explain the difference in the dynamism of the venture capital market in the US and in Europe is the lack of entrepreneurial spirit in European countries. The argument is that since European managers are less entrepreneurial and less willing to risk failure than Americans it leads to lesser demand for venture capital services. As stressed in the last report from the Bank of England on the finance of small firms, “strong entrepreneurial spirit and the desire to succeed whatever the circumstances is believed to differentiate entrepreneurs in the US from those in the UK” (and elsewhere in Europe). Modification in the insolvency legislation can contribute to reduce the stigma attached to business failure.

However, the importance of this cultural difference is difficult to assess and has to be related to the incentives affecting the demand for equity finance by SMEs. As explained before, the recourse to venture capital implies a loss of control for the owner-manager since venture capitalists require to be involved in the management of their investee businesses, to have a substantial equity stake and representation on the board... The organisation of SMEs in Europe, i.e. more “life style” business or family-oriented, means that the entrepreneur puts a higher value on keeping control of its business. The additional value brought by venture capitalists in terms of financial stability and managerial skills will reshape the internal functioning of SMEs.

The “cultural pattern” could also affect the supply-side of venture capital. Indeed, the lack of training in high-technology field of European venture capitalists could explain the reluctance to invest in high-technology sectors, making later stages financing more attractive since it is much easier to value already profitable businesses. A recent study for the UK⁶⁵ stresses the fact most venture capitalists have studied non-technical subjects at university and have a professional experience in accountancy or finance. This situation seems to be more specific to Europe while in the US and in Israel venture capitalists have a better understanding of technology (due to scientific backgrounds or engineering studies). This cultural difference is strengthened by the greater experience of US venture capitalists in the high-technology sector and by the existence of economies of scale in the market compared to European national markets.

Finally, the lack of information on the available venture capital funds and the inadequate preparation of smaller companies for venture capital investment could also deter potential investors from injecting funds in start-ups.

⁶³ A new EU Directive on occupational retirement provision is under consideration to remove the regulatory constraints prevailing in the EU (see European Commission (2000b)).

⁶⁴ Black and Gilson (1998), Jeng and Wells (2000)

⁶⁵ Robinson and Van Osnabrugge (1999b)

5.4. Maturity of the market and efficiency of operations

The development of the venture capital market and the associated increase in venture capital fundraising observed in the US is affecting the operation and efficiency of the market. An significant inflow of venture capital funds affects the price of the transaction. Competition to finance worthy projects may increase the prices that are paid to invest in these companies, and affect the returns on investment in the industry. At the same time, increased availability of funds for venture capital deals can lead to investment in bad projects or in a proportion which are not rational given any reasonable expectations of industry growth and future economic trends.

This evolution also affects the pattern of investment. Because funds have tended to become larger in real dollars terms, especially since the entry of private funds in the market, many venture capital organisations have attempted to increase the capital per partner and tried to identify deals allowing the investment of larger amounts of money.⁶⁶ For instance, the mean financing round for a start-up firm has climbed (in 1996 dollars) from \$ 1.6 million in 1991 to \$ 3.2 million in 1996. In practise, this evolution has induced a movement to finance later stage companies that can absorb larger blocks of financing. This could create an equity gap for young, emerging companies and reduce the number and quality of later stage investments. This evolution of having the venture capitalists eschewing small investments could simply reflect the fact that those investments were not profitable because of either the high costs associated with the transactions or the poor prospects of the thinly capitalised firms. Consultants, legal advice and venture capitalists' input all benefit from economies of scale, making large deals relatively more economical. Intervention of business angels could partially solve the capital gap for early stage companies. Indeed, the informal venture capital market plays a predominant role in financing early stage or start-up companies⁶⁷. Business angels rely primarily for their information on potential deals on informal networking arrangements of friends, family and other angels. Hence, they invest close to home (also to minimise travel) and share information with co-investors to reduce risks and to induce reciprocity in the future. The selection of the deal is based on the knowledge or comfort about the entrepreneur, and to lower extent on the business plan and the growth potential of the firm.

Another strategy to increase the size of the investment is to reduce the size of the investment syndicate. Syndication, i.e. bringing in other venture firms, is considered as a useful mechanism to aid in the due diligence, provide additional insights and help monitor firms in progress. It improves the quality of the investment and reduces the exposure to risks. However, the lower propensity to syndication can affect negatively the quality of the deals.

Finally, the level of maturity of the market may also modify the contractual terms of the limited partnership agreements. As explained before, compensation and covenants are critical for aligning the incentives of venture capitalists with those of the investors. When venture capitalists can raise money without difficulty, they are able to negotiate more favourable terms with the investors, i.e. increase fees and reduce restrictive covenants.

Although the UK equity market has not reached the same level of maturity as the US one, it continues to be the largest and most developed in Europe, accounting for 49% of total annual European venture capital investment in 1998. The evolution of the private equity market is strongly oriented towards large MBO/MBI deals⁶⁸. Although the value of funds available for early stage and start-ups firms has increased, the proportion of funds directed to this type of firms has fallen from 10% of total investments in 1988 to 7.6% in 1998. One reason, as discussed for the US market, is the current preference of the UK private equity industry for larger deals: the average deal size for BVCA members rose from £957,000 in 1988 to over £3 million in 1998. This evolution reflects the cost and

⁶⁶ Gompers (1998)

⁶⁷ Prowse (1998) reports estimates from Freear et al. (1996) for the US that around 250,000 business angels invest between \$10 billion and \$20 billion in around 30,000 firms annually. It makes the angel market several times larger than the venture sector of the organised private equity market (where commitments in 1995 totalled \$6.6 billion), and close to the gross funds raised by non-financial firms in IPO (\$20 billion in 1995) (see also Lerner (1998) and Lund-Wright (1999)).

⁶⁸ Bank of England (2000)

lack of expertise to evaluate and monitor a relatively large number of small investments and the recent increase in the value of funds to be invested. The shift to MBO/MBI and latter stage deals is reinforced by the strategy of the pension funds allocating 90% of their funds to large MBOs.

As in the US private equity market but to a smaller extent, business angels⁶⁹ counterbalances the equity gap by providing funds to smaller deals at the start-ups and early stage. The involvement of business angels acts as a leverage effect making attractive the co-intervention of banks and venture capitalists in the deals (due to the active role played by business angels to advise and monitor those companies). A key barrier to business angel investment is the lack of information on investment opportunities⁷⁰. Business angels want to preserve their anonymity to avoid too numerous unsuitable requests and as a consequence act on a local basis, selecting investment on the basis of the recommendations from family or friends. The creation of the network allows a better dissemination of information and offers the opportunity for co-investment. In addition, the network is able to offer advice on formulating business plans and making investments. To be successful the implementation of a business angels network needs to fulfil a set of conditions⁷¹: (i) public sector funding because they are unlikely to recover all of their costs through fees; (ii) close co-operation between informal and formal angel networks as well as between networks and venture capital institutions; (iii) sufficient size of the network to benefit from economies of scale and (iv) strong links with business incubators and technology commercialisation officers in universities and other research centres.

5.5. Risks and returns

The supply of venture capital is affected by the risk-returns pattern. Compared to the other classes of financial instrument, venture capital is considered to be at the more risky end of the investment spectrum, with on average only 2 out of 10 investments meeting their initial targets. Even within the venture capital, the risk-returns profile differs with the stage of financing as stressed in Table 2. Higher returns are expected for early stages. However, referring to Tables 6 and 7, it appears that the returns of more risky financing stage, i.e. early stages, have been lower than the ones recorded for later stage. This observation is confirmed for instance by the performance of the UK market, where MBO/MBIs have generated greater returns than early stage investments. This statement may result from the fact that the UK MBO market largely involves investment in firms with a track record working in a tested market and at the same time, private equity funders are more aware of the structure of this type of financing.

However, a recent report from the BVCA\WM shows that early stage investments in high technology firms have provided higher returns than MBO/MBI high technology investments, i.e. 28.3% compared with 19.5%. This evolution is more in line with the US market (see Table 8) where the rate of returns on early stages has been particularly high, namely due to a strong IPO market.

6. INSTRUMENTS AND POLICIES TO SUPPORT VENTURE CAPITAL DEVELOPMENT IN EUROPE

The development of the private equity and venture capital market has attracted much attention from policy makers. Supportive measures can vary widely from providing legal infrastructure to establishing funds that invest directly in private equity projects. This section⁷² reviews the role of government programmes in the EU and in various Member States.

⁶⁹ In the UK, considered as having the most developed informal venture capital market in Europe, the number of active and potential investors is estimated around 18,000 with a current annual investment in the order of £500 million in about 3,500 businesses (Masson and Harrison (1997)).

⁷⁰ Bank of England (2000)

⁷¹ European Commission (2000a)

⁷² This section does not aim to provide a comprehensive survey. Additional information on public initiatives to encourage venture capital funds could be found in Gompers and Lerner (1998), European Commission (1999, 2000c) or OECD (1997, 2000).

6.1 Public versus private venture capital support

Based on the recognition of the potential importance of venture capital to the economy and the existence of potential market weaknesses or failures in the provision of finance to SMEs (and especially NTBFs), public authorities⁷³ have implemented policies to incentivise the development of the venture capital markets. A distinction can be made between direct/indirect interventions and supply-side/demand-side measures. Schemes based on a direct intervention in the venture capital market mean the creation of state-sponsored venture capital funds or measures leading to a direct state intervention in the market, for instance through the creation of public incubators. Indirect intervention in the venture capital market concerns schemes aimed at the improvement of the functioning of the venture capital industry infrastructure. Both types of interventions could be concentrated either on the demand-side (entrepreneur) or the supply-side (venture capital funds, investors). Table 13 summarizes the discussion and identifies various measures implemented at the European and national level.

Table 13: Policy measures to support the venture capital market

	<i>Demand-side measures</i>	<i>Supply-side measures</i>
Direct intervention	<ul style="list-style-type: none"> • Public incubators (DD1) 	<ul style="list-style-type: none"> • Public (-sponsored) venture capital funds (DS1)
Indirect intervention	<ul style="list-style-type: none"> • Promotion of enterprise and entrepreneurship (ID1) • Management and skilled workforce (ID2) • Business incubators, Science and technology parks and clusters (ID3) • Tax incentives (ID4) 	<ul style="list-style-type: none"> • Down-side protection scheme (IS1) • Upside leverage scheme (IS2) • Fund's operating costs scheme (IS3) • Exit schemes (IS4) • Tax incentives (IS5) • Business angels network (IS6)

Improving the supply of equity finance to start ups and new technology-based firms is an important condition to sustain the development of a dynamic venture capital market and alleviate economic and financial constraints on investment. In order to develop healthy and successful NTBFs across Europe, actions need to be implemented to develop a stronger core of highly skilled entrepreneurs to provide the business credibility that will attract the finance in the first place. In short, to overcome the lack of entrepreneurial culture, various types of intervention on the demand-side can devise.

The promotion of enterprise and entrepreneurship (ID1) aims to sustain the demand for venture capital, especially among university scientists and engineers. This type of intervention tries, for instance, to stimulate the development of technology-based businesses out of the University's academic base. A greater proportion of new ideas or inventions will be translated into new products if those people having sufficient technical expertise are able to start new businesses. The ability to attract employees to new businesses, i.e. decision on whether to leave stable employment and establish a business, is constrained by labour market and taxation policy (ID2). Flexible labour laws and easily transferable pensions will help to promote labour mobility. In the same vein, stock options and

⁷³ The role played by the direct intervention of the public authorities in the venture capital industry has been questioned recently in the literature (see Leleux, Surlmont and Wacquier (1998)). Arguments could be made to cast some doubts on the overall benefits of this type of intervention. First, most civil servants and government employees in place to manage the fund are not the most qualified to select and support entrepreneurial companies. Second, the incentive structure of public venture capital funds may be less effective to counter the agency problem inherent in the fund structure and properly incentivise the funds managers. Finally, if the strategy of the public venture capital funds is to finance at below-market required rates, they may attract the best projects leaving only "lemons" for private venture capital funds and creating barriers to entry for new funds. Based on an pan-European empirical analysis, Leleux, Surlmont and Wacquier (1998) identify some crowding-out effect (and not a cross-spawning effect) of the direct intervention of public authorities in the venture capital market, i.e. national markets in Europe where public involvement is important and investor protections poor and unreliable, tends to develop smaller venture capital industries. In addition, it appears that public venture capitalists seem to be more oriented to later stage deals (because generating higher employment creation and being less risky). But, they are not able to clarify the direction of causality, i.e. is the lack of private equity funds forcing state intervention in the venture capital industry or is the latter preventing the emergence venture capital industry.

reduction of capital gains tax will positively affect the decision to develop a new business. Finally, investment in education and R&D will contribute to generating future demand for venture capital.

The creation of business incubators⁷⁴, either owned directly by public authorities (DD1) or by the private sector (ID3) aims to promote entrepreneurship by providing some combination of office space, accounting and legal services, and other components of “instant corporate infrastructure”. The rationale for setting-up incubators is to provide managerial support for start-ups in order to avoid failure due to bad management. A young firm is expected to leave the incubator after its first few critical years. The main advantages brought by business incubators are:

- Direct creation of jobs;
- Synergy by bringing complementary enterprises and assets into physical proximity;
- Financial support and connection to business angels who seek investment targets.

Various countries have developed business incubators which seem to have a positive impact on the failure rate of new companies. The location of the business incubators will be affected by local conditions (access to markets, sufficient business expertise in the community, commitment of local authorities...) and will also attract new investment and contribute to the local economic development. Incubators are quite often located close to higher education institutions. Finally, some sectoral specialisation can be observed among incubators: targeted incubators focus on start-ups in a specific industry or sector, like biomedical, Internet etc.

The development of business incubators is closely related to the clustering of business and financiers (like in Silicon Valley), encouraging networking and dissemination of ideas, with small companies benefiting from the expertise of those around them and also from being able to use the latest products in their own business.

Science and technology parks share some similarities with business incubators but are less-oriented towards the commercialisation of outputs. The main characteristics are⁷⁵:

- Involvement in high-tech activities, but very few engaged in applied research or mass production;
- Objective to generate new high-tech firms through spin-offs or to bring in other forms of new investment;
- Link to facilities involved in basic research;
- Support from local authorities in the form of tax reduction, land and other incentives.

As for business incubators, the success of science and technology parks is constrained by the location close to metropolitan areas that offer high-quality infrastructure and a reputable university. Even if empirical evidence indicates that business incubators contribute to the development of start-ups, it is still questionable if they create real value or simply expropriate part of the value generated by start ups.

Incentives to stimulate the supply of venture capital from established capital markets and from informal investors aim to solve the equity gap which NTBFs experience. The scale of direct public intervention is relatively greater in the seed capital area where the majority of funds are provided by public authorities. For start-ups and early stage firms, the public sector is more likely to act as “cornerstone” investor with the majority of funds raised from the private sector.

Given the high risks related to NTBFs, it is not uncommon that a significant proportion of the investee firms in a portfolio result in full or partial loss of the venture capitalist’s investment. This potential adverse outcome skews the risk/reward distributions strongly towards a poor return on funds. A down-side protection scheme (IS1) is a mechanism, either under the form of an instituted publicly supported insurance scheme or measures for the State to share in the cost of investment, in order to assume a proportion of the costs of project failure. The guarantee may cover up to 75% of an investment, with a cap per portfolio. As stressed by Murray and Marriott (1998), this type of scheme

⁷⁴ OECD (1996), European Commission (2000a)

⁷⁵ European Commission (2000a)

is important to funds constrained by limited finances, where the write-off of a significant proportion of the portfolio can reduce the level of residual operating funds to below a viable limit. On the other hand, this measure can produce adverse incentives for venture capitalists by reducing their willingness to ensure that they make good investments (adverse selection mistakes become significantly less costly).

An upside leverage scheme (IS2) does not protect venture capitalists against the cost of investment failure but multiplies the financial benefits from success to the venture capital firms and their private equity investors (limited partners). Leverage schemes usually allow each Euro of a venture capitalist's fund to be matched with one or more Euros of government money. As for the preceding scheme, this type of mechanism is particularly valuable for smaller funds, given that a relatively small number of investments will typically provide the majority of capital gain for the fund. In addition, this type of scheme assists the fund in being able to provide portfolio companies with successive rounds of finance. Given that the government finances are in effect loans, venture capitalists have to repay an annual interest charge. In addition, the government can ask to obtain a share of the capital gain of the fund (cf. Israel). This type of scheme can be considered as providing loans which allows the fund to “gear up” or “leverage” both the scale and the returns from the investment to the benefit of the private equity investors⁷⁶.

Support for the fund's operating costs (IS3) is another instrument to support small funds. Since the industry norms for the level of fee income available to the managing partners (i.e. the venture capital firm) are essentially based on the level observed in larger capital development funds, the viability of smaller funds could be depressed. Depending on their reputation, small funds in Europe can face significant downwards pressure on the percentage of fee incomes negotiable, and an increase in the stringency of the conditions under which these fees are provided. As explained before (see section 2.5), the management fee is around 2-2.5% of committed capital, with possible “tapering” fee income over the life of the fund. For specialist, early stage technology funds 4 to 5% of finance raised are required to cover the operating costs of the venture capital management activity⁷⁷. This high level implies that a substantial proportion of the total of a small fund could be lost in payments to management rather than being allocated to the targeted portfolio firms, and may well discourage potential investors. Specific schemes implemented by public authorities to support part of the administrative and operating costs, in the form of cost subsidies, can decrease the constraints faced by small funds.

The absence of effective exit routes (IS4) can be a major obstacle in the development of a dynamic European venture capital industry (see sections 2.6, 5.1). The recourse to a national market with low capitalisation and liquidity is a less attractive exit route than a combined EU market⁷⁸. In recent years, in response to the need for a substantial pan-European risk capital market, various initiatives have been taken in Europe to develop equity markets dedicated to technology-based firms.

Taxation policies (see also section 5.1) will affect both the demand-side and supply-side of the venture capital industry (ID4, IS5), with a first-order effect on the demand-side being identified in the US⁷⁹. At a general level, the lack of a special legal structure for private equity firms and tax incentives to sustain the industry could explain the very low level of development of the Austria private equity market. On the contrary, the provision by the Portuguese government of an appropriate legal environment for private equity has favoured the emergence of venture capital corporations.

Informal investors (i.e. business angels (see also section 5.4) significantly contribute to the financing of start-up and early stage firms. Schemes to sustain the development of business angels network will

⁷⁶ Murray and Marriott (1998)

⁷⁷ Murray and Marriott (1998)

⁷⁸ In addition, the diversity of regulatory and fiscal regimes across member states is likely to impede the integration of national exchanges (European Economy (1999)).

⁷⁹ Gompers and Lerner (1998)

favour the supply of venture capital funds (IS6), especially for very small firms possibly with no collateral and no track record.

6.2 European and national schemes

European institutions and the Member States have implemented various schemes⁸⁰ to encourage venture capital funds and to favour the development of the private equity market.

The effect of these programmes on the venture capital market has never been really investigated although some of these programmes seem to have been relatively successful. The impact of the European Seed Capital Fund Scheme has been reviewed recently⁸¹. The purpose of the creation of this scheme was to stimulate investments in start-ups by the private sector through the creation of new seed capital funds; some of those funds (called “regional funds”) operating in selected assisted areas of the EU. Subsidization of 50% of the eligible operating costs of the 23 early stage funds in the programme were paid by the EC through the provision of non-interest bearing, term loans to the fund. This subsidy was paid for those costs related to the creation and the first 5 years’ operation of the fund. It was only repayable if the fund subsequently made a profit on its investment over the 10 years of the fund’s life. The evaluation in 1995 seems to demonstrate the overall efficiency of the scheme. Investments have taken place in 188 enterprises, leading to 2,085 direct job creation, predominantly in technology-related activities. Failed enterprises currently represent 17.5% of investments. Regional funds representing 60% of the finance raised EUR 24.8 M and had supported 147 enterprises. The estimated subsidies per job and enterprise created appeared highly cost effective: EUR 1,260 per job (compared to an estimated EUR 2,600 per job for the UK Enterprise Allowance Scheme and EUR 1,055 per job reported by the Massachusetts Technology Development Corporation in Boston for NTBFs) and EUR 13,979 per firm (compared to an estimated EUR 78,000 per firm for the UK Enterprise Allowance Scheme and EUR 110,000 per job reported by Massachusetts Technology Development Corporation in Boston for NTBFs). The leverage effect of public loans on private investment seems to have been significant. However, some doubts about the long term viability of the new enterprises and the funds have been raised⁸²: urgent needs of the high-technology funds for refinancing, small scale of the funds affected by the fixed management costs, ability of exiting after 10 years while ensuring an acceptable risk and time adjusted return.

Considering national schemes, the Netherlands government developed in 1981 the “Private participation guarantee order” for private venture capital companies. Under this scheme the government covered up to 50 percent of losses incurred by venture capital companies. This scheme was reduced in 1990, and discontinued at the end of 1995. However, the reduction of government support programmes for venture capital has not reduced the size of the venture capital industry in the Netherlands, which is one of the most dynamic in the EU. On the contrary, over the period 1990-1995, the market has grown rapidly, showing that the Dutch private equity industry has reached some level of maturity. The same effect has been observed in other European countries. In Portugal, when a reduction of government funding occurred in 1994 and 1995, an increase in bank funding made up much of the shortfall (see also Israel).

The type of intervention of the government is different among the Member States. While some governments favour an action on the tax and regulatory environment, others try to intervene directly in the cost of raising venture capital.

Many of the national schemes supporting the venture capital industry have been concentrated on the supply-side needs of the market. This has made possible the rapid expansion of the market in terms of funds raising during the last years. Additional efforts need to be made to favour the emergence of investment professionals with relevant experience in venture funds for high-technology sectors. However, a shortage of valuable projects could occur if additional efforts are not realised on the demand-side. Indeed, a large supply of entrepreneurs with business ideas would allow capital

⁸⁰ European Commission (2000b c)

⁸¹ Murray (1998)

⁸² Murray (1998)

providers to reduce their own risks by building up portfolios where losses in one investment are more than compensated by gains in others. Various European countries have, like the US, started to implement actions in order to favour the emergence of new entrepreneurs and start ups, i.e. to sustain a high quality deals flow. For instance, the creation of business incubators or the improvement of the managerial skills of scientists and engineers could sustain entrepreneurial activities.

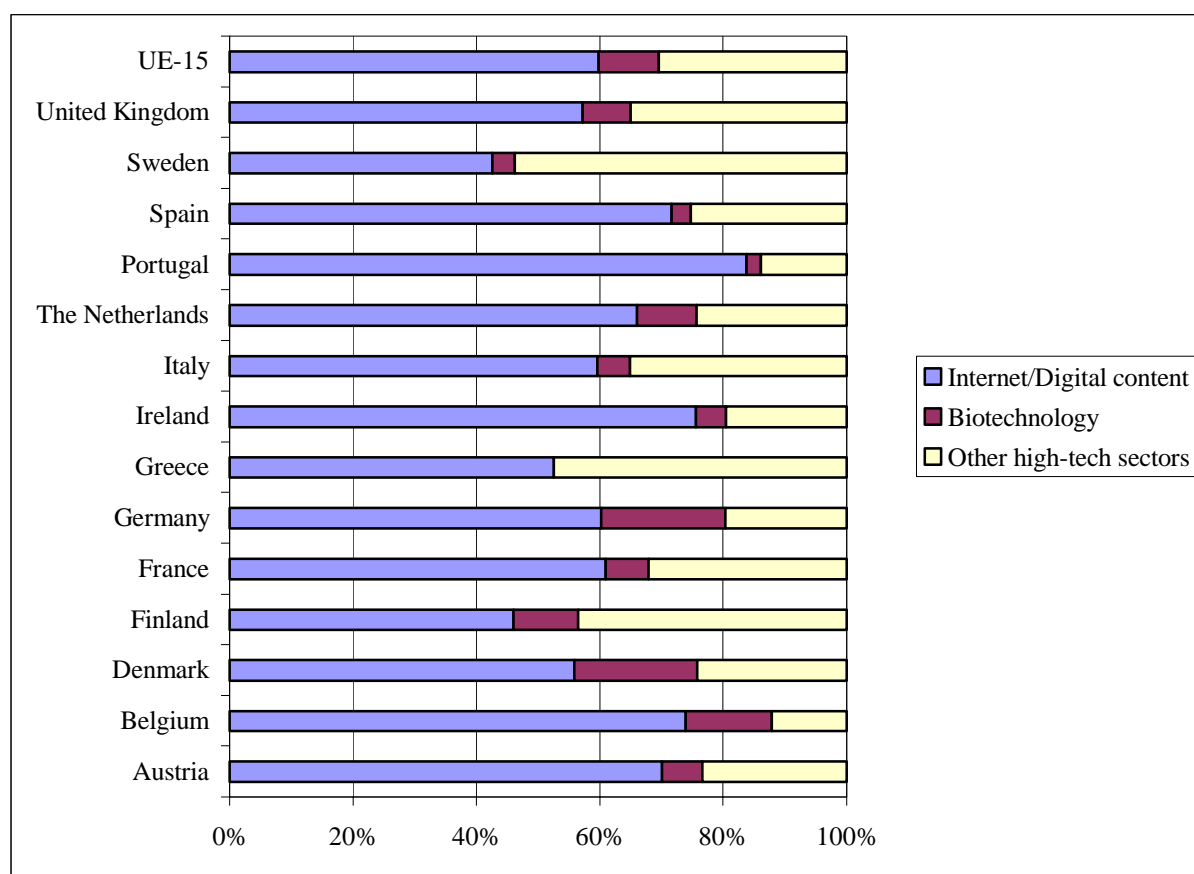
Finally, the regional dimension of those programmes needs to be questioned. The regional aspect of high-growth firms is closely linked to the notion of industrial clusters, i.e. networks of firms that feature a high degree of specialisation and benefit from spillovers through geographical proximity. Spatial concentration of high-technology firms, close to centres of economic activity, in some European countries like the United-Kingdom, Germany, France or Ireland, might induce an unbalanced economic development across regions. Governance and information demands ensure the continued spatial concentration of venture capital activity. This feature might suggest strong arguments for the logic of public initiatives addressing barriers to the local supply of additional private venture capital. However, the removal of supply-side constraints is not a sufficient condition for continued regional enterprise/employment growth if the lack of complementary, techno-commercial networks to assist the subsequent development of the new firms is not addressed. Finally, the existence of research centres and top-level educational institutions is one of the most important factors in incubating high-tech industries. The expansion and reinforcement of regional high-tech industries require the supply of high-skilled labour. Public support for the development of VC should be in part focused on regions where high-tech spin-offs from university could be supported.

7. PROSPECTS BY SECTOR

Provision of technology-focused risk or equity capital is a crucial element to ensure the competitiveness of European industries. As discussed, the main risks associated with the provision of finance to NTBFs include the complexity of the technology, the intangibility of assets, and unpredictability of cash flows. In addition, the difficulties and cost in some sectors of protecting intellectual property worldwide, together with frequently long product development times and volatility of returns add to the uncertainty. NTBFs have specific financing needs linked to the type of products under development or their planned rapid rate of growth in a given sector. For instance, in the biotechnology businesses, product inception to market times is traditionally very long, demonstrating the need for equity finance. Indeed, in such a case very little cash is available to pay for interest on a loan since there are few positive revenue streams for a relatively long period of time. A counter-example is the case of a software company where the product has to be brought to the market in a very short time frame, resulting in rapid income generation. Hence, the specific conditions of each sector will require a mixture of debt and equity. Reallocation of venture capital from other technology sectors towards Internet based companies needs to be monitored in order to avoid supply constraints for sectors strongly depending on venture capital.

As demonstrated in section 2, the allocation of venture capital funds into high-technology sectors is relatively limited in the EU. Chart 17 highlights the cumulative venture capital investment in the EU by high-technology sectors: Internet and content⁸³, biotechnology and other high-technology covering other electronics and related sectors, and medical/health sectors.

⁸³ The relevant sectors for the Internet and digital content are on the basis of the industrial sector distribution used by EVCA: computer-related and communications.

Chart 17: Cumulative investments by high-technology sectors in the EU, 1989-1999

Source: Authors' calculations based on EVCA data

Over the last decade, internet/digital content has attracted the bulk of venture capital investment, biotechnology having attracted some investors in Germany, Denmark, Finland, Belgium and the Netherlands. This chart has to be related to the low share of venture capital funds invested in early stages. As already stressed, the EU is lagging well behind the US in terms of early stages share. The inability to access equity financing could have distorting effects, particularly in high-technology industries⁸⁴.

A proxy to evaluate the interest of the high-technology sectors for investors is to look at the venture capital funds focused, on the basis of their declarations in the EVCA directory. If their declarations listed seed or start-up capital and mentioned categories of sector investment in the various high-technology sub-sectors, they are entered in the various columns of Table 12. This confirms the dominant position of France, Germany, the United-Kingdom and the Netherlands. With the exception of Sweden, the Nordic countries and Southern countries record few funds active in the Internet/digital content and biotechnology sectors.

This observation confirms, especially for Southern countries, the lack of available venture capital funds for high-technology investment. A lot of the venture capital funds are active in both types of sector, and even in some cases, are "specialised" in all high-technology sectors. It could reflect an insufficient focus of the venture capital funds, especially for investment in early stages, since one important input of the venture capitalist is the support he could offer to the management team of the start-ups. Obviously, Table 14 only provides an indication on the supply-side of the venture capital market. The low number of venture capital funds ready to invest in those two sectors might reflect the

⁸⁴ For instance, the American National Academy of Sciences raised the concern, in "Securing America's Industrial Strength" (1999), that firms have not been able to finance important innovations in engineering and physical science-based industries.

lack of viable projects in those countries, stressing the need to support demand-side policy in parallel, like investment in human capital, in R&D.

Table14 : Number of VCs who may invest Seed-Start-up capital in Internet/digital content or biotechnology firms by country

	<i>Number stating “Computers, communications, technology”</i>	<i>Number stating “Biotechnology”</i>
Austria	6	5
Belgium	6	5
Denmark	5	4
Finland	4	3
France	19	7
Germany	29	14
Greece	1	0
Ireland	5	3
Italy	4	0
Netherlands	11	6
Portugal	4	2
Spain	6	3
Sweden	8	5
United-Kingdom	27	11

The evolution in different high-technology sectors is reviewed in the following sections.

7.1 Biotechnology⁸⁵

The “new” biotechnology industry originated in the mid-1970s. Many new firms were created in the subsequent decades seeking to commercialise scientific developments in genetic engineering, often for human therapeutics but also for agricultural, diagnostic, and veterinary applications. Despite important developments in the quality and availability of healthcare, the prevalence of disease offers prospects for continued investment in biotechnology. Biotechnology projects – particularly early-stages are highly complex and uncertain, making it very difficult to specify the features of the product to be developed. Venture capital could be an effective source of finance, given that the supervision of the firms after the investment may mitigate the uncertainty of the product development.

Europe’s biotechnology is growing rapidly with a concentration of the leading companies in the UK (e.g. Shire Pharmaceuticals, PowerJect, Celltech, Chiroscience), France (Genset, Transgène) and the Netherlands (Qiagen, Innogenetics). An significant number of biotechnology firms are also located in Germany (see below).

In the early years, start-ups in biotechnology consume cash and generate little profit. Since 1995, net losses in the sector have increased but at a lower pace than the rate of sales, demonstrating the increasing viability of the sector. The high rate of firm creation observed over recent years highlights the need for funding. At the same time, a rapid globalisation and consolidation process has been observed in life science companies, pushed by the development of genomics⁸⁶, the existence of synergies and economies of scale, and by the barrier to entry provided by intellectual property rights.

In terms of financing, young biotechnology firms may have recourse to alliances with large corporations as a source of financing. In addition, since those young firms lack complementary assets such as sales forces and manufacturing know-how taking many years to develop, this type of alliances offer the access to larger capacity. The pharmaceutical industry has recognised the crucial role of young biotechnology firms in drug discovery and early stage development. In order to be

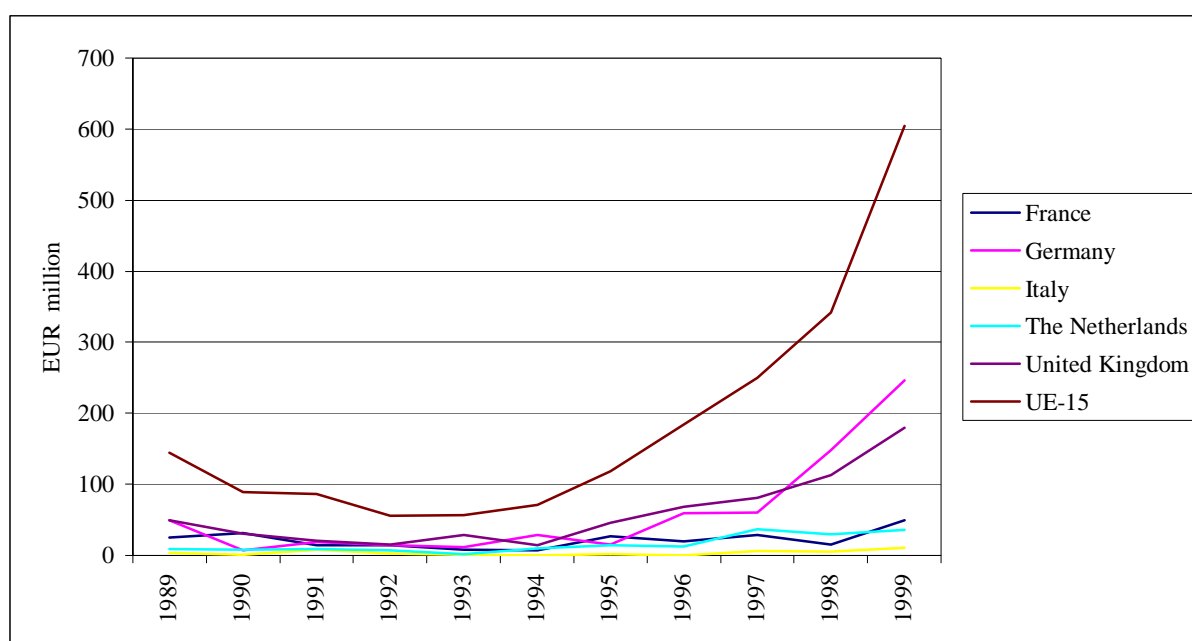
⁸⁵ See also Lerner and Tsai (1999).

⁸⁶ Genomics is the studying of the genetic code, the genetic code being the specific sequence of nucleic acids making up the DNA which defines every living organism and makes each species unique.

complementary to biotechnology start-ups, large pharmaceutical firms are more focused on regulatory approval, market development and sales. Considering the US biotechnology industry, equity financing has undergone significant variations⁸⁷, reflecting the nature of industry-wide shocks (Lerner and Tsai (1999)). Unexpected events occurring at a single biotechnology firm, e.g. the rejection of a promising drug candidate seems to affect all firms' abilities to raise equity. The same effect appears with the uncertainty about how aggressively biotechnology companies would be able to price new drugs. Periods of low availability of equity financing appear to coincide with investor uncertainty about the result of biotechnology research and the industry's commercial prospect. In the early 1990s on the US market, rejections of a few key products by the Food and Drug Administration and a dearth of new drugs in the pipeline induced a biotechnology funding shortage, hitting both the private and public markets. Several prominent US venture capital firms⁸⁸ have chosen to stop investing in biotechnology, in favour of the faster returns in Internet and telecommunication companies sectors, where regulatory barriers are less restricting. In addition, many start-ups in those two sectors (Internet and telecommunication) go public within a year or two after their creation, compared with the typical five to ten years required for biotechnology start-ups.

In the EU, around EUR 2 billion was invested between 1989 and 1999, with a very sharp increase of the funds invested in biotechnology over the last three years. The following chart describes the yearly investment in this sector over the last decade in the EU and in the major countries.

Chart 18: Evolution of private equity investment in biotechnology in the EU and in selected countries, 1989-1999



Source: Authors' calculations based on EVCA data

Funds dedicated to biotechnology like Apex Partners and Atlas Venture have been created in Europe. Germany and the United-Kingdom are among the leading countries in this sector. The German government has been particularly active in sustaining investment in biotechnology start-ups through the BioRegio and Biochance programmes. The "Biovalley" in the Rhineland is becoming one centre of excellence in biotechnology. In the UK, biotechnology clusters have emerged in Cambridge and Oxford, stressing the importance of favouring the interaction between university research and start-ups creation.

⁸⁷ The equity raised in the US by publicly traded biotechnology firms in follow-on offerings (measured in USD 1995) went from USD 340 million in 1990 to USD 2.7 billion in 1991, then fell again to USD 788 million in 1992.

⁸⁸ Accel Partners, Kleiner Perkins Caufield & Byers, Sierra Ventures

The attractiveness of the sector for private equity investors has increased recently, but is still lagging behind the Internet/content industries. This situation results from the fact that the venture-type returns expected from “high-risk” young biotechnology firms have not been realised. However, the effect of the “Internet bubble” should reorient part of the venture capital investment, namely because the venture capital funds active in Internet have in general some interests for high-technology sectors like biotechnology. Since end of last year, a sharp increase in biotechnology IPOs has been observed. In early November, Evotec BioSystems AG went public on the German Neuer Market, raising about USD 68 million which is the best performance of any biotechnology IPO in over five years. The same trend appears on the US Nasdaq market in various segments of the biotechnology sector⁸⁹, i.e. proteomics/genomics/genetics (e.g., Lexicon Genetics Inc. raising USD 220 million (6/04/00), decode genetics Inc. raising USD 198.7 million (17/07/00)), drug discovery technology (e.g., Lion Bioscience AG raising USD 208.8 million (10/08/00), Aclara Biosciences Inc. raising USD 217.4 million (20/03/00)) and clinical-stage products (e.g., Tanox Inc. raising USD 244.2 million (6/04/00), InterMune Pharmaceuticals Inc. raising USD 125.0 million (23/03/00)). Even if this evolution might reflect the fact that this market has reached a certain level of maturity, concerns exist about the emergence of a “biotechnology bubble” in the near future. In addition, the market remains particularly volatile, as reflected by the recent market fluctuations at the time of President Clinton’s statement about whether genes should be patented.

The future development of the biotechnology industry in Europe will need the enforcement of strong intellectual property rights, i.e. an efficient patent system. Although the “Human Genome Project” might affect the patenting process, the following conditions should be preserved: (i) patent offices, by the strict application of all patentability requirements, should avoid allowing patents on speculative “inventions”; (ii) the breadth of claims should be strictly commensurate with the contribution to the art; and (iii) researchers should continue to enjoy a research exemption which is easy to apply.

In addition, European biotechnology industry has to tackle the public concern about bioethics: for instance, the current debate on genetically modified organisms⁹⁰ (GMO) Based on recent Eurobarometer studies on biotechnology⁹¹, a large majority of Europeans are worried about transgenic food. They are worried about the risks associated with GM food and the respondents thinking that food production is a useful application of biotechnology has decreased from 54% (1997) to 43% (2000). They are less worried about the medical applications of biotechnology. Even if the concern about GMOs is increasing in the US, the American perception is quite different, holding a more benevolent view or being simply indifferent. Improvements in communication about the value of biotechnology could significantly modify the public perception in Europe.

7.2 Internet and digital content industries

The development of the information society or the e-Economy, defined⁹² as the transformation of economic activities as digital technologies makes accessing, processing and storage of information increasingly cheaper and easier, has led to important economic restructuring and the emergence of new companies on the basis of the exploitation of available information. The role of Internet has been crucial in this process, by lowering transaction costs, generating positive network externalities and inducing complementarities between the network infrastructure, Internet applications and e-commerce.

Internet and related activities, like digital content, have attracted a lot of investment of venture capitalists during the last years, as described in Chart 19.

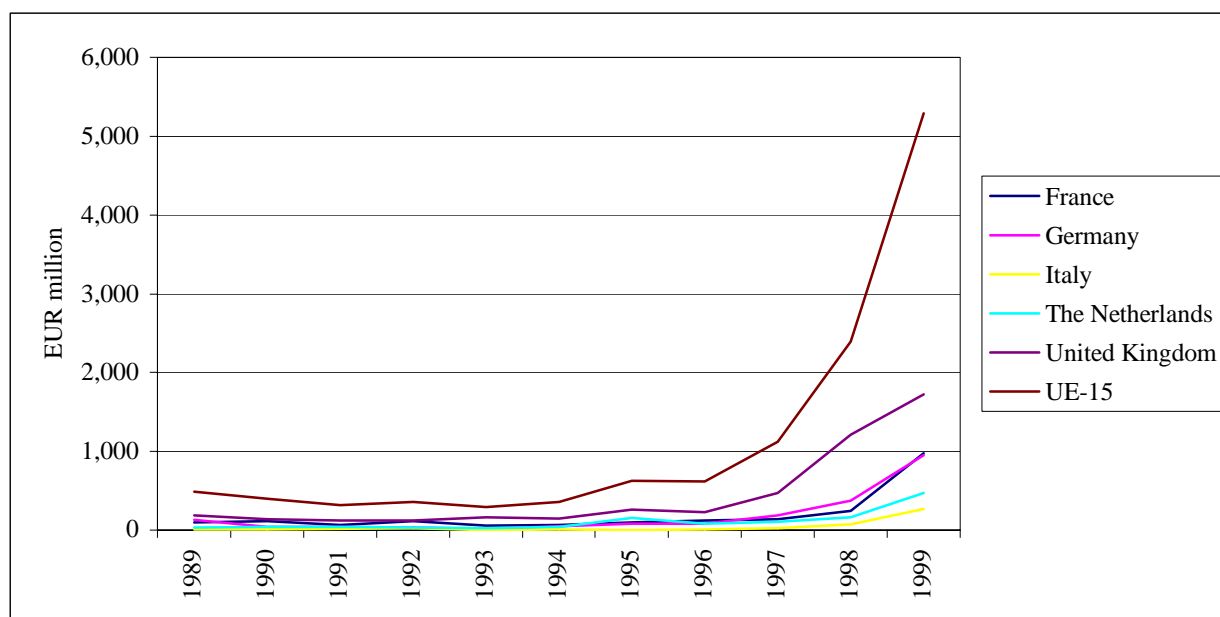
⁸⁹ For more information, see Van Brunt J. (2000)

⁹⁰ An organism produced by genetic engineering techniques that allow the transfer of functional genes from one organism to another, including from one species to another. Bacteria, fungi, viruses, plants, insects, fish and mammals are some examples of organisms, the genetic material of which has been artificially modified in order to change some physical property or capability. Living modified organisms (LMOs), and transgenic organisms are other terms often used in place of GMOs.

⁹¹ Results are reported in the following working document from the European Commission (2000), DG Agriculture, “Economic Impacts of Genetically Modified Crops on the Agri-Food Sector: A Synthesis”.

⁹² On the basis of the definition adopted by the European Commission (2000), “eEurope: An Information Society for All”.

Chart 19: Evolution of private equity investment in Internet/digital industries in the EU and in selected countries, 1989-1999



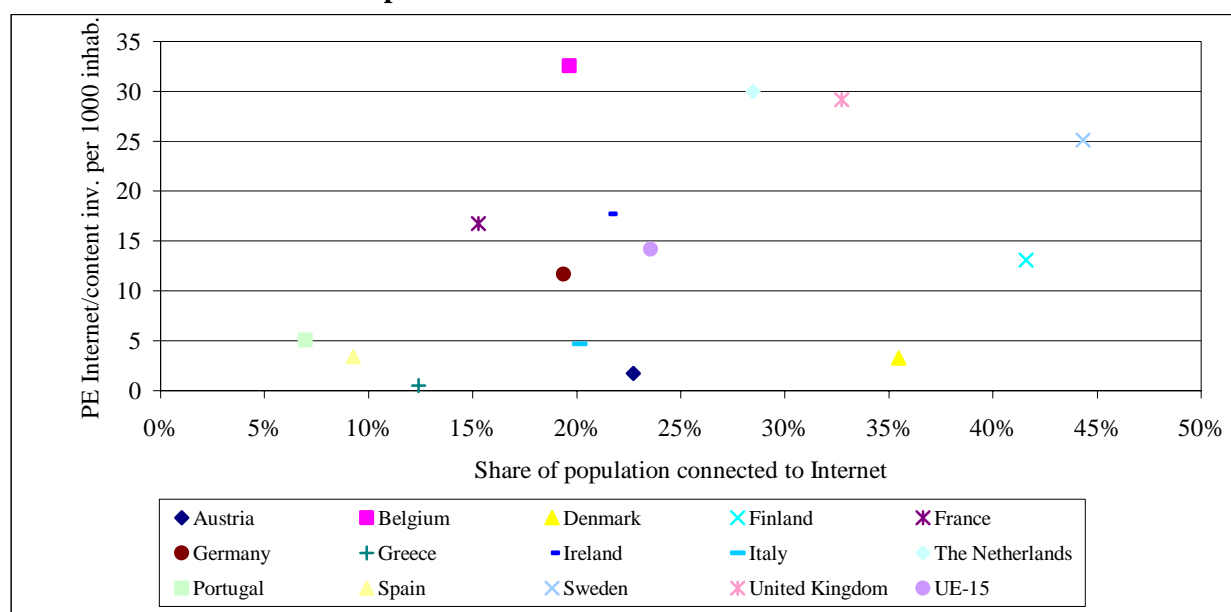
Source: Authors' calculations based on EVCA data

These investments have supported the creation of high number of start-ups dedicated to the Internet (creation of software, portals...). In total, around EUR 12.3 billion of private equity has been invested in communications and computer-related sectors over the last decade. Among the member states, the UK has a leading position in this sector, namely with the development of the "Silicon Fen", in the area of Cambridge, being one important cluster having attracted various research centres (e.g., Microsoft Research Cambridge) and scientific parks.

In the US, the Internet and e-commerce have led to the creation of numerous venture-backed companies, characterised by the search for rapid IPO. Internet-related companies have attracted in 1999, USD 31.9 billion, of venture capital investments, an increase of 355% over 1998.

Assuming that an indication of the demand for Internet applications and digital content can be inferred from the share of the population connected to the Internet, Chart 20 provides an insight of the potential EU market.

Chart 20: The supply of private equity investment for Internet and digital content industries versus the potential demand for Internet services in 1999



Source: Authors' calculations based on EVCA data and NUA survey

Based on communications and computer-related investments, Chart 20 shows that the United-Kingdom, Belgium, the Netherlands, and to a lower extent France and Ireland, perform relatively well, i.e. there is no major shortage of investment possibilities. On the other hand, the availability of capital for Internet/digital content industries is low in Austria, Denmark, Finland, Sweden and Italy, where the share of the population connected to Internet is relatively high compared to the level of private equity investment in Internet/content industries. In countries like Portugal and Spain, there is a weak private equity market but there is a sort of balance between the supply of private equity and the demand for digital services. The same type of relationship appears when considering the relationship between the supply of private equity in those sectors and the development of Internet multimedia web sites.

To investigate the prospects for investment in this sector, a distinction⁹³ is made between e-commerce and content creation.

7.2.1 E-commerce

The electronic commerce developed through Internet could be defined as “all forms of transactions relating to commercial activities, involving both organisations and individuals, that are based upon the processing and transmission of digitised data, including text, sound and visual images”⁹⁴. The following picture summarizes the whole matrix of e-commerce and broader Internet applications.

	Government	Business	Consumer
Government	G2G (e.g. coordination)	G2B (e.g. information)	G2C (e.g. information)
Business	B2G (e.g. e-procurement)	B2B (e.g. e-business)	B2C (e.g. e-retail)
Consumer	C2G (e.g. tax compliance)	C2B (e.g. price comparison)	C2C (e.g. auction markets)

Source: Coppel (2000)

This section focuses on B2B, B2C and to a lesser extent on C2C. The largest share of e-commerce is taking place between businesses (i.e., B2B accounts for 70 to 85 percent of all electronic sales) and B2B expansion is expected to be higher than B2C over the next few years. This trend is linked to the rapid migration of supply chain management from relatively expensive closed electronic data

⁹³ This distinctions might appear arbitrary since content is a crucial asset for the development of e-commerce. However, the distinction rests on the fact that content, like music, books, cinema is a specific commodity which could be to a certain extent sold and distributed via telecommunication networks.

⁹⁴ OECD (1997), p. 11

interchange networks (EDI⁹⁵) towards the Internet. In addition, reduction of purchasing and inventory costs through disintermediation and better customer service through higher adaptability and interactivity will drive the implementation of e-business solutions. B2C has grown rapidly over the last few years but still accounts for only a small share of overall transactions: around 0.5% of retail sales in the US at the end of 1998 and around 0.2% in the EU, with important divergence across countries i.e. Sweden, the Netherlands and the United-Kingdom have similar rate of penetration to the US. The main potential sectors for the introduction of B2B and B2C are respectively:

- Motor vehicles, shipping, chemicals, industrial and high technology equipment;
- Books, music, video, travel, financial and investment services.

During recent years, internet start-ups have attracted a lot of funds from venture capital investors, especially in the US. Even during the first semester of this year in the US, the sub-category “e-commerce and Web content” has continued to receive a major amount of funds. In the EU, as described in Chart 19, this segment has been also very dynamic, accounting for the large share of high-technology investment.

The financing of investment in B2B is mainly done internally or by new public offerings. Venture capital is provided for B2B start-ups or for B2B companies, spun-off by traditional players. The C2C concept usually requires lower level investment, since part of the services is produced by the consumer themselves. However, this category of e-commerce requires significant efforts in marketing and recruiting, which could be supported by venture capital investors. The financing of B2C – as well as B2B - start-ups might involve critical issues:

- development of a business proposal adding value to the customer by being delivered on-line (i.e., taking benefit from interactivity, personalisation and inter-connection);
- lack of robust revenue models (direct selling model, advertisement model, hybrid model...);
- necessity to build and to develop strong brand awareness;
- necessity to invest in the technology and business processes;
- ability to bring together sufficient resources to build an Internet business (rapid time-to-market, the need for sufficient resources including access to experienced management skills, capital investment and both business and technical Internet expertise, right mindset and long-term view to take the company beyond a quick IPO).

Starting first in the US, and affecting now Europe to a lesser extent due to the size of the market, a major shakeout of Internet start-ups or dot.coms has been observed following the stock market “correction” in the second quarter of 2000. This evolution confirms predictions from companies specialised in e-business like Gartner Group or Rubus Ltd. The former predicted at the end of 1999 that by 2003, many e-businesses would fail – up to 75% - due to poor strategies and failing to deliver on their promises. The latter estimated that around 70% of dot.com start-ups in the UK would disappear within two years due to the inability to develop propositions fit for the Internet. Rubus Ltd blames *“the growing number of “dumb money investors”, many of which have set themselves up as dot.com incubators...many are too inexperienced in the Internet market to be a real value to start-ups, offering little more than cash, and lacking the necessary in-depth technical and business knowledge to give good advice. As a result, they are backing dot.com start-ups in order to be part of the Internet gold rush, but failing to develop solutions which will ensure long-term business success.”*

Even if the rate of failure of start-ups is always relatively high⁹⁶, the extent of restructuring among the Internet start-ups will be even higher. The market has been characterized by major inflows of funds from venture capital investors, giving rise to the impression of “easy money” and the belief that the venture capital markets will remain liquid despite poor earnings performance and tough competition for market attention, which has fuelled an investment “burn rate” among dot.com businesses much

⁹⁵ An EDI is a standard for processing and transmitting information between computers over private communications networks (called value-added networks). It requires expensive and complex customised software, dedicated communication links and in general strictly compatible equipment. The main uses of EDI are large companies and their first-tier suppliers.

⁹⁶ As an illustration, according to the last available business census (1999) from the US Small Business Administration (SBA), roughly 41% of all start-up businesses dissolve within eight years.

higher than the burn-rate for traditional “bricks-and-mortar” start-ups. Among the bankrupted dot-com start-ups with a high “burn rate”: Boo.com – fashion and sportswear e-tailer –with a “burn rate” around USD 120 million, Toysmart.com – toy e-tailer – with a “burn rate” around USD 40-50 million, Digital Entertainment Network – multimedia entertainment outfit – with a “burn rate” around USD 60 million. Venture capitalists seem to have used an inappropriate due-diligence process, accepting business models supporting the original idea without analysing the market prospects, the quality or added-value of the project, the marketing to customers, and the ability to generate revenues. They have been more inclined to try to achieve rapid returns through IPOs of dot.com start-ups still making losses. This evolution might reflect a lack of expertise and knowledge of venture capitalists for the Internet sector - in other words, a lack of maturity of the market. Venture capitalists are expected now to focus more on project demonstrating a believable business model, with the possibility of more-rapid positive cash-flows and profits. The recent scepticism of the market increase the likelihood of capital scarcity, reducing refinancing at a later stage (also for post IPO dot.com firms) and increasing the risk of insolvency even for start-ups offering real value-added.

Among the various categories of firms, Internet-based companies that sell physical products through Internet, having to ship those goods to the customers through physical distribution network, are the more exposed. They are not offering real new services to customers and are exposed to the competition from “bricks-and-mortar” counterparts. Over recent months, various “bricks-and-mortar” companies have bought dot-com start-ups⁹⁷ rather than continuing to implement on their own an Internet strategy. Indeed, dot-com start-ups in financial troubles will become less valuable in the public market and will represent a good acquisition for traditional companies for their traffic and e-commerce infrastructure, reducing the risk of e-business deployment. This strategy⁹⁸ seems particularly attractive since the dot.com investment may allow the traditional enterprises to leverage their strengths (brands and physical infrastructure) and the strengths of the dot.coms (e.g., time-to-market, access to an on-line market and access to scarce talent). As a consequence, funds provided by venture capitalists will be replaced by investments for acquisition by traditional firms. It will remove funds for real digital companies, i.e. either pure digital-products businesses offering content, knowledge or services directly through Internet or content developers, Internet service providers, Web and applications hosting services. Industries which are information-intensive like retail financial services, publishing, education, travel and music could use the Internet as the primary delivery mechanism. The new companies emerging in this area, like eTrade, are effective competitors for “bricks-and-mortar” firms.

The future development of the e-commerce market depends on various factors (see also section 6.2.2). Consumers have some concerns over privacy, consumer protection, new payment methods, order fulfilment and delivery. Contract enforcement and greater certainty vis-à-vis liability damages that may arise as result of electronic transactions are additional constraints. The high cost of local connection also reduces the attractiveness of on-line transactions for consumers. Cultural and language barriers may reduce the use of Internet in Europe. Technological constraints may affect the future expansion of e-commerce, i.e. network capacity and speed of data transmission. Legal, taxation and regulatory uncertainty for Internet transactions, which are essentially borderless, (identification of the competent jurisdiction, protection of intellectual property rights...) may hinder the development of e-commerce.

7.2.2 Digital content industries

The content industry, covering book publishing, music, cinema, radio and TV broadcasting, has been confronted with significant changes, with the convergence between the information, entertainment and computing sectors. Following the OECD (1998), a distinction can be made between two categories of network-based content markets: (i) traditional audio-visual and music content, distributed through physical media such as video tapes, CD-ROMs, and cinema but also broadcast on over-the-air

⁹⁷ For instance, Casino has acquired CDiscount, Vitego, Freesbee and Booston.

⁹⁸ A hybrid model is also emerging where companies create partnership between a physical store and Internet company (e.g., Peapod and Ahold) or an Internet company decided to build its own physical distribution network (e.g., Sephora.com).

terrestrial, satellite, cable TV and radio networks; and (ii) multimedia services combining digitized text, data, audio and visual content distributed via physical media such as CD-ROMs or the Internet. The major difference between those two categories (i.e. “analogue” vs “digital” content market) is the fact that the second one allows for a high degree of interactivity in relation to the content involved. However, the digitalization of the content and the distribution through Internet allows a greater degree of freedom for the consumer even for the first category, e.g. music or video-on-demand, in terms of timing of reception for instance.

Content projects are relatively complex and uncertain since they are based on creative human input. Creative businesses have a particularly difficult task of convincing financial backers that their intellectual property is effectively protected and that the risks involved with their business are manageable. This could be a significant inhibitor to growth for early stage and developing small businesses in the content industries. Considering digital content, even though it can be delivered electronically and is well-suited for electronic commerce, such projects have important drawbacks: lack of solid revenue models for selling content on Internet, ability to copy content and therefore size and presence in different countries matters, culturally dependent good requiring national adaptation and leading to a fragmentation of the market, free provision of most of the content on the Internet. As a consequence, financing content firms means additional risks.

Within the EU, the strong content players are located in France (e.g. Havas, Hachette, Canal +); Germany (e.g. Bertelsmann, Axel Springer Verlag, KirchGruppe), Italy (e.g. Mondadori), the Netherlands (e.g. Elsevier, VNU, Wolters Kluwer), Spain (e.g. Grupo Planeta, Terra Networks), Luxembourg (e.g. CLT-UFA) and the United-Kingdom (e.g. Reuters, Pearson, Trinity Mirror and United News & Media).

To adapt to the digital revolution, traditional content companies have followed different strategies: (i) creation of new independent companies – in some cases co-financed by venture capital firms - for the development of their digital activities (Internet, DVD...) in order to reduce financial risks; (ii) co-operation with digital content intermediaries, through licensing agreements for the use of digital content, in order to have more time to transform themselves and to reduce the risk of “cannibalization”; or (iii) merger with Internet or telecommunications companies to speed-up their transformation and increase their valuation (AOL/Times Warner, Endemol/Telefonica; CLT-UFA/Pearson). Hence, although traditional content companies do not have recourse in general to venture capital, the impact of digital technology on the content industries should give rise to an increasing demand for venture capital.

The recent evolution of the music industry is quite illustrative, especially also because many SMEs are active in this industry. The music market is dominated by large corporates, the result of four mergers, i.e. BMG, EMI Music/Warner Music Group, Sony Music Entertainment and Universal Music Group. These companies dominate the distribution of recorded music through traditional retail outlets, which provide the decisive advantage of ready access to costly marketing and global distribution. In addition, there is a significant number of independent record companies and publishers (SMEs) covering all types of music. In 1999, the European market for sound recording is valued at EUR 13 billion, the European market representing around 34% of total worldwide sales. Publishing and authors’ rights revenues represented around EUR 3 billion in 1998.

While currently music is mainly accessible through traditional analogue radio and TV broadcasts that devote a significant broadcasting time to music⁹⁹, the new digital services will affect the usual revenue model and modify the market structure. Music has been the first cultural medium to be confronted with digital technology. The integration into Internet has been facilitated by the fact that (i) music is a universal less prone to cultural barriers and is global like Internet; and (ii) music can easily be digitally compressed and transmitted thus allowing online services to provide good CD quality. New digital packaged formats, like DVD or CD-R, wireless terminals for instant media access allowing portable

⁹⁹ In Europe, artists, producers, authors and composers derive a substantial income from this form of exploitation on the basis of their intellectual property rights in performances and communication to the public.

phones to store music, and the development of digital telecommunication infrastructure is reshaping the organization of the industry¹⁰⁰.

The new technologies are expected to affect profoundly the functioning of the music industry. Indeed, Internet, combined with the reduction in the production cost due to advances in recording technology makes it easy for artists to have access to a worldwide audience without having to rely on the strong distribution network of the incumbent corporates. However, on-line artists will still need help accessing the market and consumers would need filters to present them with an attractive selection. Traditionally, this role has been fulfilled by the music industry. A new breed of Internet service providers and companies already dominates access to consumers on the Internet. They will occupy a vital part in the value chain from song to consumer, and who controls them will impact on the value of music. Music majors have reacted by investing and forming alliances with Internet and software companies in the search for a new delivery mechanism and the new audience (EMI/Warner taking a major stake in musicmaker.com and forming an alliance with Liquid Audio, EMI/Warner and Sony taking a major shareholding in Cdnw...). Independent producers might extract substantial benefits from Internet since they lack international distribution infrastructure.

The expansion of digital music is linked to the development of e-commerce. The access to music through the Internet is based on various customer models¹⁰¹:

- Play (scheduled/pre-selected): the consumer receives a pre-packaged, scheduled stream of music; which could be simulcast with a traditional broadcast or stand-alone Internet radio;
- Play (near-on-demand): the consumer can choose one of the pre-set times to view or listen to the product
- Play (on-demand): the consumer can call up any track to be played on-line at a time of their choosing, the copy being retimed by the central server;
- Download (rental): the consumer downloads the track and can play it during the rental period;
- Download ('indefinite ownership): the consumer can retain the copy locally and play it as long as often as they like.

The music industry is characterized by the prevalence small businesses (independent producers) which are relatively under-capitalized, and venture capital appears a meaningful financing instrument to sustain their technological shift. In terms of financing, moving into e-commerce will require additional funds and may incur more short-term risk, while the market remains untested. While finance has been readily available for new Internet companies, existing companies, seeking to expand into the on-line market, less easily obtain it. In recent years, a high number of start-ups have been created developing music Websites (like Emusic, Liquid Audio...). In addition, Internet start-ups in content have shown a strong interest for artists.

The attractiveness of the sector for venture capital investors is constrained due to the following factors: the implementation of a viable revenue model, the consumer acceptance of the on-line environment, a strong intellectual property rights system, the definition of technological standards for secure delivery. Various revenue models have been developed: on-line delivery revenue models (Pay-per-download, rental, pay-per-play, subscription, advertising, datamining), equity model (no direct revenue source, the company building up an audience, creating a brand and selling out to another company or through an IPO) and the hybrid model, i.e. on-line purchase/physical delivery revenue models. The search for a viable business model is one of the key issues in the development of the

¹⁰⁰ Digital technology affected the Music Industry in the early 1980's with the advent of the CD. The new digital formats since the CD, like DVD, have increased capacity and functionality. Delivery remains physical, either through retail or mail order, having little impact on the industry value chain. On-line access, the Internet, and increasing convergence of carrying technology will change the traditional value chain (development, packaging, distribution, retailing). The worldwide web linking computers located all around the world allow them to exchange information, one type of information being digitised music. One crucial development in software and associated technologies is the compression techniques which enables sound files to be packaged in such a way that they can be transmitted easily on the web. In addition by breaking the sound files into tiny packages, it can be received by the user and played in real time. MP3 is the most popular compressed format for sound files. Associated software and physical devices have developed in parallel. Future development in terms of higher bandwidth (DSL), digital broadcasting and mobile telephony offer new opportunity for access to music.

¹⁰¹ Department for Culture, Media, Sport (2000)

digital music industry. Most Internet companies are trading at a loss, funding their operations by building up huge capitalization. In addition, some start-ups have developed revenue models where music is delivered free to the end consumer, being only an incentive marketing tool to entice visitors.

Consumer acceptance of on-line transaction is critical to support on-line trading. Little information is available on consumer behaviour and significant differences will arise between current users and music consumers in the mass market expecting an easy route to find the music they are looking for. Privacy of transactions, reduction in telecommunications costs by opening up the local telephone loop, and securitisation of payment mechanism for on-line transactions are important factors in achieving a larger consumer acceptance.

The enforcement of a strong intellectual property rights system is an essential condition for the dissemination of music on Internet¹⁰² and the global nature of Internet requires harmonising regulations internationally (World Intellectual Property Organization Treaties). As for patent in the biotechnology industry, copyright is the means by which creators are rewarded and legal protection of that asset is essential to the business. The following key conditions need to be achieved: (i) new standards of protection to take into account digital downloading and digital copying; (ii) liability rules for on-line service providers in relation to copyright infringement; and (iii) protection against the circumvention of technological copyright protection methods and rights management. This last point is related to the development of proper technological measures for tracking music which need to be operational with various software and platforms.

7.3 General observations

The European venture capital market has been characterised during the last two to three years by an increase of investment in the high-technology sectors. The preceding analysis shows the particular importance of some issues, regardless of the sector:

- Enforcement of strong intellectual property rights (patent, copyrights) for investment in intangible assets
- Development of a robust business/revenue model, showing its path to profitability and the real value-added of the product/service for consumers
- Importance of the due diligence process by the venture capitalist investors, requiring a specialisation in a specific high-technology sector
- Importance of the experience of the start-up's management team
- Congruence between the exit procedure and the characteristic of the asset.

In the biotechnology sector, start-ups active in the development of biotechnology and medical infrastructure are attractive since the development of diagnostic tools, for instance, does not require usually an approval by public authorities. In addition, a major demand exists for data processing and gene database capacity to support the sequencing of the human genome and to convert those discoveries into therapeutic applications. Indeed, the important amount of data resulting from the genome sequencing efforts requires new technologies to identify drug candidates. Start-ups building laboratory and diagnostic tools, helping to speed the process of discovering and developing new drugs, appear as good candidates for alliances or acquisitions by major pharmaceutical firm. In terms of drug development, investors are looking for firms which are at late-stage drug development (human clinical trials). They might offer lower expected returns than seed-round investment in drug makers, but promise a short-term payback period (and a more certain payback).

The growth of e-commerce in Europe is expected to double each year between 2000 (USD 87.4 billion) and 2004 (USD 1,533.2 billion), reaching around 6% of total sales in 2004 (Forrester Research (2000)). Despite the major shakeout of start-ups active in the Internet and independently of the development of an appropriate legal and fiscal environment, this sector still offers big opportunities, less in the development of an e-commerce web sites (especially for e-retail, depending as it does on

¹⁰² See the recent statement of a US federal judge establishing that MP3.com has infringed copyrights owned by Universal Music (6/09/2000).

the existence of a physical distribution network) but more in the infrastructure, software and services required for the expansion of e-commerce.

The development of content in the high-technology sector is related to the digitalisation of the support (music, television, books...) and the development of new software enabling the working of new applications. Concerning the development of portals or web site dedicated to a specific content, the expansion of the market depends on the implementation of effective copyright policy and the development of a strong business model¹⁰³, namely solving the issue of free versus paid content. Specific niches exist for the development of portals focused on local or regional audience or on a specific subject (market segmentation) like in the context of tourism.

Telecommunications are characterised by a high level of concentration of activities in the hand of various merged corporations. There are still niches for start-ups, namely in the field of optical component and in the development of software, for instance for the integration of mobile telecommunication and Internet.

Finally in computer-related activities, significant opportunities will emerge in the development of software and application enabling the introduction of Internet into firms' business (digitalisation of products...).

The following table prioritises the prospects by sector in the EU.

Table 15: Level of prioritisation by sectors

Sectors	Level of priority		
	Low	Medium	High
Biotechnology			
<i>Seed-stage drug development</i>		√	
<i>Late-stage drug development</i>			√
<i>Data processing and medical devices</i>			√
Internet			
<i>e-tail/retail mode (B2C)</i>	√		
<i>e-business model (B2B)</i>		√	
<i>Internet service providers...</i>		√	
Content			
<i>Portals</i>		√	
<i>Content developers</i>			√
Telecommunications			
<i>Optical component</i>			√
Computer and software			
<i>Internet software applications</i>			√
<i>Mobile software applications</i>			√

¹⁰³ Various strategies have emerged in the development of content activities: "media house" offering a multiple choice of digitised content and based on free and paid content delivery; "telecom provider" using the technical advantage of the telecom provider and the large stock of private clients; and finally "multi store" based on the successful development of a single new idea (like books) and enlarging its offer to include digital content products.

REFERENCES

- Bank of England (1999), *Finance for small firms: A sixth report*, London, Bank of England.
- Bank of England (2000), *Finance for small firms: A seventh report*, London, Bank of England.
- Berger A. and Udell G. (1998), “The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle”, *Journal of Banking and Finance*, 22, pp. 613-673.
- Black B. and Gilson R. (1998), “Venture capital and the structure of capital markets: bank versus stock markets”, *Journal of Financial Economics*, 47, pp. 243-277.
- British Venture Capital Association and WM Company (1998), *UK High Technology Performance Measurement Survey 1998*, BVCA- WM Company.
- British Venture Capital Association and PriceWaterhouseCoopers (1999), *The economic Impact of venture capital in the UK*, BVCA- PriceWaterhouseCoopers.
- Bygrave W., Hay M. and Peeters J. (eds) (1999), *the Venture Capital Handbook*, London, Financial Times-Prentice Hall.
- Coopey R. and Clarke D. (1995), *Fifty Years Investing in Industry*, Oxford University Press.
- Coppel J. (2000), “e-Commerce: Impacts and Policy Challenges”, Economics Department Working Papers n°252, Paris, OECD.
- Department for Culture, Media, Sport (2000), *The Impact of New Technologies on the Music Industry*, London.
- European Venture Capital Association (1996) and Coopers&Lybrand Corporate Finance, *The Economic Impact of Venture Capital in Europe*, EVCA and Coopers&Lybrand Corporate Finance.
- European Venture Capital Association (1999, 2000), *Statistical Yearbook*, Zaventem, EVCA.
- European Commission (2000a), *Informal investors and the financing of innovative technology – A survey and analysis*, DG Enterprise and MCS.
- European Commission (2000b), *Progress Report on the Risk Capital Actions. Communications from the Commission to the Council and the European Parliament*, COM(2000) 658 final, Brussels.
- European Commission (2000c), *Trends in European innovation policy and the climate for innovation in the Union*, Commission Staff Working Paper-SEC(2000) 1564, Brussels.
- European Commission (2000d), *Economic Impacts of Genetically Modified Crops on the Agri-Food Sector: A Synthesis*, DG Agriculture, Brussels, European Commission.
- European Economy (1999), *Risk capital: a key to job creation. Implementation of the Action Plan*, n°12, Brussels, European Commission.
- Fenn G., Liang N., and Prowse S. (1997), *The Private Equity Industry: An Overview*, (Financial Markets, Institutions and Instruments Series, Volume 6, Number 4), Boston, Blackwell Publishers.
- Gompers P. and Lerner J. (1998), “What Drives Venture Fundraising?”, *Brookings Papers on Economic Activity: Microeconomics*, July, pp. 149-192.
- Gompers P. and Lerner J. (1999), *The Venture Capital Cycle*, Cambridge, MIT Press.
- Gompers P. and Lerner J. (2000), “Money chasing deals? The impact of fund inflows on private equity valuations”, *Journal of Financial Economics*, 55, pp. 281-325.
- Gompers P. and Lerner J. (2000), “The Venture Capital Revolution”, forthcoming, *Journal of Economic Perspectives*.
- Gompers P. (1995), “Optimal Investment, Monitoring, and the Staging of Venture Capital”, *Journal of Finance*, 50 (December) pp. 1461-1489.

- Gompers P. (1996), "Grandstanding in the Venture Capital Industry", *Journal of Financial Economics*, 43 (September), pp. 133-156.
- Gompers P. (1998), "Venture Capital Growing Pains: Should the Market Diet?", *Journal of Banking and Finance*, 22, pp. 1089-1104.
- Jeng L. and Wells P. (2000), "The determinants of venture capital funding: evidence across countries", *Journal of Corporate Finance*, 6, pp. 241-289.
- Kortum S. and Lerner J. (2000), "Assessing the contribution of Venture Capital to Innovation", Boston University and Harvard University, Unpublished working paper.
- Leleux B., Surlemont B. and Wacquier H. (1998), "State Vs Private Venture Capital: Cross-Spawning Or Crowding Out? A Pan-European Analysis", Paper presented to Entrepreneurship Research Conference 1998, Babson College, May, 14 p.
- Leleux B. and Muzyka D. (2000), "Courting the European growth firms: a survey of attitudes towards listing alternatives", *Venture Capital*, 2(1), pp. 41-59.
- Lerner, J. (1994), "Venture Capitalists and the Decision to Go Public", *Journal of Financial Economics*, 35 (June), pp. 293-316.
- Lerner J. (1998), "Angel Financing and Public Policy: An Overview", *Journal of Banking and Finance*, 22, pp. 285-318.
- Lerner, J. (1999), "The Government as Venture Capitalist: An Empirical Analysis of the SBIR Program", *Journal of Business*, 72, pp. 285-318.
- Lerner J. and Tsai A. (1999), "Do Equity Financing Cycles Matter? Evidence from Biotechnology Alliances", Harvard University and National Bureau of Economic Research, Unpublished working paper.
- Lund M. and Wright J. (1999), "The financing of small firms in the United Kingdom", *Bank of England Quarterly Bulletin*, May, pp. 195-201.
- Mackewicz & Partner (1998), *Venture Capital and Corporate Venture Capital: Financing Alternatives for Innovative Start-ups and Young Technological Companies in Germany*, Munich, Mackewicz & Partner.
- Masson C. and Harrison R. (1997), "Business Angel Networks and the Development of the Informal Venture Capital Market in the U.K.: Is There Still a Role for the Public Sector", *Small Business Economics*, 9, pp. 111-123.
- Murray G. (1998), "A Policy Response to Regional Disparities in the Supply of Risk Capital to New Technology-based Firms in the European Union: The European Seed Capital Fund Scheme", *Regional Studies*, 32(5), pp. 405-419.
- Murray G. and Marriott R. (1998), "Why has the investment performance of technology-specialist, European venture capital funds been so poor?", *Research Policy*, 27, pp. 947-976.
- National Venture Capital Association (1999), *NVCA Yearbook*, NVCA and Venture Economics.
- OECD (1996), *Venture Capital and Innovation*, Paris, OECD.
- OECD (1997), *Government venture capital for technology-based firms*, Paris, OECD.
- OCDE (2000), *Perspectives de l'OCDE sur les PME*, Paris, OCDE.
- Poterba J. (1989), "Venture capital and capital gains taxation", in: Summers L. (ed), *Tax Policy and the Economy*, Cambridge, MIT Press.
- Prowse S. (1998), "Angel investors and the market for angel investments", *Journal of Banking and Finance*, 22, pp. 785-792.
- Ritter J. (1998), "Initial Public Offerings", in. Logue D. and Seward J. (eds), *Warren Gorham & Lamont Handbook of Modern Finance*.

- Ritter J. (1999), “IPOs in 1999”, University of Florida, Unpublished data.
- Ritter J. (2000), “Big IPO Runups of 1975-2000”, University of Florida, Unpublished data.
- Schreyer P. (2000), “High-growth firms and employment”, STI Working Papers 2000/3, Paris, OECD.
- Storey D. J. (1994), *Understanding the small business sector*, London, Routledge.
- Van Brunt J. (2000), “Biotech’s Tsunami”, *Signals Magazine*, 08/18/2000.
- Van Osnabrugge M. and Robinson R. (1999a), “A Comparison of Business Angel and Venture Capitalist Investment Procedures: An Agency Theory-Based Analysis”, Harvard Business School, Unpublished working paper.
- Van Osnabrugge M. and Robinson R. (1999b), “Financing Entrepreneurship: Business Angels and Venture Capitalists Compared”, Harvard Business School, Unpublished working paper.
- Van Osnabrugge M. and Robinson R. (2000), “The influence of a Venture Capitalist’s Source of Funds”, Harvard Business School, Unpublished working paper.
- Venture Economics (1999), *1999 Investment Benchmarks Report – Venture Capital*, Newark, Venture Economics.
- Venture Economics and Bannock Consulting (1999), *1999 Investment Benchmarks Report – European Private Equity*, Newark, Venture Economics.
- Wall J. and Smith J. (1999), *Better Exits*, Price Waterhouse Corporate Finance-EVCA.
- Yli-Renko H. and Hay M. (1999a), “European venture capital – an overview”, in: Bygrave W., Hay M. and Peeters J. (eds), *the Venture Capital Handbook*, London, Financial Times-Prentice Hall, pp. 1-22.
- Yli-Renko H. and Hay M. (1999b), “The major European venture capital markets”, in: Bygrave W., Hay M. and Peeters J. (eds), *the Venture Capital Handbook*, London, Financial Times-Prentice Hall, pp. 23-77.

APPENDIX 1: PUBLIC EQUITY MARKETS

The existence of efficient and effective capital markets is a key ingredient for the development of the venture capital industry by ensuring the provision of finance to smaller quoted companies (SQC) and by ensuring an exit route for private equity investments. The increased acceptance of loss making companies is also widening the coverage of those markets¹⁰⁴ and making this exit route most valuable for start-up firms.

Various public equity markets¹⁰⁵ are available respectively, in Europe (EURO.NM, EASDAQ, AIM, techMARK) and in the US (NASDAQ).

Alternative Investment Market (UK)

Following the establishment of the AIM, the UK as a three tier market structure consisting of the official list on the London Stock Exchange, AIM and OFEX, the unregulated Off-Market Trading facility. AIM was introduced in June 1995 as a second tier market to target small or young companies whose shares were not publicly traded.

AIM has no minimum trading record, no minimum assets or profits levels, no minimum capitalisation requirement and no minimum free float shares. The less stringent entry requirements and continuing obligations were intended to improve smaller companies' access to public equity. Although AIM has a less onerous regulatory regime than for the Official list, the level of regulation (tightened since the establishment of the market to encourage more institutional investment), the costs of listing on AIM¹⁰⁶ are considered by many companies not to be sufficiently lower than those required for a full listing. This situation shows the difficulty of ensuring sufficient shareholder protection and reducing the burdens of regulation. While fewer requirements can enable a company to concentrate more on its core business, any such benefits might be offset by a reduction in trading of their shares resulting from reduced investor confidence. AIM requires that, if a company has been generating revenue for less than two years, its directors and employees at the time of listing must not dispose of any of their shares for at least a year. Given that the ease of exit plays a vital role in venture capitalists' returns, this can restrict the supply of venture capital finance at the smaller end of the market.

Another factor which might have restricted AIM's attractiveness to venture capitalists is the lack of liquidity of the market. Average daily trade value for over half other companies traded on AIM is less than £ 5,000 (check with data). One reason of this lack of liquidity reported by the Bank of England (2000) has been the absence of sufficient published analysis relating to companies quoted on AIM. This has deterred potential investors, and in return, reducing the interest for analysts to write report.

TechMARK (UK)

The Stock Exchange's launch on 4 November 1999 of techMARK, a new market designed to promote existing technology businesses, and attract new ones. Some 180 companies from the technology sectors of the main market have been included in techMARK on a dual-listing basis. In terms of listing requirements, this new market will have a special listing procedure for other technology companies with less onerous requirements, but it will be limited to companies of a certain minimum size (£50 million market capitalisation) which are selling a minimum volume of new or existing shares on flotation (£20 million).

EURO.NM (Pan-European)

EURO.NM is an agreement between the Paris (Le Nouveau Marché, 14/02/1996), Brussels (EURO.NM Belgium, 04/1997), Frankfurt (Neuer Markt, 10/03/1997), Amsterdam (Nieuwe Markt-NMAX, 20/02/1997) and, since January 1999, Milan, stock exchanges to promote the listing and trading of European start-up, high technology and growth companies on member exchanges. The

¹⁰⁴ For instance, 40% of companies going public on NASDAQ are loss making companies.

¹⁰⁵ For a more complete description, see for instance Rutschman (1999)

¹⁰⁶ AIM companies are, for instance, obliged to: produce working capital statements before listing; publish annual accounts and half yearly reports.

domestic markets were established to address the respective national needs, whereas EURO.NM was created to favour a European dimension and to guarantee easy access. To ensure functioning of the market at an European level, members of EURO.NM have signed a Market Harmonization Agreement, establishing minimum rules and regulations.

In addition to the provision of sufficient information (business plan and financing scheme before listing and regular information once admitted), minimum listing requirements have been defined: (i) no minimum level of revenue but equity prior to listing of EUR 1.5 million; (ii) mandatory capital increase of 50 percent of issue volume or more; (iii) minimum capitalization of EUR 5 million; (iv) minimum number of publicly traded shares of 100,000; (v) minimum public equity offered of 20 percent; (vi) lock-up period of 100 percent shares for 6 months or 80 percent for one year.

Among the EURO.NM network, the “Neuer Markt” and the “Nouveau Marché” represent the most significant share. To be quoted on one of those two markets, companies have to fulfil the own listing requirements of each of those markets.

European Association of Securities Dealers Automated Quotation (Pan-European)

EASDAQ was established in September 1996 as a pan-European highly regulated market for small and medium sized companies with a bias towards the high technology sector. This market, modelled on the NASDAQ structure (which originally took a 5% stake), is regulated by the Belgian Ministry of Finance and supervised by the Belgian Banking and Finance Commission. It operates across 14 European countries and has just one regulatory system and one seamless trading and settlement system. EASDAQ attracts companies from a variety of industry sectors such as engineering, electronics, information technology, biotechnology, telecommunications, automotive and leisure. Admission to trading on EASDAQ is possible for companies at any stage of development and can take various forms such as IPO (on EASDAQ and another market), a private placement, a dual trading facility for its financial instruments.

Listing requirements include informal presentation of the company to the EASDAQ’s Admissions Department and preparation of a prospectus which has to be approved by the Market authority of EASDAQ and a relevant Competent authority. A company must be duly incorporated with total assets of at least EUR 3.5 million and capital and reserves of at least EUR 2.0 million. No minimum level of profitability is required. Applications are considered in general for growth firm with a market capitalization of EUR 40 million or more at the time of admission to trading. At least 20 percent of the capital should be publicly held and there should be a minimum of 100 shareholders. Additional restrictions are introduced on the owners of shares at the time of listing.

However, the development of this market remains a long way behind Euro.NM. This situation may result from the listing requirements, making this market more an exchange place for high growth mid-size businesses.

National Association of Securities Dealers Automated Quotation (US)

Created in 1971 to match the demand for capital by high growth SMEs with the public interest in wanting to own stock in rapidly growing companies, the Nasdaq is the most largest market in the world for such a type of innovative, leading-edge growth companies. The Nasdaq has two tiers:

- Nasdaq National Market with large companies;
- Nasdaq SmallCap Market with emerging growth companies.

Listing requirements for both markets are described in Rutschmann (1999).

APPENDIX 2: VENTURE CAPITAL GLOSSARY¹⁰⁷

<i>Agency problem:</i>	A conflict among managers and investors, or more generally an instance an agent does not intrinsically desire to follow the wishes of the principal that hired him.
<i>Asymmetric information problem:</i>	When, because of day-to-day involvement with the firm, an entrepreneur knows more about the company's prospects than investors, suppliers, or strategic partners.
<i>Bridge Loan, Bridge Finance or Bridge Round:</i>	A loan or equity investment to provide financing for a relatively short time period until the issuer can complete a longer term financing such as a public offering.
<i>Burn Rate:</i>	In venture capital financing, the rate at which a start-up company spends capital to finance overhead before generating a positive cash flow from operations.
<i>Business Angels:</i>	Private individuals who invest directly in new and growing unquoted businesses. Business angles usually provide finance in return for an equity stake in the business, but may also provide other long-term finance. This capital can complement the venture capital industry by providing smaller amounts of finance (generally under EU 150 000) at an earlier stage than most venture capital firms are able to invest.
<i>Buyback:</i>	A corporation's repurchase of stock or bonds it has issued. Also, the purchase of a long position to offset a short position.
<i>Call Option:</i>	The right to purchase a specified number of securities at a fixed price at or during a specified time. See 'Put Option'.
<i>Carried interest:</i>	The substantial share, often around 20 percent of profits that are allocated to the general partners of a venture capital partnership.
<i>Closed-end fund:</i>	A publicly traded mutual fund whose shares must be sold to other investors (rather than redeemed from the issuing firm, as is the case with open-end mutual funds, Many early venture funds were structured in this manner.
<i>Closing:</i>	The signing of the contract by an investor or group of investors that binds them to supply a set amount of capital to a venture capital fund Often a fraction of that capital is provided at the time of the closing. A single venture capital fund may have multiple closings.
<i>Collateral:</i>	Securities or other property pledged by a borrower to secure repayment of a loan.
<i>Committed capital:</i>	Pledges of capital to a venture capital fund. This money is typically not received at once, but rather taken down over three to five years, starting in the year the fund is formed.
<i>Corporate venture capital:</i>	An initiative by a corporation to invest either in young firms -outside the corporation or units formerly part of the corporation. These are often organized as corporate subsidiaries, not as limited partnerships.
<i>Covenants:</i>	In the venture capital context, an agreement by the company which may remain in effect as long as the venture capital investors hold a stated amount of securities or may terminate on the occurrence of certain events (eg completion of a public offering). Affirmative covenants define acts which the company must perform, and may include payment of taxes, maintenance of corporate existence, insurance, property and equipment, environmental and legal compliance, representation of venture capital firm on the board, etc. Negative covenants define acts which the company may not perform,

¹⁰⁷ Essentially based on EASD (1999) and Gompers and Lerner (2000)

	and could include a prohibition on mergers, sale or purchase of assets, amendments to its corporate charter, incurring of indebtedness, the issuing of securities, distributions and redemption of securities, etc.
<i>Disbursement:</i>	An investment by a venture capitalist into a company.
<i>Due Diligence:</i>	The review of a business plan and assessment of a management team prior to a venture capital investment. The phrase derives from the fact that under USA law certain persons (including the directors, underwriters and auditors) are personally liable for a misstatement of material fact in a registration statement unless they can demonstrate that after reasonable investigation they had reasonable ground to believe, and in fact did believe, that the statement was true. Conducting the due diligence examination enables these persons to raise a 'due diligence defence' if sued.
<i>Employee Retirement Income Security Act (ERISA):</i>	(USA) The Employee Retirement Income Security Act of 1974, the principal USA law regulating retirement and employee benefit plans, i.e. that codified the regulation of corporate pension plans.
<i>First closing:</i>	The initial closing of a fund.
<i>First fund:</i>	An initial fund raised by a venture capital organization.
<i>Follow-on fund:</i>	A fund that is subsequent to a venture capital organization's first fund.
<i>Follow-on investment:</i>	An additional investment by existing investors, which may be provided for in documentation relating to the initial investment.
<i>Fund:</i>	A pool of capital raised periodically by a venture capital organization. Usually in the form of limited partnerships venture capital funds typically have a ten-year life, though extensions of several years are often possible.
<i>Fund of funds:</i>	A fund that invests primarily in other venture capital funds rather than portfolio firms organized by an investment advisor, or investment bank.
<i>General Partner:</i>	A partner in a limited partnership who is responsible for the day-to-day operations of the fund. In the case of a venture funds, the venture capitalists are either general partners or own the corporation that serves as the general partner. The general partners assume all liability for the fund's debts.
<i>General Partnership:</i>	A partnership in which the parties carry on all their business for the joint benefit and profit of all the parties concerned without attention to the capital being limited or not, or the contribution being equal or unequal. Although capital contributions may vary, all partners and members of management share the profits and losses equally. The partners of a general partnership are liable for all debts and obligations of the partnership.
<i>Hot issue market:</i>	A market with high demand for new securities offerings, particularly for initial public offerings.
<i>Hurdle rate:</i>	Either, (1) the set rate of return that the limited partners must receive before the general partners can begin sharing in any distributions, or (2) the level that the fund's net asset value must reach before the general partners can begin sharing in any distributions.
<i>Initial Public Offering (IPO):</i>	The sale of shares to public investors of a firm that has not hitherto been traded on a public stock exchange. These are typically underwritten by an investment bank.
<i>Institutional Investor:</i>	An institution such as an investment company, mutual fund, insurance company, pension fund, or endowment fund, which generally has substantial assets and experience in investments. In many countries, institutional investors are not protected as fully by securities laws because it is assumed that they are more knowledgeable and better able to protect themselves. They account for a majority of overall trading volume in most major securities markets.

<i>Intangible asset:</i>	A patent, trade secret, informal know-how brand capital, or other non physical asset
<i>Intellectual Property:</i>	Patents, copyrights, trademarks, trade secrets and similar rights in ideas, concepts, etc.
<i>Investment advisor:</i>	A financial intermediary who assists investors, particularly institutions, with investments in venture capital and other financial assets. Advisors assess potential new venture funds for their clients and monitor the progress of existing investments. In some cases, they pool their investors' capital in funds of funds.
<i>Leveraged buyout (LBO):</i>	The acquisition of a firm or business unit, typically in a mature industry, with a considerable amount of debt.
<i>Leveraged buyout fund:</i>	A fund, typically organized in a similar manner to a venture capital fund, specializing in leveraged buyout investments. Some of these funds also make venture capital investments.
<i>Limited Partner:</i>	A person having an interest in a limited partnership whose liability is limited to a fixed amount and who does not participate in the management of the partnership.
<i>Limited Partnership:</i>	A partnership consisting of one or more general partners and one or more special partners (the 'limited partners') who are not liable for the debts of the partnership beyond their capital contribution. See ' <i>General Partnership</i> '.
<i>Management fee:</i>	The fee, typically a percentage of committed capital or net as set value, that is paid by a venture capital fund to the general partners to cover salaries and expenses.
<i>Market capitalization:</i>	The price of a stock multiplied by the total number of shares outstanding. The market's total valuation of a public company. By extension, the total valuation of companies listed on a stock market.
<i>Mezzanine Financing or Round:</i>	A financing round in venture capital-backed companies occurring after the company has completed its product development and after it is an operating company, but before the company is ready for a public offering or to be acquired.
<i>Patent:</i>	The exclusive right, granted by a government, to make, use or sell an invention or a process for a specific period of time.
<i>Preferred stock:</i>	Stock that has preference over common stock with respect to any dividends or payments in association with the liquidation of the firm. Preferred stockholders may also have additional rights, such as the ability to block mergers or displace management.
<i>Private equity:</i>	As opposed to public equity; investment in equity stake by private investors in companies not listed on a stock market.
<i>Put Option:</i>	The right of an investor to demand repurchase by the company or by another investor of a certain number of its shares at a fixed price within a specified time period or at a specified point in time. See ' <i>Call Option</i> ' for converse.
<i>Risk capital markets:</i>	Market providing equity financing to a company during its early growth stages (start-up and development). In the framework of this communication, it covers three sorts of financing: <ul style="list-style-type: none"> • Informal investment by Business Angels. • Venture capital. • Stock markets specialized in SMEs and high growth companies.
<i>Shares outstanding:</i>	The number of shares that the company has issued.
<i>Small Business Investment</i>	A US federally guaranteed risk capital pool. These funds were first

<i>Company (SBIC):</i>	authorized by the US Congress in 1958, proliferated during the 1965, and then dwindled after many organizations encountered management and incentive problems.
<i>Spinoff:</i>	The creation of a new independent company from an existing company by the transfer of the assets of part of the company to a new corporation and the distribution of stock of that new corporation to stock holders of the old one.
<i>Staging:</i>	The provision of capital to entrepreneurs in multiple instalments, with each financing conditional on meeting particular business targets. This helps ensure that the money is not squandered on unprofitable projects.
<i>Syndication:</i>	The joint purchase of shares by two or more venture capital organizations or the joint underwriting of an offering by two or more investment banks.
<i>Venture capital:</i>	Investment in unquoted companies by venture capital firms who, acting as principals, manage individual, institutional or in-house money. Four main financing stages are identified in relation to the stages of development of a venture-backed company: early stage, expansion, replacement and buy-out. In the USA, the world “venture capital” does not include most of the buy-out deals.
<i>Venture capital funds:</i>	Close-end funds, created to provide venture capital.

APPENDIX 3: COMPANY DEVELOPMENT PHASES AND TYPE OF FINANCING DEFINITIONS

3.1 Stages classification

EVCA¹⁰⁸ and the NVCA¹⁰⁹ identify several financing stages in relation to the development phases of a company. These are described below, with a distinction made where there is a divergence in the EVCA/NVCA definitions:

1. Early Stage

- 1.1. **Seed:** Relatively small amount of financing provided to an inventor or entrepreneur to prove (research, assess, and develop) an initial concept before a business has reached the start-up phase and to qualify for start-up financing. Financing may cover product development and market research as well as building a management team and developing a business plan.
- 1.2. **Start-up:** Financing provided to companies for product development and initial marketing. Companies may be in the process of being set up or may have been in business for a short time, but have not yet sold their product commercially. By this phase companies usually will have made market studies, assembled the key management, developed a business plan, and are ready to do business.
- 1.3. **Other Early- /First-Stage:** Financing to companies that have completed the product development phase and require further funds to test a prototype, or initiate commercial manufacturing and sales. Companies will not yet be generating a profit.

2. Expansion

- 2.1. **Second-/Third-Stage:** Financing provided for the growth and initial expansion (development) of a company that is producing and shipping, and has growing accounts, receivables and inventories. It is breaking even or trading profitably. Capital may be used to finance increased production capacity, market or product development, and/or to provide additional working capital.

3. Later-Stage

- 3.1. **Bridge Financing:** Financing made available to a company in the period of transition from being privately owned to being publicly quoted. Often bridge financing is structured so that it can be repaid from the proceeds of a public underwriting. It can also involve restructuring of major stockholder positions through secondary transactions – see below.
- 3.2. **Replacement Capital (secondary transactions):** Purchase of existing shares in a company from another private equity investment organisation or from another shareholder or shareholders. This may be undertaken if there are early investors who want to reduce or liquidate their positions, or if management has changed and the stockholdings of the former management, their relatives and associates are being bought out to relieve a potential oversupply when public. Also, often associated with growth plans including the provision of Expansion capital - see 2. above.
- 3.3. **Rescue/Turnaround/Refinancing bank debt:** Financing made available to existing businesses which have experienced trading difficulties, with a view to re-establishing prosperity/reducing a company's level of gearing.
- 3.4. **Open Market/Venture Purchase of Quoted Shares:** Financing provided for acquiring securities of companies whose common shares trade publicly (venture purchase for the purpose of delisting a company).

4. Acquisition/Buyout/Buyin

¹⁰⁸ EVCA 1999 Yearbook

¹⁰⁹ NVCA 1999 Yearbook

- 4.1. Acquisition:** Financing provided for acquiring another company.
- 4.2. Management Buyout:** Financing provided to enable current operating management and investors to acquire an existing product line of business. This may occur at any phase of a company's development and involve either a public (quoted) or private company. Often these companies are closely held or family owned. Management buyouts usually involve revitalising an operation, with entrepreneurial management acquiring a significant equity interest.
- 4.3. Management Buyin:** Financing provided to enable a manager or group of managers from outside the company to buyin to a company with the support of private equity investors.

EVCA groups the above financing stages into 5 broader categories for reporting in its annual Yearbook:

1. Seed;
2. Start-up;
3. Expansion (including Other Early- /First-Stage; Expansion; Bridge Finance and Rescue/ Turnaround);
4. Replacement Capital;
5. Buyout (including Management Buyouts and Management Buyins).

Open Market/Venture Purchase of Quoted Shares is altogether excluded from the statistics.

NVCA report on the basis of the 4 basic categories outlined above:

1. Early Stage;
2. Expansion;
3. Later Stage;
4. Acquisition/Buyout (where funding is provided by a venture capital firm, but not when it is by a buyout firm)

However increasingly new funds are raised which specialise in specific segments such as :

- Platform or “buy and build” consisting mainly in acquiring a base company which will be merged or allied to others in the same sector, with a view to achieving sufficient critical mass in the European or global marketplace
- Turnarounds of underperforming companies, often requiring intensive management implication from the venture capitalists

Also new hybrid financial products to cater to the VC market see the day such as:

- Highly leveraged lending
- Mezzanine, typically debt with warrants which associate the lender to the risk of the company more than in the case of senior debt.
- “Dequity” providing a “one stop shop” for SMEs seeking development finance and who in light of their limited size are not prepared to deal with separate debt, mezzanine and equity providers.

3.2 Sectors classification

By sector: There are a number of useful segmentations:

- Technology based funds which can be subdivided into “generalist” hi-tech and sector focuses funds such as biotechnology only, etc.
- Generalist funds addressing areas other than hi-tech

The following segmentation is typically used in compiling statistics¹¹⁰ :

- High-Tech including : Communications, Computer Related, Other Electronics Related, Biotechnology, Medical/Health Related
- Energy
- Consumer Related
- Industrial Products and Services
- Chemicals and Materials
- Industrial Automation
- Other Manufacturing
- Transportation
- Financial Services
- Other Services
- Agriculture
- Construction
- Other

¹¹⁰ See EVCA statistics in EVCA 1999 Yearbook.

APPENDIX 4: SOURCES OF INFORMATION

Various sources¹¹¹ of information are available on private equity and on recent developments in sectors supported by venture capital.

Many venture capital firms make some information available through the World Wide Web. The easiest way to find these is through Yahoo: the list is located at Business and Economy > Business to Business > Financial Services > Finance and Receivables > Financing > Corporate Finance > Venture Capital. The quality, informativeness, and accuracy of these Web pages vary widely. A few of the many more general sites about the venture capital *industry* are informative. Among the best is the Price Waterhouse's (www.pwcglobal.com, and go to Insights & Solutions/Money Tree Survey Report).

1) Europe

Information is available about European private equity firms in the European Venture Capital Association's *Yearbook* (www.evca.com). Many national venture capital associations in Europe publish (in their native languages) detailed annual reviews and directories. For instance, the British Venture Capital Association prepares a *Membership Directory* and *Report on Financing Activity*. The European Venture Capital Association has done a series of monographs on legal aspects of private equity investing across Europe that are very helpful. Links to many national venture capital associations in Europe are available on the EVCA web site. Recently, Venture Economics (see below US section) have developed VentureXpert and EVCJ(European Venture Capital Journal).com, the first on-line sources of European and global venture capital and private equity news, statistics and analysis (see www.evcj.com).

On business angels in Europe, various links to national network are available from the European Business Angels Network web site (www.eban.org).

2) US

In the US, general information on the private equity and venture capital market could be found on the web site of the American Venture Capital Association (www.nvca.com). The National Venture Capital Association provides basic data on the venture capital market in the US (statistical yearbook...) but also publishes reviews and provides links to the members of the American Venture Capital Association. Additional information is available on the two following web sites:

- VentureOne (www.ventureone.com) providing statistical data in VentureOne's *Annual Review* and *IPO Report*. VentureOne also does a variety of other special reports: they are summarized at www.ventureone.com (and may also be ordered there). VentureOne, provides more detailed profiles, including information on directors and detailed business profiles. While their coverage does not extend as far back in time as Venture Economics' and only includes venture-backed firms, the accuracy and detail of their information is generally superior. Like the Venture Economics database, VentureOne allows one to undertake extensive screening—e.g., it is possible to identify all Internet firms that received seed financing in 1997 and were based in Massachusetts. VentureOne is a professional database, with subscriptions restricted to limited partners in private equity funds and corporations making direct investments.
- Venture Economics (www.ventureeconomics.com) producing jointly with the National Venture Capital Association very useful report. Among them, the primary sources for returns data are Venture Economics' *Investment Benchmarks Reports*, which are prepared for venture capital, other private equity (primarily buyouts), and international funds. Venture Economics, a unit of Securities Data Corporation (SDC), provides profiles of firms backed by venture capital and (less comprehensively) buyout funds in its VentureXpert (formerly known as the Venture Intelligence) Database. It also provides information about the amount of and the investors in each financing round. Its Joint Venture and Strategic Alliances Database summarizes corporate transactions.

¹¹¹ This is not an exhaustive list.

3) Information on sectors

In addition, a lot of helpful information may be available through a Web site specializing in that particular industry. For instance, Recombinant Capital--which markets a high-priced database on biotechnology-pharmaceutical alliances--has put much ancillary information on biotechnology firms on its Web site (www.recap.com). Additional information on the biotech industry could be found in www.signals.com, the online magazine of biotechnology industry analysis or on the health and life science web page of Ernst&Young (www.ey.com). See also the links on the Gompers web page (www.people.hbs.edu/pgompers/biotech.html)

On the Internet, for instance, statistical information is available on the NUA web page (www.nua.ie/surveys) or on the ESIS web page (www.europa.eu.int/ISPO/esis/default.htm). Additional information could be found on web sites like www.commerce.net or the web sites of consulting companies including Forrester Research (www.forrester.com), Gartner Group (www.gartner.com).

Finally, for recent information on dotcom failures, see www.dotcomfailures.com and www.upside.com/graveyard/index.html

4) Publications

Many new publications are covering the high-technology sectors, among them:

- *The Red Herring* (which focuses on high-tech firms), www.redherring.com;
- A general-interest magazine focusing on venture capital is *Upside*, www.upside.com;
- See also www.wired.com and www.business2.com ;
- Some French magazines are also available (www.journaldunet.com, www.newbiz.fr,...)

The most useful periodicals about the U.S. market are the *Venture Capital Journal*, *Buyouts*, and the *Private Equity Analyst*. Detailed accounts of transactions are contained in *Private Equity Week* and the quarterly *Venture Edge*. The specialized world of Small Business Investment Companies is covered in the *NASBIC NEWS*. Asian private equity is covered in two publications, the *Asian Venture Capital Journal* (www.asiaventure.com) and the less satisfactory *Venture Japan*. The European private equity scene is covered by the *European Venture Capital Journal* and the much less satisfactory *Start-Up*. Latin American funds are covered by the *Latin American Private Equity Analyst* and EuroMoney's *LatinFinance*.

Finally, academic journals publish papers on venture capital. There is also now one specific journal dedicated to venture capital, "Venture Capital" (www.tandf.co.uk/journals)