

Financing young and innovative enterprises in Europe: Supporting the venture capital industry



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Small businesses have been the largest contributors to net job creation in most countries.

1. Introduction

The unemployment situation of Europe has generated a growing interest in small business finance, because young and newly created enterprises have been responsible for an increasing share of the job growth over the past two decades (1), and these firms seem to have limited access to external funds. On the one hand, studies on job creation in OECD economies show that small businesses have not only been the largest contributors to gross job gains and losses in recent years, but also to net job creation in most countries (OECD, 1997). Research on job creation in the US also points to a negative relationship between net job creation rates and the age of firms (Davis *et al.*, 1996a and 1996b). On the other hand, recent studies on the determinants of the financial structure of small and medium-sized enterprises (SMEs) indicate that they face specific problems (2). Arjona *et al.* (1998) analyse a sample of SMEs from France, Italy, Germany and the United Kingdom. They find that young companies have almost no long-term debt, and rely on short-term debt and trade-credits to finance operations, whereas older SMEs use some long-term debt but in a rather limited way (3). In addition, they note a negative relationship between the age of firms and financial leverage, as well as between firm profitability and financial leverage. These relationships are consistent with financial theories suggesting that, because of market imperfections, some firms may have to rely on internal funds to finance their activity. The financial literature points out that small firms may be unable to raise external capital because of agency costs, e.g. costs arising from conflicts of interest with entrepreneurs and imperfect information (4).

A large body of economic literature demonstrates the sensitivity of investment to liquidity constraints (5). Several empirical studies show that internal funds can have an important influence on investment (6). Hence, as investments by SMEs are likely to be hampered by their financial constraints, there is some justification for public support programs to ease SME access to external funds. This would increase investment and thereby create jobs. It should be noted, however, that various financial assistance programs in the form of loan schemes, tax concessions and grants have been created in the past, but there is little evidence that they have been successful in the long-run. Nevertheless, the dramatic rise of unemployment rates in Europe, combined with the recognition of the predominant role of *start-ups* for technological innovation (7) and economic growth, have induced governments to look for ways to promote the *venture capital industry*.

I am indebted to Chris Hurst, Eric Perée and Daphne Venturas for helpful comments and suggestions.

- 1) See, for example, Dennis *et al.* (1994) for a comprehensive survey of the job creation process in the US.
- 2) See, for example, Petersen and Rajan (1993, 1994) for the United States and Arjona *et al.* (1998) for Europe.
- 3) Over the sample period, the average ratio of long-term debt to capital was less than six percent for Italy and around twelve percent for the UK. Furthermore, some 38 percent of Italian and 26 percent of British SMEs have no long-term debt at all.
- 4) Harris and Raviv (1991) survey this literature.
- 5) This literature is reviewed in Levine (1997).
- 6) See, for example, Fazzari *et al.* (1988) and Hoshi *et al.* (1991).
- 7) Empirical evidence is provided by Kirchoff (1995), Gambardella (1995) and Audretsch (1995) for the United States, and Ghobadian *et al.* (1995) for the UK.

However, the idea for public support for the European venture capital industry raises two questions. First, which imperfections can be corrected by public intervention; and, second, when intervention is needed, how best can it be structured. The issues raised are far from easy, but the literature on venture capital has expanded over the last few years and provides some valuable insights (8). This paper, therefore, reviews this literature to provide some potential answers to these two questions.

This paper is organised as follows. Section 2 analyses the economics of venture capital finance, e.g. the oversight role played by venture capitalists and the basic structure of venture capital financing. Section 3 provides an overview of the European venture capital industry and discusses potential impediments to the development of risk-capital in Europe. Section 4 addresses the issue of a public support to the industry. It reviews the factors affecting commitments to the venture capital industry, and discusses the costs and benefits of various support schemes. The last section summarises the main findings and offers some policy recommendations.

2. Venture capital finance

Young and innovative companies are confronted by the very specific problems of few collateralisable assets, high uncertainty, and asymmetric information.

Before discussing public support for venture capital, it is necessary to review this industry and its unique features. Venture capitalists finance young and innovative companies, engaged in projects with high potential and high risk. In fact, the venture capital industry developed because such firms are confronted by very specific problems. Three aspects of start-up finance are particularly important. First, their operations are high risk, because of the uncertainty regarding the outcomes of inventions and innovations (9). Second, they often entail substantial investments with few collateralisable assets. This may be due to the extent of their R&D activities or because of the expense of financing growth. Third, the parties involved have asymmetric information. Compared to investors, entrepreneurs always have a superior knowledge of the future prospects of projects in which they are involved. Thus, the combination of these three aspects imply that start-ups have essentially no access to credit markets, and must resort to so-called *angels* (10).

The asymmetric information associated with start-up finance means that opportunistic behaviour flourishes. Venture capitalists have therefore developed control mechanisms to mitigate these problems and most venture capital deals combine *intensive monitoring* of companies and the use of *hybrid securities*, such as convertible debts and other equity-like instruments to better align the interests of entrepreneurs and venture capitalists. The rationale for these practices is explained below (11).

2.1 Monitoring

A major problem in start-up finance is that entrepreneurs may have little incentive to stop a failing project, either because they do not provide the capital, or because they are earning private benefits from the running of the company. Thus, with personal information regarding the prospects of their project, entrepreneurs may opt for an inefficient continuation of operations. This possibility requires the gathering of information and monitoring by venture capitalists. They normally have

8) Note that most of the literature is centred on the US industry, because it is the oldest and largest one in the world.

9) Note that it is unrelated to the technological content of an innovation.

10) Angels are individuals - including family members and relatives of owners - that are contributing to the capital at their risk.

11) See Sahlman (1990) for an extensive survey of the relationships between venture capitalists and investee's companies in the United States.

long-term relationships with companies, and combine the *staging of capital infusions* with an *ongoing involvement* in portfolio companies as mechanisms of *control*.

Venture finance is never one shot, but always staged. Usually, the first stage of investment (seed stage) serves to assess a new concept presented by an entrepreneur. If a project is backed by venture capitalists, then all successive stages of financing are in relation with the development of the company: the start-up stage for product development and marketing, followed by the expansion stages. The last stage of an operation is always an exit, which, for successful ventures, normally leads to an initial public offering (IPO). In practice, however, less than 20 percent of venture-backed firms are "high reward" investments. Most ventures are sold off privately or liquidated.

The staging of capital is obviously one of the most important mechanisms for controlling a venture, since it links funding decisions to the release of new information about projects. Thus, venture capitalists are able to monitor a firm's progress and, by denying capital, can force the shutdown of operations if the project appears to be a bad investment (12). It means that only projects for which venture capitalists receive favourable feedback are funded (13).

The inefficient continuation of a firm is not the only point of concern for venture capitalists. Without any further control than the staging of capital, entrepreneurs have sufficient operating discretion to adopt other opportunistic behaviour. For example, they can take strategic decisions giving them private benefits at the expense of other investors. Therefore, venture capitalists are also active investors, and claim that their deep involvement in company management is as important as their capital investment. They normally sit on boards of directors and help the entrepreneurial team in areas such as strategic and operational planning or recruitment, even replacing management if things go badly. In addition, they help raise new money and assist successful ventures in the process of going public. According to one survey (Gorman and Sahlman, 1989), venture capitalists - although not involved in the day-to-day management of a company - show up frequently (1.5 times a month) and spend on average 80 hours per year in direct contact (e.g. on-site) with their investments.

The monitoring role of venture capitalists increases the chances of success of a firm.

It is clear that the monitoring role of venture capitalists increases the chances of success of a firm, because it serves to limit opportunistic behaviour. It also adds considerably to the value of the venture by providing it with the expertise of venture capitalists (14). Both aspects are well documented in the empirical literature. Gompers (1995) observes that venture capitalists in the US do concentrate investments in companies where informational problems are high, and that the monitoring frequency increases for industries in which expected agency costs are higher (for example, in high-technology) (15). Finally, using data on IPOs, Barry *et al.* (1990) show that the quality of monitoring

12) These aspects are documented in Sahlman (1990), Lerner (1995) and Gompers (1995). Looking at a random sample of US venture-backed firms, Gompers (1995) shows that venture capitalists invest only when they learn that a project meets a milestone and that successful ventures (e.g. firms that go public) receive on average more financing and more rounds than others firms. Since IPOs yield the highest returns for investors, this positive relationship between going public and the number of rounds or the level of investment provides evidence that venture capitalists are gathering and using valuable information during the staged investment process.

13) The role of staged finance as a control mechanism is also emphasised in the theoretical literature on venture capital, see Hansen (1990) and Bergemann and Hege (1997). The "stopping problem" mentioned above is analysed in depth by Bergemann and Hege (1997). They also point out that the venture capitalist's threat to abandon a venture creates incentives for an entrepreneur to act in a way that maximises value.

14) The value added aspect is modelled by Chan *et al.* (1990).

services is acknowledged by the financial market at the time of an IPO: there appears to be less under-pricing for issues with recognised venture-capital investors.

2.2 The use of equity-like financing instruments

Most deals between venture capitalists and entrepreneurs involve hybrid financial instruments that combine debt and equity components to mitigate incentive problems.

Another key feature of contractual arrangements between venture capitalists and entrepreneurs is that most deals involve *hybrid* financial instruments that combine debt and equity components. Very often, the capital is provided via the acquisition of *convertible preferred stock*. Like common stock, convertible preferred stock is considered equity, but does not pay a dividend on a current basis and offers a liquidation preference. However, it can be converted to common stock at the discretion of the venture capitalist, and usually carries voting rights on an as-if-converted basis. Other widely used instruments are redeemable preferred shares, warrants and convertible debts. Warrants are similar to stock options, in that they give investors the right to buy a fixed number of shares of a venture at a pre-specified price. Convertible debt combines many features of straight debt and warrants. Investors are entitled to receive interest and principal payments, have priority over stock in the event of a liquidation, and the debt can be surrendered to the firm for a specified number of new shares (16).

The financial literature suggests that the main purpose of the financial instruments used by venture capitalists is to mitigate incentive problems. The cash-flow allocation rule affects entrepreneurs' incentives because they look at their own payouts when taking decisions (17), and the systematic use of hybrid securities limits over-investment or the manipulation of information by entrepreneurs.

As pointed out by Ravid and Spiegel (1997), most standard financing instruments can provide entrepreneurs with incentives to over-invest (i.e., to initiate negative NPV projects) as they select projects that are profitable from their point of view. Take the simple case of debt financing: The entrepreneur captures most of the gain from investments yielding large payoffs, which far exceed the face value of the debt. However, if the investment fails, the entrepreneur does not bear the consequences because of his limited liability. Thus, with this type of financing scheme, the entrepreneur may benefit from "gambling" with the firm by switching to more risky, negative NPV projects. Ravid and Spiegel show that, under limited liability, the only way to deter entrepreneurs from engaging in any negative NPV projects is to use linear sharing rules that split the proceeds of ventures in proportion to initial investments. Then, entrepreneurs behave as if they were the sole investors in firms, since they bear both the costs and benefits from their investment choices. Thus, according to this model, venture capitalists must receive equity, or possibly packages combining equity and riskless debt. A similar result is demonstrated by Admati and Pfleiderer (1994) for the case where a venture capitalist takes over control of the project (18).

That most deals involve convertible securities instead of straight equity can be explained by two other major incentive problems. First, the value of a venture depends crucially on entrepreneurial

15) The fact that the involvement of venture capitalists increases when firms get in trouble is illustrated by Lerner (1995). He also shows that their representation on board of directors is more important in crises.

16) The difference between a convertible debt and a warrant is therefore that the former has a changing exercise price equal to the value of the debt.

17) See Harris and Raviv (1991) for a survey of the literature.

18) This model also provides a rationale for the syndication of venture capital investments. Some empirical evidence on syndication is provided by Lerner (1994).

efforts in managing the firm's resources. Jensen and Meckling (1976) argue that entrepreneurs can under-invest when they do not own the total company, since they only capture a fraction of the gain from their efforts whereas they support the integral cost. Thus, venture capitalists may want to keep "hard" claims that penalise entrepreneurs in the case of failure. The recourse to convertible debt may also serve this purpose by rewarding an entrepreneur only the case of a success (19). A second problem is that the staging of capital injections can have perverse effects on the incentives of entrepreneurs, unless a deal is carefully designed. Staged finance always provides entrepreneurs with the incentive to conceal the "bad news" in order to avoid liquidation, but, in addition, Cornelli and Yosha (1997) have demonstrated that straight equity financing can induce an entrepreneur to engage in "window dressing", i.e. in activities that artificially improve the short-term performance of a project. Convertible securities, on the other hand, can mitigate this type of incentive problem by imposing a possible cost on the entrepreneur through the exercise of the conversion options when short-term performance is good. In this case, the ownership share of the venture capitalist is larger than in the case of a pure equity financing. Window dressing then becomes a costly behaviour for the entrepreneur, because although it reduces the probability of a liquidation, it also increases the probability of the conversion of debt into equity (20). One must note, finally, that convertible securities can also give liquidity to a venture capitalist's investment. Such securities typically contain redemption rights that provide some income when a company is financially viable, but not successful enough to go public or to be privately sold off.

To summarise, the high uncertainty and asymmetric information in start-up finance make the governance of projects essential. Venture capitalists manage these problems through the monitoring of companies, the staging of capital injections, and the use of hybrid securities. Venture capitalists screen hundreds of proposals every year, but support very few of them. As monitoring is costly and projects are risky, they only fund projects with a very high potential. Thus, it is not unusual for venture capitalists to apply discount rates between 40 to 60 percent.

3. The European industry

The characteristics of the European venture capital industry can be highlighted through a contrast with the basic features of the US industry (21), because the latter is the oldest and largest in the world. In fact, conventional wisdom is that the European industry is underdeveloped compared to that of the US. However, a look at industry data gives a slightly more complex picture. Although most markets in continental Europe are clearly of a smaller relative size than the US market, the opposite holds true for the United Kingdom. Still, European markets exhibit significant - and potentially important - differences, in terms of investments or exit opportunities. These differences are presented below.

3.1 Market size

Some history may be useful. The US venture capital industry started in 1946, with the creation of American Research and Development (ARD). Whereas it developed smoothly until the end of the 1970s, the activity rose dramatically during the early and mid-1980s. New commitments to venture

19) See Bergemann and Hege (1997). Harris and Raviv (1991) survey the costs and benefits of debt.

20) Another justification for convertible securities is that an entrepreneur's managerial abilities impact on the success of a venture. Hence, as pointed out by Chan et al. (1990), conversion options may also serve to implement optimal transitions of control between entrepreneurs and venture capitalists when there is uncertainty about the skills of entrepreneurs.

21) See Gompers (1994) for the history of the US industry.

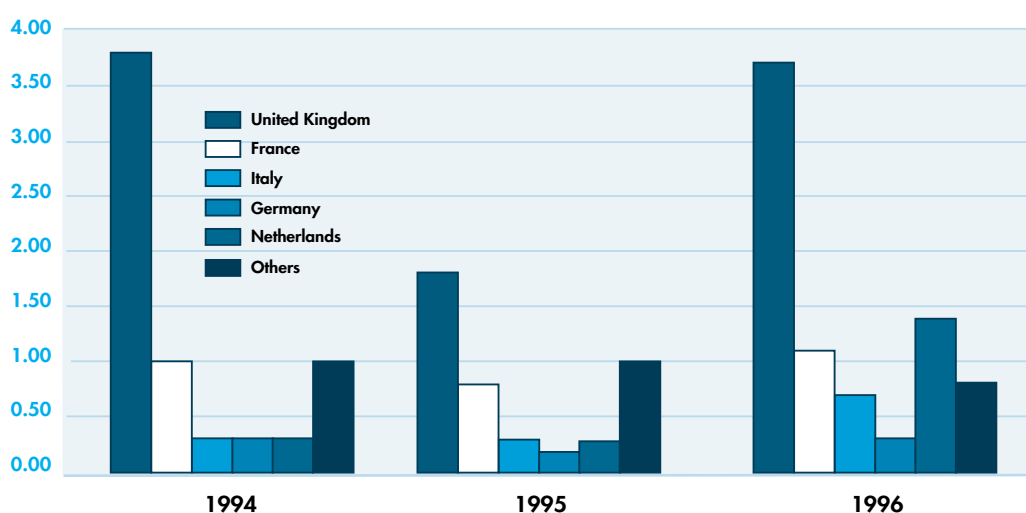
capital funds increased from less than US dollar 300 million in 1978 to over US dollar six billion in 1982, and were exceeding US dollar five billion on average during the period from 1982 to 1986. The industry "boom" was related to regulatory changes in pension funds investments, and highly correlated with the development of the US market of IPOs. Gompers (1994) observes, for example, that the correlation coefficient between the level of IPO activity and venture capital new funds commitments is equal to 0.70 for the period from 1969 to 1992. In fact, more than 900 firms were brought to the market during that same period. The "success stories" include Intel, Apple or DEC in high-technologies, Biogen or Genentech in bio-technologies, and Federal Express in services. The early-1990s saw the end of the expansion, and industry growth appears to have resumed at a steady rate, with a slight increase in commitments over the recent years. The new commitment of funds to the industry averaged US dollar 3.5 billion per year for the period 1988 to 1996.

The European industry is more recent, having started in the United Kingdom during the early 1980s. The British industry expanded very rapidly and its activity is also correlated with the UK initial public offering market. EVCA reports that venture backed companies accounted for 40 percent of all flotations on the main market of the London Stock Exchange from mid-1992 to end-1996 (22). Today, the British venture capital market displays the features of a mature industry. Conversely, the expansion of the industry has been very slow in other European countries, despite a variety of public assistance programs.

Venture capital commitments in France, Italy and Germany are still very small. However, the amounts involved for the UK are larger than those of the US when measured as a percentage of GDP.

Venture capital commitment by selected European countries is given in Figure 1. It can be seen that the relevant amounts for France, Italy and Germany are still very small, despite an increase of new commitments over the past few years. The Dutch market recently experienced very rapid growth, though the sustainability of this surge remains to be seen. The amounts involved for the UK, however, are similar to those of the US and, if new funds raised were measured as a percentage of GDP, the UK market would actually be much larger than that of the US. For example, in 1995, new funds commitments represented 0.22 percent of GDP for the UK, almost four times that of the United States (0.06 percent of GDP).

Figure 1. New funds raised in Europe (ECU billion)



Source: EVCA.

22) The European Venture Capital Association (EVCA) was created in 1983 to promote the development of the industry.

3.2 Investment patterns

The sectoral distribution of European investment totals are presented in Table 1 (23). Whereas innovative industries attract the vast majority of investments in the US, traditional industries (the consumer-related sector in particular) have received the largest share in Europe over the past few years.

Table 1. Sectoral distribution of investments in Europe (in percent)

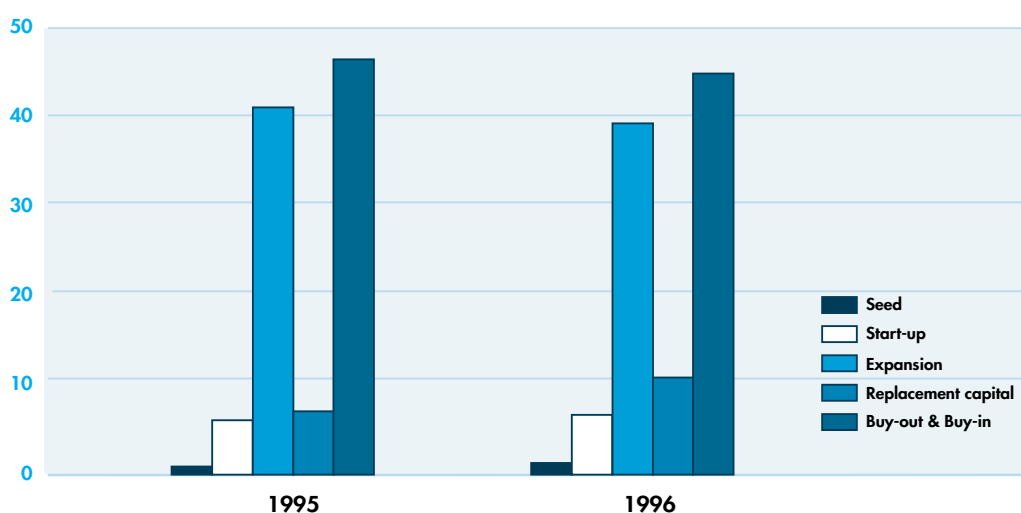
	1994	1995	1996
Innovative industries: Communications, computer-related, electronics, biotech, medical	16.3	21	19.6
Traditional industries: Consumer-related, industrial, chemicals, transportation, construction	52.2	48	45.2
Other industries	31.5	31	35.2

Source: EVCA.

Whereas innovative industries attract the vast majority of funds in the US, traditional industries have received the largest share in Europe.

Figure 2 shows the stages in the life cycle when venture capitalists intervene. There is an important bias toward late-stage financing in Europe. While seed and start-up investments increased from 12.5 to 23 percent in the US from 1988 to 1995, they decreased from 12.5 to six percent in Europe over the same period of time. Furthermore, as Figure 2 shows, most European investments are for *management buy-outs* (MBOs) and *management buy-ins* (MBIs); operations which concern the financing of a change of ownership of *existing* product lines or businesses. In particular in the UK, management buy-outs and buy-ins accounted for almost three-quarters of total investments for 1996. In the US, on the contrary, they account for less than a quarter of the total.

Figure 2. Stage distribution of investments in Europe (in percent)



Source: EVCA.

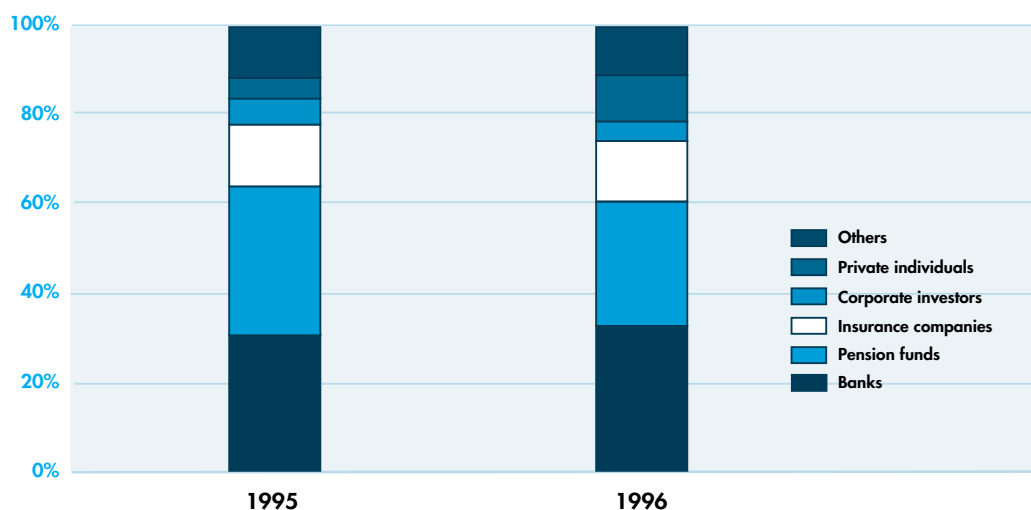
23) The amounts actually invested annually in each country follow the level of new fund commitments.

There is an important bias towards late-stage financing in Europe, due to the short-termism of institutional investors.

The economic literature suggests that the extreme bias toward late-stage investments in Europe, with the concentration on *development capital* (MBO, MBI), may be due to the sources of funds. One should note that many European venture capital companies are captive or semi-captive organisations (24). The contribution of captive and semi-captive companies to total investments exceeded 40 percent in 1995 and 1996. Figure 3 also shows that institutional investors (e.g. banks, insurance companies and pension funds) play a predominant role in Europe, accounting for more than 75 percent of new commitments.

The potential link between this characteristic of the European market and the bias toward late-stage financing lies in the *short-termism* of institutional investors. Several empirical studies indicate that most institutional investors are subject to short-term performance pressures, which have a considerable impact on their investment strategies (25). For example, pay-for-performance schemes are very common, with remuneration indexed to some indicator of profitability. This induces managers to behave myopically (26), e.g. to go for short-term lower-risk investments (MBO, rather than seed capital where it can take a decade to get results). The periodic evaluation of managers has the same effect on their activities: they must seek short-term successes. A similar incentive also applies to professional investors who have yet to establish a reputation. As the market is still uncertain about their abilities, they have a strong incentive to produce early returns (see von Thadden, 1995, and Viala, 1998) (27).

Figure 3. Venture capital raised in Europe by type of investor



Source: EVCA.

In fact, the evolution of the US venture capital industry during the 1980s gives a good illustration of the impact of short-termism on investment. This period saw the institutionalisation of the US venture capital industry, after the clarification of pension fund investment rules by ERISA (28). The 1979

24) Captive firms are subsidiaries of industrial corporations or financial institutions (mainly banks and insurance companies). Semi-captive organisations invest on behalf of their parent company, but also raise some external funds.

25) There is much empirical evidence of this type of behaviour. See, for example, Lakonishok et al. (1991) for a study on the investment behaviour of US pension fund managers.

26) See Stein (1989), for example.

27) Sirri and Tufano (1992) provide empirical evidence that the market punishes young managers who do not perform rapidly.

28) ERISA stands for the Employee Retirement Income Security Act.

regulatory change allowed pension funds to invest up to 15 percent of their assets in high-risk investments, including venture capital. This had two major consequences on the industry: a large inflow of funds during the 1980s, and an evident move to later stage financing. Whereas pension funds accounted for only 15 percent of new commitment to the industry in 1978, their share shot up to 46 percent of new funds in 1988. Over the same period, seed and start-up financing dropped from 25 percent of investments to only 12.5 percent, while LBOs increased from zero to 20 percent of investments. Note, however, that the turmoil of the IPO market towards the end of the 1980s has changed these patterns by reducing returns on investment, especially for LBOs and other late-stage financing.

3.3 Exit Routes

Although other factors might explain the state of development - or underdevelopment - of the venture capital industry in many European countries, divestment opportunities are a major determinant. Venture capitalists always invest with the objective of liquidating their portfolio holdings at a substantial gain, either through IPOs or with private sales. As IPOs are normally the best way to "cash-out" successful ventures, the existence of active stock exchanges open to small firms, i.e. second-tier markets or markets for unlisted securities, is essential for the supply of new commitments to the venture capital industry.

In fact, such markets are very active both in the US and in the UK. In the US, most venture-backed companies go public on NASDAQ. In the UK, venture-backed companies can go public on the Alternative Investment Market (AIM) (29). Interestingly, IPOs represented over 45 percent of divestments at cost (30) in the UK for 1996, while they accounted for only 21 percent of the total amount of divestments at in the European market. Trade sales and acquisitions are the main exit routes for the industry in continental Europe and it seems likely that the development of stock exchanges for small firms would benefit the European venture capital industry (31).

The existence of active stock exchanges open to small firms is essential for the supply of new commitments by the venture capital industry.

To conclude this section, let us briefly summarise the main features of the European industry. Firstly, most continental markets are less developed than the UK industry. Secondly, independently of their location, the vast majority of venture capital investments are for late-stage financing. Finally, trade sales are the main exit route in continental Europe. These features have generated a clear interest in public support to the European venture capital industry, which inevitably raises the question of the role of public intervention. Some tentative answers are provided below.

4. Public support to the venture capital industry

Governments can affect the flows of funds in two ways. They can either increase commitments to the industry indirectly, through regulatory changes and tax incentives, or they can provide the cap-

29) Most professionals claim that the growth of the UK venture capital industry during the 1980s was explained by the development of the Unlisted Security Market (USM). The Alternative Investment Market (AIM) has replaced the USM. Its market capitalisation was about US dollar nine billion in October 1997.

30) The aim of the divestment information of the EVCA survey is to attempt to keep track of the European portfolio of investments. Thus, the survey asks about the amount of divestments at cost, rather than the amounts actually realised by any sale. Therefore, the figures do not reflect the amounts actually received by venture capitalists.

31) Note that, although the market capitalisation of EASDAQ was equal to US dollar 4.1 billion in October 1997, some of the admission criteria impair the access of small firms to that market.

ital directly. Both types of schemes have been used in the recent past. The costs and benefits of these approaches are reviewed after a discussion of the role of public intervention.

4.1 Is there a role for public intervention?

This question can be restated: is there some market imperfection that can be corrected by government involvement? There are arguments in favour of that view. In general, SMEs face major problems when seeking external funds, because of information and transaction costs, and start-ups are confronted with more severe problems than mature companies, because of their high uncertainty.

The industry in continental Europe is underdeveloped, nearly inactive in early-stage financing, and mainly controlled by banking and insurance groups. This may be taken as a symptom that the industry needs support if the authorities wish it to finance the more innovative dynamic young firms that create jobs. As in any industry that is relatively young, the potential for economies of scale and of scope justifies the support of the public sector.

Since the venture capital industry is characterised by learning by doing, state involvement may foster its development.

In addition, the venture capital industry is likely to be characterised by *learning by doing*. In such a case, the productivity of monitoring and advisory activities of venture capitalists increases with aggregate investment. Then, state involvement may help to internalise spillover effects and foster the development of the venture capital industry (see Keuschnigg, 1997).

Inversely, one could also argue against support to the venture capital industry if the current state of development of the European industry reflects a lack of entrepreneurial projects, the risk-averse attitude of Europeans, or their lack of ideas. In these cases, public intervention would only add distortions. Further, the injection of capital could adversely affect the industry, by leading venture capitalists to overinvest. In fact, it is often argued that managers tend to waste "free cash-flows" on unsatisfactory projects. In addition, increased funding would also encourage the entry of inexperienced venture capitalists, leading to a drop in investment quality and monitoring, as evidenced by the US experience. According to Gompers (1994), the large inflow of funds into the venture capital industry during the 1980s generated the development of a *herd mentality*. Fund managers, either because they had too much cash or because they were inexperienced, invested simply because certain general sectors looked attractive. The result was an increase in the failures of firms.

The existence of large market imperfections is far from clear, although one cannot exclude that public support to the European venture capital industry may be warranted. Even without having a clear idea of the optimal size of the industry, policy-makers should remove impediments to expansion.

4.2 Tax incentives and regulatory changes

Tax reforms are a traditional intervention tool for governments. They can affect commitments to the industry in several ways.

For one thing, the legal and fiscal environment of an industry can severely affect the creation and development of new venture capital firms and a key objective, when structuring a venture capital fund, is to avoid double taxation for investors. Therefore, *tax transparency* is a major issue, because it can affect the location of both venture capital funds and their investments. The United Kingdom has

one of the most favourable legal and fiscal environments (32) in Europe and it is perhaps not surprising that this country also has one of the largest venture capital industries. The legal environments in which French, Irish and Dutch venture capitalists operate are also generally considered favourable to the industry, but improvements to legislation may be needed in other countries. For example, Sweden still has double taxation of capital gains, which deters the supply of venture capital.

Other tax incentives may directly affect commitments to the industry. These can take various forms, such as direct tax credits or tax breaks on capital gains. In fact, tax exemptions are already used in France, Belgium and the UK. Further, the conventional wisdom is that tax breaks which give advantages to capital gains over normal income could increase the *supply* of capital, by giving incentives to investors to favour long-term investments (including in venture capital). One must note, however, that there is a debate regarding the potential size of this effect. Poterba (1989) observes that the way a tax break affects the supply of funds depends crucially on the tax status of the investors themselves. For instance, more than 80 percent of the funding of the US venture capital industry comes from tax exempt investors such as pension funds. Thus, a change to capital gains tax rates may not significantly affect the commitment of funds to the industry. However, Poterba suggests that reductions in capital gains tax rates might increase the *demand* for venture capital finance. Cuts in capital gains taxes can create incentives for employees to set up companies and become entrepreneurs. There is some evidence of this effect in the United States (see Gompers and Lerner, 1997b).

Regulatory reform affecting savings in continental Europe should also benefit the venture capital industry.

Regulatory reforms affecting savings in continental Europe should also benefit the venture capital industry. Pension fund reforms, in particular, are expected to have an impact on fund inflows in two ways: directly, as pension funds would invest in the industry (if not excluded by prudential rules); and indirectly, via increased activity in stock exchanges, including those open to small firms. To date, private pension funds are mainly present in the UK and the Netherlands, where they are major investors in stock markets and the venture capital industry. However, one must note that even if the development of pension funds in other European countries might increase the overall size of the venture capital industry, it will not necessarily improve the structure of venture capital investments, e.g. the important bias toward late-stage financing.

4.3 Direct provision of capital

Governments can also support the European venture capital industry through the direct supply of capital. Whereas general assistance programs for SMEs have existed for some time, specific programs to supply risk capital have been developed more recently. Governments have resorted to either guarantees or the direct provision of risk capital, mainly through state-owned institutions.

Guarantee schemes

Like tax incentives, guarantee schemes are a conventional tool of public intervention. The basic idea is to expand financing for firms in targeted sectors by reducing the downside risk for investors (banks, in general). In the case of small businesses, there are two main types of guarantees. In the most frequent type, governments simply open access to the credit market by offering *loan guarantees*. The second type consists of *guarantees for the equity-capital* of private investors in venture capital

32) Most UK venture funds are structured as limited partnerships.

Guarantees are often ill-suited for young, innovative and newly created companies.

funds (i.e., a public agency guarantees a share of private investors money in a specific fund). One of the best known of these programs is the PPM scheme operating in the Netherlands from 1981 to the end of 1995.

Up to now, most attempts by the public sector to provide guarantees have not been very successful, mainly because they disregard the problems of intense monitoring and financial incentives discussed before. The scale of this problem obviously depends on the maturity of the small or medium-sized enterprise, and the uncertainty it faces. They are of greater concern for young, innovative and newly created companies. Guarantees are ill-suited in this context as they distort incentives and can provide suppliers of funds with wrong incentives. By limiting the extent of their capital at risk, they reduce the benefits to investors of screening and monitoring activities. Though debt financing and guarantees protect investors in case of bankruptcy, they also create a variety of other problems. First, they may trigger an early liquidation, because of the extreme uncertainty of the cash-flows of a young company. Second, loans limit the influence and the control of an outside investor on the development of a company, leading to opportunistic behaviours. Third, loans structure the payoffs of entrepreneurs in a way that they gain a lot with investments yielding very high returns, but - because of limited liability - they do not bear the consequences of failures. Hence, loans can seriously increase entrepreneurs incentives to "go for broke" by shifting to riskier activities.

The failure of the vast majority of Small Business Investment Companies (SBICs) in the US illustrates the problem. SBICs, created by the US Small Business Administration in 1958, had access to government-guaranteed debt to leverage their capital. They provided early-stage financing, but because they needed to make periodic payments, chose to offer debt instead of equity. Then, because of the recession after the first oil shock, many SBIC-backed companies went bankrupt. At the same time, SBICs themselves faced the same difficulties, and many were forced to liquidate.

Equity investments by state-owned institutions

The second approach for governments is to provide equity-capital directly, mainly through state-owned institutions (33). In most cases, programs are established to promote technological development or research and development. The UK, France and Germany offer typical examples. *Investors In Industry*, better known as 3i, is certainly one of the best European "success stories". 3i was created with government funds more than 50 years ago and was floated in 1994. It is today the largest investment trust in the UK and has contributed to what is known as the "Cambridge phenomenon" by promoting the commercialisation of academic research. In France, the government invests in firms involved in R&D with quasi-equity through the *Agences Nationales de Valorisation de la Recherche* (ANVAR). Typically, ANVAR's share of profits is indexed on firm turnover. In Germany, the government invests equity capital through the *Technologie-Beteiligungs-Gesellschaft* (TBG). Normally, TBG acquires an interest in the company on the basis of a silent partnership.

Although these programs are often considered very successful, it is difficult to have a clear idea of their long-run impact because of a lack of data. These schemes do seem to avoid some of the per-

33) Grants to small businesses are a third approach. The US Small Business Innovation Development Act, enacted in 1982, is a good illustration. The SBIR program mandated federal agencies to set aside a fixed percentage of their spending on external research for awards to small businesses. The long-run impact of this program is analysed by Lerner (1996). He shows that his sample of SBIR awardees grew significantly faster than a matched set of firms over a ten year period.

verse effects of governmental guarantees, though they have also their own imperfections. In particular, state-owned institutions usually have a non-profit behaviour, a possible source of investment distortions. These organisations have less incentive to closely monitor companies, possibly leading to the continuation of bad projects.

To the extent that this criticism is valid, it appears that the public sector should try to reach start-ups via the private sector. Therefore, the best vehicle for the participation of governments in the financing of start-ups may be through investment of resources in private venture-capital funds.

Investment in private funds

The public sector should try to reach start-ups via the private sector.

In the previous sections of the paper, the incentives and information problems between entrepreneurs and venture capitalists have been discussed at length. However, the relationship between venture capitalists and their financial backers can also be plagued by similar problems. This raises the question of how best the public sector should provide its financial support. The broad conclusion is that the public sector should intervene through minority interests in independent funds.

Before discussing the rationale for this, consider first how the relationships between venture capitalists and their providers of funds are typically structured. There is also an agency problem between venture capitalists, who play an active role in their portfolio companies, and other investors, who do not monitor the ventures as closely. Hence, venture capitalists must be provided with incentives to adopt value-increasing activities. This is the motivation for many contractual provisions in partnerships agreements, where venture capitalists are general partners and other investors are limited partners. Most contractual agreements specify the staging of capital injections by limited partners, and require that venture capitalists produce periodic reports on the investees' companies. Finally, venture capitalists typically receive a large part of their compensation in the form of a percentage share of the gains realised by the fund. These various provisions are designed to prevent overinvestment and ensure the proper supervision of venture-backed companies.

There is, in addition, another difficulty of venture finance arising from the high uncertainty regarding the abilities of new entrants. The easier availability of funds for the venture capital industry will lead inevitably to the entry of new venture capitalists, who may seek early returns in order to establish a track record. In fact, the innovative characteristics of most ventures imply that, in very young organisations, neither the venture capitalist nor the investors know a priori the skills that are required for a good selection of projects. Thus, parties *learn* about the abilities of venture capitalists from the results of investments (34).

From a public policy perspective, there are two key questions that should be taken into account: First, is the venture capital industry in general suffering from a shortfall of finance; and second, should public intervention try to develop those segments of the industry that are under-developed, or intervene only where there are some additional economic benefits that are not sufficiently taken into account by the private sector.

34) Empirical evidence of this learning process is provided by Gompers and Lerner (1997a), who study cross-sectional and time-series variations in the compensation schemes of 419 venture partnerships formed between 1978 and 1992. The results are consistent with the view that venture capital entrants do not have superior information about their abilities, which makes reputation concerns very important.

The public sector should avoid disturbing the way the industry deals with incentives and informational issues. This suggests only funding minority interests in private funds.

Consider first the case where the major problem is a global deficit of funds. In such an environment, the public sector intervention should strive to avoid disturbing the way the industry has come to deal with incentives and informational issues. As already pointed out, this may not be possible through state-owned or captive organisations, whereas investments in private funds normally ensure that agency problems are mitigated. However, because of the learning process, the uncertain behaviour of governments can still produce some distortions unless a partnership has a diversified ownership (Viala, 1998). This is because government representatives may value projects differently than the market and, therefore, can decide to stop funding some valuable investments. This forces ventures capitalists to seek alternative funds in the financial market. The market, less informed about the reasons for renegeing on a funding commitment, tends to interpret such events as a bad news, posing problems for new professionals lacking an established reputation. However, this problem can be overcome if a fund has a diversified ownership. Then, through the different actions of the other investors, the design of share contracts may allow the signalling of a "good" venture capitalist.

Naturally, as shown in section 3 above, the European venture capital industry is also characterised by a strong bias toward late-stage financing. This could be caused by a host of factors, but, as already pointed out, it could also result from the way the industry has developed. In order to shift the venture capital industry toward more early-stage financing, the public sector should do more than just provide additional capital. It should avoid the creation of a short-term focus for the venture capitalists. Viala (1998) shows that funding in the form of minority interests in private funds can also serve that specific purpose.

5. Conclusion

To resume the main findings, industry data shows that, contrary to conventional belief, the European industry is not "small" as compared to the US industry. Although the venture capital industry is clearly underdeveloped in continental Europe, it possesses the attributes of a mature industry in the UK. However, it appears that - all over Europe - venture capitalists essentially provide late-stage development capital, and there are few investments in start-up companies.

Even if conclusions must be drawn with caution, these features of the European industry may advocate some government intervention. Of course, public support can take different forms, such as tax and regulatory changes or direct inflows of capital. Regulatory impediments to the industry should obviously be removed. In the case of direct inflows, past experience in the US and Europe points out the inadequacy of conventional tools such as loans or guarantee schemes for young innovative companies, and suggests that investments in private funds offer a better alternative.

References

- Arjona, R., Viala, P. and Wagenvoort, R. (1998). "Small Business Finance and the European Financial Environment: Some Empirical Evidence". Economic and Financial Report 98/03, Luxembourg: EIB.
- Admati, A.R. and Pfleiderer, P. (1994). "Robust Financial Contracting and the Role of Venture Capitalists". *Journal of Finance*, 49(2), pp. 371-402.
- Audretsch, D.B. (1995). "Firm Profitability, Growth and Innovation". *Review of Industrial Organization*, 10(5), pp. 579-588.
- Barry, C., Muscarella, C., Peavy, J.W., and Vetsuypens, M.R. (1990). "The Role of Venture Capital in the Creation of Public Companies: Evidence from the Going-Public Process". *Journal of Financial Economics*, 27(2), pp. 447-471.
- Bergemann, D. and Hege, U. (1998). "Venture Capital Financing, Moral Hazard, and Learning". *Journal of Banking and Finance*, (forthcoming).
- Chan, Y.S, Siegal, D.R. and Thakor, A. (1990). "Learning, Corporate Control and Performance Requirements in Venture Capital Contracts". *International Economic Review*, 31(2), pp. 365-381.
- Cornelli, F. and Yosha, O. (1997). "Stage Financing and the Role of Convertible Debt". Tel Aviv University Working Paper No. 23-97.
- Davis, S.J., Haltiwanger, J.C., and Schuh, S. (1996a). "Small Business and Job Creation: Dissecting the Myth and Reassessing the Facts". *Small Business Economics*, 8(4), pp. 297-315.
- Davis, S.J., Haltiwanger, J.C., and Schuh, S. (1996b). *Job Creation and Destruction*. Cambridge, MA: MIT Press.
- Dennis, W.J., Phillips, B.D., and Starr, E. (1994). "Small business job creation: The findings and their critics". *Business Economics*, 29(3), pp. 23-30.
- EVCA Yearbook 1996: A Survey of Venture Capital and Private Equity in Europe.
- EVCA Yearbook 1997: A Survey of Venture Capital and Private Equity in Europe.
- Fazzari, S.M., Hubbard, R.G., and Petersen, B. "Financing Constraints and Corporate Investment". *Brookings Papers on Economic Activity*, 0(1), 1988.
- Gambardella, A. (1995). *Science and innovation: The US pharmaceutical industry during the 1980s*. Cambridge: Cambridge University Press.
- Gompers, P. (1994). "The Rise and Fall of Venture Capital". *Business and Economic History*, 23(2), pp. 1-26.
- Gompers, P. (1995). "Optimal Investment, Monitoring, and the Staging of Venture Capital". *Journal of Finance*, 50(5), pp. 1461-1489.
- Gompers, P. and Lerner, J. (1997a). "An Analysis of Compensation in the US Venture Capital Partnership". Harvard Business School Working Paper.

- Gompers, P. and Lerner, J. (1997b). "Venture Capital Fundraising, Firm Performance, and the Capital Gains Tax". Harvard Business School Working Paper.
- Gorman, M. and Sahlman, W.A. (1989). "What Do Venture Capitalists Do?". *Journal of Business Venturing*, 5, pp. 231-248.
- Ghobadian, A., Liu, J., and Rekettey, G. (1995). "Product innovation and SMEs: Evidence from United Kingdom". *Zbornik Radova Ekonomskog Fakulteta Rijeka*, 13(2), pp. 147-158.
- Hansen, E. (1990). "Venture Capital Finance with Temporary Asymmetric Information". London School of Economics Financial Markets Group Discussion Paper No. 112.
- Harris, M. and Raviv, A. (1991). "The Theory of Capital Structure". *Journal of Finance*, 46(1), pp. 297-355.
- Hoshi, T., Kashyap, A., and Scharfstein, D. (1991). "Corporate Structure, Liquidity, and Investment: Evidence from Japanese Industrial Groups". *Quarterly Journal of Economics*, 106(1), pp. 33-60.
- Jensen, M. and Meckling, W. (1976). "Theory of the Firm: Managerial Behavior, Agency Costs, and Ownership Structure". *Journal of Financial Economics*, 3(4), pp. 5-50.
- Keuschnigg, C. (1997). "Venture capital: A case for investment promotion?". Economic and Financial Report 98/04, Luxembourg: EIB.
- Kirchhoff, B.A. (1995). *Entrepreneurship and dynamic capitalism: The economics of business firm formation and growth*. Westport: Greenwood, Praeger.
- Lakonishok, J., Schleifer, A., Thaler, R., and Vishny, R. (1991). "Window Dressing by Pension Fund Managers". *American Economic Review*, 81(2), pp. 227-231.
- Lerner, J. (1994). "The Syndication of Venture Capital Investments". *Financial Management*, 23, pp. 16-27.
- Lerner, J. (1995). "Venture Capitalists and the Oversight of Private Firms". *Journal of Finance*, 50(1), pp. 301-318.
- Lerner, J. (1996). "The Government as Venture Capitalist: the Long-Run Impact of the SBIR Program". NBER Working Paper No. 5753.
- Levine, R. (1997). "Financial Development and Economic Growth: Views and Agenda", *Journal of Economic Literature*, 35, pp. 688-726.
- OECD (1997). "Small Businesses, Job Creation and Growth: Facts, Obstacles and Best Practises". DSTI/IND (97)21.
- Petersen, M. and Rajan, R. (1994). "The Benefits of Lending Relationships: Evidence from Small Business Data". *Journal of Finance*, 49(1), pp. 3-35.
- Poterba, J. (1989). "Venture Capital and Capital Gains Taxation". In Summers, L.H.(ed.), *Tax Policy and the Economy*, vol. 3, pp. 47-67. Cambridge, MA: MIT Press.
- Ravid, S.A. and Spiegel, M. (1997). "Optimal Financial Contracts for a Start-Up with Unlimited Operating Discretion". *Journal of Financial and Quantitative Analysis*, 32, pp. 269-286.

- Sahlman, W.A. (1990). "The Structure and Governance of Venture Capital Organizations". *Journal of Financial Economics*, 27(2), pp. 473-521.
- Sirri, E. and Tufano, P. (1992). "The Demand for Mutual Fund Services by Individual Investors". Mimeo.
- Stein, J.C. (1989). "Efficient Capital Markets, Inefficient Firms: A Model of Myopic Corporate Behavior". *Quarterly Journal of Economics*, 104(4), pp. 655-669.
- Viala, P. (1998). "Venture capital fundraising: Does the pool of investors matter?". Mimeo, EIB.
- Von Thadden, E.L. (1995). "Long-Term Contracts, Short-Term Investment and Monitoring". *Review of Economic Studies*, 62(4), pp. 557-575.