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2000/07

The Internationalisation
of Venture Capital Activity
in OECD Countries:
Implications for
Measurement and Policy

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<https://dx.doi.org/10.1787/084236411045>

Unclassified

DSTI/DOC(2000)7



Organisation de Coopération et de Développement Economiques
Organisation for Economic Co-operation and Development

19-Dec-2000

English - Or. English

DIRECTORATE FOR SCIENCE, TECHNOLOGY AND INDUSTRY

**DSTI/DOC(2000)7
Unclassified**

**STI WORKING PAPERS
2000/7**

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THE INTERNATIONALISATION OF VENTURE CAPITAL ACTIVITY IN OECD COUNTRIES: IMPLICATIONS FOR MEASUREMENT AND POLICY

Günseli Baygan and Michael Freudenberg

Venture capital has grown significantly in most OECD countries during the 1990s, and is increasingly associated with improved firm performance in terms of survival rates, innovation and growth. This paper compares venture capital activity across OECD countries by taking into account international venture capital flows. Most comparisons are based on data concerning investments made *by* venture capital funds located in a given country (“country of management”). In contrast, this paper also uses a more policy relevant measure that examines data on investments made *in* a country (“country of destination”), by subtracting cross-border outflows and including inflows. For countries such as Ireland, Denmark and Switzerland, inflows plus outflows largely outweigh investments by domestic venture capital funds. Some countries, especially Ireland and Denmark, have significant net inflows of venture capital, while net outflows appear for the United Kingdom and Switzerland. While such cross-border flows can improve the efficiency of the global venture capital market, they can also reduce the relative importance of domestic supply factors in favour of domestic demand factors, such as creativity, innovation, risk-taking and entrepreneurship. However, OECD countries also differ in terms of barriers to entrepreneurship and entrepreneurial activity. Preliminary results indicate a strong negative relationship between barriers to entrepreneurship and venture capital investments. Countries with low barriers to entrepreneurship tend to have more active venture capital markets, and *vice versa*.

L'INTERNATIONALISATION DE L'ACTIVITÉ DE CAPITAL-RISQUE DANS LES PAYS MEMBRES DE L'OCDE : IMPLICATIONS POUR L'ÉVALUATION ET L'ACTION DES POUVOIRS PUBLICS

Günseli Baygan and Michael Freudenberg

Le capital-risque a augmenté de manière considérable dans la plupart des pays Membres de l'OCDE au cours des années 90. Cette activité est de plus en plus souvent associée à la performance des entreprises, en termes de survie, d'innovation et de croissance. Le présent document compare l'activité de capital-risque dans les pays Membres de l'OCDE en tenant compte des flux internationaux de capital-risque. La plupart des études sont basées sur des données relatives aux investissements *par* des fonds de capital-risque localisés dans un pays donné (“pays gestionnaire”). Par contre, ce papier s'appuie également sur des données qui permettent d'analyser, de manière plus pertinente en termes de politique économique, les investissements *dans* un pays donné (“pays destinataire”), en incluant les entrées mais en excluant les sorties de capitaux. Dans certains pays comme l'Irlande, le Danemark et la Suisse, le montant global des entrées et des sorties de capitaux est nettement supérieur à celui des investissements par des fonds nationaux. Dans des pays tels que l'Irlande et le Danemark, les entrées dépassent de loin les sorties de capitaux alors qu'au Royaume-Uni et la Suisse, c'est l'inverse. Si ces flux internationaux de capitaux peuvent améliorer l'efficacité des marchés du capital-risque à l'échelle mondiale, ils peuvent aussi, au niveau national, réduire l'importance relative des facteurs de l'offre, au profit de ceux de la demande, tels que la créativité, l'innovation, la prise de risque et l'esprit d'entrepreneuriat. Or, les pays Membres de l'OCDE diffèrent également au niveau des obstacles à l'entrepreneuriat et de l'activité entrepreneuriale. Les résultats préliminaires de la présente étude démontrent une corrélation négative entre les obstacles à l'entrepreneuriat et les investissements de capital-risque. Les pays dans lesquels les obstacles sont les moins importants se caractérisent généralement par des marchés du capital-risque plus dynamiques, et *vice versa*.

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INTRODUCTION

It is not a new idea that entrepreneurs striving to bring new products and services to markets may be capital-constrained (**Box 1**). However, our understanding of the role that financial systems play in facilitating this activity has broadened, and a body of literature has recently emerged with new mechanisms and indicators for linking finance, innovation, and economic growth (King and Levine, 1993; Pagano, 1993; Saint-Paul 1992). Financial systems can influence decisions to invest in productivity-enhancing activities through several channels (Tsuru, 2000). Financial institutions can pool funds from many small investors and hence can *mobilise sufficient resources* for projects, reducing capital constraints on entrepreneurs. Financial systems can *screen* the projects of prospective entrepreneurs and *monitor* services more effectively and less expensively than individual investors, hence investments can be allocated to the highest return use. Financial institutions can also enhance *risk management*. The outcomes of innovative activity are in part uncertain; hence it is desirable for the financial system to provide means for entrepreneurs to diversify risk. In the absence of such mechanisms, firms will find it difficult to invest in new technologies that are inherently risky.

Given that these mechanisms have sufficient impact on entrepreneurial behaviour and choice, one can argue that improvements in the provision of financial services will promote future technical innovation and thus future economic growth. Likewise, from a reverse channel of causation, one can also argue that distortions in the innovative sector lower the demand for financial services and retard financial and economic development. While recent empirical evidence suggests a robust positive correlation between various financial development indicators and economic growth for countries where the financial markets are at the initial stages of development (Tsuru, 2000), understanding of the workings of this complex system still needs to be deepened.

Box 1: Capital-constrained Gutenberg

Johannes Gutenberg, a goldsmith, had the idea of producing small, regular blocks of steel with letters on them to be used as mould to mass-produce letter blocks. However, it took many years before he convinced a businessman, Johann Fust, in 1450 to back his invention and loan him 800 guilders. Fust later agreed to let Gutenberg have a further 800 guilders. But the two men had a falling out and Fust brought a lawsuit against Gutenberg. Nevertheless, two years later, the first printed book in Europe, the *Mainz Psalter* came off Gutenberg's press. As many books were produced in the 50 years following Gutenberg's invention as in the thousand years before it.

Source: The Economist, 31 December 1999.

Recently, a number of studies has focused on the role of the entrepreneurial firm in the innovative process and the type of financing innovative companies need and receive at various stages of their life cycle (Berger and Udell, 1998). One such financial service is venture capital, which is a special type of equity finance for typically young, high-risk and often high-technology firms.

Existing evidence suggests a positive impact of venture capital on firm performance. Particularly in the United States, the availability of venture financing has been accredited with the large number of start-ups in high-technology and Internet fields. Many large high-technology firms were initially venture backed, including Apple, Compaq, Digital Equipment Corporation, Intel, Microsoft and Sun Microsystems (OECD, 2000a). Comparing venture-backed firms and other firms between 1965 and 1992, Kortum and Lerner (1998) found that venture-backed firms patent more than other firms and their patents are more often cited and more aggressively litigated than other patents, a sign of their higher technological and economic values. Studies for other countries also suggest positive effects from venture capital activity. A survey by the European Venture Capital Association (EVCA, 1996) found that the vast majority of managers believed their company would not have existed or would have grown less rapidly without venture capital. Respondents also believe that venture capital funding encouraged employment, investment, R&D spending and exports. Venture-backed companies over the period 1991-95 outperformed the top 500 European companies in terms of growth, employment creation, and R&D investment as a share of total sales. In a similar vein, a Canadian survey reports that during the period 1994-98, Canadian venture-backed companies largely outperformed many of the top 100 companies from the Canadian Business' Corporate 500 in terms of growth rates for exports, R&D expenditures, jobs created, and sales (Business Development Bank of Canada, 1999).

Although venture capital activity is rather small when compared to the financial markets as a whole, it has grown significantly in most OECD countries during the 1990s. The United States is by far the largest venture capital market in the OECD, but these markets are also rapidly expanding in Europe and in parts of Asia. The first part of the paper provides an overview of venture capital activity in OECD countries, including an analysis of international venture capital flows. The second part examines major supply and demand factors conducive to the development of venture capital markets, and analyses the relationship between barriers to entrepreneurship and venture capital activity.

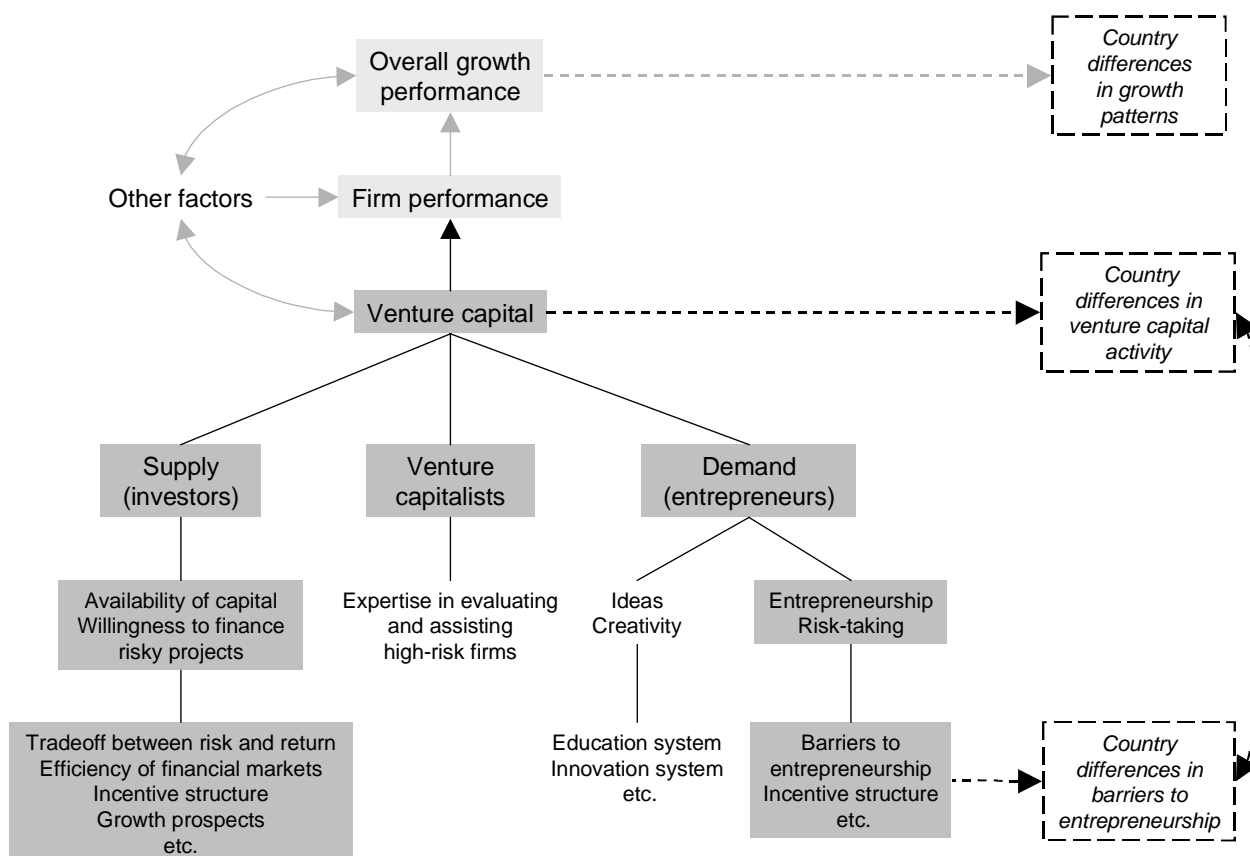
The paper addresses in particular the often overlooked, but increasingly important phenomenon of international flows of venture capital. Available data are based on surveys of venture capital funds, and thus indicate the amount of funds raised or investment made *by* funds located in a given country. In contrast, this paper provides a more policy relevant picture of venture capital activity across countries, as it also examines recent data on funds raised and investments made *in* a country, by subtracting cross-border outflows and including inflows. Two main results appear concerning investments in 1999, which is currently the only year for which such information is available. First, European countries differ substantially concerning the degree of "internationalisation" of venture capital investment: for example for Ireland, Denmark and Switzerland, inflows plus outflows largely outweigh investments from domestic venture capital funds, whereas these flows are of far less importance for Italy, the United Kingdom and Germany. Second, inflows can substantially differ from outflows, leading to *net* outflows for some countries (*e.g.* United Kingdom and Switzerland) and to significant *net* inflows for others: total investments in Irish or Danish firms appear to be more than four times higher than those originating from domestic venture capital funds.

Disparities in venture capital markets across countries could be stemming from several factors, including differences in the supply of capital willing to finance risky undertakings (**Figure 1**). Government can provide appropriate framework conditions that stimulate private sector investments, including efficient financial markets and an incentive structure that adequately rewards risk-taking. Government can also take a more active role in cases of "funding gaps", where access to financing is a major business constraint, where investors are not willing to provide funds in small amounts or where regional imbalances are too pronounced. But the demand side is also important, including the availability of promising ideas and entrepreneurs suitable for investment, which can be affected by appropriate framework conditions conducive to creativity, innovation, risk-taking and entrepreneurship. The latter are particularly crucial, as international venture capital flows may increasingly dissociate domestic supply from domestic demand,

and change the relative importance of the underlying factors. Domestic supply conditions matter less for domestic venture capital activity when investors are willing to invest in foreign venture capital funds with a better reputation and performance track record. Domestic demand conditions, in contrast, may become more important, as international venture capital flows, which are a particular form of foreign direct investment, may go to firms in those countries where entrepreneurship, innovation, prospects for growth and expected returns are highest.

The paper provides evidence that OECD countries differ not only in terms of venture capital activity, but also in terms of barriers to entrepreneurship and entrepreneurial activity. Factors depressing entrepreneurship include regulations and institutional impediments, which discourage risk-taking either in establishing new ventures or expanding existing activities, such as overly-complicated business establishment procedures and costly compliance burdens. The preliminary results indicate a strong negative relationship between barriers to entrepreneurship and venture capital investments in the early stages and expansion: countries with low barriers to entrepreneurship tend to have more active venture capital markets, and *vice versa*.

Figure 1: Simple framework of underlying factors and the impact of venture capital



Note: Factors in dark grey are treated in this paper.

VENTURE CAPITAL ACTIVITY

Functioning of venture capital markets

The need for and sources of finance differ from firm to firm, depending in part where in its life cycle an individual firm is located. For new businesses, the entrepreneur's own capital, supplemented with loans or equity from family, friends and informal investors, is often the most important source of finance (**Table 1**). For young and growing firms, external finance represents a significant supplement to own resources, including banks and venture capital funds. Larger and/or older firms on the other hand have access to a broader range of sources of finance, including stock markets and institutional investors than younger firms do. Hence, the main wedge in finance occurs in the early years of the life cycle of a firm and the majority of younger firms face financial constraints.

Table 1. Main sources of finance by business development stage

Seed	Young	Growing	Mature
		Stock market	
		Institutional investors	
	Profit retention		
	Venture capital		
	Banks		
Informal investors			
Family / friends			
Own Capital			

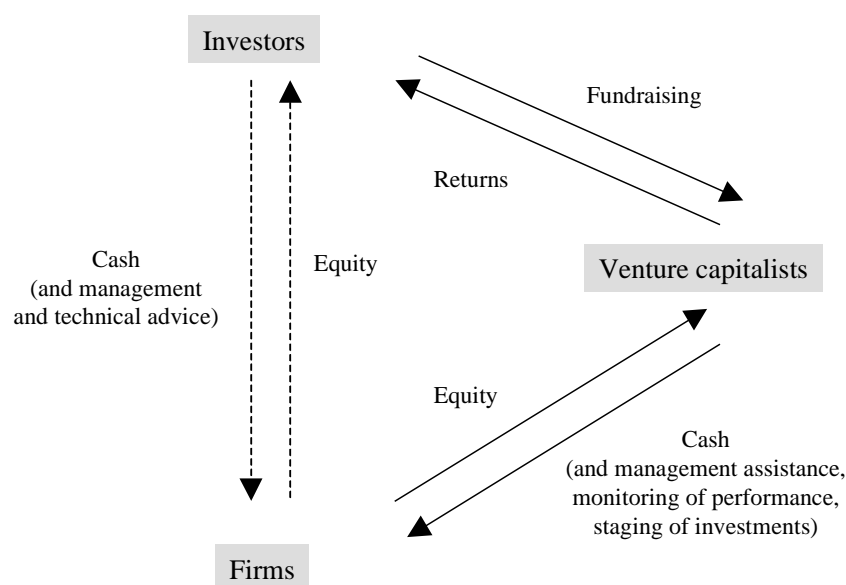
Source: Adapted from Netherlands, Ministry of Economic Affairs, 1999.

Venture capital is a special type of finance targeted mostly to young and innovative firms that need capital to fund product development or growth, and must, by the nature of their business, obtain capital largely in the form of equity. In fact, heavy reliance on intangible assets, uncertain operating environments and negative cash flows make it unlikely that these firms can access bank loans or use other debt financing instruments. Information asymmetries between entrepreneurs and outsiders can be particularly important for intangible-intensive firms. Insiders within a company are in a much better position than are outsiders to assess the strength of a firm that relies heavily on intangible assets (*e.g.* brand names, patents, human capital) or investments (in *e.g.* R&D, software or organisational change). For example, executives in a biotechnology company can much better assess whether trials of drugs under development will be successful than outside investors who lack specialist knowledge and information about innovation

activities. Investors may thus require an “uncertainty compensation”, leading to a higher cost of capital for the firm and thus to lower investment and growth potential (Lev, 1999). Young, technology-intensive companies with little track record may find it particularly difficult to raise capital, as they have few tangible assets which investors or bankers may regard as potential collateral (Lev, 2000). Consequently, without venture capital, many of these firms would be capital-constrained and fail to survive.

Firms could receive venture financing in two ways (**Figure 2**): venture capital can be supplied *directly* from investors such as individuals (“business angels”) and corporations (**Box 2**), or *indirectly* from specialised venture capital funds. The latter act as financial intermediaries between investors (such as individuals, corporations, pension funds, banks and insurance companies) and portfolio firms. Venture capitalists however provide more than money to their portfolio companies. These additional contributions include management assistance, intensive monitoring of performance, staging of investments, and reputational capital (*i.e.* the venture capitalist’s ability to give the portfolio company credibility with third parties), and play a crucial role in the survival of these companies, at least in the short-run. They help to reduce informational problems and mitigate agency conflicts between entrepreneurial firms and outside investors. The staged timing of capital infusion is an important mechanism for monitoring and disciplining portfolio firms; venture capitalists usually provide funds in stages based on the periodic assessment of the firm’s performance and potential profitability.

Figure 2: Venture capital markets



The time and form of the investment exit, on the other hand, are critical for investor incentives and in determining the fund raising cycle. Investors will be willing to contribute funds only if their risk is adequately rewarded. The existence of appropriate exit mechanisms is thus essential to ensuring a well functioning venture capital market. The preferred mechanism, especially for young and dynamic firms, is an initial public offering (IPO). The stock markets best suited to IPOs of such companies are second-tier stock markets (of which the best-known is the *NASDAQ* in the United States), which have less stringent admission requirements and lower initial and continuing costs than first-tier markets. An alternative form of exit is the sale of the portfolio firm to a larger company. This form of exit is effective, especially when production, marketing and innovation functions could be divided between the parent and the acquired

company. In more mature and cash-generating firms, however entrepreneurs can preserve the control over the firm by buying back the venture capitalist's stake in the firm.

Box 2: Direct investors

Business angels: Business angels are generally wealthy individuals with substantial business experience that invest directly in unquoted small companies. Individual investors in the informal markets tend to be more focused on early-stage financing than institutional investors and they provide more managerial and business advice through their greater personal involvement. There seems to be a virtuous circle with angel investment: the more successful entrepreneurs that exist, the more potential angels there will be. Although data are scarce (partly because these individuals are hard to identify and are often reluctant to reveal exact information), it is believed that total funding by business angels is several times greater than all other forms of private equity finance.

Corporate investors: Large companies are increasingly investing in entrepreneurial ventures in spin-offs or other start-ups, especially in the United States. For instance, Microsoft acquired shares in 44 firms for USD 13 billion in 1999, and Intel in 35 firms for USD 5 billion. Much of the corporate interest is driven by recent encouraging developments in venture capital markets and the desire of larger companies to outsource innovative activity. This strategic collaboration could be beneficial for all parties. By financing and co-operating with small innovative firms, larger firms can gain access to new technologies; small firms in return can benefit from the expertise of large corporations in their respective field. A recent study which analysed 30 000 firms that received venture capital financing from various sources showed that the likelihood of success of large corporations in backing other companies financially, especially if there is a complementary in the type of operations, is similar to any other venture capital fund's probability of success (Gompers and Lerner, 1999b). Hence, it is probable that more and more corporations will be involved with venture financing. Corporate venture capital could reflect the changing relationship between large and small firms and the new dynamics of innovation. However, recent developments could also be a repeat of a previous cycle. In the 1970s, the strength of returns in venture capital markets initially attracted several corporations, and similar programmes were launched but then folded shortly after IPO markets declined.

Measurement problems

Venture capital activity in OECD countries has grown significantly in the 1990s, though there are considerable variations in the size of venture capital markets across OECD countries, both in absolute and relative terms. However, before providing more detailed analysis, the major difficulties in international comparisons of venture capital activity need to be addressed.

First, there are substantial differences across countries in the *definition* of venture capital. The terms "venture capital" and "private equity" are often used interchangeably, which is a confusing and misleading practice. *Private equity* is investments in companies made by institutions or individuals in the form of unregistered equity securities, and includes venture capital as well as management buyouts and buy-ins (MBO/MBIs). Strictly speaking, *venture capital* is thus one type of private equity investing and typically refers to equity investments made in young companies during their launch, early development or expansion. Apart from the United States, which has a separate market for MBO/MBIs and which does not usually classify buyouts as venture capital, other statistics for venture capital do so, particularly in Europe. Comparisons across countries are hampered by this lack of generally accepted definitions, especially for funds raised. In fact, these difficulties are less pronounced for investment figures, as these are broken down by stage (early stages, expansion, buyouts, etc.), and buyouts and other later-stage financing can be thus excluded.

Second, the *data* on venture capital activity differ substantially for some countries, depending on the sources. For example, investment figures for 1996-98 provided by the *Asian Venture Capital Journal* are

on average three times higher than alternative estimates for Korea (which refer more narrowly to “venture capital companies”), two times higher for Australia, and 30 percent lower for Japan. And even in the United States, figures differ depending on the source, though significantly less. Estimates can vary greatly due to differences not only in definition, but also in coverage, methodology and statistical procedures. In many countries, national venture capital associations thus choose one company to provide “official” estimates. But even these may not always be comparable over time: for example, data for the European Private Equity and Venture Capital Association (EVCA) were gathered and analysed for various years by different companies with different methodologies.

Third, statistics cover only *formal* private equity or venture capital, *i.e.* funds raised and investments that circulate through “intermediary” venture capital companies, whereas there are no comparable data on “direct” investments by *e.g.* “business angels”. While business angels may not currently be important investors in many OECD countries, in the United States they are believed to play a significant and probably more important role than formal investors. Business angel activity may be several times higher than formal venture capital investment in early stages. The European Business Angels Network (EBAN) estimates the number of active investors in Europe at 125 000 and the number of potential investors at 1 million. The investment pools of available business angels finance is estimated at Euro 3 billions in the United Kingdom, 1.5 billion in the Netherlands, 300 millions in Finland and 20 millions in Ireland. Although data for other countries are not available yet, the investment pool of business angel finance for Europe, based on an extrapolation of population, is estimated to range between Euro 10 and 20 billions.

Fourth, it is impossible to *combine the different breakdowns* of venture capital activity. Funds raised and investments are broken down in various ways, of which the most often used for funds raised concerns the type of investor (banks, pension funds, etc.) and for investment the stage (early stage, expansion, etc.) and the sector. The breakdown by stage is useful for identifying the amount of venture capital invested in firms in the early or expansion stages where funding is most needed. The breakdown by sector, although difficult to compare internationally due to the lack of a common nomenclature for industry statistics, is useful to identify the amount of venture capital invested in firms in a given industry or in high-technology sectors. Only a portion of total investment goes to firms in their early stages; only a portion goes to high-technology sectors, etc. All components of the different breakdowns add up to the same figure, *i.e.* total investment. Unfortunately, published data do not combine these breakdowns: in other words, there is no information on the amount of venture capital invested in firms *e.g.* in the early or expansion stages that operate in a given sector (or in high-technology sectors).

Finally, an often-overlooked, but increasingly important problem concerns *international flows of venture capital*, *i.e.* inflows and outflows of both funds raised and investments. Available data generally refer to the “country of management” approach, *i.e.* according to the *geographic location of the managing venture capital firms* that raise and invest these funds. However not all funds managed by a venture capital firm that operates in a given country are from domestic investors. Likewise, not all investment by a venture capital firms go to domestic firms. Evidence indicates that international flows of venture capital are increasing, for example, US venture firms are increasingly investing in Europe and Asia. And within Europe and Asia, there are substantial cross-border investments. EVCA recently estimated funds raised using the so-called “country of origin” approach, which indicates the *geographic origin of the funds* that are managed by European venture capital companies: it appears that the United States is among the major sources for funds raised by European venture capital firms. Likewise, EVCA estimated investments using the so-called “country of destination” approach, which indicates the *geographic destination of investments* made by European venture capital firms, by excluding outflows (to other European or non-European countries) and including inflows (unfortunately only from European-managed funds). This distinction is important for analysts and policy makers alike, as investment *in* a country may matter more than investment *by* a country. It appears that investments *going to* firms in Denmark and Ireland are more than four times as important as investments *managed by* venture capital funds located in these countries. The

use of the “country of origin” (for funds) and the “country of destination” (for investment) approaches is certainly an important progress for European statistics. Unfortunately, these data are not available for the various breakdowns such as investments by sector or by stage. In addition, this method still misses an important dimension: inflows from *foreign*-managed funds. But this is a more general problem, which concerns all countries, including the United States and Canada.

A better and more reliable picture of venture capital activity in OECD countries can only be obtained once more detailed and relevant data become available. In fact, many of the above mentioned problems are due to the unit of observation: data are based on surveys of the *managing venture capital funds* that operate in a given country. A much better picture of venture capital investments would be obtained from *firm level data*, *i.e.* from venture-backed *recipients* within a given country. This, however, may be difficult, and international comparability of venture capital data thus hampered for still some time.

Funds raised for private equity / venture capital

Total funds raised: “country of management” versus “country of origin”

The United States is by far the most important venture capital market in the OECD. New funds raised for private equity accounted for more than USD 100 billion in 1999, of which venture capital commitments represent almost USD 50 billion (**Table 2**). And the pace is increasing, despite recent downturns of the NASDAQ: it is estimated that new funds raised for venture capital in the first half of 2000 are almost as important as the total figure for 1999. The amount of new funds raised for private equity has also considerably increased in Europe, from some USD 5 billion in the early 1990s to more than USD 25 billion in 1999, of which USD 13 billion is expected to be allocated for venture capital. The grey shades in **Table 2** show what is generally compared, *i.e.* US venture capital and European private equity figures. These difficulties can be somewhat alleviated once data concerning actual investment (and not funds raised) are analysed, as the breakdown by stage allows to exclude buyouts and other later-stage financing.

Until recently, EVCA published data on funds raised only according to the so-called “country of management” approach, *i.e.* according to the geographic *location* of the companies which raise and manage these funds. In 1999, funds raised by UK private equity or venture capital companies are by far the most important in Europe (more than USD 10 billion of a total of USD 27 billion), followed by France and Germany (**Table 3, column 1**).

Table 2: New funds raised for private equity / venture capital (USD billion)

	United States		Europe	
	Private equity	<i>of which:</i> Venture capital	Private equity	<i>of which:</i> Venture capital
1980	2.2	2.1	..	..
1981	1.3	1.1	..	..
1982	2.0	1.5	..	..
1983	5.3	4.1	..	..
1984	5.6	3.0	..	..
1985	5.5	3.0	..	..
1986	8.2	3.6	..	..
1987	19.1	4.0	..	..
1988	13.3	3.5	4.1	na.
1989	15.3	5.2	6.4	na.
1990	10.3	2.6	5.8	na.
1991	5.5	1.5	5.2	na.
1992	13.2	3.4	5.5	na.
1993	22.0	3.9	4.0	na.
1994	30.9	7.2	7.9	na.
1995	41.1	8.2	5.7	na.
1996	45.2	10.6	10.1	na.
1997	73.8	15.7	22.7	na.
1998	105.4	28.0	22.8	7.5
1999	108.1	46.6	27.1	12.9

Source: European Private Equity and Venture Capital Association (EVCA), various Yearbooks, National Venture Capital Association (NVCA), various Annual Reports, Asian Venture Capital Journal, *The 2000 Guide to Venture Capital in Asia*.

However, not all funds managed by a venture capital firm that operates in a given country are from investors from that same country. In fact, there are substantial and increasingly important cross-border flows of funds raised, both inflows and outflows. Concerning inflows, more than half of all funds raised between 1995 and 1999 by venture capital firms located in the United Kingdom, Sweden, Spain and Ireland stem from foreign investors located in “other European” or “non-European” countries. In contrast, the symmetric information on outflows, *i.e.* investments by domestic investors in venture capital firms located outside the country, is not available. However, for the first time in its 2000 Yearbook, EVCA partially solved this problem. EVCA estimated funds raised for private equity in 1999 by the so-called “country of origin” approach, which indicates the geographic *origin* of the funds managed by European companies, but unfortunately, there is still no information on European investment in *non-European* venture capital funds. This approach gives a very different picture and highlights among others the importance of funds originating from abroad, especially the United States. In fact, the main sources for funds raised by European private equity or venture capital companies are the United States and the United Kingdom (USD 4.3 billion each), closely followed by Germany and France (USD 3.8 billion) (**Table 3, column 6**).

A comparison of these two approaches shows that funds *managed by* UK private equity companies in 1999 are more than twice as important as those that *originate from* UK investors, and net inflows appear also for Ireland, Italy, Sweden, Austria and Spain. In contrast, funds managed by Dutch companies are only half as important as those originating from the Netherlands, *i.e.* Dutch investors invest as much in Dutch funds as in other European funds. Net outflows appear also for Norway and Finland.

The link between the “country of management” approach and the “country of origin” approach” is as follows. Total funds managed by domestic firms (column 1) *minus* those that originate from other European (2) and non-European countries (3) yield the amount of funds managed by domestic funds that originate from domestic sources (4). These latter funds *plus* the funds managed by other European venture capital firms that originate from domestic sources (5) yield total domestic investment in (European-managed) funds (6).

Intra-European flows can be seen from columns 2 (inflows) and 5 (outflows). While they are identical for the European total (USD 5.76 billion), this is not true for individual countries. The UK is the main target of European cross-border flows of funds, followed by Germany, Italy, France and Sweden. The main investors in other European funds are the Netherlands and Germany.

With USD 5.8 billion, inflows from non-European countries (lower part of column 6) are as important as intra-European flows. The United Kingdom is by far the main target of non-European inflows (USD 4.1 billion or 70% of the European total, column 3), and these inflows stem mainly from the United States. For the United Kingdom, these inflows are even more important than funds that stem from domestic investors.

Expressed as a percentage of GDP, funds raised and managed *by* domestic venture capital firms are most important for the United Kingdom, Finland, Iceland, Sweden and Ireland (“country of management”, presented negatively in **Figure 3**). In contrast, the “country of origin” approach suggests that investments *from* domestic sources are most important for Finland, the Netherlands and Iceland.

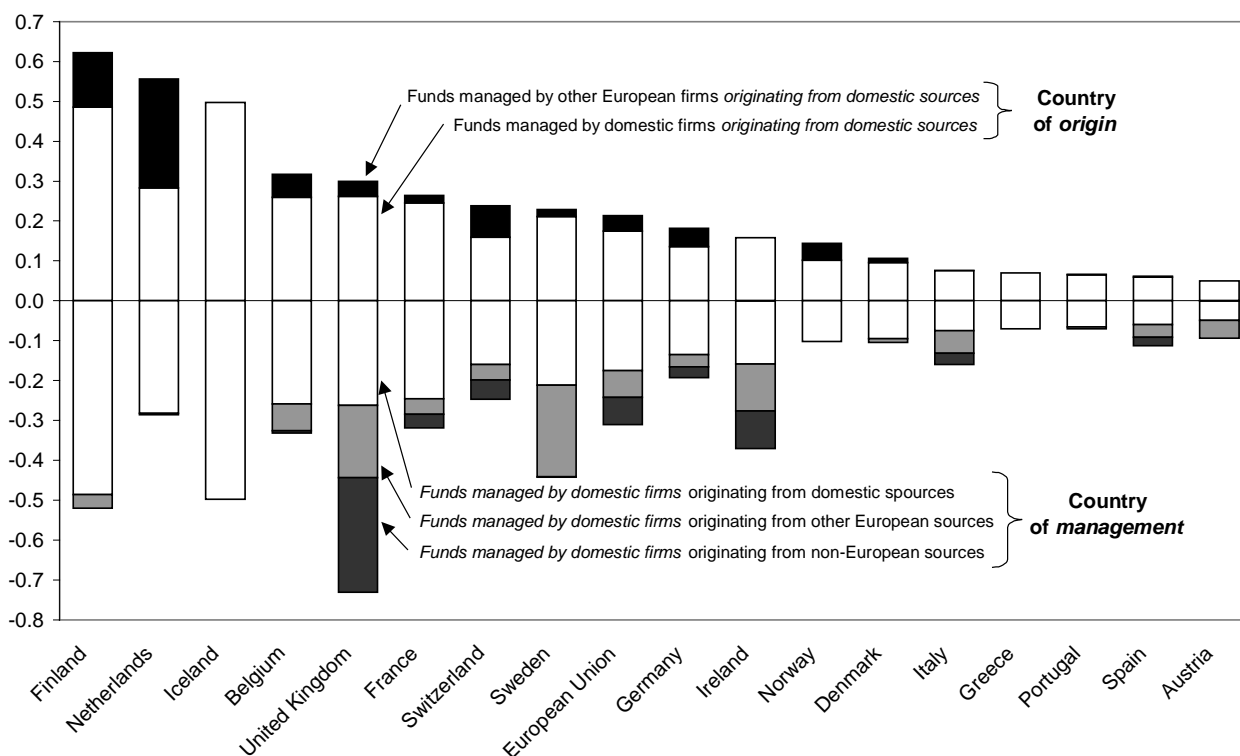
Countries differ substantially concerning the degree of “internationalisation” of private equity funds. The sum of cross-border inflows (from foreign sources that invest in domestic funds) and outflows (of domestic investors that invest in “other European” funds) is more important than domestic investments in domestic funds for the United Kingdom, Ireland, Sweden, Italy and Switzerland. In contrast, virtually all funds raised by firms in Iceland, Greece, Portugal and Denmark stem from domestic sources, with very little inflows or outflows.

Table 3: Breakdown of European funds raised for private equity according to the “country of management” and “country of origin” approach, 1999 (USD million)

	Country of management	Funds managed by domestic firms	Funds managed by domestic firms	Funds managed by domestic firms	Funds managed by other European firms	Country of origin
	(funds managed by domestic firms)	– firms originating from other European sources	– firms originating from non-European sources	= firms originating from domestic sources	+ European firms originating from domestic sources	= (origin of European funds)
	1	2	3	4 = 1 - 2 - 3	5	6 = 4 + 5
Total Europe	27 069	5 759	5 853	15 459	5 759	21 216
European Union	26 229	5 658	5 725	14 847	3 284	18 130
United Kingdom	10 518	2 615	4 131	3 772	551	4 323
Germany	4 062	651	551	2 861	989	3 850
France	4 559	564	482	3 513	274	3 787
Netherlands	1 127	13	0	1 113	1 079	2 192
Italy	1 870	651	333	885	0	886
Finland	670	45	0	625	177	801
Belgium	822	165	13	645	144	789
Switzerland	640	101	126	412	206	618
Sweden	1 055	549	1	505	41	547
Spain	671	185	129	358	8	366
Norway	157	0	0	157	63	220
Denmark	181	15	0	166	20	185
Ireland	337	108	85	144	0	144
Austria	195	92	0	103	0	102
Greece	87	0	0	87	0	87
Portugal	76	5	0	71	1	71
Iceland	44	0	0	44	0	44
Other Europe					395	395
Unknown Europe					1 809	1 809
Total non-Europe						5 853
United States						4 347
Asia						258
Canada						270
Israel						5
Other non-Europe						81
Unknown non-Europe						892
Total	27 069					27 069

Source: own calculations, based on EVCA, 2000 Yearbook.

Figure 3: Breakdown of funds raised for private equity according to the “country of management” and “country of origin” approach, 1999 (as a percentage of GDP)

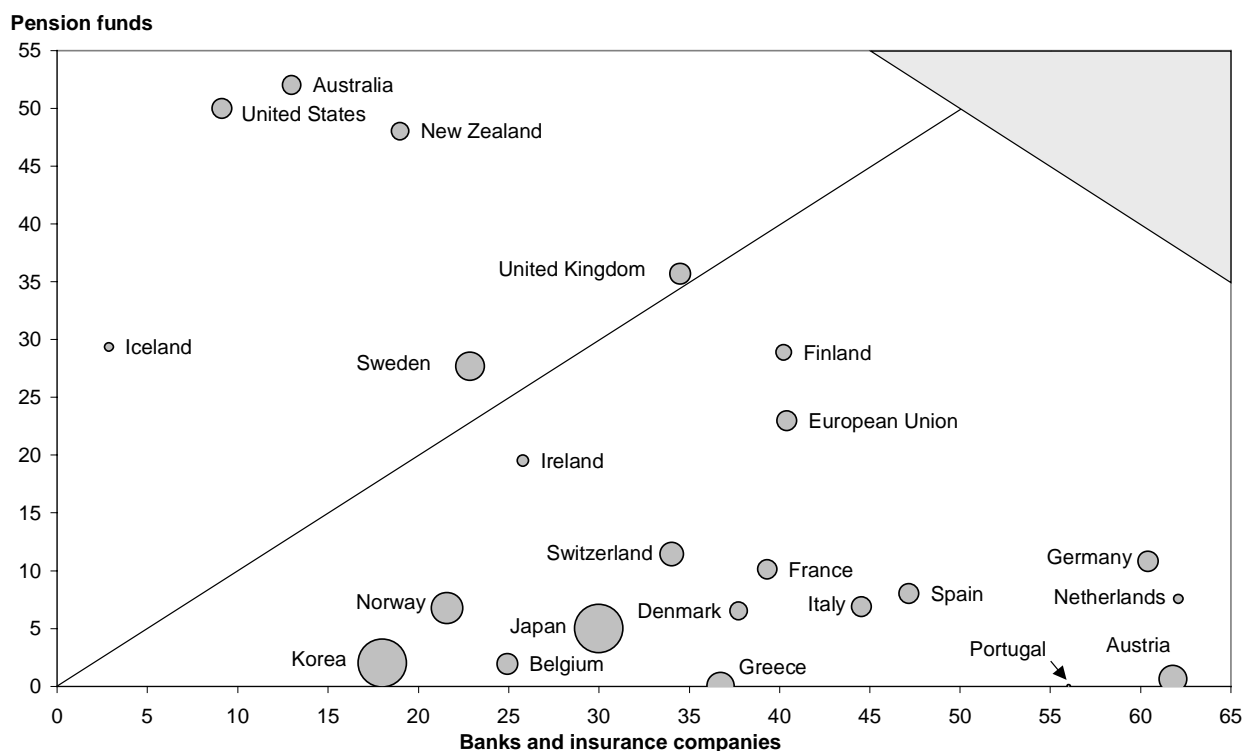


Source: Own calculations, based on EVCA, 2000 Yearbook.

Sources of funds

There are also marked differences across countries concerning the composition of the sources of venture capital funds (**Figure 4**). In the United States, pension funds remain by far the most important source, but corporations have become increasingly active in this area (**Annex, Table A 1**). Concerning Asian countries, pension funds are by far the most important sources for Australia and New Zealand, and likewise corporations for Japan and Korea. (**Annex, Table A 2**). The major sources of funds managed by European companies are banks, followed by pension funds.

But the European private equity market is all but homogeneous, and the European average hides substantial differences across countries. Banks account for more than half of all new funds raised by venture capital firms located in Portugal and Austria, are the single most important source of venture funding for Germany, the Netherlands, Spain, Italy, Denmark, Greece and Switzerland. In contrast, banks are virtually absent from the private equity market in Iceland, Sweden and Norway. Pension funds are the leading source for the United Kingdom, Finland and Sweden, but are still underdeveloped in Greece, Portugal, Austria and Belgium. Concerning other sources (**Annex, Table A 3**), insurance companies are particularly important for Finland and Sweden. Corporate investors are significant for Norway, Sweden, Austria and Greece (but are of little importance in Portugal, Iceland, the Netherlands and Ireland). Private individuals are important for Norway, Ireland and Denmark. Government agencies account for a non-negligible part of total funding for Portugal, Austria and Finland. Realised capital gains (from previous investments) are major sources for Iceland and Belgium.

Figure 4: Share of major sources of funds raised, 1995-99 (as a percentage of total)

The area of the bubbles corresponds to the share of corporations, which ranges from 0% (Portugal) to 51% (Korea).
 Source: EVCA, various Yearbooks.

Venture capital investment

Data on investment differ sometimes substantially from figures for funds raised. This is partly because not all funds raised for private equity or venture capital are invested in the same year. For example, a venture firm may reserve some of its committed capital for later investment in some of its successful companies that have additional capital needs.

Total investment: “country of management” versus “country of destination”

Total new investment in the United States amounted to about USD 60 billion in 1999 (up from less than USD 6 billion in 1995), followed by the European Union with USD 26 billion, of which almost half corresponds to the United Kingdom (**Table 4**). In contrast, venture capital investment for Japan seems very low (about USD 1 billion). Investment increased in virtually all countries between 1995 and 1999, sometimes substantially, especially in small countries where the venture capital industry is still young.

Expressed as a percentage of GDP, private equity investment is by far the most important for the United Kingdom, followed by the Netherlands, the United States, and Sweden, whereas it is of little importance for Austria, Greece, Denmark, as well as Japan. Korea appears to have an active venture capital market, but as is also the case for Australia and Japan, data need to be interpreted with caution, as they differ substantially depending on the sources (see also **Annex, Table A 4**).

In addition, figures on total private equity investment cannot be directly compared, for at least two reasons. Differences in the treatment of MBO/MBIs in the definition of venture capital seriously hampers comparisons across countries, and buy-outs and other later-stage financing need to be excluded from the analysis to get a more meaningful picture about venture capital activity (see below). The other problem relates to international flows of venture capital.

Table 4: Total private equity / venture capital investment

	USD (million)					% of GDP					
	1995	1996	1997	1998	1999	1995	1996	1997	1998	1999	1995-99
United Kingdom	3 442	3 773	5 018	7 947	12 256	0.306	0.320	0.381	0.566	0.851	0.502
United States	5 457	11 178	17 406	21 687	59 531	0.074	0.143	0.210	0.248	0.643	0.278
Netherlands	611	753	861	1 184	1 823	0.147	0.183	0.229	0.303	0.463	0.263
Sweden	112	533	398	227	1 361	0.047	0.204	0.167	0.095	0.570	0.216
OECD-19	13 705	19 280	25 814	36 500	87 041	0.080	0.109	0.147	0.200	0.463	0.204
Canada	487	802	1 316	1 116	1 831	0.083	0.131	0.208	0.185	0.287	0.181
European Union	7 029	8 303	10 681	15 724	25 988	0.082	0.095	0.130	0.185	0.307	0.159
Europe	7 250	8 570	10 942	16 174	26 764	0.080	0.093	0.127	0.182	0.301	0.156
Iceland	1	1	6	24	25	0.014	0.014	0.075	0.293	0.285	0.147
Norway	157	106	192	185	282	0.107	0.067	0.124	0.126	0.185	0.121
Belgium	146	138	203	289	718	0.053	0.051	0.083	0.116	0.289	0.116
France	1 112	1 077	1 414	1 988	3 002	0.072	0.069	0.101	0.137	0.210	0.116
Finland	44	51	128	211	265	0.034	0.040	0.105	0.164	0.206	0.110
Germany	870	908	1 502	2 179	3 366	0.035	0.038	0.071	0.101	0.159	0.079
Italy	331	647	684	1 043	1 896	0.030	0.052	0.059	0.088	0.162	0.079
Ireland	25	48	41	71	112	0.038	0.066	0.052	0.084	0.123	0.076
Switzerland	63	161	62	241	469	0.021	0.054	0.024	0.092	0.181	0.072
Portugal	72	43	71	55	126	0.068	0.040	0.070	0.052	0.117	0.069
Spain	212	245	297	406	770	0.036	0.040	0.053	0.070	0.129	0.066
Denmark	40	43	25	45	124	0.022	0.024	0.015	0.026	0.071	0.031
Greece	11	41	18	22	76	0.009	0.033	0.015	0.018	0.061	0.028
Austria	1	1	21	56	95	0.001	0.000	0.010	0.027	0.046	0.016
Poland ^a	..	..	..	124	186	..	..	..	0.079	0.121	0.099
Hungary ^a	..	..	..	41	8	..	..	..	0.087	0.017	0.051
Czech Republic ^a	..	..	..	19	31	..	..	..	0.033	0.058	0.045
Korea ^b	742	1 195	1 307	523	..	0.152	0.230	0.274	0.164	..	0.209
Australia ^b	402	341	366	321	..	0.110	0.083	0.090	0.088	..	0.093
New Zealand ^b	28	23	16	25	..	0.046	0.036	0.025	0.047	..	0.038
Japan ^b	803	1 511	1 067	800	..	0.016	0.033	0.025	0.021	..	0.024

a 1998-99. Data for the Czech Republic, Hungary and Poland are preliminary pilot data.

b 1995-98. Data for Australia, Korea and Japan differ substantially depending on the sources (see Table A 4).

Source: EVCA, various Yearbooks, NVCA, various Annual Reports, Canadian Venture Capital Association (CVCA), Asian Venture Capital Journal, *The 2000 Guide to Venture Capital in Asia*.

The geographic breakdown by the NVCA only shows US States; in other words, all US venture capital investment covered by NVCA goes to companies located in the United States. In contrast, the geographic breakdown for Europe (EVCA) and Asia (AVCJ) is very different: it distinguishes between domestic recipients, other European (Asian) countries, and non-European (Asian) countries. Data show that not all investment by the surveyed venture capital providers is invested within a country: Between 1995 and 1999, 55% of Swiss and 45% of Greek investment went abroad, and this ratio is also higher than 25% for Belgium, Japan, Iceland and Sweden. At the same time, there are significant inflows stemming

from foreign (here: other European) investors. While on average about 80% of investments by European countries remain in the country, 95% of European investment remains in Europe once investment that goes to “*other* European countries” is included. Until recently, there was no information available on which (European) countries benefit from these outflows. However, for the first time in its 2000 Yearbook, EVCA estimated total venture capital investment by “country of destination”, *i.e.* looking at investment *in* countries rather than *by* countries (“country of management”).

For the European total, the difference between the “country of management” approach (USD 26.7 billion) and the “country of destination” approach (USD 25.4 billion) is very small: only about USD 1.3 billions is invested in non-European countries (**Table 5**).¹ However, there are substantial differences for individual countries. For example, investments in 1999 *going to* firms in Denmark and Ireland are more than four times as important than investments *managed by* funds located in these countries, and that ratio is also high for Finland, Portugal and Spain. In contrast, this ratio is only about 60% in Greece and Iceland.

Columns 2 to 5 of **Table 5** give more detailed information about the link between the “country of destination” approach and the “country of management” approach”. Total investments managed by domestic firms (column 1) *minus* those that go to other European (2) and non-European countries (3) yield the amount of investments managed by domestic funds that go to domestic firms (4). These latter investments *plus* the investments managed by other European venture capital firms that go to domestic firms (5) yield total investments going to domestic firms (6).

Concerning intra-European cross-border flows (USD 4.7 billion), UK-managed funds are by far the major investors in other European countries, followed by the Netherlands, Sweden and France (column 2). In contrast, the main target of European cross-border investment flows are Germany and France, followed by the Netherlands, Denmark, the United Kingdom, Sweden and Ireland (column 5).

Investment outflows to non-European countries (USD 1.3 billion) are of relatively little importance when compared to intra-European flows. UK-managed funds are the major investors (column 3), and the United States are by far the main recipient (column 6).

As already seen from **Table 4**, investments *managed by* domestic firms as a percentage of GDP in 1999 are important for the United Kingdom, Sweden and the Netherlands (“country of management”, presented negatively in **Figure 5**). In contrast, the “country of destination” approach suggests that investments *going to* domestic firms are most important for the United Kingdom, Sweden and Ireland. Due to investment inflows from other European countries, Ireland and Denmark move up significantly in the rankings (**Figure 6**).

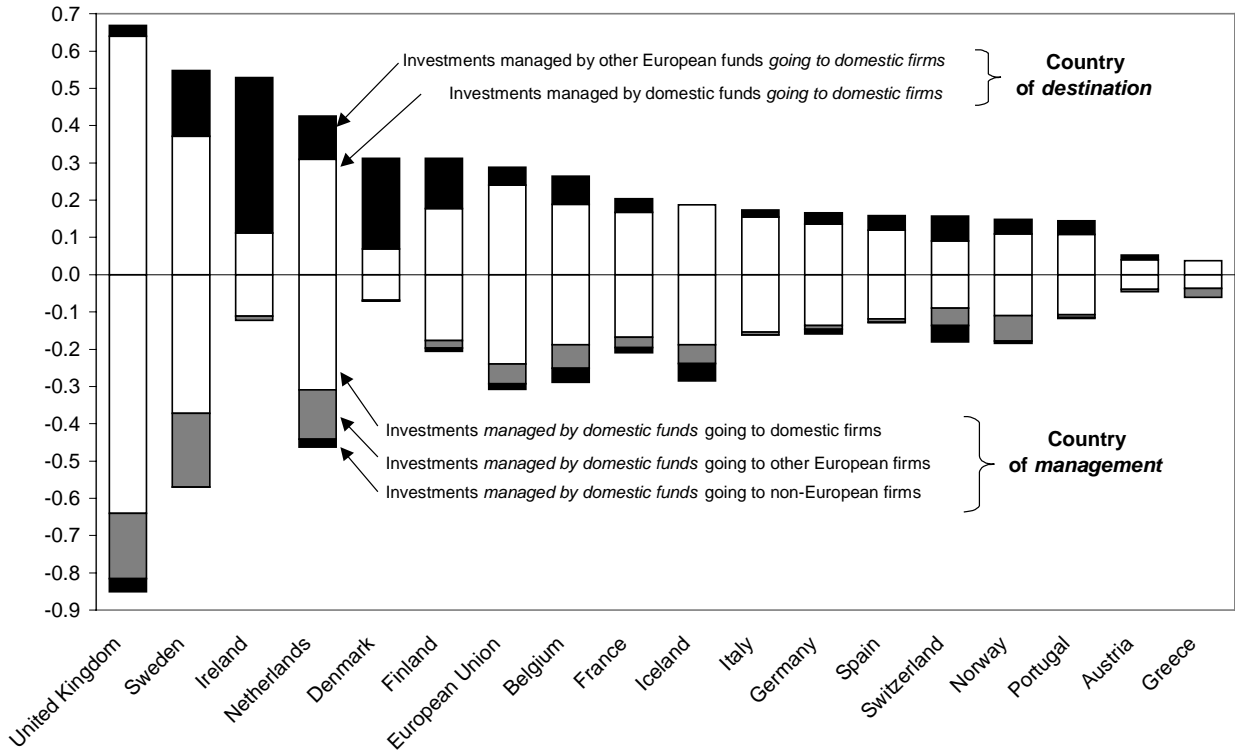
1 . Unfortunately, the symmetric information on venture capital that is invested in European firms by *non*-European venture capital funds is not available. EVCA tried to include information on US activity in Europe, but the response rate for questionnaires sent to 27 US-based firms was very low. While US investments in European acquisitions and buyouts are estimated to be at least Euro 1.5 billion in 1999, there are not even rough estimates on investments in venture capital in the strict sense.

Table 5: Breakdown of European private equity investment according to the “country of management” and “country of destination” approach”, 1999 (USD million)

	Country of management (investments managed by domestic funds)	Investments managed by domestic funds – going to other European firms	Investments managed by domestic funds – going to non-European firms	Investments managed by domestic funds = going to domestic firms	Investments managed by other European funds + going to domestic firms	Country of destination (investments going to ...)
	1	2	3	4 = 1 - 2 - 3	5	6 = 4 + 5
Total Europe	26 764	4 748	1 331	20 685	4 749	25 434
European Union	25 988	4 520	1 201	20 267	4 143	24 411
United Kingdom	12 256	2 519	522	9 215	419	9 633
Germany	3 366	226	269	2 871	630	3 502
France	3 002	400	205	2 396	525	2 921
Italy	1 896	84	6	1 806	228	2 034
Netherlands	1 823	519	86	1 218	458	1 675
Sweden	1 361	472	1	887	419	1 305
Spain	770	53	5	712	234	946
Belgium	718	156	94	467	190	658
Denmark	124	3	1	120	421	541
Ireland	112	10	0	102	380	482
Switzerland	469	120	115	234	171	405
Finland	265	27	10	228	173	401
Norway	282	104	11	167	59	226
Portugal	126	8	1	117	40	157
Austria	95	12	0	83	27	110
Greece	76	30	0	46	0	46
Iceland	25	4	4	17	0	17
Other Europe					196	196
Unknown Europe					207	207
Total non-Europe						1 332
United States						772
Asia						102
Israel						28
Canada						23
Other non-Europe						66
Unknown non-Europe						341
Total	26 764					26 764

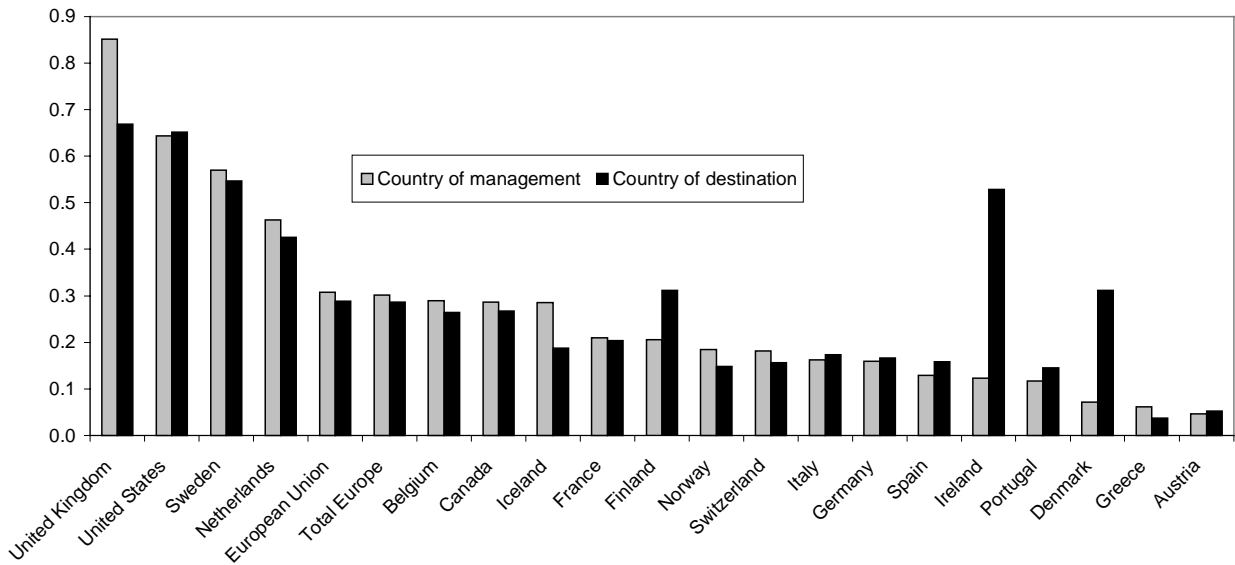
Source: own calculations, based on EVCA, 2000 Yearbook. Revised figures for some countries kindly provided by Didier Guennoc from EVCA.

Figure 5: Breakdown of total private equity investment according to the “country of management” and “country of destination” approach, 1999 (percentage of GDP)



Source: Own calculations, based on EVCA, 2000 Yearbook.

Figure 6: Total private equity investment according to the “country of management” and “country of destination” approach, 1999 (percentage of GDP)



Source: Own calculations, based on EVCA, 2000 Yearbook.

The importance of international venture capital flows can be obtained by expressing investment inflows (from other European funds) and outflows (to foreign firms) as a percentage of domestic investments (**Table 6**). In 1999, countries differ substantially concerning the degree of “internationalisation” of investments. The sum of inflows and outflows is of little importance relative to domestic investments in Italy, the United Kingdom, Germany, Spain and Portugal. In contrast, cross-border flows are significant for Ireland, Denmark and Switzerland.

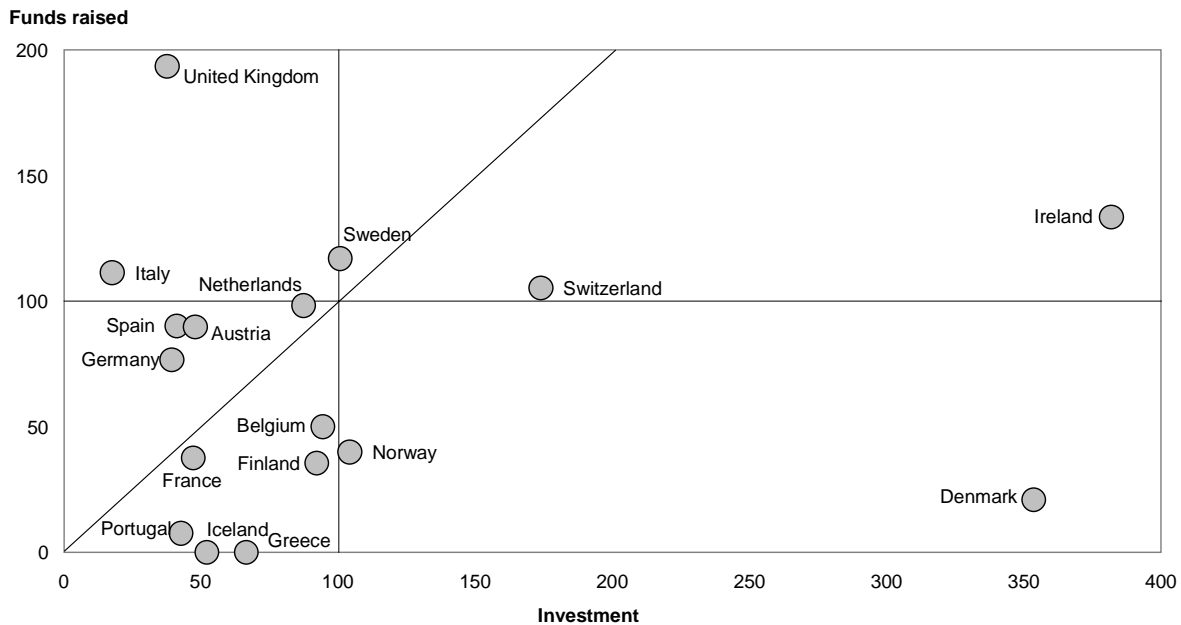
Countries differ also strongly in terms of net flows (inflows minus outflows). Ireland and Denmark have significant net inflows in 1999, whereas net outflows appear for Greece, Iceland, Norway, the United Kingdom and Switzerland.

Given the strong observed volatility of outflows over time (**Table 6**), inflows, which for the moment are only available for 1999, may thus be also subject to strong volatility. This may potentially lead to an even stronger volatility in terms of net flows and total international flows, be it in terms of funds raised or investment (**Figure 7**).

Table 6: Cross-border venture capital investment flows as a percentage of domestic investments

	Outflows (to other European or non-European countries)					Inflows (from other European countries)	Total flows (inflows <i>plus</i> outflows)	Net flows (inflows <i>minus</i> outflows)
	1995	1996	1997	1998	1999	1999	1999	1999
Ireland	0	13	4	8	10	372	382	362
Denmark	8	5	28	32	3	351	353	348
Finland	9	10	36	18	16	76	92	60
Portugal	0	2	14	6	8	34	43	26
Spain	2	1	3	1	8	33	41	25
Austria	373	44	6	3	15	33	48	18
Italy	2	26	22	0	5	13	18	8
Germany	16	10	8	11	17	22	39	5
France	4	5	7	51	25	22	47	-3
Sweden	3	36	26	2	53	47	101	-6
Europe	14	18	24	30	29	23	52	-6
European Union	13	18	24	29	28	20	49	-8
Netherlands	24	33	42	47	50	38	87	-12
Belgium	6	17	17	123	54	41	94	-13
Switzerland	74	73	44	289	100	73	174	-27
United Kingdom	18	18	35	35	33	5	38	-28
Norway	16	4	29	24	69	35	104	-34
Iceland	0	0	2	40	52	0	52	-52
Greece	0	126	407	60	66	0	66	-66

Source: Own calculations, based on EVCA, various Yearbooks.

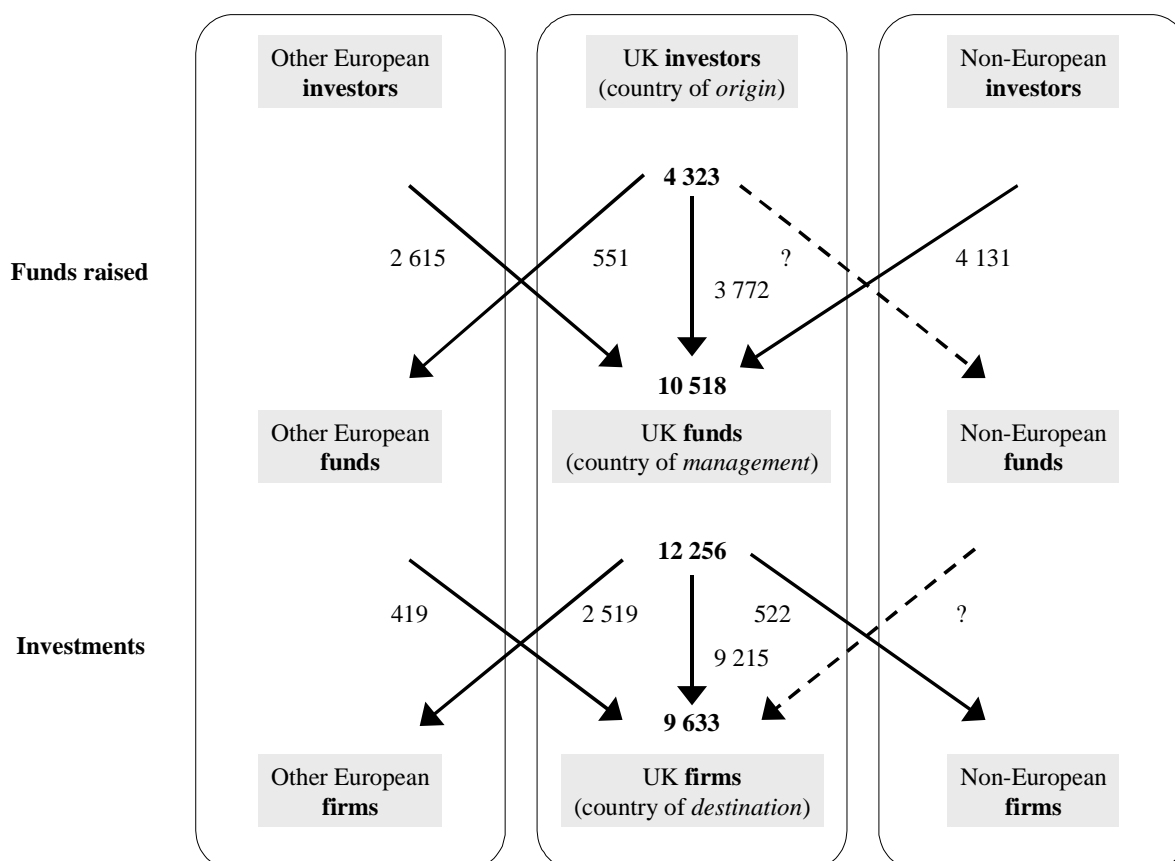
Figure 7: Degree of internationalisation for funds raised and investments, 1999

Measured as inflows plus outflows as a percentage of domestic.

Source: Own calculations, based on EVCA, 2000 Yearbook.

An additional problem concerns the underestimation of both funds raised and investment. Using the data from Table 3 and Table 5 for the United Kingdom, **Figure 8** illustrates the “country of management” approach compared to the “country of origin” (for funds raised) and “country of destination” (for investment) approaches. Both the “country of origin” and the “country of destination” methods underestimate “true” funds raised and investment: in addition to informal venture capital (by *e.g.* business angels), inflows and outflows of formal venture capital involving *non-European*-managed funds are not captured in the statistics.

Figure 8: “Country of management” compared to “country of origin” (for funds raised) and “country of destination” (for investment): the case of the United Kingdom, 1999 (USD million)



Source: Own calculations, based on EVCA, 2000 Yearbook.

Investment by stage

As already mentioned, differences in the treatment of management buyouts or buy-ins in the definition of venture capital seriously hampers comparisons across countries. Thus, more important than looking at total investment is to examine the stage of enterprise financing to which it is directed. Excluding buy-outs and other later-stage financing (which represent about one quarter of total investment in the United States, more than half in Europe and as much as three-quarters in the United Kingdom, **Figure 9**)², several financing stages can be identified in relation to the development of a venture-backed company:

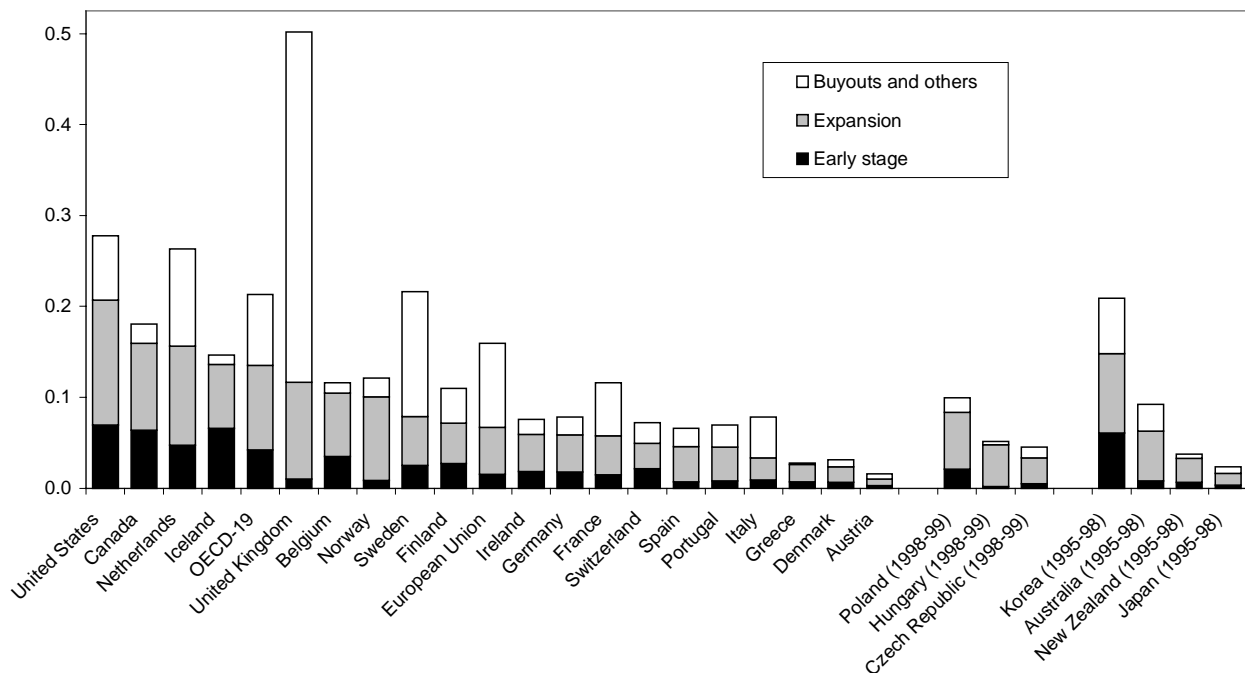
- *Seed capital* is provided to research, assess and develop an initial concept;

2. A different breakdown by *firm size* also suggests the importance of buyouts relative to venture capital. In 1999, more than 45% of total European investment was invested in firms larger than 500 employees, and 17% in firms with more than 5 000 employees! In contrast, firms with less than 10 employees received only 9%, and those between 10 and 19 less than 5% of the total.

- *Start-up capital* is 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 sold their product commercially; and
- *Expansion capital* is provided for the growth and expansion of a company that 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.

The breakdown of investment by stage is useful to identify which share of total venture capital investment finances firms in their early stages or expansion where funding is most needed. However, such a breakdown is for the moment only available for the “country of management” approach. Expressed as a percentage of GDP (**Figure 9**), venture capital investment in early stages and expansion (“country of management” approach) between 1995 and 1999 is highest in the United States (almost 0.2% of GDP), followed by Canada, the Netherlands and Iceland (all above 0.13%). It is particularly low in Austria, Denmark, Greece, Italy, the Czech Republic, Japan and New Zealand. The intensity of venture capital investment in early stages and expansion has increased in virtually all countries between 1995 and 1999, particularly in the United States, Iceland, Belgium, Canada, Switzerland and the Netherlands (**Figure 10**).

Figure 9: Venture capital investment (“country of management” approach) by stages as a percentage of GDP, 1995-99

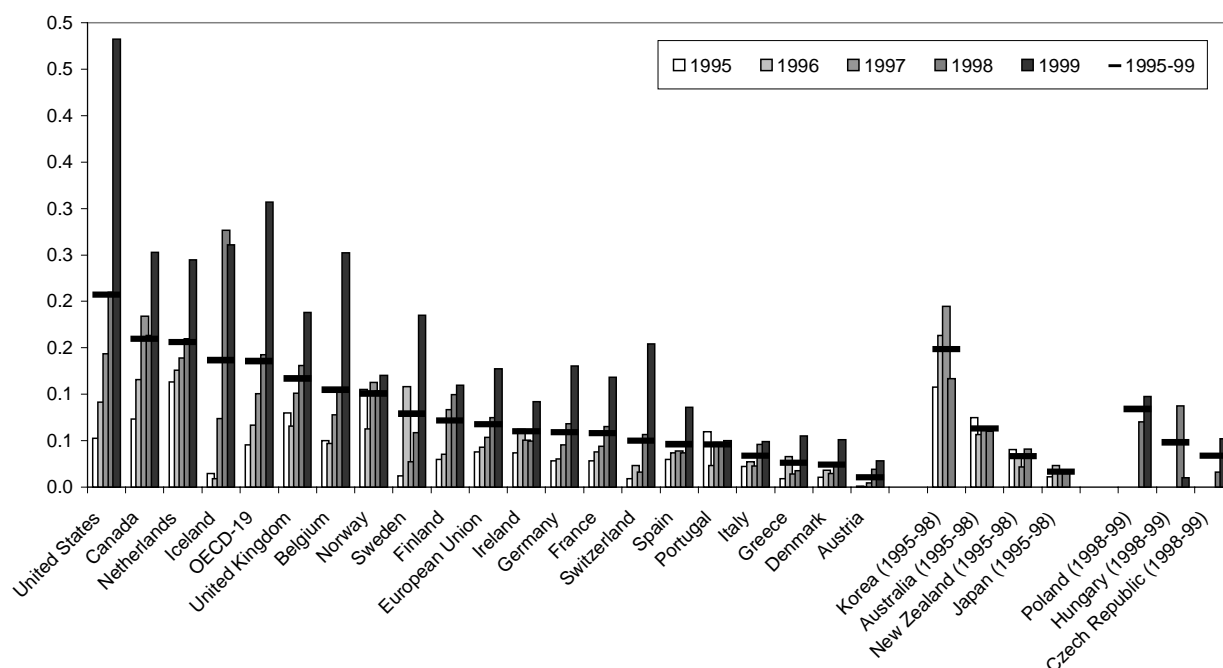


Source: EVCA, various Yearbooks, NVCA, various Annual Reports, Canadian Venture Capital Association (CVCA), Asian Venture Capital Journal, *The 2000 Guide to Venture Capital in Asia*.

In all countries, venture capital investment finances the expansion of firms rather than firms in their early stages. Looking closer at the stages of financing, even in North America, most venture capital is directed to start-up financing rather than seed financing and thus plays only a minor role in funding basic innovation. It is estimated that less than 5% of US venture capital funds go to seed capital to assess and

develop an initial business concept. The majority goes to follow-on funding for projects and spin-offs that may have originally been developed through government or corporate expenditures. In the United States, venture money plays the most important role in the second stage of the innovation life cycle -- the period in a company's life when it begins to commercialise its innovation. In this, a large share of venture capital goes into building the infrastructure required to grow the business -- in expense investments (manufacturing, marketing and sales) and the balance sheet (providing fixed assets and working capital).

Figure 10: Venture capital investment (“country of management” approach) in early stages and expansion as a percentage of GDP

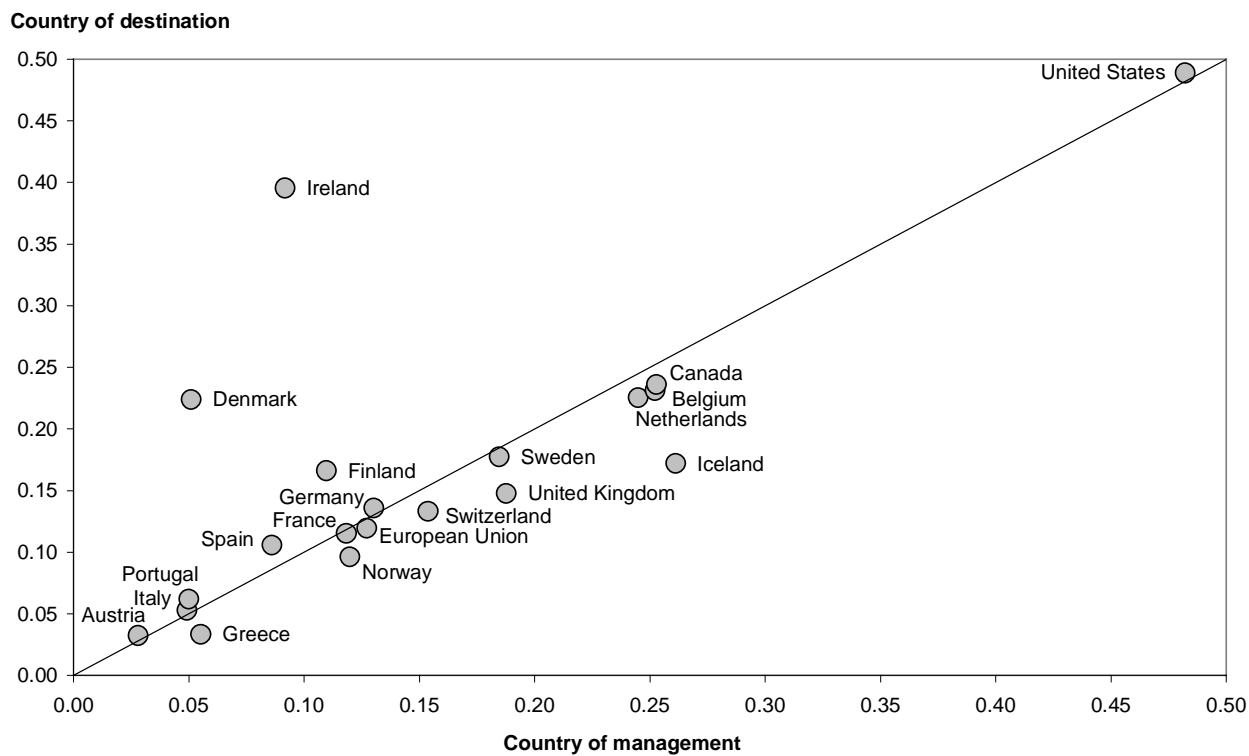


Source: EVCA, various Yearbooks, NVCA, various Annual Reports, Canadian Venture Capital Association (CVCA), Asian Venture Capital Journal, *The 2000 Guide to Venture Capital in Asia*.

As already mentioned, investments according to the “country of destination” approach are not broken down by stage. A rough approximation of investments in early stages and expansion *in* a country can be obtained by applying the share of the various stages in total investment according to the “country of management” approach to investments according to the “country of destination” approach. This (admittedly strong) assumption suggests that these hypothetical investments are more important in Germany than in the United Kingdom, and rise substantially for Ireland and Denmark.

Examining investments in early stages and expansion in a country (“country of destination”) rather than by a country (“country of management”) considerably changes the rankings of some countries, countries above the diagonal having net inflows and those below the diagonal having net outflows (**Figure 11**). The difference is most pronounced for Ireland: investment *in* Irish firms in their early stages and expansion seems highest of all European countries, just behind the United States.

Figure 11: Investment in early stages and expansion: “country of management” versus “country of destination” approach, 1999 (percentage of GDP)



Source: EVCA, NVCA, Canadian Venture Capital Association (CVCA).

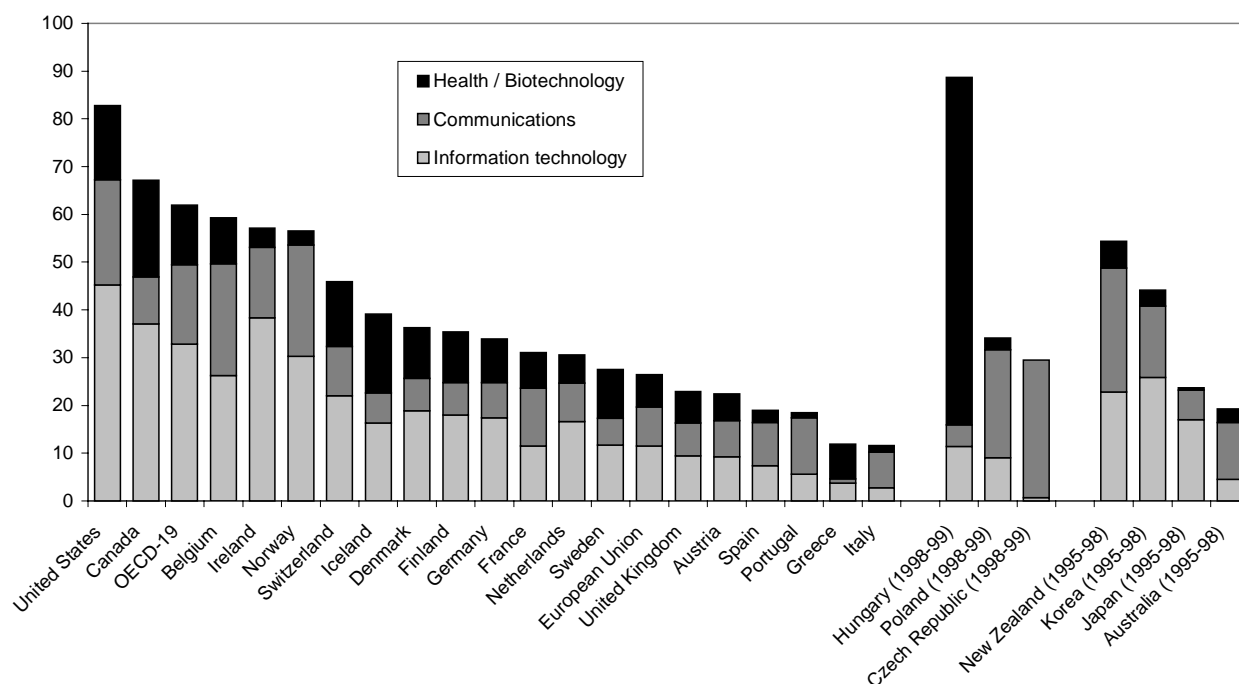
Investment by sector

The breakdown by sector is useful to identify the amount of venture capital invested in firms in high-technology sectors where the outcomes of innovative activity are particularly uncertain, even if the lack of a common nomenclature for industry statistics makes it difficult to define “high-technology” sectors in a satisfying way. As is the case for investment by stage, investment by sector is only available for the “country of management” approach.

Countries differ substantially with respect to the distribution of venture capital by industrial sector. Between 1995 and 1999, information and communication technology (ICT), biotechnology and medical/health-related sectors accounted for more 80% of total venture capital investment in the United States, and for almost 70% in Canada (**Figure 12**). This is in stark contrast to Japan and the European Union, where high-technology industries obtain only about one quarter of venture capital investment.

Within Europe, more than half of total venture capital investment went to high-technology sectors in Belgium, Ireland and Norway, whereas these sectors receive little such funding in Italy, Greece, Portugal and Spain.³ For most countries, information technology is the major recipient of venture funding. Software, particularly relating to Internet activities, is the most favoured technology area at the moment in the United States. In most countries, an increasing share of total investment goes to high-technology sectors (Figure 13).

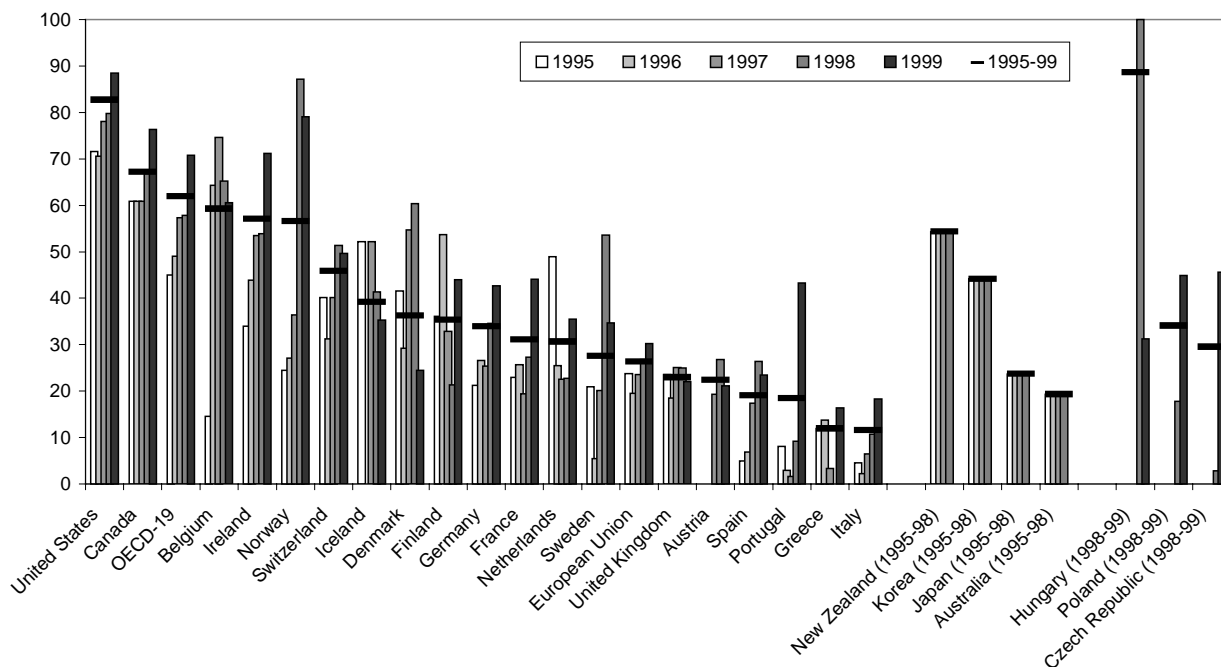
Figure 12: Share of high-technology sectors in total venture capital investment (“country of management” approach), 1995-99



Source: EVCA, various Yearbooks, NVCA, various Annual Reports, Canadian Venture Capital Association (CVCA), Asian Venture Capital Journal, *The 2000 Guide to Venture Capital in Asia*.

3. Figures for Central European countries are pilot data and can show up extreme volatility. For example in Hungary, there were 16 investments in biotechnology and medical and health-related activities in 1998, accounting for almost 90% of total investment. In 1999, there were no investments at all in these sectors, and even total investment decreased by a factor of four.

Figure 13: Share of high-technology sectors in total venture capital investment (“country of management” approach)



Source: EVCA, various Yearbooks, NVCA, various Annual Reports, Canadian Venture Capital Association (CVCA), Asian Venture Capital Journal, *The 2000 Guide to Venture Capital in Asia*.

Investment by stage and sector

There seems to be a significant positive relationship between venture capital activity in early stages and expansion (country of management approach) and the relative importance of high-technology sectors, especially once Asian and Central European countries (for which comparable data are still difficult to establish) are excluded (**Figure 14**). The United States and Canada have a vibrant venture capital market that is strongly oriented towards financing of early stages and investment and towards high-technology sectors. On the other extreme are Austria, Japan Greece, Italy, Portugal and Spain, where venture capital activity is low and oriented towards sectors other than high technology.

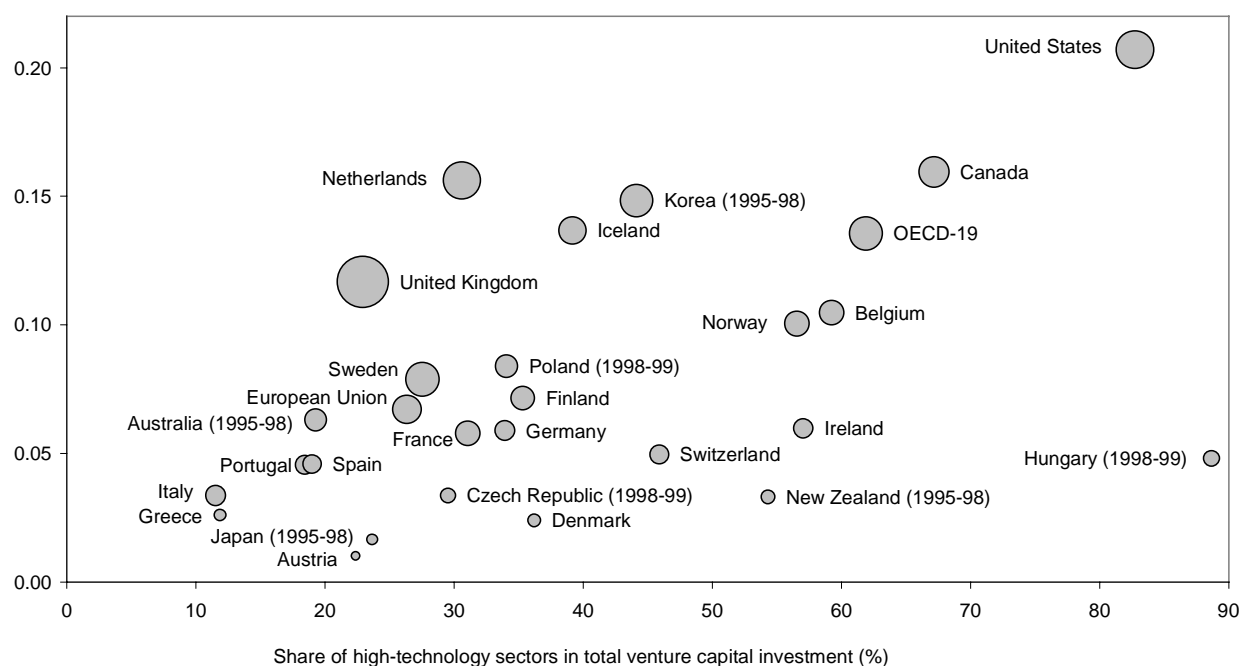
Unfortunately, published data according to the “country of management” approach do not combine the breakdowns by stage and by sector (**Table 7**). In other words, there is no information on the amount of venture capital invested in firms in the early or expansion stages that operate in high-technology sectors. One possibility to overcome this problem is to calculate hypothetical values: under the assumption that the relative importance of each stage is the same for each sector, investment in early stages and expansion can be corrected downwards by the share of high-technology sectors in total investment. For example, while total investment relative to GDP is highest in the United Kingdom, taking into account these factors suggest that hypothetical investments in the United Kingdom is ten times lower than in the United States (column 4, **Table 8**).

These shortcomings are even more pronounced for the “country of destination” approach, as there is no breakdown at all (**Table 7**). In this paper, investments in early stages and expansion according to the “country of destination” approach were approximated under the assumption that their share is the same as

in the “country of management” approach (column 6, **Table 8**). A similar estimate could be done for investments in high-technology sectors (column 7) and for investments in domestic firms in the early or expansion stages that operate in high-technology sectors (column 8). Such investments relative to GDP appear to be highest in the United States, Ireland, Canada and Belgium, and lowest in Greece, Austria, Italy, Spain, Portugal and the United Kingdom. Though highly policy-relevant, such information is for the moment unfortunately purely hypothetical.

Figure 14: Investment in early stages and expansion (“country of management” approach) and the share of high-technology sectors in total investment, 1995-99

Investment in early stages and expansion (% of GDP)



The area of the bubble corresponds to the percentage of total private equity / venture capital investment in GDP. Source: EVCA, various Yearbooks, NVCA, various Annual Reports, Canadian Venture Capital Association (CVCA), Asian Venture Capital Journal, *The 2000 Guide to Venture Capital in Asia*. Data for the Czech Republic, Hungary and Poland are preliminary pilot data.

Table 7: Availability of different breakdowns of venture capital investment

	Country of management	Country of destination
Total investment	Yes	Yes
Investment by stage	Yes	Not available
Investment by sector	Yes	Not available
Investment by stage <i>and</i> sector	Not available	Not available

Table 8: Actual and hypothetical venture capital investments, 1999

	Country of management				Country of destination			
	Total	Early stage and expansion	High-technology sectors	Early stage & expansion in high-technology	Total	Early stage and expansion	High-technology sectors	Early stage & expansion in high-technology
	1	2	3	4 = 2*3/1	5	6 = 5*2/1	7 = 5*3/1	8 = 6*7/5
USD million								
United States	59 531	44 642	52 673	39 500	60 303	45 221	53 356	40 011
Europe	26 764	11 373	8 313	3 532	25 434	10 807	7 900	3 357
European Union	25 988	10 768	7 848	3 252	24 411	10 114	7 372	3 054
Germany	3 366	2 754	1 435	1 174	3 502	2 864	1 493	1 221
Canada	1 831	1 616	1 399	1 235	1 708	1 508	1 305	1 152
France	3 002	1 695	1 323	747	2 921	1 649	1 288	727
United Kingdom	12 256	2 704	2 696	595	9 633	2 125	2 119	467
Belgium	718	627	435	380	658	574	398	348
Netherlands	1 823	964	647	342	1 675	886	595	315
Ireland	112	84	80	60	482	360	343	257
Switzerland	469	398	233	198	405	344	201	171
Spain	770	513	181	120	946	630	222	148
Sweden	1 361	441	471	153	1 305	423	452	147
Norway	282	184	223	145	226	147	179	116
Italy	1 896	576	346	105	2 034	619	372	113
Denmark	124	89	30	22	541	389	132	95
Finland	265	141	117	62	401	214	176	94
Portugal	126	54	55	23	157	67	68	29
Austria	95	58	20	12	110	67	23	14
Greece	76	69	12	11	46	41	8	7
Iceland	25	23	9	8	17	15	6	5
% of GDP								
United States	0.643	0.482	0.569	0.427	0.651	0.489	0.576	0.432
Ireland	0.123	0.092	0.087	0.065	0.528	0.395	0.376	0.281
Canada	0.287	0.253	0.219	0.193	0.267	0.236	0.204	0.180
Belgium	0.289	0.252	0.175	0.153	0.265	0.231	0.160	0.140
Netherlands	0.463	0.245	0.164	0.087	0.425	0.225	0.151	0.080
Norway	0.185	0.120	0.146	0.095	0.148	0.096	0.117	0.076
Finland	0.206	0.110	0.091	0.048	0.311	0.166	0.137	0.073
Switzerland	0.181	0.154	0.090	0.076	0.156	0.133	0.078	0.066
Sweden	0.570	0.185	0.197	0.064	0.547	0.177	0.189	0.061
Iceland	0.285	0.261	0.101	0.092	0.188	0.172	0.066	0.061
Germany	0.159	0.130	0.068	0.056	0.166	0.136	0.071	0.058
Denmark	0.071	0.051	0.017	0.012	0.311	0.224	0.076	0.055
France	0.210	0.118	0.092	0.052	0.204	0.115	0.090	0.051
Europe	0.301	0.128	0.094	0.040	0.286	0.122	0.089	0.038
European Union	0.307	0.127	0.093	0.038	0.288	0.119	0.087	0.036
United Kingdom	0.851	0.188	0.187	0.041	0.669	0.148	0.147	0.032
Portugal	0.117	0.050	0.051	0.022	0.145	0.062	0.063	0.027
Spain	0.129	0.086	0.030	0.020	0.159	0.106	0.037	0.025
Italy	0.162	0.049	0.030	0.009	0.174	0.053	0.032	0.010
Austria	0.046	0.028	0.010	0.006	0.053	0.032	0.011	0.007
Greece	0.061	0.055	0.010	0.009	0.037	0.033	0.006	0.005

Areas in grey are hypothetical investments.

Source: EVCA, NVCA, Canadian Venture Capital Association (CVCA).

FACTORS INFLUENCING VENTURE CAPITAL ACTIVITY AND THE IMPLICATIONS OF INTERNATIONAL VENTURE CAPITAL FLOWS

Two major results have come out from the preceding analysis: there are strong disparities across countries in terms of venture capital activity, and international venture capital flows are important for some countries. Disparities in venture capital activity across countries stem from various factors, including:

- *The supply of capital willing to finance risky undertakings.* The availability of capital is a necessary condition, but may not be in itself a problem in most OECD countries. In contrast, the willingness to engage capital in risky investments may differ across countries, and depends on the existence of high-potential projects suitable for investment and the trade-off between risk and expected returns. The latter depend in turn on many factors, including the efficiency of financial markets (e.g. existence of easy entry and exit mechanisms), the incentive structure (adequate reward of risk) and firm, sector and overall growth prospects.
- *The existence of promising ideas and high-potential entrepreneurs or firms suitable for investment.* Framework conditions conducive to ideas and creativity include well-functioning education and innovation systems, whereas appropriate incentive structures and low barriers to entrepreneurship can positively influence attitudes towards risk-taking and entrepreneurship to transfer these ideas into profitable ventures.
- *The availability of a sufficient number of specialists with the necessary expertise on evaluating, funding and assisting high-risk firms,* especially in emerging industries and technologies. Venture capital funds play an important role not only by acting as an intermediary between investors and firms, but also by providing additional value added to the portfolio firms.

These various immediate and underlying factors influence each other to a certain extent, and can be affected by government through a range of policies. The first section briefly examines the inherent interdependence, risk and cyclical nature of venture capital markets and the implications for the economy. The second section discusses the implications of international venture capital flows for government policy that are for the most part overlooked. In particular, it argues that while cross-border flows may improve the efficiency of the global venture capital market, they may to a certain extent dissociate domestic supply from domestic demand factors, and increase the relative importance of factors conducive to creativity, innovation, risk-taking and entrepreneurship. The third section tentatively examines the relationship between barriers to entrepreneurship and venture capital activity.

The cyclical nature of venture capital markets

It is important to note that successive business failures and a sharp drop in new capital can easily follow a period of high fundraising, investment, and enterprise creation. Even in relatively more mature capital markets like the United States, the annual commitments to venture capital funds varies widely. For example, the annual flow of funds increased strongly during the 1980s, then declined until 1991, and increased again substantially in the 1990s. Various factors could have contributed to this instability

(Gompers and Lerner, 1999a). The surge in new capital during the 1980s for instance was mainly attributed to regulatory changes, which allowed pension funds to invest in venture capital markets. In addition, stock market performance can affect the amount of funds raised: the returns on venture investments are driven in part by the strength of initial public offerings (IPOs), which in turn are quite irregular and heavily dependent on the existence of sound stock markets. Recent experience in the United States has shown that an increase (*decrease*) in venture capital fundraising has usually been preceded by an increase (*decrease*) in IPO market activity.

Sudden shifts from boom to bust cycles are believed to be the principal deficiency of venture capital markets and raise questions concerning their overall efficiency in the long run. Some observers fear that volatility and uncertainty makes it harder for capital to be allocated efficiently, thus adversely affecting the pace and direction of innovation and the firm dynamism. Unless entrepreneurs can come up with new ideas and products to broaden the potential areas of investment, venture capital supply may at times strongly exceed demand (*i.e.*, “too much money chasing too few deals”), raising the likelihood that “bad” deals get also funded, which in turn may adversely affect future fundraising and investment behaviour. The other extreme, where demand exceeds supply (“funding gaps”), may lead to situations where even potentially profitable start-ups and innovative firms cannot get access to sufficient funding.

Both excess funding and excess demand may coexist at sub-national level, *i.e.* some firms, industries and regions may attract too much, and others too little capital. Investors may overvalue the potential of firms in some fashionable, intangible-intensive industries (*e.g.* Internet related activities and biotechnology), leading to a surge of investment in these industries to the detriment of other industries. For example, in the United Kingdom, investors became increasingly attracted to biotechnology companies during the early 1990s, resulting in a surge of investment and rapidly rising stock prices. However, a series of disappointing results in clinical trials subsequently lead investors to withdraw from that sector, resulting in depressed stock prices and lower investment. This volatility has induced uncertainty about the industry and caution among investors, to the detriment of new promising biotechnology ventures (Leadbeater, 1999). These potential funding gaps may be a drawback not only for firms in some sectors but also for some regions: in many countries, venture capital investment is concentrated on only few regions. In the United States, for example, California, New York and Massachusetts account for more than 50% of total US investment, whereas virtually no formal venture capital investment goes to *e.g.* South Dakota and Wyoming. And even in terms of venture capital intensity, *i.e.* investments divided by Gross State Product, differences among US States remain very pronounced (see **Annex, Figure A 1**).

An additional problem is that some firms need only small amounts of venture capital that venture capital funds may be reluctant to provide. As an indication, the average deal size of US investments rose from about USD 5 million in 1995 to some 15 million in 1999.

Implications for government policy

Governments can affect the supply of venture capital in several ways. They can stimulate private investment through a range of policies and framework conditions, including through the rules on which types of investors may carry out venture capital investments⁴, the development of an active second-tier market and fiscal policies. Governments can also take a more active role and invest directly in venture capital funds (**Box 3**).

4. Some governments have chosen to block or actively discourage pension funds, insurance companies and other institutions from venture capital investments that are seen as too high-risk, but the trend across the OECD is now to loosen such restrictions.

Government policy in favour of an increase in the supply of venture capital is founded on the assumption that there is a funding gap, *i.e.* the private sector provides insufficient capital to new firms, particularly at the seed stage. Access to financing seems indeed a problem for many firms, especially young and growing firms. A recent survey by the European Commission of some 8 000 European small and medium-sized firms (SMEs) suggests that access to financing is the major obstacle for 14% of all firms, followed by administrative regulation and lack of skilled labour (**Annex, Table A 5**). This constraint is most pronounced for firms that are in the early stages, highly innovative or expanding, and differs strongly across countries (**Annex, Figure A 2**). A survey in the United Kingdom of 238 manufacturing SMEs found that innovative small firms are more likely to be refused access to external finance than their peers, which is partly ascribed to the risk-averse stance of UK financial institutions (Freel, 1999). This study also suggests that the lack of awareness of small firms concerning alternative financing is a factor depressing demand for venture capital. Other research suggests that new firms, especially technology-intensive ones, may receive insufficient capital despite the presence of venture funds (Bank of England, 1996). In most countries, venture capitalists fund a modest number of firms each year and these investments are highly concentrated and in the later stages of the firm's life.

Box 3: Government as venture capitalist

Many OECD governments are also playing an active role as venture capitalists with the aim of enhancing innovation and increasing employment. *Direct equity investments* by governments are the most high-profile way of providing financial resources to small businesses or venture capital firms. Government equity programmes are generally based on the assumption that there is insufficient liquidity available for particular classes of investment and the government must fill the void. These are often targeted to helping firms that are in a very early stage of development where the risk profile is too high to attract private capital. One approach is for a government to invest in private sector venture capital firms, which in turn provide equity to small enterprises. Alternatively, a government may create its own venture capital fund; some government-created funds receive part of their funding from the private sector and are referred to as hybrid funds.

A few governments have *equity guarantee* programmes that attempt to overcome the aversion that many investors have towards what are perceived as high-risk investments. Investors may avoid private equity investments because of the high failure rate associated with young firms. They require as compensation a very high, anticipated return. Venture capital firms typically look for an estimated internal rate of return on prospective investments of 30% to 50%; this allows, after accounting for failures, a targeted portfolio return of 20% to 30%. Most small business plans cannot demonstrate such high returns. The logic behind an equity guarantee programme is that if a portfolio is shielded from much of the cost relating to failures, the target internal rate of return for individual investments can be lowered while at the same time the portfolio can achieve its targeted overall return.

However, the need for and efficacy of such programmes are subject to a heated debate, whether government can identify firms in which investments will yield high private and/or social returns or can encourage private sector parties who can do so. Critics argue that government schemes are misplaced; they can displace or retard the development of the private sector venture capital market, subsidise unviable firms or ventures, and even depress levels of entrepreneurship. In contrast, proponents claim that government interventions can attract investors to riskier ventures, which result in job and wealth creation that would not otherwise have occurred; that they can be targeted to areas which are in need of job creation but which are unable to offer attractive financial returns in the near-term; and that they can have a leveraging effect on private sector risk capital. In fact, past experience illustrates that it is possible for governments to play a useful venture capital role, if such schemes are properly conceived and designed (OECD, 1997a). This could be particularly important in cases where venture capital investment is very concentrated in terms of sectors or regions, and where firms need only small amounts of financing that venture capital funds may be reluctant to provide.

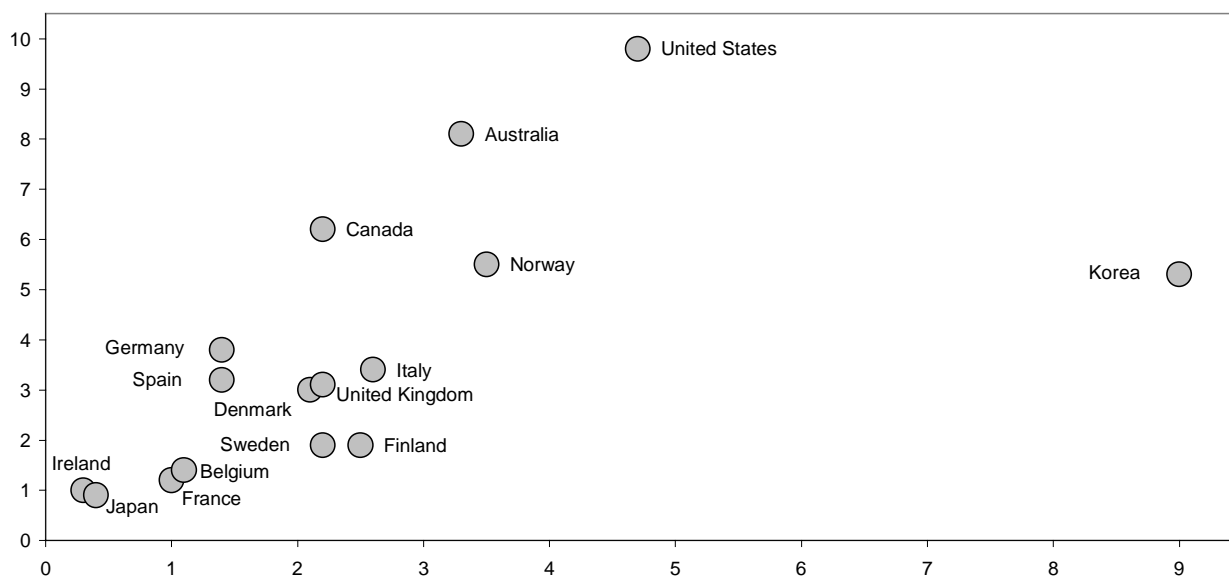
However, pursuing one-dimensional supply-side policies may only have minor effects on the venture capital market. Demand side factors, including the existence of promising ideas and high-potential entrepreneurs or firms suitable for investment are also important.

Several factors could indeed depress demand for venture capital financing. Entrepreneurs could be forced to use internal or bank financing, simply because they are not informed about the availability of other sources of finance. For example, over 50% of small firms surveyed in the United Kingdom obtained external finance from banks because they were unaware of possible alternatives (Freel, 1999). Entrepreneurs could be substituting other forms of financing. Internally generated funds or debt financing could be preferred by some firms over venture capital, since the former allows the owner to retain control of the company, whereas the latter implies a change in ownership or at least a partial loss of control. Especially when preference for control is high, an entrepreneur will be reluctant to apply for external financing, and will instead continue to rely on other sources for financing new investments, which could limit the scope of their investments even to a degree that no risky investments are undertaken. There is also some evidence that government support schemes for small firms may be so extensive that they depress demand for venture capital. A survey of manufacturing firms in the United Kingdom found that 21% of firms received grant funding for innovation-related activities and that this affected their motivation to seek further funding (Freel, 1999). However, the most important factor is certainly the lack of entrepreneurial activity, and the pool of entrepreneurs seeking venture capital financing could in fact be limited: in some countries, the entrepreneurial environment needed to motivate and implement potential ideas may not be in place or discouraged by regulations and culture.⁵ Using a population survey, a recent study estimated the active participation in new business creation in some twenty countries (Reynolds et al., 2000). A representative sample of some 2 000 adults in each country was asked a series of questions about their participation in entrepreneurial activities, including whether or not they had been engaged in any activity to start a firm in the past 12 months (“start-up activity”) or whether they are owning and managing an operating business that is less than 42 months old (“new firm activity”). On this basis, entrepreneurial activity seems much higher in North America than in Europe and in Japan (**Figure 15**). Reynolds et al (1999) suggest several key factors that could explain the cross-country variations in firm start-up rates: entrepreneurial opportunity, entrepreneurial capacity, infrastructure, demography, education, and culture.

5. In addition, the structure of the economy also plays a role, in the sense that countries dominated by traditional industries tend to have a lower demand for venture financing than countries with more knowledge-intensive industries and services.

Figure 15: Level of entrepreneurial activity, 2000

Start-up activity: Percentage of adults engaged in the process of creating a business in the past 12 months



New firm activity: Percentage of adults owning (solely or partly) and managing an operating business that is less than 42 months old

The Korean situation for new firm activity may be a temporary anomaly due to the recovery following the recession in 1998.

Source: Reynolds et al., 2000.

In addition, the growing internationalisation of venture capital activity dissociates to a certain extent the link between domestic supply and demand factors, and changes their relative importance in favour of the latter. Investors typically care more about the experience, reputation and performance of a particular venture capital fund than its geographic location, and may thus be willing to invest in foreign venture capital funds. Likewise, venture capital funds may allocate funds beyond national borders and invest in firms in those countries where entrepreneurship, innovation, prospects for growth and expected returns are highest. Policies conducive to domestic supply may be of little effectiveness for domestic venture capital activity if the additional supply goes to foreign venture capital funds, or is invested in foreign firms. In contrast, policies that foster the demand side, especially creativity and entrepreneurship may not only improve domestic opportunities, but may be also a means to attract foreign venture capital investment.⁶ Some of these factors are amenable to change through policy intervention, including the ease with which new firms can be created and the degree to which investors can realise adequate rewards (**Box 4**).

6. Incidentally, much of international venture capital investment flows is in fact foreign direct investment. According to the *OECD Benchmark Definition of Foreign Direct Investment* and the *IMF's Balance of Payments Manual*, foreign investment is considered a direct investment if the foreign investor owns 10% or more of a company's ordinary shares or voting stock. Equity participation by a venture capital fund is typically well beyond this threshold.

Box 4: Some government policies affecting the demand for venture capital

Governments can encourage the *development of an active second-tier market*, which are important both for entrepreneurs and investors. For example, appropriate exit mechanisms give entrepreneurs an additional incentive to start a company, and investors are more willing to supply funds to start-ups if they feel that they can later recoup their investment.

Taxation is another important policy area that affects both supply of and demand for venture capital. For example, many governments choose *tax incentives*, particularly investor tax credits, to stimulate the supply of venture capital. Such incentives assume that enough liquidity exists in the system, which these incentives seek to channel towards particular investments. A reduction in *capital gains tax rates* can also stimulate venture capital activity. In the United States, investment analysts have noted a correlation between the performance of shares in the NASDAQ stock market and proposals for increases or decreases in the tax rate for capital gains. Analysts believe that a capital gains tax cut acts like a wall between old and new investment. It tends to cause investors to sell stock in older companies and to buy into newer technologies and firms (New Technology Week, 1997). However, this less may be the case where a large percentage of venture capital funding comes from tax-exempt investors such as pension funds and endowments. This leads some authors to suggest that the main mechanism through which capital gains taxes impact on venture capital is not on the supply side, but on the demand side: favourable capital gains taxes may be a significant incentive for individuals to start new businesses (Poterba, 1989). Lower rates make it relatively more attractive for an employee to become an entrepreneur. Changes in the capital gains tax rate and its differential from ordinary income tax rates (that are applied to the major part of employee compensation, *i.e.* salary and cash bonuses) can increase the growth of entrepreneurial companies (Carroll et al, 2000).

In the United States, *stock options* may also have contributed to the emergence of many small, innovative firms, particularly in the information technology sector. According to a survey by the NVCA, more than 90% of venture-backed firms in the United States awarded stock options to their employees in 1996. Stock incentives can be a large part of the compensating reward for founders and managers of young companies. Stock-based incentives, which can be made available to all categories of employees, also enable new, high-growth firms to attract and keep talent without draining scarce cash flow. At the same time, they are an instrument that increases the private benefit (*cost*) of successful (*poor*) decisions, and are thus an important mechanism to align managers' and stakeholders' interests. At present, several European countries -- including France, Germany and Spain -- are debating proposals to facilitate use of stock options and to lower option tax rates.

In addition, *Intellectual Property Rights regimes and procedures* may also play an important role in the survival and growth of a firm. For a group of early-stage companies -- those that are technology-based -- intellectual property represents almost the entirety of their assets. How firms garner the benefits of their innovations is a critical determinant of their success. To allow smaller as well as larger firms to profit from their intellectual assets, it is important that countries process patents and copyrights in a timely and efficient manner and have an effective enforcement system for intellectual property rights (OECD, 1997b). But current intellectual property systems tend to favour large over small firms. In many countries, the filing process for patents and copyrights is costly and slow. Filing for international patents is expensive and complicated. In addition, the costs of maintaining a patent and defending it in patent suits brought by competitors can be prohibitive, which in turn may discourage smaller firms from registering patents at all.

The relationship between barriers to entrepreneurship and venture capital activity

Regulations and institutional impediments can discourage risk-taking either in establishing new ventures or expanding existing activities. These include overly complicated business establishment procedures, onerous and costly compliance burdens, and intellectual property regimes that do not reward innovation. Policy frameworks conducive to entrepreneurship pertain to administrative procedures and regulations, which govern the manner in which companies are created and the ongoing information these

companies must provide their governments. Business establishment procedures affect both the number of start-ups and the perspective of the venture capital firms. In some countries, business establishment may be an expensive, lengthy and complex procedure that discourages entrepreneurship. For example, formalities for establishing a corporation are relatively low in Denmark, the United States and the United Kingdom, and high in Italy, Spain, Greece and France (**Table 9**).

Table 9: Formalities for establishing a corporation, around 1998

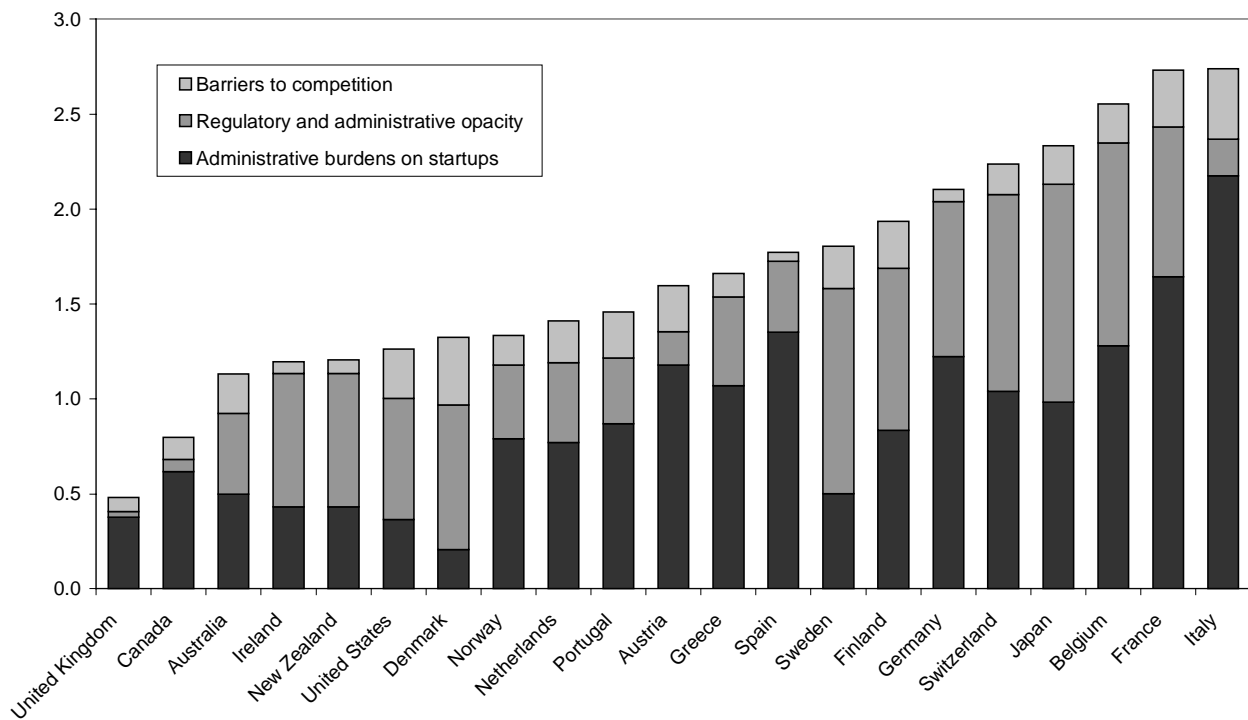
	Minimum direct and indirect cost (ECU)	Maximum delays (weeks)	Minimum number of services	Minimum number of procedures (pre & post)	Synthetic indicator: Administrative burdens for corporations (0: low - 6: high)
Denmark	300	1	2	2	0.50
United States	200	2	2	2	0.50
United Kingdom	900	1	1	4	0.75
Australia	200	1	1	9	1.00
Sweden	1 130	4	1	6	1.25
Belgium	1 000	6	4	3	1.50
Finland	1 050	6	1	7	1.50
Ireland	650	4	3	6	1.50
Netherlands	1 400	12	1	7	1.75
Japan	4 600	4	1	13	2.25
Germany	750	24	2	8	2.50
Portugal	1 000	24	1	9	2.50
Austria	2 200	8	5	7	2.75
France	2 200	15	1	21	3.25
Greece	750	10	4	25	3.25
Spain	330	28	5	12	3.75
Italy	7 700	22	4	21	5.25
<i>Criteria for the synthetic indicator</i>	< 500	≤ 4	0	≤ 3	0
	< 1 000	≤ 8	1	≤ 5	1
	< 1 500	≤ 12	2	≤ 8	2
	< 2 500	≤ 16	3	≤ 12	3
	< 5 000	≤ 20	4	≤ 16	4
	< 7 500	≤ 24	5	≤ 20	5
	≥ 7 500	> 24	6	> 20	6

Source: OECD, International Regulation Database (<http://www.oecd.org/subject/regdatabase/index.htm>). Each country is assigned a value between 0 and 6 for each of the four variables (see criteria). These values are then weighted (25% each) to derive the synthetic indicator of "administrative burdens for corporations".

Once created, small firms are often disproportionately burdened by the ongoing cost of compliance procedures and are generally handicapped in their ability to navigate through the complexities of administrative regulations (OECD, 1999b). Due to the fixed-cost nature of regulatory compliance for taxes, labour-related and social insurance contributions and business-related regulations (*e.g.* annual accounts, permits, environmental legislation, statistics), the cost per employee of complying with government regulations decreases with firm size.

A broader picture of countries' relative standing with respect to *barriers to entrepreneurship* can be obtained from the OECD International Regulation Database. This database contains over 1 100 quantitative and qualitative observations on regulatory and market environments in OECD countries in (or around) 1998, including those listed in **Table 9**. The results for the individual observations are weighted to derive synthetic summary indicators at various aggregate levels.⁷ Barriers to entrepreneurship appear to be lowest in the United Kingdom and Canada and highest in Italy and France (**Figure 16**). Countries exhibit substantial differences concerning the contribution of the three underlying factors to the overall indicator: administrative burdens on start-ups for sole proprietors and corporations, regulatory and administrative opacity; and barriers to competition. Thus, for example, Denmark seems to have the lowest administrative burdens on start-ups of all OECD countries. However, an unfavourable ranking concerning regulatory and administrative opacity drives up substantially the overall indicator. In contrast, Italy's unfavourable ranking of barriers to entrepreneurship is almost entirely due to high administrative burdens on start-ups.

Figure 16: Barriers to entrepreneurship, around 1998



The indicator ranges between 0 (no barriers) and 6 (highest possible barriers).

Source: own calculations, based on the OECD International Regulation Database and the weights from Nicoletti, Scarpetta and Boylaud (1999) (see Annex, Table A 6).

7. See Annex, **Figure A 3** for the underlying variables and **Annex, Figure A 4** for the countries' relative standing according to the overall summary indicator of "product market regulation"

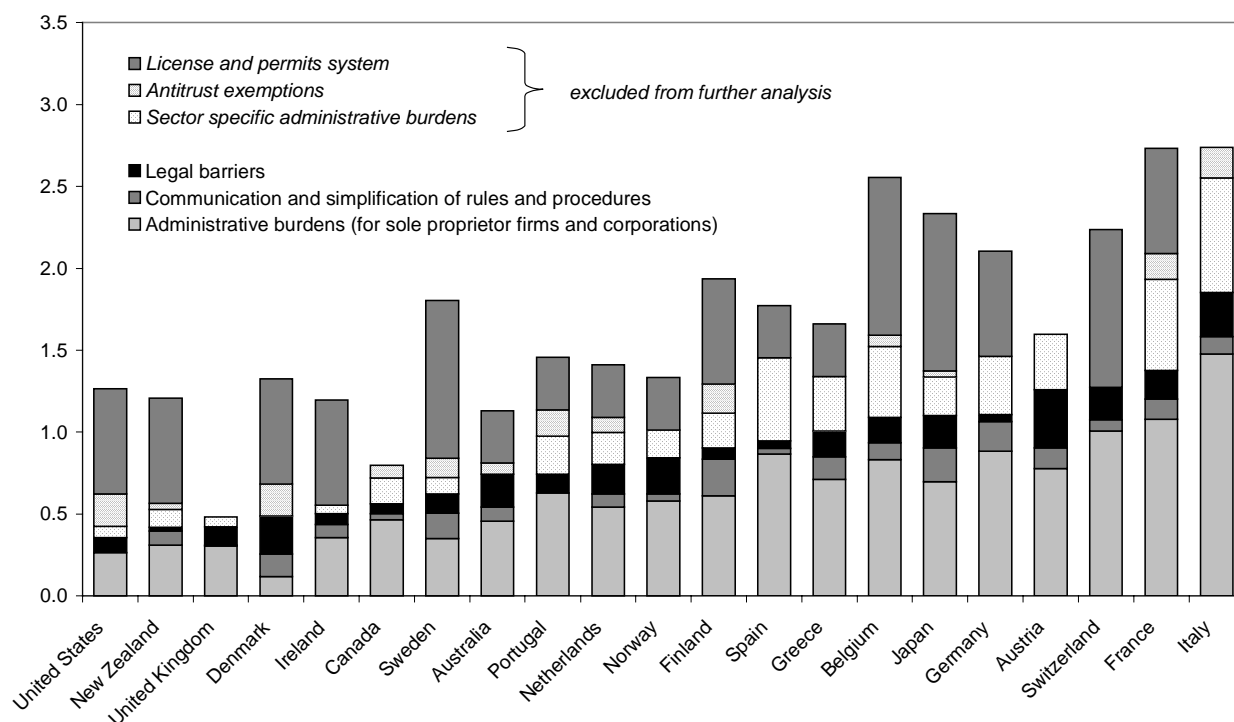
This picture may be too broad for barriers to entrepreneurship that are relevant for venture capital activity. In fact, a closer look at the International Regulation Database calls for the exclusion of some of the underlying variables: sector specific administrative burdens as well as antitrust exemptions are excluded for economic reasons, and license and permit systems for statistical reasons (**Box 5**). The exclusion these three variables alters significantly the rankings of the countries in terms of barriers to entrepreneurship (**Figure 17**).

Box 5: Adjustments of the indicator of barriers to entrepreneurship

Sector specific administrative burdens: The eleven questions used to construct this variable refer only to *road freight* and *retail distribution* (for food and clothing products). This variable is thus of little economic importance for venture capital activity and needs to be excluded.

Antitrust exemptions: This variable is based on four questions, which all concern *public* enterprises or *state-mandated* actions and are thus of little relevance for the link between barriers to entrepreneurship and venture capital activity.

License and permit systems: This variable is excluded not for economic, but for statistical reasons. It is based on only three questions: (i) Is the “silence of consent” rule used at all, *i.e.* are licenses issued automatically if the competent licensing office has not acted by the end of the statutory response period? (ii) Are there single contact points for getting information on licenses and notifications? (iii) Are there single contact points for issuing or accepting on licenses and notifications (one-stop-shops)? Each of these questions is answered by either “yes” or “no” and is assigned a value of either 0 (no barrier) or 6 (highest possible barrier). The values then weighted (each by one third) to derive the overall value for each country, which takes the full range between 0 for some countries (*e.g.* Canada and the United Kingdom) and 6 for others (Belgium, Japan, Sweden and Switzerland). This variable seems much more subject to caution than others that are based on much more questions and on underlying data, yielding less dispersion. In addition, while the correlation of license and permit systems with the overall measure of entrepreneurship varies is relatively high (0.54), it drops substantially (to 0.10) once barriers to entrepreneurship are recalculated excluding this variable (Appendix, **Table A 7**). In fact, given the important weight of this variable (each of the three underlying questions accounts for more than 5% of the overall indicator; in other words, each “no” drives up the overall indicator by about 0.3 points), the overall indicator of barriers to entrepreneurship is very sensitive to the inclusion or not of this variable (**Figure 17**). For the United States, this variable (two questions relative to “single contact points” answered by “no”, which may be not surprising for such a large country) “explains” more than 50% of the overall indicator of barriers to entrepreneurship, which seems unreasonably high.

Figure 17: Barriers to entrepreneurship and underlying variables, around 1998

The indicator ranges between 0 (no barriers) and 6 (highest barriers). Countries are ranked by the sum of the values for administrative burdens, communication and simplification of rules and procedures, and legal barriers

Source: own calculations, based on the OECD International Regulation Database and the weights from Nicoletti, Scarpetta and Boylaud (1999) (see Annex, Table A 6).

These figures can be used to examine tentatively the link between barriers to entrepreneurship and venture capital activity. There seems to be a strong negative relationship between barriers to entrepreneurship (excluding the above discussed items) and venture capital investment in early stages and expansion (**Figure 18**, see also Annex, **Figure A 5**). This is true for the country of management approach and even more so for the country of destination approach. This evidence suggests that countries with low barriers to entrepreneurship tend to have more active venture capital markets, and *vice versa*. However, further work needs to be undertaken to better understanding the link between (barriers to) entrepreneurship and venture capital activity. Especially for venture capital, a better and more reliable picture can only be obtained once more detailed and relevant time series become available. The country of destination approach is available for the moment only for a single year and thus provides just a snapshot, it is only available for European countries, and does not include investment inflows by non-European venture capital funds. As already mentioned an alternative to the existing approach (that surveys venture capital funds) would be using *firm level data*. Data on venture-backed recipients within a given country would also help to better estimate the impact of venture capital of firm performance. This, however, may be difficult, and international comparability of venture capital data thus hampered for still some time.

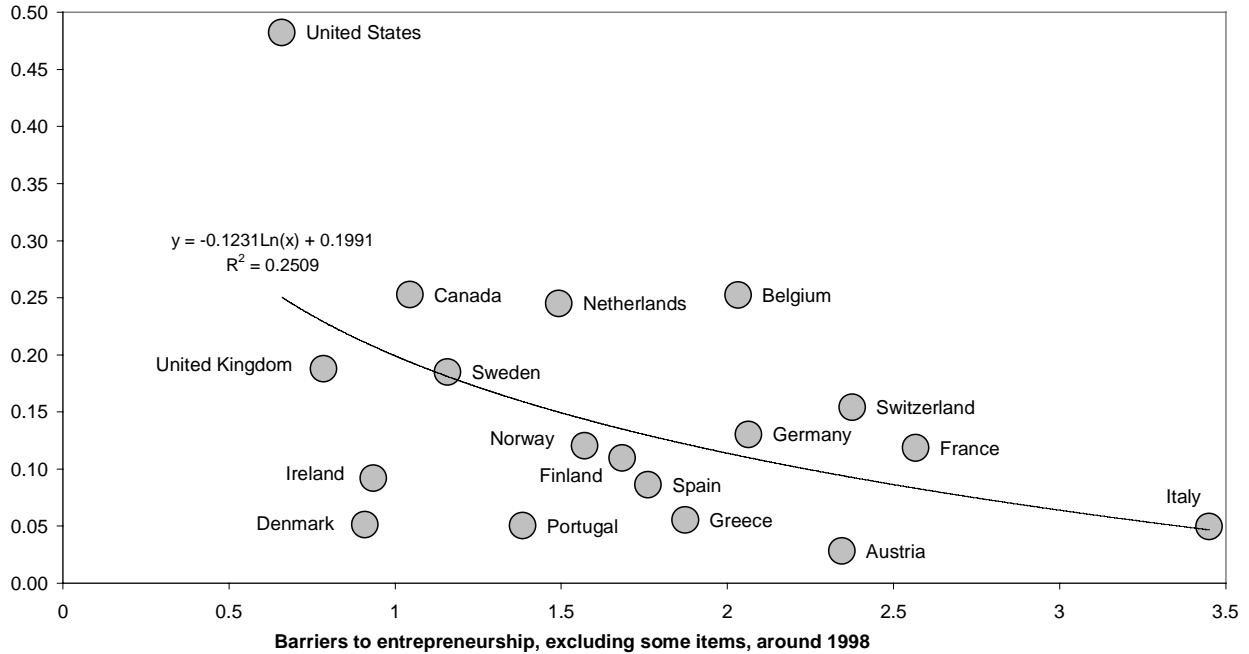
Governments in many OECD countries are setting up policies to promote entrepreneurship and risk-taking, facilitate firm start-up and expansion, and provide mechanisms for easy entry and exit on capital markets. The United States, for example, exhibits many of the factors that foster entrepreneurship and venture investing. These include a secondary stock market (NASDAQ) allowing easy entry and exit for investors, favourable capital gains tax treatment, availability of and favourable tax treatment of stock options, rules allowing pension funds and institutions to invest in venture capital, and an extensive business

angel network. As a result, US growth companies have benefited from the continuum of finance provided by business angels in the early stage, then venture capital from the private equity market, then an initial public opening, and subsequent access to institutional and private investors. Other countries in the OECD are trying to replicate this success, but many may have not yet put together the complete package.

Figure 18: Barriers to entrepreneurship (excl. some items) and venture capital activity

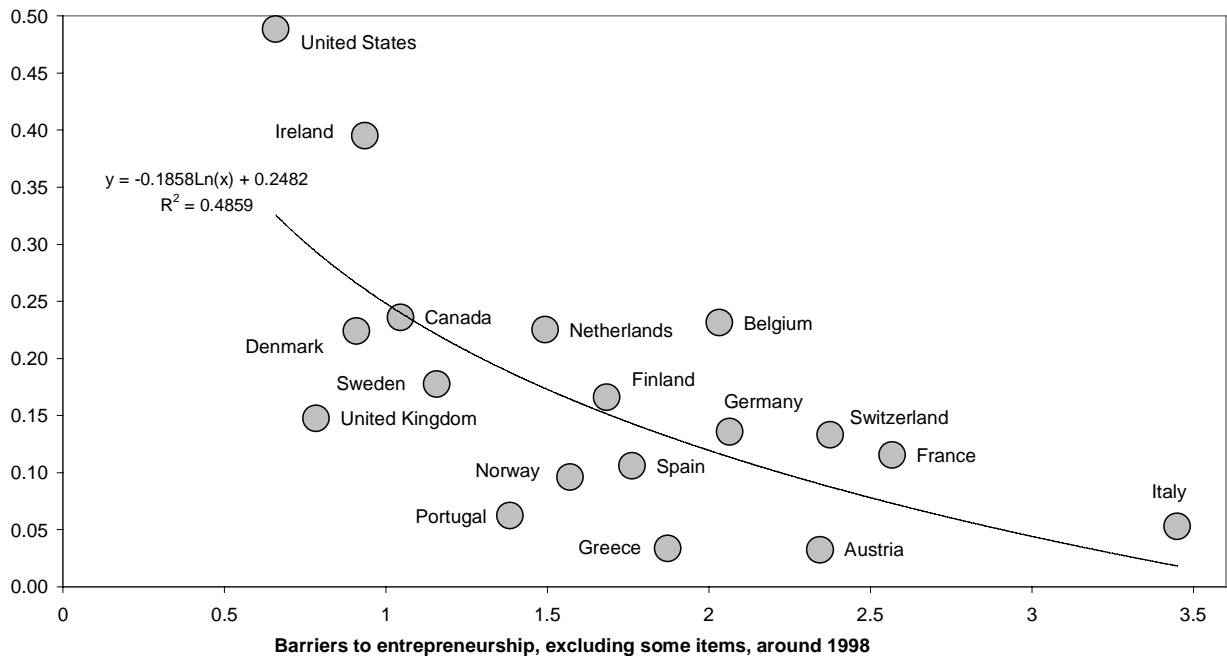
Country of management approach

Venture capital investment in early stages and expansion as a percentage of GDP, 1999



Country of destination approach

Venture capital investment in early stages and expansion as a percentage of GDP, 1999



Excluding “license and permit systems”, “sector specific administrative burdens” (for road freight and retail distribution), and “antitrust exemptions” (for public enterprises).

Source: own calculations, based on OECD International Regulation Database the weights from Nicoletti, Scarpetta and Boylaud (1999) (see Annex, Table A 6); EVCA, various Yearbooks, NVCA, various Annual Reports, Canadian Venture Capital Association (CVCA).

ANNEX

Table A 1: Sources of funds raised for private equity / venture capital in the United States and Europe (% of total)

	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	1995-99
United States												
Pension funds	36.3	52.2	42.5	41.7	59.3	45.8	37.0	54.8	38.0	59.4	..	50.0
Corporations	20.2	7.0	4.2	3.2	8.0	9.1	4.1	18.9	24.0	11.7	..	15.1
Individuals and families	6.1	11.4	12.5	11.0	7.3	11.8	16.2	6.5	12.0	11.2	..	11.3
Endowments and foundations	12.3	12.4	24.2	18.4	10.6	21.5	19.5	11.3	16.0	6.2	..	11.5
Financial and insurance	12.7	9.5	5.0	14.6	10.6	9.5	19.4	2.9	6.0	10.2	..	9.1
Foreign investors	12.5	7.5	11.7	11.0	4.3	2.4	3.8	5.6	4.0	1.1	..	3.0
Europe												
Banks	..	..	..	36.2	30.0	28.4	25.6	29.8	25.8	27.8	29.1	27.5
Pension funds	..	..	..	14.6	15.7	19.7	27.3	22.7	25.0	24.0	18.7	22.6
Insurance companies	..	..	..	11.3	10.0	12.2	10.8	11.3	16.4	8.9	13.2	12.6
Corporate investors	..	..	..	5.1	5.3	10.2	4.9	3.5	11.3	9.8	9.5	9.2
Realised capital gains	..	..	..	17.2	21.8	17.2	18.0	15.8	6.9	8.8	7.3	9.0
Private individuals	..	..	..	4.7	3.1	2.7	3.4	7.4	4.0	7.6	6.2	6.0
Government agencies	..	..	..	1.6	6.5	2.7	3.1	2.3	2.2	5.1	4.7	3.9
Academic institutions	..	..	..	0.3	0.8	0.2	1.9	1.0	0.7	0.1	0.4	0.6
Others	..	..	..	9.0	6.8	6.6	5.1	6.1	7.7	8.0	10.9	8.5

It should be noted that the US breakdown of funds raised includes "foreign investors", whereas EVCA and AVCJ provide two separate breakdowns, which unfortunately cannot be combined: one by type of investor, one by geographic origin.

Source: EVCA, various Yearbooks, NVCA, various Annual Reports.

Table A 2: Sources of funds raised for private equity / venture capital in Asia, investment portfolio as of 1998 (% of total)

	Australia	Japan	New Zealand	Korea
Pension funds	52	5	48	2
Corporations	8	51	7	51
Government agencies	15	4	19	11
Banks	9	15	5	12
Insurance companies	4	15	14	6
Private individuals	7	2	7	5
Others	5	8	0	13

Source: Asian Venture Capital Journal (AVCJ), *The 2000 Guide to Venture Capital in Asia*.

Table A 3: Sources of funds raised for private equity / venture capital in Europe, average 1995-99 (% of total)

	Banks	Pension funds	Insurance companies	Corporate investors	Realised capital gains	Private individuals	Government agencies	Academic institutions	Others
Austria	57.5	0.6	4.3	17.2	0.3	6.6	13.4	0.0	0.0
Portugal	55.8	0.0	0.2	0.3	12.9	0.0	21.1	0.0	9.6
Germany	48.7	10.8	11.7	9.1	0.1	8.5	8.8	0.0	2.3
Netherlands	47.4	7.5	14.7	1.9	17.2	3.0	0.7	0.1	7.5
Spain	43.2	8.0	3.9	9.0	6.6	6.0	8.6	0.0	14.6
Italy	39.6	6.9	4.9	8.8	12.0	16.6	1.6	0.0	9.7
Denmark	37.7	6.5	0.0	7.1	13.8	18.1	4.7	0.0	11.9
Greece	31.2	0.0	5.5	16.4	27.6	10.1	0.0	0.0	9.2
France	27.8	10.1	11.5	8.4	29.3	4.0	2.1	0.3	6.4
European Union	27.8	23.0	12.6	9.1	8.9	5.8	3.9	0.6	8.5
Switzerland	26.7	11.4	7.3	12.6	8.5	12.1	3.6	0.0	17.7
Belgium	22.1	1.9	2.9	9.7	39.7	8.4	4.5	1.7	9.1
United Kingdom	20.1	35.7	14.4	9.5	2.6	4.4	3.1	0.9	9.4
Ireland	19.0	19.5	6.8	2.9	4.1	21.3	8.6	0.0	17.7
Finland	15.5	28.9	24.7	5.6	2.8	1.8	13.3	0.3	7.2
Norway	7.7	6.7	14.0	21.7	23.1	23.2	0.6	0.0	3.0
Sweden	6.4	27.7	16.5	18.0	5.0	5.1	3.3	1.3	16.7
Iceland	2.6	29.3	0.3	1.8	48.6	2.4	4.2	0.0	10.7

Source: European Private Equity and Venture Capital Association (EVCA), various Yearbooks.

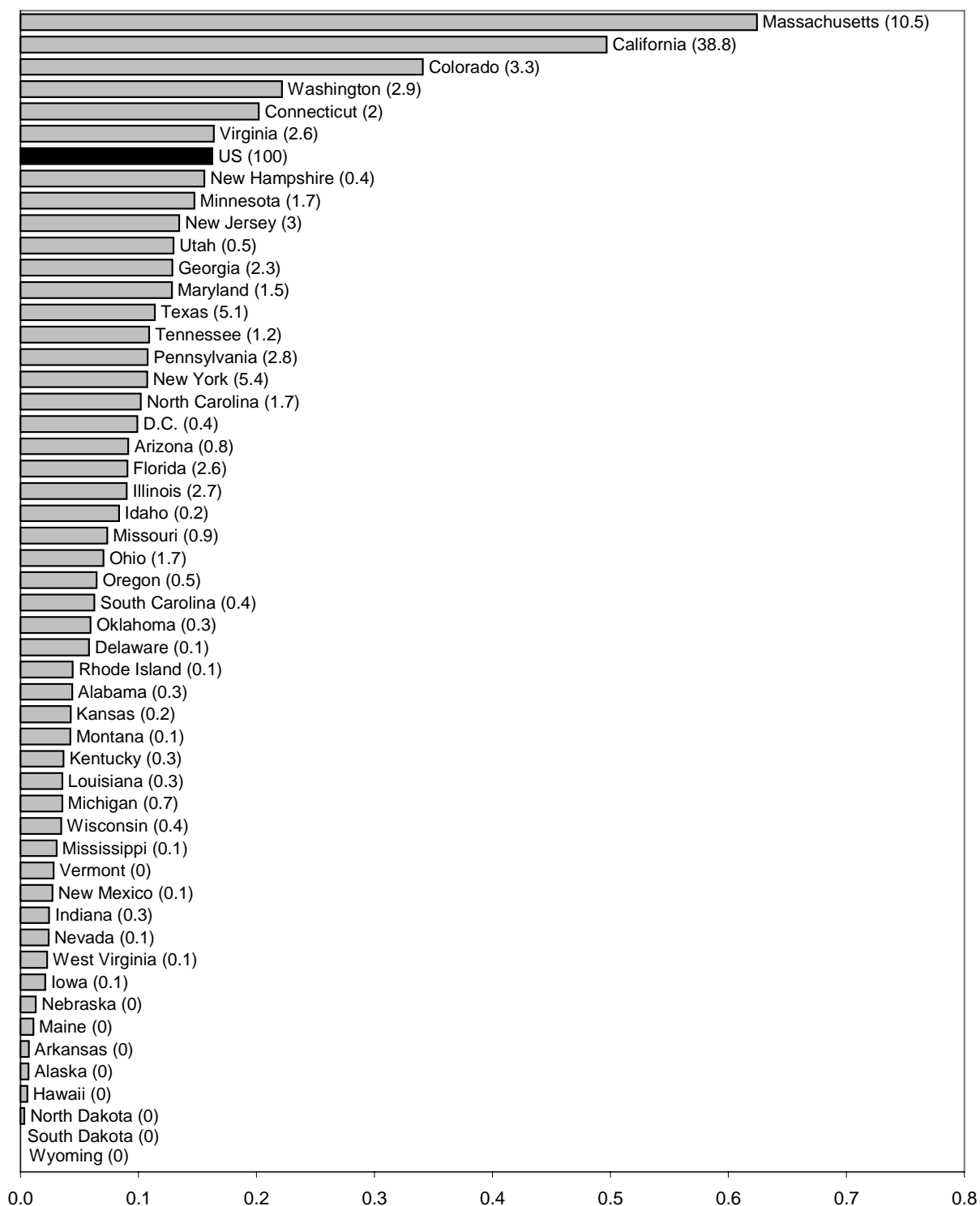
Table A 4: Venture capital investment for Asian countries according to different sources

		USD (millions)		AVCJ = 100
		AVCJ	Alternative source	
Australia	1995	402	113	28.0
	1996	341	146	42.8
	1997	366	229	62.7
	1998	321	139	43.2
	1999	..	261	..
Japan	1995	803	1 748	217.6
	1996	1 511	2 230	147.6
	1997	1 067	1 656	155.3
	1998	800	884	110.5
Korea	1995	742	..	..
	1996	1 195	300	25.1
	1997	1 307	380	29.1
	1998	523	155	29.6
	1999	..	522	..

Source: Asian Venture Capital Journal (AVCJ), *The 2000 Guide to Venture Capital in Asia*.

Alternative sources are for Australia: Australian Venture Capital Association Limited (AVCAL), *1999 Yearbook*; Japan: MITI, *White Paper on SMEs*, 2000 (based on data from Venture Enterprise Centre); Korea: Small & Medium Business Administration (http://venture.smba.go.kr/english/bg_policy3.html).

**Figure A 1: Venture capital intensity for US States
(investments relative to Gross State Product), 1996-98**



Figures in parentheses indicate the State share in total investment.

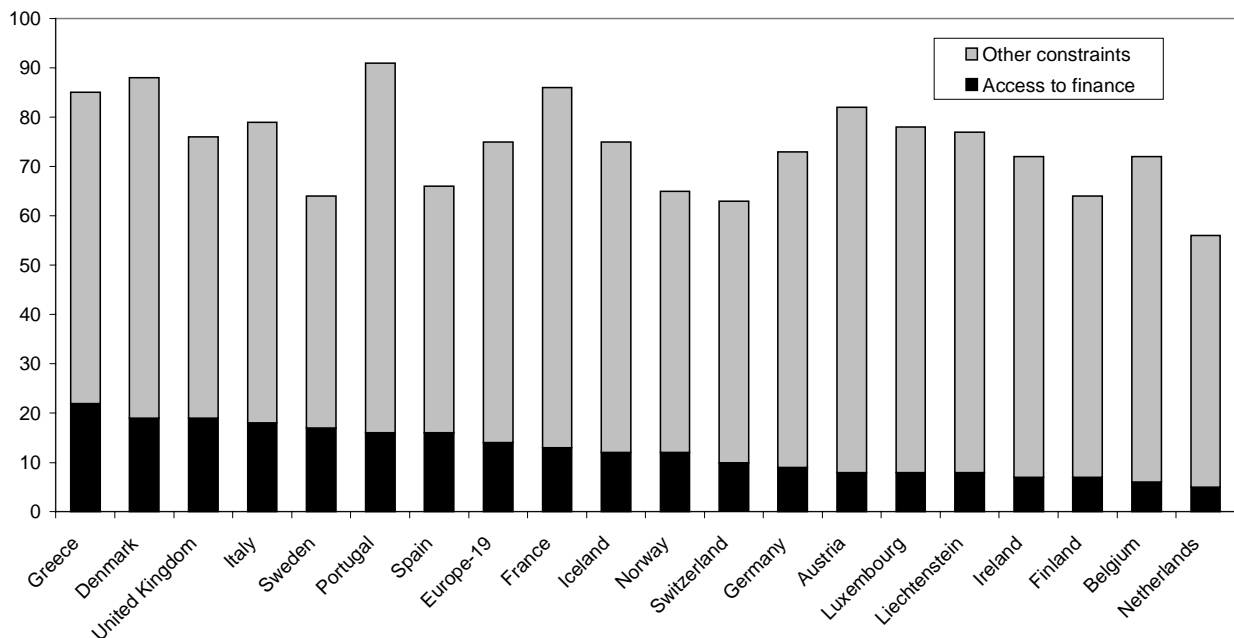
Source: Venture capital figures from NVCA, Gross State Product from BLS.

Table A 5: Major constraints of European SMEs on business performance, 1999, by enterprise size

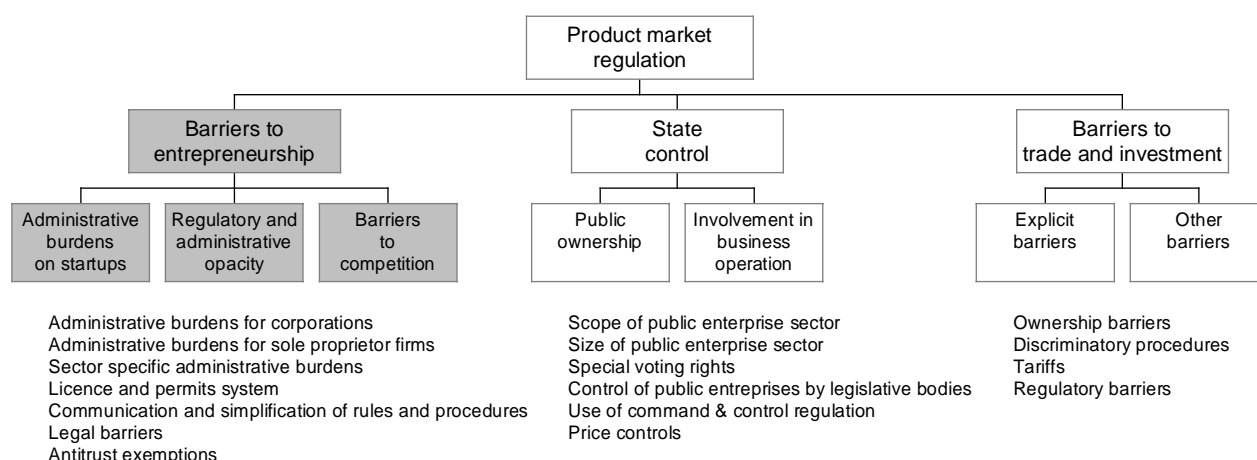
Major constraints (% of total)	Number of employees				Total
	0	1-9	10-49	50-249	
No constraints at all	27	19	16	15	23
Total 8 constraints	40	50	61	62	46
Access to financing	16	12	14	8	14
Administrative regulations	10	12	15	15	11
Lack of skilled labour	4	13	17	23	9
Implementing new technology	4	4	4	5	4
Infrastructure	3	4	5	4	3
Quality assurance	1	2	3	3	2
Changing organisation of production	1	1	3	4	1
Introduction of the Euro	0	1	1	1	1
None of these factors	31	30	22	23	30
Don't know / no answer	2	1	1	0	1
Total	100	100	100	100	100

A somewhat intriguing result of the survey is that a fully 30% of all firms have constraints other than the eight listed in the questionnaire.

Source: European Commission (2000), based on ENSR Enterprise Survey 1999.

Figure A 2: Percentage of SMEs with major business constraints

Source: European Commission (2000), based on ENSR Enterprise Survey 1999.

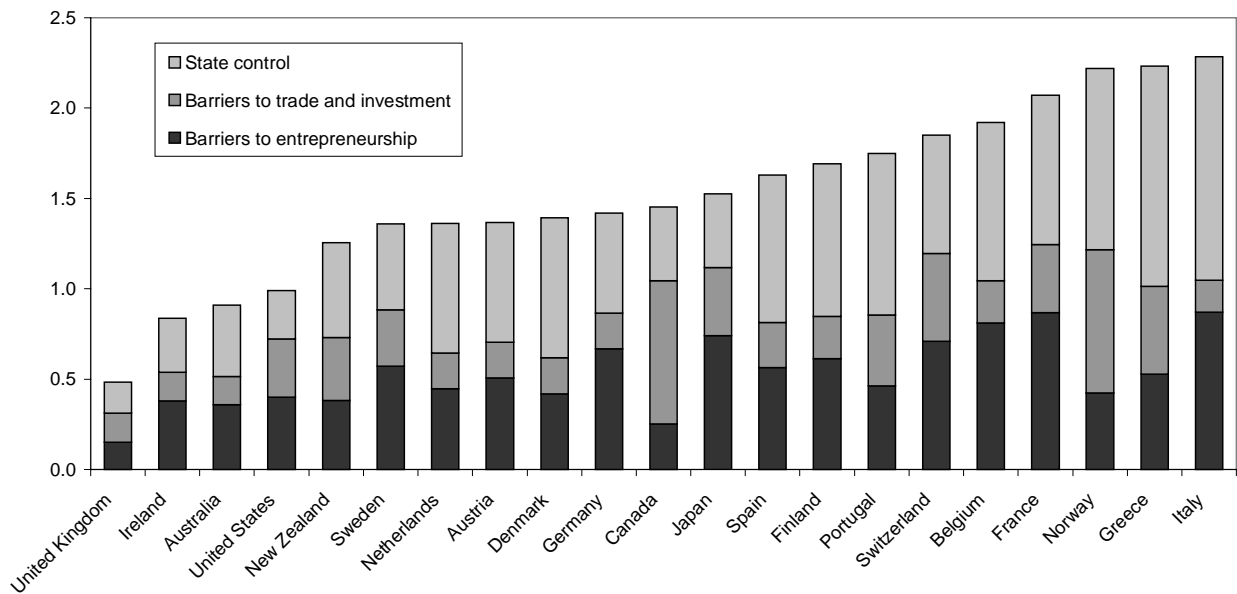
Figure A 3: Taxonomy of regulations

Source: Adapted from Nicoletti, Scarpetta and Boylaud (1999). For the weights of the various variables, see Annex, Table A 6.

Table A 6: Weights (%) of indicators and factors for the synthetic measure of product market regulation

Barriers to entrepreneurship				
	Total	Administrative burdens on start-ups	Regulatory and administrative opacity	Barriers to competition
<i>Total barriers to entrepreneurship</i>	31.8	15.4	9.6	6.7
Administrative burdens for corporation	5.2	5.0	0.1	0.0
Administrative burdens for sole proprietor firms	4.7	4.3	0.3	0.0
Sector specific administrative burdens	4.9	4.9	0.0	0.1
License and permits system	5.1	0.2	4.8	0.1
Communication and simplification of rules and procedures	4.4	0.2	3.9	0.3
Antitrust exemptions	4.7	0.1	0.2	4.4
Legal barriers	2.8	0.8	0.2	1.8
State control				
	Total	Public ownership	Involvement in business operation	
<i>Total state control</i>	31.5	17.7	13.8	
Size of public enterprise sector	5.3	5.3	0.0	
Scope of public enterprise sector	5.6	5.0	0.7	
Control of public enterprises by legislative bodies	4.9	4.8	0.0	
Special voting rights	4.3	2.3	2.0	
Use of command & control regulation	6.2	0.3	5.9	
Price controls	5.2	0.0	5.2	
Barriers to trade and investment				
	Total	Explicit barriers	Other barriers	
<i>Total barriers to trade and investment</i>	36.8	20.63	16.14	
Ownership barriers	10.3	9.3	1.0	
Discriminatory procedures	7.6	4.9	2.6	
Tariffs	8.0	6.4	1.6	
Regulatory barriers	11.0	0.0	10.9	

Source: Adapted from Nicoletti, Scarpetta and Boylaud (1999).

Figure A 4: Overall ranking of product market regulation, around 1998

The indicator ranges between 0 (no barriers) and 6 (highest barriers).

Source: own calculations, based on the OECD International Regulation Database and the weights from Nicoletti, Scarpetta and Boylaud (1999) (see Table A 6).

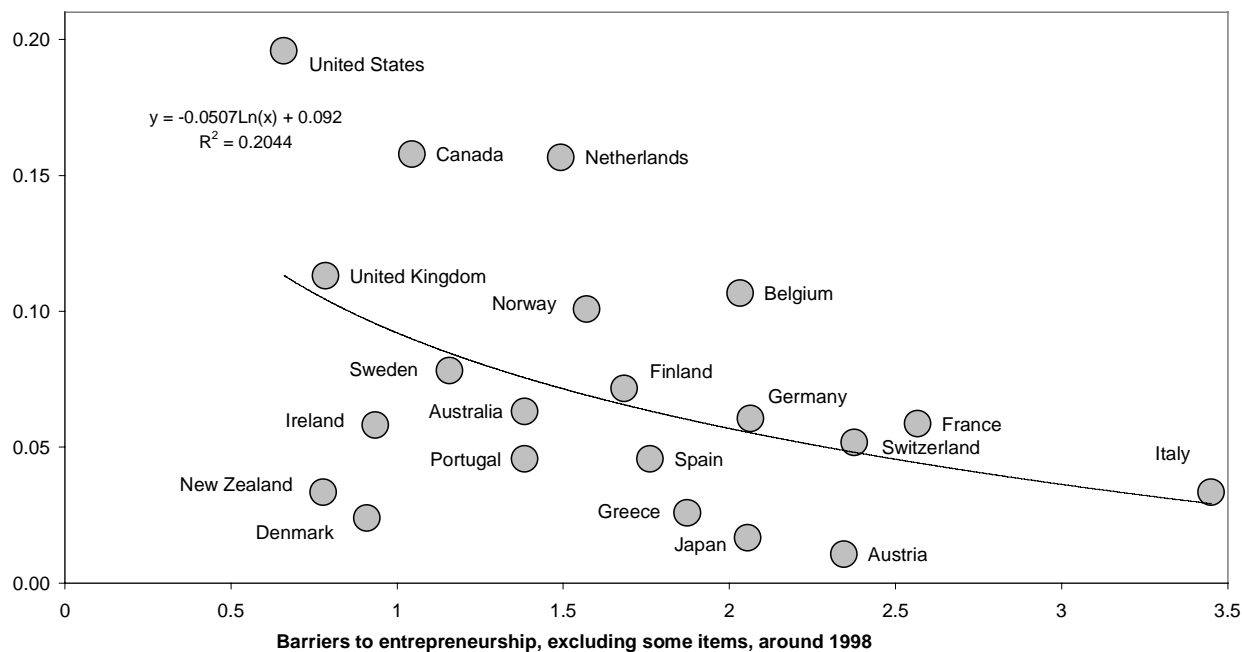
Table A 7: Correlation coefficients of the seven variables of barriers to entrepreneurship

	Barriers to entrepreneurship		(1)	(2)	(3)	(4)	(5)	(6)
	all variables	excl. current variable						
(1) Administrative burdens for corporation	0.75	0.58						
(2) Administrative burdens for sole proprietor firms	0.82	0.72	0.68					
(3) Sector specific administrative burdens	0.76	0.60	0.83	0.73				
(4) Communication / simplification of rules / procedures	0.71	0.65	0.41	0.42	0.43			
(5) License and permits system	0.54	0.10	0.00	0.25	-0.01	0.45		
(6) Antitrust exemptions	0.41	0.26	0.18	0.18	0.26	0.43	0.05	
(7) Legal barriers	0.18	0.07	0.21	0.22	0.11	0.07	-0.23	0.17

Source: own calculations, based on the OECD International Regulation Database.

Figure A 5: Barriers to entrepreneurship (excluding some items) and venture capital activity (country of management approach), 1995-98

Venture capital investment in early stages and expansion as a percentage of GDP, 1995-98



Excluding "license and permit systems", "sector specific administrative burdens" (for road freight and retail distribution), and "antitrust exemptions" (for public enterprises).

Source: own calculations, based on OECD International Regulation Database the weights from Nicoletti, Scarpetta and Boylaud (1999) (see Annex, Table A 6); EVCA, various Yearbooks, NVCA, various Annual Reports, Canadian Venture Capital Association (CVCA), Asian Venture Capital Journal, *The 2000 Guide to Venture Capital in Asia*.

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