TAKING RISKS IN REGIONS: THE GEOGRAPHICAL ANATOMY OF EUROPE'S EMERGING VENTURE CAPITAL MARKET

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Abstract

Over the past twenty-five years, the USA has pioneered a new technological revolution, based on large numbers of new small enterprises, financed by a dynamic venture (risk) capital market. The European Union, meanwhile, has lagged behind in this sector of economic activity. The European Commission considers the development of a substantial risk capital market to be a key condition for closing the 'enterprise gap' with the US. But whereas the Commission argues that venture capital activity needs to be much more regionally clustered if it is to emulate the US experience, some member states, together with the OECD, have argued for a more even regional distribution. The aim of the paper is to chart the growth and geographical anatomy of the emerging European venture capital market and to examine its spatial development and its regional implications in the context of these somewhat opposing views.

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1. Introduction: Venture Capital and the 'New Economy'

Over the past twenty-five years, the USA has pioneered a new technological revolution based on large numbers of new small enterprises, and now has a commanding lead in this so-called 'new economy' (Norton, 2001). Thus according to the USA Senate (1999, p.2) "US leadership in the high-tech sectors highlights the gap between America's fast-growing and dynamic economy and the slow growing economies of Europe and Japan during the 1990s". The new industries – essentially identified with technology, media and telecomunications (TMT) – require significant external finance, and the majority of these businesses in the US raise their initial or early-stage finance from venture capitalists and other similar providers of risk money (such as business angels and corporate venturing), rather than from banks. The venture capital market in the USA first developed in the 1950s and 1960s. It grew slowly in the 1970s, but then began to take off in the 1980s. In recent years it has expanded dramatically: between 1995 and 1998 it surged from $7.4bn to $25.3bn, and continued to grow apace in 1999, reaching $35.6bn (these figures exclude venture finance used for leveraged buy-outs). Recent figures suggest that in 2000 the USA industry invested a staggering $68.8 billion. Taking the second half of the 1990s as a whole, it is estimated that between a third and a half of US venture capital funds have been invested in high technology sectors.[1]

The European Union, meanwhile, has lagged behind in the growth of 'new economy' high-tech activity, and, compared to the US, innovative small and medium enterprises appear to find it more difficult to get started and grow. Although there has been some debate over whether this is because Europe lacks an individualistic entrepreneurial culture of the sort that seems to characterise the

became subject to reform and some of the major impediments to venture capital have been lowered. In France and Italy, for instance, company regulation has been changed to encourage buy-outs. A major reform of Germany's fiscal environment is also imminent, under which capital gains taxes for companies selling equity will be removed: it is predicted that this will provide a major stimulus to venture capital. In general, there has been some progress in improving the institutional infrastructure and the presence of intermediaries. In addition, in some member states, specific policy measures have been targeted at increasing venture capital. The Dutch industry was significantly boosted before 1995 by the provision of a public guarantee of fifty percent of venture capital investments, and a similar measure has been introduced in Denmark. Similarly, public subsidies to venture capital in Germany have acted as a magnet for private funding, a process we return to later in the paper.

2.3 The under-funding of new and high risk ventures

In the same way that marked national differences continue to exist in the size of venture capital funds and in the institutional and market structures through which those funds are raised and allocated, there are also significant differences between countries in the stage of activities in which funds are being invested (Figure 3). In general terms, the European industry devotes a much larger proportion of funds to buyout activity (51 percent of the total invested in 1998-99) than the US, where seed and start-up stages are much more important. Indeed, as Murray (1997) notes, the European venture capital industry is basically a development capital industry. Important national variations lie beneath these aggregate trends, however. The UK market has certainly been dominated by buy-outs. In 1998-99, for example, management by-outs (MBOs) accounted for nearly 80 percent of funds invested, and the increase in average value of UK deals, from £1 million to £3 million between 1994 and 1998, in large part reflects this

preference for MBO ventures (Cruickshank, 1999). The French market in 1998-99 saw buyouts take 40 percent of funds while expansion investments took 35 percent, and the Netherlands' stage distribution was similar. In Germany, however, there is much less focus on buyouts, which received only 20 percent of total investment in 1998-99, compared to 50 percent for expansion and 32 percent for seed capital and start ups. In contrast, UK start-ups accounted for only 2.2 percent of the annual total invested. Indeed, by the mid-1990s, the absolute amounts invested in early stage finance in Italy, Germany and the Netherlands were all larger than was the case in the UK (Bank of England, 1996). The nascent Italian market seems to be most like that in the UK, with buyouts absorbing 60 percent of funds in 1998-99, while seed capital and start-ups took less than 10 percent.

The preference for less risky MBO investment in the UK venture capital industry has been the focus of recurring criticism, in that it runs counter to what is regarded as the classic role of venture capitalism, namely the supply of capital to risky new, small and innovative enterprises that have difficulty raising such capital from other sources. Pension funds in the UK have been criticised for appointing generalist portfolio managers who have little understanding of high technology risks and rewards, and therefore tend to incline towards more secure later-stage investments (Houlder, 1997). In addition, pension fund managers stress the need to protect the financial interests of their savers and future pension holders. It has also been argued that European institutional investors prefer to direct their money into buy-outs because these offer higher returns and lower risks than early-stage investments. For example, the British Venture Capital Association reported in 1996 that the internal rates of return from middle and large MBOs at that time were 16.2 and 23.8 percent compared to only 4.3 percent for start-ups (Bank of England, 1996). The problem of low returns from classic early stage investment may of course become cumulative under this approach, with low investments meaning fewer opportunities for firm growth, leading in turn to low returns.

However, although late-stage and MBO investments have tended to be much more prominent recipients of venture funding in Europe than in the US, there are signs in one or two European markets that start-up and high technology activities are now beginning to attract an increasing share of funds.[5] For example, by 1999 more than 50 percent of Belgian, Danish, Irish and Swedish venture capital investments went into high-technology, compared to 27 percent in France, 26 percent in the UK and only 11 percent in Italy (PricewaterhouseCoopers, 2000). Thus while the overall size of the UK venture capital market far exceeds that of other European nations, many of the latter are now channelling much higher proportions into innovative high technology activities, and indeed at an accelerating rate (see Table 2). For example, while the UK invested €2.2bn in technology ventures in 1999, in Germany and France such investment had doubled over the previous year, to €1.4bn and €1.0bn respectively. As the PricewaterhouseCoopers (2000a) report commented, "the data show that investment activity levels [in high technology] in continental Europe are catching up on the UK" (p. 6). Indeed, in 1999 there were 1088 such deals in Germany and 966 in France compared to a 960 in the UK.

Within the technology sector there are marked variations in the proportions devoted to seed and other early stage investments. In 1999 over 82 percent of technology funding in Germany and France was devoted to early stage and expansion venture capital, whereas in most of the smaller markets the proportion was about two-thirds. In the UK, barely half of all technology private equity went to early stage and expansion (and 40 percent to high-technology MBOs and MBIs).[6] Early stage financing has grown apace in Germany, reflecting the government's fostering of start-ups and the influx of Anglo Saxon venture firms. Frankfurt's Neuer Markt, opened in 1998, has also grown impressively and its funds have doubled each year since the mid-1990s. The number of firms listed increased from 82 to 842 between March 1999 and March 2000, and one in three of its projects are early stage financing (*Financial Times,* 2000b). Of course, these figures tell us nothing about the quality and likely

success of investment, but it does seem that while continental European venture capital markets continue to lag the UK in overall terms, they are catching up rapidly in the volume of classic start-up high–technology investment. It is relation to high-technology, however, that views about the regional distribution of venture capital seem to be particularly divided.

3. Venture Capital and Regional Development: Clustering or Dispersal

3.1 The spatial dynamics of venture capitalism: two contrasting views

One of the key arguments in recent academic and policy discussions about the growth of high-tech firms and regional economic success concerns the role and importance of 'clusters'. This basically neo-Marshallian notion has spiralled out of the work of the business economist Michael Porter (1990, 1998) on competition and location, although similar ideas have in fact been utilised by economic geographers for some time (for example 'industrial districts', 'new industrial spaces', learning regions' and regional high-tech milieux'). According to Porter and other economists (see for example Fujita, Krugman and Venables, 1999), industrial clustering is not only a key source of international competitive advantage for the industries concerned, it also fosters the growth and success of the regions in which such clusters occur. Over the past few years, stimulated very much by Porter's promotion of the concept, policy-makers across the globe have seized upon the idea of industrial clusters as an important policy tool for developing their national and regional economies.

Although clusters occur in many types of industries, it is high-tech clusters in particular that have attracted the attention of academics and policy-makers (Swann, Prevezer and Stout, 1998; OECD, 1999; Keeble and Wilkinson, 2000; Norton, 2001; DTI, 1999; 2001). Again, the USA is usually taken as the exemplar. There, the phenomenon of rapidly expanding and highly successful companies has been

particularly associated with the development of geographical high-tech clusters, such as computers and software in Silicon Valley, California, and Route 128 in Massachusetts, and biotechnology in the San Francisco Bay area, near San Diego and the New York Tri-state area (see Norton, 2001). These high-tech clusters have generated external economies of scale and agglomeration with the presence of suppliers, skilled personnel and supportive services and institutional structures, including financial intermediaries. Among the latter, the availability of venture capital funds is argued to have been of central importance, not only in terms of providing risk capital but also in supplying a vital co-ordinating mechanism (see Langlois and Roberston, 1995). The evidence from the USA, therefore, suggests that small firms nourished by venture capital have been instrumental in promoting and sustaining these regional clusters of technological innovation and job growth.

The problem, as the European Commission sees it, is not only that European venture capitalism suffers from being fragmented into national markets, it is also being held back by *a lack of geographical clustering*:

> In Europe there exists few geographic concentrations of high tech clusters of SMEs as compared to the US. Neither are the European clusters as deep nor as integrated as in the US. Networking of SMEs also seems less easy in the EU than in the USA. Yet the ability of companies to tap the best available competencies and resources through flexible co-operation patterns are the key assets for innovation and competition. The lack of networking between European research and financial circles is particularly damaging. It accounts for a general lack of understanding and awareness of financial options, increases access times to finance and creates information asymmetries which in turn raise costs

(European Commission, 1998, p.1).

The argument is that regional high-tech clusters in Europe are not only few in number but lack the critical mass to generate the mutually reinforcing networking synergies between entrepreneurs and venture capitalists that are needed to give such clusters the strong growth dynamic found in US examples. In the latter:

> there is a melting pot of venture capitalists, researchers, technology experts, real estate merchants, lawyers, accountants, business schools, and universities – all of which have a stake in the entrepreneurial process. The result of this clustering and cross fertilisation is a spur to innovation, entrepreneurship and the development and marketing of new ideas serviced by a fertile venture capital community. Again, apart from one or two exceptions, the European Union is lagging behind (European Commission, 1998, p. 7).

However, such arguments tend to run counter to the other view, also found in official policy circles, that instead of lacking spatial concentration venture capitalism is already *too* geographically localised, being disproportionately located in, and orientated to, more dynamic and buoyant regions to the detriment of less prosperous areas, which as a consequence face a 'risk capital gap'. According to this argument, there should be *greater regional dispersal* of venture capital funds to less developed and economically lagging regions so as to stimulate and support new and small firm activity – especially innovative activity - in such areas. It is increasingly argued by many policy-makers, for example, that the key problem facing lagging regions is that of low rates of new and small, and especially high-technology based, enterprise formation. These low rates of small innovative firm creation are attributed, at least in part, to a lack of readily available risk capital. Hence, according to the OECD (1996), one of the ways European governments can stimulate dynamic

entrepreneurship is to:

> Encourage a more even regional distribution of venture capital activity. The difficulty which venture capitalists say they encounter in finding good investment propositions may be caused, in part, by geographical mismatches between the supply of, and demand for, venture capital which arises from the geographical concentration of venture capital funds and investment in certain regions (p.17).

Evidence from the US and the UK supports the argument that venture capital activity and funds are concentrated in only a handful of regions (see, Martin, 1989, 1992; Murray, 1998; Mason and Harrison, 1999a; Doran and Bannock, 2000; PricewaterhouseCoopers, 2000b; Norton, 2001). In the USA, nearly two-thirds of venture fund investment in recent years has gone to only five areas: Silicon Valley (which alone has accounted for about 35 percent of the national total), Route 128 in Massachusetts (about 13 percent), the Washington DC metropolitan region (6 percent), the New York metropolitan region (6 percent), and Texas (5 percent). As Norton (2001, p. 244) points out, venture capital organisations, their component funds and their investments are all highly concentrated within these areas. This localised geography is seen as one of the key ingredients helping to reduce investors' risk. Similarly, in his study of the UK venture capital industry in the late-1980s and early-1990s, Martin (1989, 1992) found that over 60 percent of venture capital firms were concentrated in London and the surrounding area. Other, provincial, clusters of locally-based venture capital firms were extremely small by comparison. Even more significantly, the London-based firms were found to control around 80 percent of the total national venture finance pool. Further, the spatial allocation of those London-based funds followed a distinct distance decay pattern, with local access to London-based funds declining sharply with increasing distance away from the city. The South East region alone attracted some 53 percent of venture funds investments by value. Although Mason and

Harrison (1999a) found that by the late-1990s the distribution of venture capital activity across the UK had become slightly less uneven geographically, London still accounted for over 60 percent of venture capital firms, and the South East region for 43 percent of investments. The northern regions of the country remain largely dependent on local sources of venture capital, which are limited. These findings have been taken to imply that such regions suffer from 'venture capital gaps', and that these gaps in turn constrain new and small firm development.

Thus under the clustering view, the supply of venture capital is too fragmented geographically and should be more spatially concentrated in the regions that are leading high–technology development; while under the dispersion view the supply of venture capital tends to be too biased towards a few select areas at the expense of unmet demand in other regions. In practice, of course, the geographical location of venture capital investment is the outcome of a complex interaction of demand and supply processes. To some extent the concentration of venture capital funds in high-growth regions is demand-induced, and thus venture capitalism can be expected to follow and thus accentuate the geography of uneven economic development. To compound this process, the very nature of venture capitalism, as an entrepreneurial activity itself, also militates against the less dynamic regions. Venture capitalists invariably insist that good projects can expect financial support regardless of where they happen to be located. Yet, in practice, the spatial proximity of, and scope for 'hands on' contact between, venture capital fund managers and local client projects is considered of key importance. So while in principle capital can be raised anywhere, the face-to-face nature of the venturing relationship means that venture firms prefer to be within easy commuting distance of their investments. In other words, risk aversion is likely to be an increasing function of the locational separation between the venture capitalist and the enterprises seeking risk finance. In this way, a spatial bias is likely to be built into the supply of venture finance, in that it will tend to favour enterprises located close to venture capital institutions. A strong mutually-reinforcing process seems to be at

work: venture capital firms emerge and develop where there is a high level of SME – and especially innovative SME – activity, and this in turn stimulates further expansion of the local venture capital market, which in turn contributes yet further to the formation and development of local SMEs, and so on.

However, the development of the venture capital industry in both the USA and the UK has also been closely associated, geographically, with existing major metropolitan centres of financial activity (New York, Los Angeles and San Francisco in the former, London in the latter). Many venture capital organisations are linked to, or formed by spin-offs from, existing financial institutions, and consequently tend to be based in or near to major centres of financial activity. At the same time, being near such centres also confers easy access by venture capital firms to the pools of knowledge, expertise and related business services, and the concentrations of potential investors, found in these agglomerations. Thus, such urban-financial centres are likely to be the major spatial sources of venture finance, which, given the local hands-on nature of venture activity, will tend to favour enterprises and projects in immediately surrounding or neighbouring regions.

The 'clustering versus dispersal' debate thus raises a whole series of wider issues that relate to the spatial structure of the financial system and to the regional development process, as well as to the nature of venturing itself. Other things being equal, the locational dynamics of venture capitalism would appear to be such that there is an inherent tendency towards a conjoint regional concentration or clustering of venture firms and venture investment. Such concentrations or clusters are likely to be found near major urban-financial centres. It does not follow, however, that these concentrations of venture capitalism will also be major clusters of high tech development. As we have already noted, across much of Europe, venture funds have tended to go into MBOs rather than into start-ups and early-stage financing, and in most countries into activities other than high-technology. In addition, there are several other factors influencing the development of high

technology industry, both at the general national level, and at the level of regional clusters. All this suggests that the promotion of a more even geographical spread of venture capitalism – the dispersal argument - is not only likely to be difficult, but of itself will not automatically stimulate the development of local high-technology activity. The supply of venture capital – whether spatially concentrated or dispersed – will not automatically create its own, high-tech-based demand.

3.2. The regional anatomy of Europe's emerging venture capital market

To date there has been very little comparative analysis of the regional distribution of venture capital activity across Europe. The obvious reason for this is the shortage of reliable and comparable information on a region by region basis. In addition, in many European countries the size of venture capital funds remain small so that their geographical distribution can be very strongly affected by single large deals in particular regions. For the purposes of this paper, we have managed to obtain some regional information from national Venture Capital Associations for five states: Britain, France, the Netherlands, Germany and Italy.[7]

Figure 4 shows absolute investment totals (averaged over 1997-1999) for the NUTS1 level regions in the five member states. It is clear that the two countries with the greatest degrees of regional concentration are Britain and France. Given its history of centralised *dirigisme* and Paris's financial domination of *le desert Francais*, it is not surprising that France has the most regionally imbalanced industry in terms of the destination of funds. In 1999, the Ile de France received 58 percent of total investment and 37 percent of the total number of investments. This was four times the share of the next largest regional recipient, the Rhone Alpes, with just under 10 percent of the total amount invested. The concentration of funds in the greater Paris region partly reflects the large share of investment devoted to MBOs. In France as a whole, MBOs have accounted for around 45 percent of

total venture capital in recent years, and many of the companies involved had their headquarters in the metropolis.

In the UK, the venture capital industry is again highly regionally concentrated. The concentration of a large proportion of venture capital funding in London and the South East, and the relative lack of investment in Wales and the northern regions of England has been well documented (Martin, 1989, 1992; Mason and Harrison, 1991, 1999a). Recent data confirm that this concentration is persistent, although there appears to have been a growth of investment in the Midlands and the North West. In terms of the amount invested in 1999, the South East region received a 45 percent share (including 25 percent for London). The next largest shares were found in the North West (10 percent), East Midlands (9 percent) and West Midlands (8 percent). At the other end of the scale, Wales received only 1 percent and Northern Ireland even less than this. The South East and London also have by far the largest shares of early stage financing, accounting for 54 percent of the total amount of early finance by amount and 45 percent of the number of early stage companies funded in 1998. Outside the South East only Scotland and the North have attracted significant shares of early stage finance (13 and 10 percent of the national total respectively). Thus, early stage or classic venture capital funding is highly regionally concentrated in the UK. The growth of venture capital activity in the Midlands and parts of Northern England appears to owe much to the increased supply of development capital (particularly for MBOs, MBIs and other acquisitions) in these regions.

In terms of regional shares of total funds invested, the other states appear to show a somewhat less concentrated pattern, with most of the investment concentrated in three or four regions. At the same time, as we will see, these states still contain some marked regional inequalities in levels of investment, including some areas which have virtually no venture capital actiivity at all. In the Netherlands, for example, almost a third of investment in 1998 went to the North Holland province, which, of course, includes Amsterdam. After this,

Noord Brabant and South Holland received 19 and 18 percent of the total respectively. The large extractive and agricultural economies of northern regions, such as Drenthe and Friesland, attracted only a minute share of the investment.

A similar pattern of two or three leading regional concentrations, followed by a gradual slope in the regional hierarchy is apparent in recent Italian regional data. According to figures for 1999, Lombardia was the largest destination with 26 percent of the total, followed by Toscana with 20 percent, Piemonte with 16 percent, then Friuli-Venezia-Giulia with 12 percent and Lazio with 11 percent. The dynamic region of Emilia Romagna gained only 5 percent of the total, although its share in other years has been much higher. The 1999 data show that Northern Italy is receiving almost two-thirds of the total, and Central Italy (Toscana and Lazio) about one-third, leaving only a very small share indeed for the economically lagging south of the country (typically 4 or 5 percent).

The regional pattern in Germany is similar, with four regions accounting for the bulk of venture capital invested: Nordrhein-Westfalen (24 percent in 1998), Bavaria (20 percent) Baden Württemburg (about 13 percent), and Neidersachsen (12 percent). Germany also has regions with very low levels of venture capital investment. Surprisingly perhaps, the Hamburg region receives only a small share of the German total (about 4 percent), despite the city's size and the restructuring of its economy. Many of the former East German Länder also have very low levels of venture capital funding, reflecting the continuing difficulties of political-economic transition. Brandenburg, for example, has consistently received one of the lowest shares, and despite the expansion of its small firm sector, Berlin has had only 5 percent of the total in recent years.

To what extent, then, are these variations in regional concentration a reflection of supply factors and specifically the location of venture capital firms? As argued above, there is considerable evidence that venture capital firms depend on access to personal networks and face-

to-face contact in finding and evaluating opportunities. Their reliance on personal visits to evaluate potential clients and to monitor and supervise customers means that most firms have a limited geographical range of activity, which is usually one to two hours travel from their office location (Mason and Harrison, 1991). Moreover, once there is a significant supply of experienced venture capitalists in a region then their presence is likely to stimulate increased demand for funding and further expansion (Doran and Bannock, 2000). In the UK over 80 percent of all venture capital offices are in the South East, and over sixty percent of venture firms have their offices in London (Figure 5). By comparison other, provincial, centres – such as Birmingham, Bristol, Manchester, Leeds, Edinburgh and Glasgow – have only small numbers of offices. In France also, the location of investments reflects the institutional geography of the industry, with three-quarters of the members of the French Venture Capital Association (AFIC) having their head-quarters in Paris. The Dutch venture capital industry is also relatively spatially concentrated, with a quarter of all institutions being in Amsterdam. Similarly, in Italy the industry is almost entirely concentrated in just two cities, namely the financial centres of Milan and Rome: there are no venture capital institutions in the southern half of the country. In Germany, however, the locations of venture capital firms is much more geographically dispersed, with sizeable concentrations in Hamburg, Hanover, Dusseldörf, Frankfurt, Munich and Berlin.

It is clear that in all states the location of the venture industry is shaped by a tendency for firms to agglomerate in and around financial centres, and this is especially apparent in Paris, London, Milan and Frankfurt. Proximity to local knowledge about Stock Exchanges may facilitate the ease and effectiveness of exit from venture capital investments (that is, IPOs). The tendency also arises from the need for venture capitalists themselves to gain access to new sources of finance by being integrated in close social networks with other financiers (Florida and Kenney, 1988). Where such networks are more dispersed because of a decentralised and localised banking

structure, as in Germany, then it is likely that the venture industry itself will be more dispersed. What is also clear however, is that such financial centres often export capital to other regions. For instance, there appears to be an export of capital from Milan to other regions in Italy, and from Frankfurt to other parts of Germany. Conversely, it appears that there is a significant inflow of capital into South Holland and to regions such as Emilia Romagna and Piemonte in Italy. As these examples illustrate, while the geography of venture firms is an important influence on the distribution of venture capital investment, there can be some mismatch between the regional sources and destinations of venture funds. The closeness of the correspondence depends on the organisational structure of the venture capital firms involved, particularly whether they have significant regional offices and whether they are prepared to enter into syndicates and alliances with smaller locally-based firms.

How do these patterns bear on the arguments about regional clustering versus dispersion of venture capitalism and venture-backed high-technology development? Venture capital firms seem to be highly clustered, typically in or near to significant financial centres. Venture capital investment in turn tends to be concentrated in, or in areas adjacent to, the regions containing the major clusters of venture capital firms. But, as Figure 5 shows, the pattern differs across countries. Germany shows a much more regionally dispersed pattern of venture activity than either France or the UK, where the pattern is much more one of regional clustering. However, even the smaller provincial clusters of venture capitalism in the UK are large by general European standards. The basic point is that, the UK aside, levels of venture capitalism in Europe, though growing rapidly, are still small, so that where 'clusters' exist they are as yet relatively minor. The only regional venture capital cluster of any scale is that in the South East region in the UK: in 1999 this region attracted about $5.3bn of venture investment, about a fifth of the EU total. But to put this concentration in perspective, in the US in the same year, Silicon Valley alone attracted about $20bn.

The same lack of sizeable spatial clusters of high-technology activity is evident across Europe. Whether measured in terms of expenditure, employment or output, high technology activity in the EU as a whole is considerably lower than in the US: for example, research and development personnel account for only 0.75 percent of total employment, and gross expenditure on research and development for only 2 percent of GDP in the Union. In venture capital terms, investments in the technology sector in 1999 in the US amounted to €18.0bn, some three and half times the €5.2bn in Europe (PricewaterhouseCoopers,2000). At the regional scale, Figure 6 shows the geographical distribution of employment in research and development (both private and public sector) across the EU.[8] The largest local concentrations of research and development that exist do tend to be near the main regional concentrations of venture capital firms, that is near or around London, Paris, Amsterdam, Frankfurt, Munich, Milan and Rome. These are the so-called 'islands of innovation' identified by the European Commission (1997). In reality, however, they are rather small islands in an otherwise relatively empty sea. Some well-publicised centres of research and development such as Cambridge (in East Anglia, UK), and Lyons (Rhone-Alpes, France), are actually relatively modest in employment terms. The former has a low share of venture capital investment, despite its proximity to London-based based venture institutions; while despite its limited venture capital market, the Lyons sub-region is France's second most important area for research and development activity. In addition, there are regions where there is relatively little high-technology development but above average levels of venture capital investment (such as the West Midlands in the UK, Toscana in Italy, and Alsace, Champagne-Ardennes and Limousin in France). Large areas of the UK, France and Italy have no significant clusters of high technology based development or venture capital activity.

In fact, a significant proportion of the creation and growth of small technology-intensive firms in Europe has taken place in a spatially dispersed pattern, involving a variety of accessible rural areas and small towns, rather than in concentrated regional clusters (see Keeble

and Wilkinson, 2000: also Midelfart-Knarvik, 2000). The perception within the venture capital industry itself is certainly that high technology in the EU lacks clusters of the scale and depth necessary to attract high levels of finance:

> Europe is a very fragmented market; we don't have the Silicon Valley or Silicon Alley concentration of initiative that attracts VC investment. It's very hard to apply the rule applied in the US that you shouldn't live more than half a mile from your VC (quoted in Debellis, Raik-Allen and Richardson, 1999).

On this basis, the problem in Europe is threefold: an overall low level of high-technology activity, a lack of large and well-developed clusters of such activity, and a corresponding lack of localised concentrations of venture capital. The lack of venture-based high technology in many regions is to a substantial degree a reflection of regionally uneven economic structures so that the problem many regions face goes far deeper than merely venture financing. The analysis above has provided signs that there are important national variations in the degree of regional concentration, and we argue below that the less concentrated, more regionally even pattern in Germany, in particular, is a reflection of both economic and political-institutional realities. Given this complexity, suggesting how venture capitalists should respond to regional variations in funding, and recommending government policies to promote regional supplies of risk capital – let alone high technology based economic development - are far from straightforward issues.

4. Some Policy Questions

We began this paper by addressing the question of whether and how far a mature venture capital industry, similar to that in the US, has emerged in Europe. Although, European venture capitalism began to take of at the end of the 1990s, it remains well behind that in the US,

both in terms of overall scale and in terms of the proportion of funds going into 'new economy' activities. As the evidence reviewed in this paper suggests, many regions across the EU have little, if any, venture capital activity. At the same time, while there is some evidence of the emergence of a limited number of high-technology clusters, these are undoubtedly much smaller and much less well developed than their US role models. In response to these problems, various EU member states, backed by the European Commission itself – for example though its new Risk Capital Action Plan (European Commission (1999) - have been introducing public policy initiatives aimed at boosting their venture capital markets. We have highlighted what would appear to be an underlying tension in the policy debate surrounding the need to promote venture capitalism in the European Union. On the one hand, there are good grounds for arguing that such policy should seek to encourage and sustain dense and concentrated clusters of high-technology sectors and new economy start-ups. But on the other hand, states are also concerned to fulfil the needs of more peripheral economic regions for early stage and development funding, as without this the shift to a more entrepreneurial culture is only likely to deepen regional inequalities. Clearly, meeting these apparently opposing imperatives poses a real challenge, as it implies that both core and peripheral regions will need to develop their own specialised venture capital agglomerations. Indeed, arguably, what states in their different ways seem to be pursuing is a sort of policy of 'dispersed clustering', in which the aim is to promote a significant venture-backed high-tech cluster in most regions.

In the UK, for example, it has long been argued that 'regional equity gaps' have hindered the formation and growth of SMEs in areas outside the South East. As part of its new Enterprise Fund programme, the UK government intends to establish a network of Regional Venture Capital Funds (RVCFs) and co-finance these funds by committing £50 million over the next two to three years with the aim of leveraging in up to £200 million of private capital. The regional nature of these funds (which will operate in the English

regions and in London) is intended to reflect the need for locally-based supplies of risk capital and the surveillance of investments by local fund managers.[9] How far these RVCFs will be successful remains to be seen. The British government's RVCFs will be allocated not according to an assessment of the scale of the risk-capital gap in each region, but on the basis of competitive tender, in which putative RVCFs will bid for the minimum level of public support necessary to attract private co-financing of venture capital in their respective regions. This bidding process may end up steering funds to those regions which already lead the venture capital investment process, the more so, because many commentators argue that venture capital activity in lagging regions is primarily constrained by the restricted supply of viable, high-potential businesses. It may be difficult, therefore, for such regions to demonstrate that they have a real existing venture capital gap. As USA experience has shown, "simply making venture capital available will not magically generate the conditions under which... entrepreneurship can flourish" (Florida and Kenney, 1988, p. 316-317). Venture capital is only one of a host of necessary conditions for entrepreneurial-led local economic development, especially of high-technology activity (Florida and Smith, 1990).

What this suggests is that policies to create or stimulate regional venture capital funds and investment activity need to be combined with other measures aimed at fostering and supporting regional clusters of high-technology research, innovation, and small firm start-ups. This has been the German state's approach to building up a significant national biotechnology industry over the past decade (Adelberger, 2000). On the one hand, the German state sought to stimulate regional clusters of biotechnology small firm start-ups by inviting regions to submit applications for public funds (of DM50 million) to its Research Ministry's Bioregio Competition. Three regions – Cologne, Munich and Heidelberg were the main winners. On the other hand, the government has underwritten a venture capital fund specifically directed to small technology-based firms. Two near-public credit institutions historically employed to provide long-term

financing to industry – the KfW and DtA – have been recruited to provide matched funding (up to DM1million) if a lead investor (bank or venture capital firm) is willing to invest the same amount in new high-technology firms. At the same time, the Research Ministry guarantees 80 percent (and the semi-public bank a further 10 percent) of any investor's loss. According to Adelberger (2000) the result has been a rapid growth in seed-financing, such that Germany now leads Europe in this form of venture capital investment. Apparently, in the view of industry experts, there is no longer a credit crunch in venture capital in Germany; rather, money is in search of good ideas. However, and this is the problem associated with any form of public support or subsidy, the continued success of venture capital seed financing in Germany would seem to be dependent on a continuing state role. Even in Germany, the biotechnology clusters that have developed over the past decade or so do not appear to be large or deep enough to generate self-sustaining networks of independent venture funds.

There are in fact differing views as to whether region-specific venture capital policies are likely to work. Reviewing the evidence from the USA, Lerner (1999) argues that public policy support and funding there have been significant factors in the dramatic growth of the venture capital market. He suggests that the Federal SBIR programme as well as similar initiatives in at least thirty states and over one hundred local business incubators have played an important catalytic and 'certification' role in high technology sectors, reducing some of the information gaps faced by investors and thereby helping the certified firms to obtain venture funding, as well as contributing directly over $2billion per annum of public venture funds. A similar argument in the USA context is made by Laughlin and Digirolamo (1994), who advocate publicly supported 'capital-access programmes' at the state and local level. Evidence from Scotland also suggests that relatively small direct or indirect public investments may have an important demonstration effect (Hood, 2000). Contrary to these examples, Mason and Harrison (1999a) maintain that previous attempts by national and local governments to fill regional

venture equity gaps have not on the whole proved very impressive. The effect, they suggest, has often been to reinforce existing spatial biases in the venture capital industry.

There continues to be significant policy uncertainty in Europe about what is both desirable and feasible. In its Risk Capital Action Plan (RCAP), the European Commission considers public funding to have an important role to play in addressing identifiable market failures. In line with this view, the European Investment Fund (an affiliate of the European Investment Bank - the EU's long-term finance agency) has turned itself into a specialist venture capital branch (with a portfolio of €1.5bn). Its aim is to play a catalytic role in the very earliest stages of investment in sectors shunned by the market (Norman, 2001). But at the same time, the Commission is concerned that such funding does not distort markets and crowd out private sector venture activity (European Commission, 2000b). Most recently, for instance, the UK government's plan to introduce regional venture funds has been stalled by the European Commission's Competition Directorate. The Commission fears that regional ventures will offer companies cheaper capital than that available on the market, and so represent a form of 'back-door' state aid, as well as offering investors better returns (Hargreaves, 2001). Consequently, the UK Government's fund for Northern Ireland (run by Viridian) has had to be reduced in size. But we know that small scale funds will face proportionately higher fixed transition and monitoring costs and hence may find it harder to achieve financial credibility (see Murray, 1998).

One possible response and means of ensuring that public funds generate the best possible private and social returns is to focus them on existing venture capital agglomerations (where more experienced managers and intermediaries already exist). Forcing such funds to invest in firms away from such clusters on political or equity grounds may reduce their returns (Lerner, 1999). Furthermore, it has become almost a truism to say that public venture capital programmes are necessary but not sufficient in generating the growth of small firms and entrepreneurial economies (Florida and Kenney, 1988; Mason

and Harrison, 1999b). To this end, further supply-side and fiscal reforms are clearly needed in many European states to encourage a higher number of small firm and high-technology start-ups.

Lurking behind these various concerns and questions, however, is a further issue. As the European Union has become increasingly integrated, economically and monetarily, so processes of rationalisation and consolidation have accelerated, not only across traditional industrial sectors, but also across financial activities. The question is whether a fully integrated EU can sustain numerous individual national industries, banks, and capital markets and stock markets. If the USA – as a long-standing economic and monetary union – is any guide, not very member state of the EU can expect to have its own automotive industry cluster, its own aerospace industry cluster, its own, independent stock market, and so on. The argument is that it will be those nations and regions that have a clear pre-exisiing competitive advantage in a given type of activity that will benefit from integration, while the nations and regions in which the given activity is less competitive, or less developed, could well see it disappear. In other words, it is argued by some observers that European economic and monetary integration is leading to a process of increasing regional concentration and specialisation, with just a few regions across the EU dominating any given sector of activity. There seems little reason to suppose the same logic will not apply to high tech industry. Realistically, just how many large high-tech clusters can the EU economy support? Is each member state only likely to contain one such large regional cluster? Will each country tend to specialise in a particular type of high tech activity? Or will some member states not be able to develop and sustain a large high tech cluster at all? If on the other hand, member states are firmly committed to developing a number of venture-backed regional high-tech clusters, the implication may be that these will never reach the sort of size found in the US. As Norton (2001) points out, the extraordinary rise of the new high-tech, venture-backed economy in the USA has been an inherently regionally uneven process. While structural changes in the European economies mean that progress

towards a more extensive and liquid venture capital industry is likely to continue, given the changed investment climate, the debate over policy, and the regional-economic dynamics unleashed by the integration process itself, progress may be even more geographically uneven than in recent years.

Notes

[1] High technology being defined in this context as communications, internet, computers and computer-related, semiconductors, other electronics related, biotechnology, and medical instruments and devices,

[2] Similarly, in the US the impact of mergers, rationalisation and consolidation on the role of small banks as providers of finance to small enterprises has also attracted attention (see Peek and Rosengren, 1998; Strahan and Weston, 1998).

[3] In the US, corporate venture investment has escalated rapidly in recent years, from £392m in 1995 to $12bn in 2000. In the EU, corporate venturing has yet to get underway, although between June 2000 and February 2001 some 72 corporate venture funds were established, worth a total of $4bn. Lloyds-TSB, Orange, France Telecom, and Bertelsman have been among those raising cash to invest in promising innovative high technology companies.

[4] The European Association of Securities Dealers Automated Quotation was set up in 1996 by an association of 75 venture firms and banks.

[5] According to the relevant Venture Capital Associations, just over a third of German venture capital in 1998 went to high-technology sectors, compared to around a quarter in Britain and France. In Italy only ten percent went to high-tech compared to almost 20 percent to other manufacturing.

[6] In terms of seed capital and start-ups alone, the percentages were Germany 39, France 45, Netherlands 32, Switzerland, 71, Belgium 70, and the UK 21 percent (Price Waterhouse Coopers, 2000a).

[7] The data show formal venture capital and provide no measure of the growing role of informal capital and business angels (see Mason and Harrison, 1999a).

[8] Unfortunately, detailed data on high-technology employment, output or patents are not available for all NUTs1 and NUTs2 regions in the EU, so employment in research and development is used here as a proxy measure.

[9] At the time of writing the UK government has just announced a further initiative aimed at promoting venture capital investment in economically depressed areas with low rates of business start-ups, namely a credit to investors in venture funds equivalent to a 5 percent top up on the returns from such investments made in these areas.

TABLES AND FIGURES

Table 1: Source of Venture Capital Funds across Europe: Private Equity Raised by Type of Investor, 1999

	Percent										
Country	Corporate investors	Private	Govt agencies	Banks	Pension funds	Insurance companies	Academic insitutions	Realised capital gains	Capital markets	Other	Total
Austria	25.57	0.00	9.09	56.15	0.00	8.94	0.00	0.25	0.00	0.00	100.0
Belgium	16.27	14.98	3.97	16.29	0.00	5.17	3.48	39.23	0.00	0.61	100.0
Denmark	10.50	16.15	3.23	35.94	7.27	0.00	0.00	10.29	0.00	16.63	100.0
Finland	1.74	2.05	12.60	13.63	27.56	38.11	0.51	2.46	0.00	1.33	100.0
France	4.81	4.70	2.89	26.28	9.71	15.49	0.22	24.77	0.00	11.14	100.0
Germany	11.01	11.89	14.88	41.18	8.98	11.77	0.00	0.29	0.00	0.0	100.0
Greece	0.00	0.00	0.00	41.39	0.00	0.00	0.00	58.61	0.00	0.0	100.0
Ireland	3.59	24.86	4.41	28.71	30.68	7.74	0.00	0.00	0.00	0.0	100.0
Italy	16.04	7.85	1.69	46.01	7.11	6.73	0.00	9.11	0.00	5.44	100.0
Netherlands	6.03	3.95	1.88	52.68	2.11	16.01	0.51	16.09	0.00	0.75	100.0
Norway	20.77	19.46	0.00	0.00	0.00	19.46	0.00	40.31	0.00	0.0	100.0
Portugal	0.00	0.00	28.92	35.59	0.00	0.67	0.00	30.12	0.00	4.7	100.0
Spain	11.82	1.63	14.79	46.11	12.76	2.60	0.00	0.25	9.23	0.82	100.0
Sweden	21.26	3.22	0.75	7.53	35.94	23.32	1.01	5.68	0.00	1.28	100.0
Switzerland	14.33	9.82	6.64	20.18	13.04	9.57	22.98	1.90	0.00	1.53	100.0
UK	9.41	4.41	1.84	26.35	31.90	14.33	0.51	0.00	0.00	11.24	100.0

Source: European Venture Capital Association

Table 2: High Tech Venture Capital Investment, Selected EU countries, 1999

	Amount of Investment in High Tech activities (€ 000s)	High Tech as proportion of Total VC Investment	High Tech investment by Stage of Investment (proportions)			
			Seed/Start-ups/ Other Early-Stage	Expansions	Management Buy-Outs	Other
Belgium	364,656	65.26	70.36	28.32	0.34	0.97
Denmark	28,768	60.38	40.34	57.60	0.00	2.02
Ireland	61,569	54.02	47.95	50.10	0.00	1.94
Sweden	339,030	53.60	53.25	37.93	5.10	3.71
Germany	1,349,043	34.61	38.94	42.86	14.80	3.40
France	1,047,039	27.29	45.31	41.33	10.81	2.54
Spain	126,564	26.38	31.65	34.85	19.90	13.60
UK	2,181,049	24.95	21.03	36.60	40.60	2.30
Netherlands	540,474	22.78	32.36	41.35	18.87	7.43
Italy	286,189	10.62	42.91	45.02	11.98	0.08

Sources: European Venture Capital Association; PricewaterhouseCoopers (2000)

Figure 1

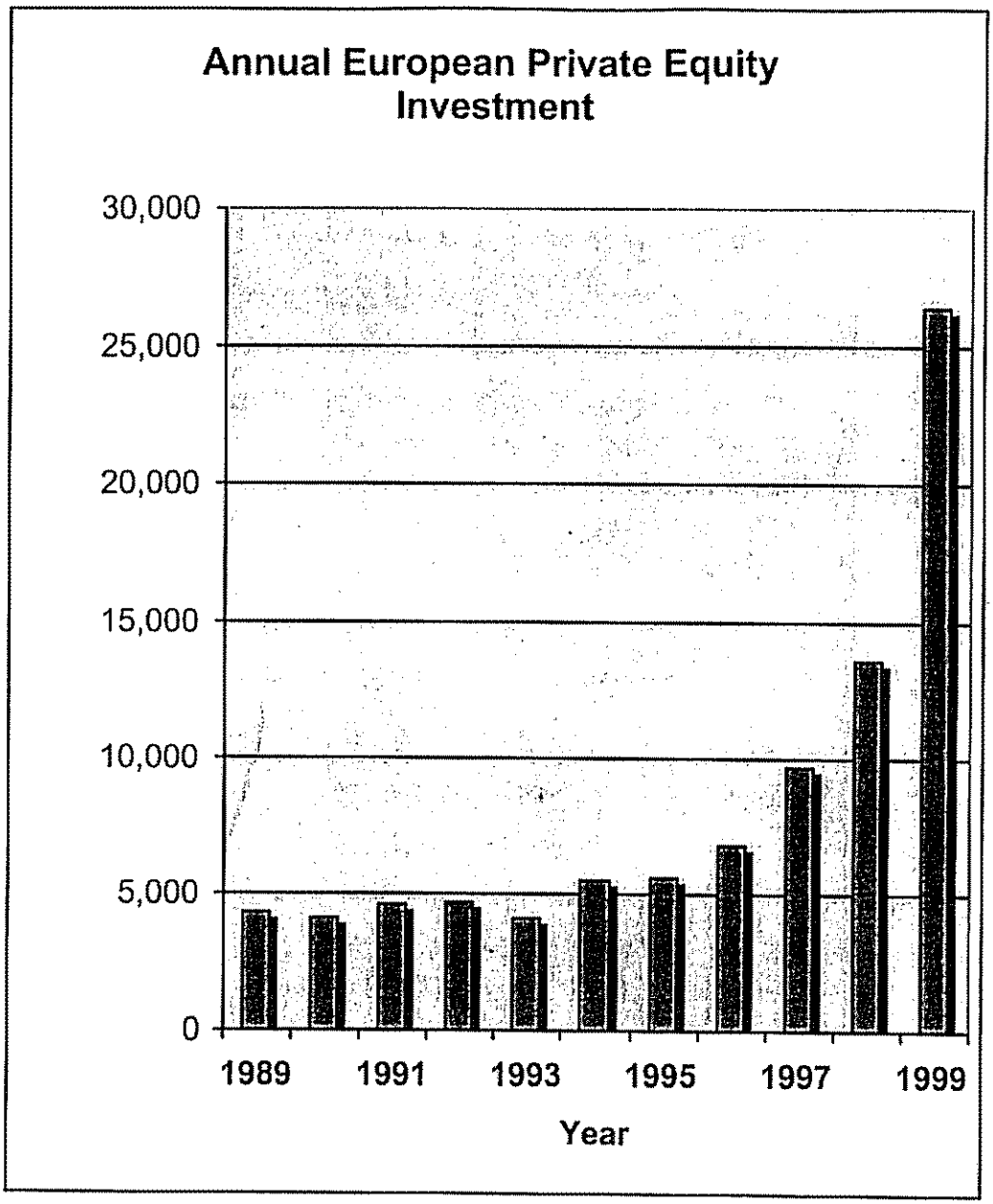

Annual European Private Equity Investment
30,000
25,000
20,000
15,000
10,000
5,000
0
1989
1991
1993
1995
1997
1999
Year

Figure 2

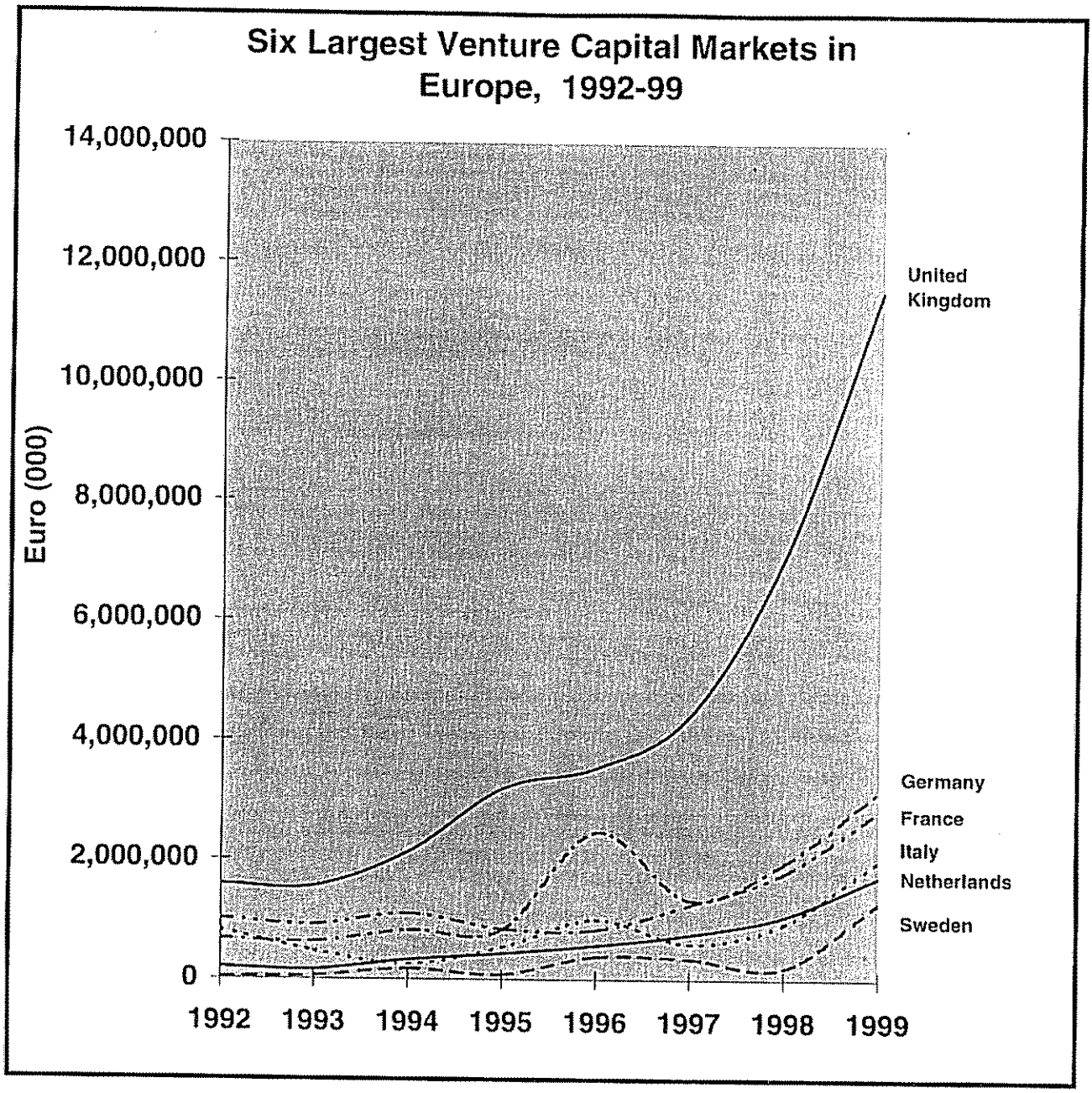

Six Largest Venture Capital Markets in Europe, 1992-99
Euro (000)
14,000,000
12,000,000
10,000,000
8,000,000
6,000,000
4,000,000
2,000,000
0
1992
1993
1994
1995
1996
1997
1998
1999
United Kingdom
Germany
France
Italy
Netherlands
Sweden

Figure 3

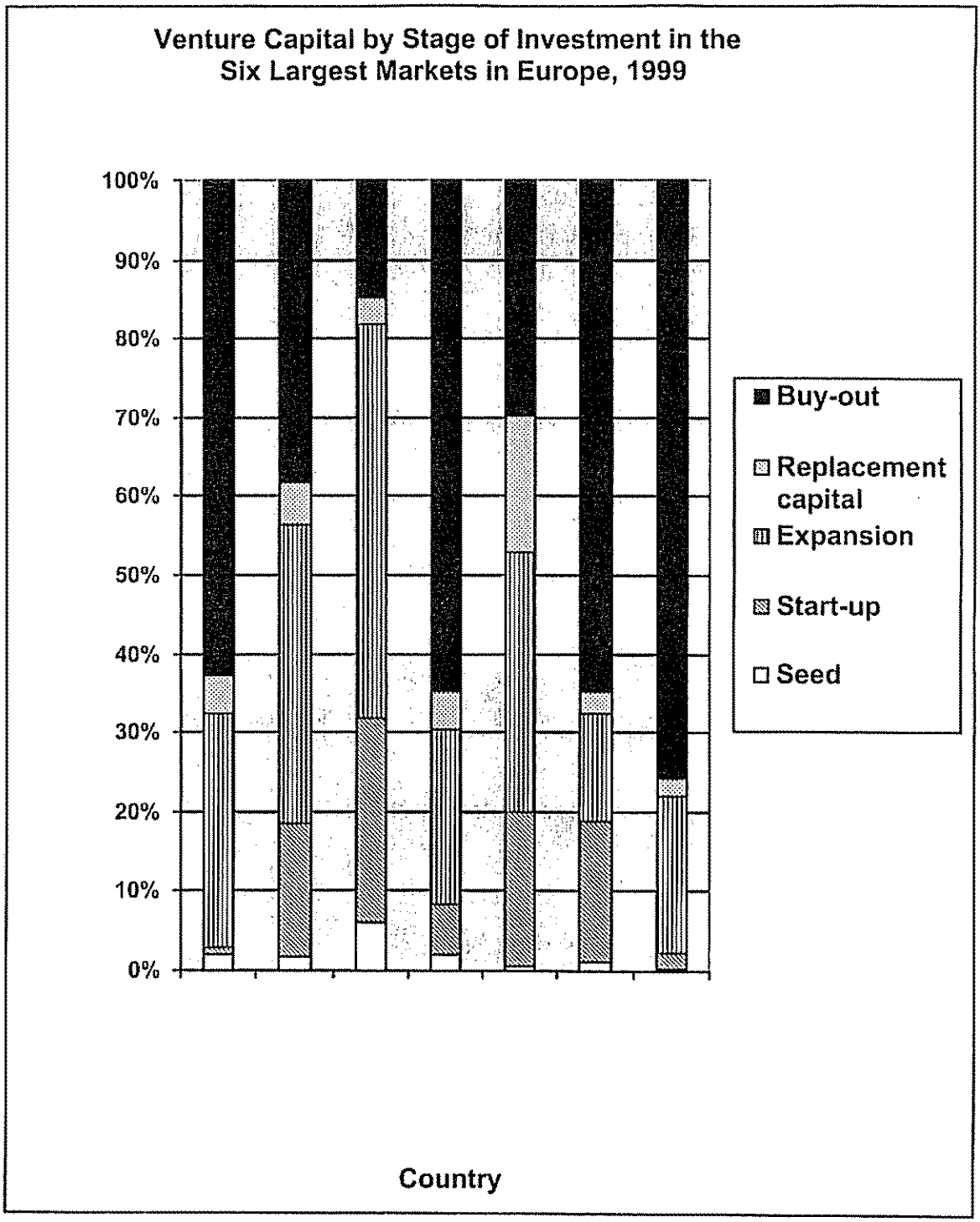
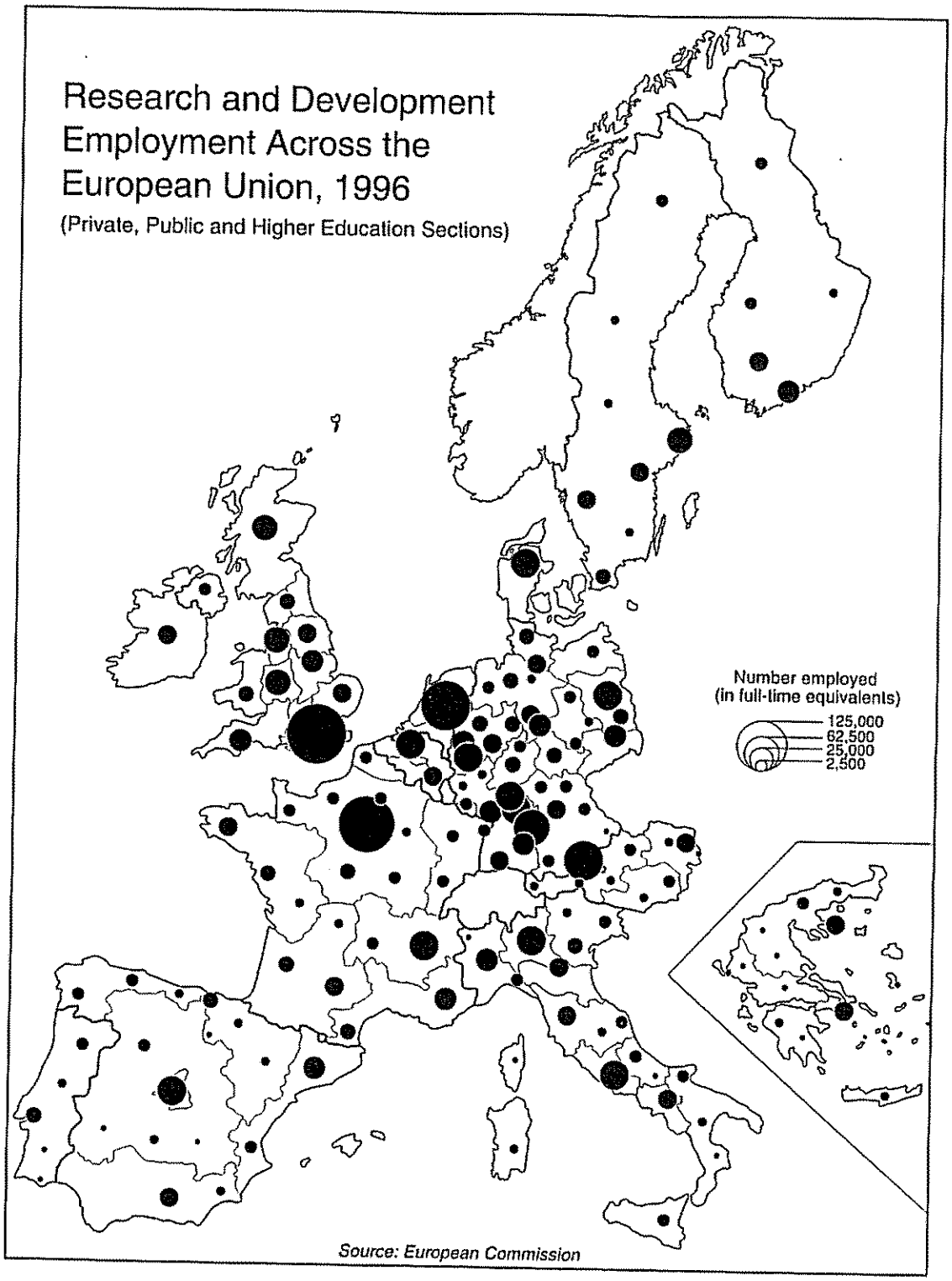
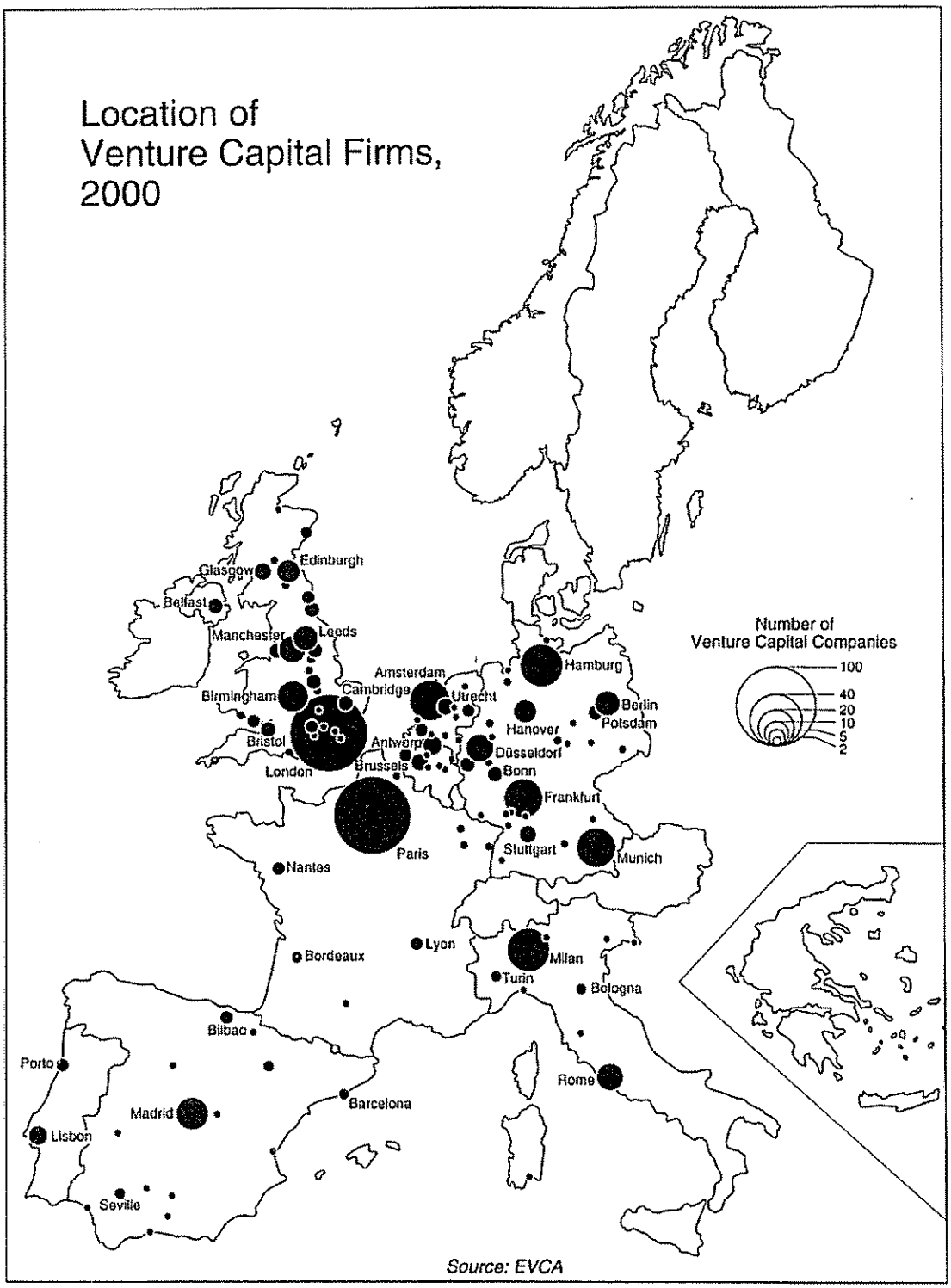

Venture Capital by Stage of Investment in the Six Largest Markets in Europe, 1999
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
Buy-out
Replacement capital
Expansion
Start-up
Seed
Country

Figure 4



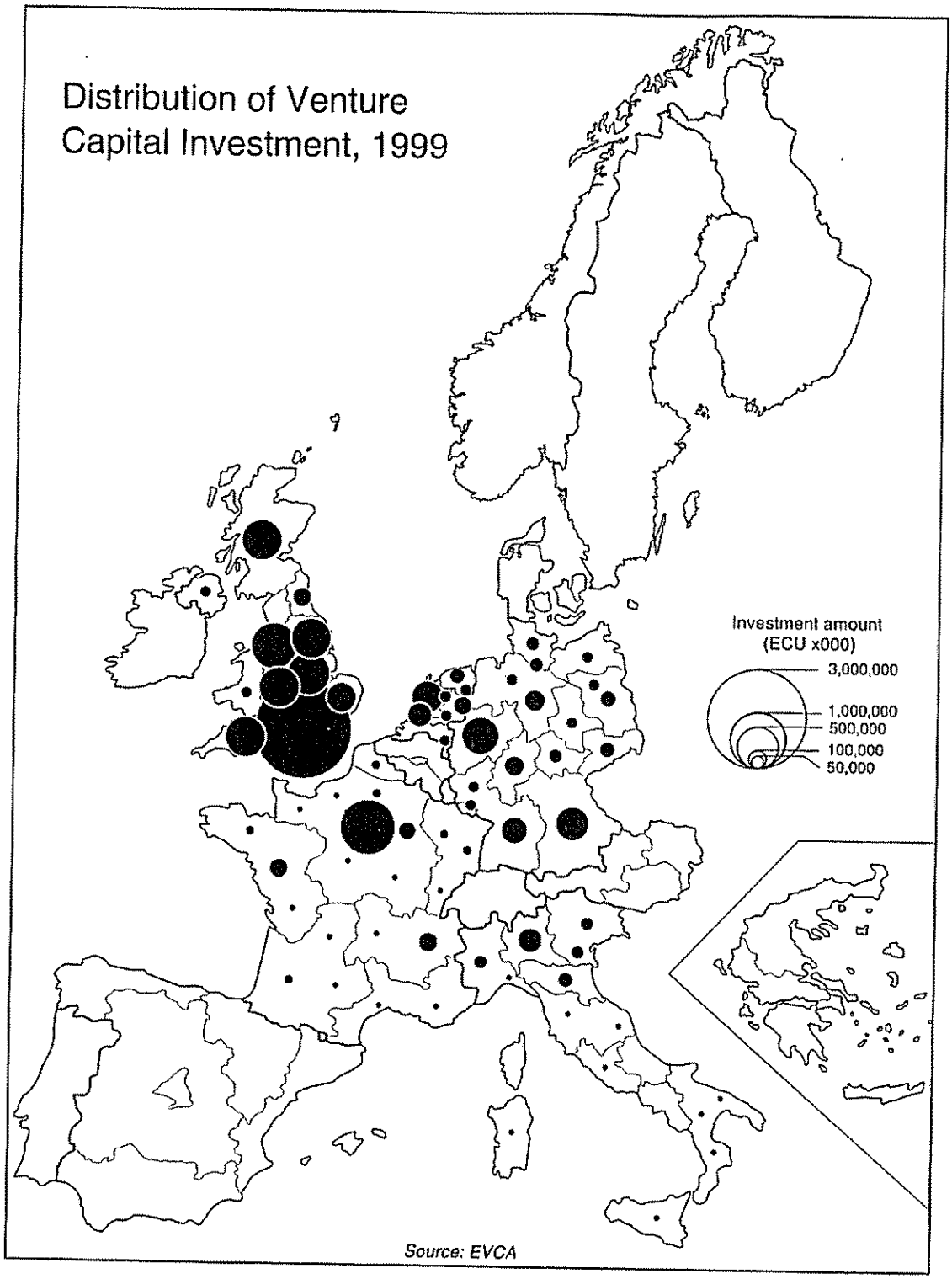
(Source: National Venture Capital Associations)

Figure 5



(Source: National Venture Capital Associations)

Figure 6



Source: European Commission (2000) *Sixth Periodic Report*

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