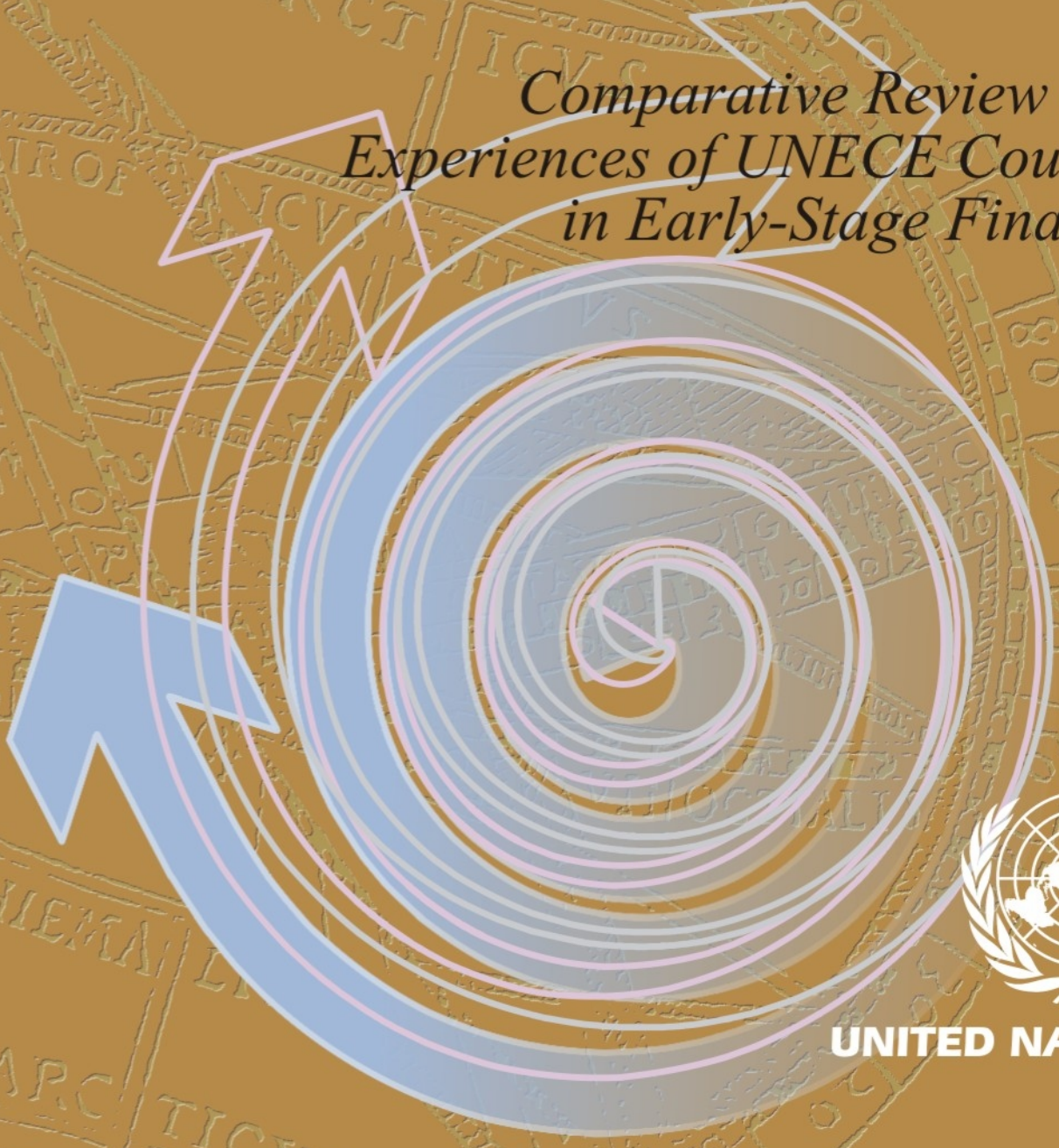
UNITED NATIONS ECONOMIC COMMISSION FOR EUROPE

Financing Innovative Development

Comparative Review of the Experiences of UNECE Countries in Early-Stage Financing



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FOREWORD

Innovation is widely recognized as a main driver for economic growth and a powerful force to create the conditions for sustainable development, addressing various environmental and social challenges. Innovative activities, however, face particular difficulties in raising finance. Effective support to innovation requires more than additional resources. It demands the presence of specialized financial intermediaries that are able to provide not only money but also managerial and technical expertise. The emergence and growth of a financing infrastructure for early-stage support of innovative enterprises is a complex process, depending on many enabling conditions and requiring efficient allocation and recycling of capital. The development of national venture capital industries has often received government support as a component of general innovation policies. Well-targeted public interventions play an important role in shaping a vibrant venture capital industry.

These issues feature prominently in the Programme of Work of the UNECE Subprogramme on Economic Cooperation and Integration. This *Comparative Review* was compiled in accordance with the Programme of Work of the UNECE Committee on Economic Cooperation and Integration (CECI) for 2007-2008 under the theme "Promoting an enabling environment for efficient financial intermediation in support of innovative development".

The *Comparative Review* focuses on the provision of early-stage equity financing to innovative technology-based enterprises with a view to identifying policy options and recommendations to facilitate the access of these enterprises to early finance. The UNECE region includes countries at very different levels of their innovative capability, which is reflected in the various degrees of maturity of the venture capital industry and the scope of the policy initiatives adopted in this area. This *Comparative Review* makes a contribution to transnational learning, that is to say, the transfer of good experiences and best practices across the whole UNECE region. In particular, in accordance with CECI mandate, it aims to facilitate the ongoing policy efforts on financing innovative enterprises in the catch-up economies of the region by promoting a better understanding of the international experiences. I hope that this publication will be useful for all stakeholders involved in early-stage financing of innovative firms as well as for policymakers in their efforts to promote innovative development in their countries.

Marek Belka
Executive Secretary
United Nations Economic Commission for Europe

ACKNOWLEDGEMENTS

This *Comparative review* is compiled in the context of the Programme of Work of the UNECE Subprogramme on Economic Cooperation and Integration, concerning the focus area "Promoting an enabling environment for efficient financial intermediation in support of innovative development".

A leading substantive contribution to the *Review* by **Dimo Dimov,** Assistant Professor of Management, University of Connecticut, is gratefully acknowledged.

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ABBREVIATIONS

AIM	Alternative Investment Market
ARD	American Research and Development Corporation
BAN	Business Angel Network
BDC	Business Development, Bank of Canada
BES	Business Expansion Scheme (Ireland)
CalPERS	Californian Public Employees' Retirement System
CaTIP	Californian Technical Investment Partnership
CAPCO	Certified Capital Companies
CDC	Caisse des Depots & Consignations (France)
CIP	Competitiveness and Innovation Framework Programme
CPC	Capital Pool Company (Canada)
CREA	Capital Risk for Enterprises d'Amorcage (France)
EBAN	European Business Angel Network
EGF	Early Growth Funds
EIB	European Investment bank
EIF	European Investment Fund
ERDF	European Regional Development Fund
ESCF	European Seed Capital Fund Pilot Scheme
ETF	Environmental Technologies Fund/Facility
EU	European Union
EVCA	European venture Capital Association
FII	Finnish Industrial Investment
GDP	Gross Domestic Product
GEM	Global Entrepreneurship Monitor
GIF	Growth and Innovation Facility (SMEs)
ICFC	Industrial and Commercial Finance Corporation
I-TEC	Innovation and Technology Equity Capital
ISO	Incentive Stock Options
JEREMIE	Joint European Resources for Monitoring Micro- to Medium Enterprises
LLP	Limited Liability Partnership
LSVCC	Labour Sponsored Venture Capital Corporation
MAP	Multi-Annual Programme
MTDC	Massachusetts Technology Development Corporation
RCAP	Risk Capital Action Plan
RCM	Risk Capital Mandate
R & D	Research and Development
SBA	Small Business Administration
SBIC	Small Business Investment Company
SBIR	Small Business Innovation Research programme
SEF	Slovene Enterprise Fund
TEKES	Finnish funding agency for technology and innovation
UNECE	United Nations Economic Commission for Europe
VC	Venture Capital
VCT	Venture Capital Trust

EXECUTIVE SUMMARY

This report provides a comparative review of policy initiatives in the UNECE countries seeking to improve the financing environment for innovative firms in the early stages of their development.

It discusses the specific financing problems of innovative enterprises and the need for the emergence of specialized types of financial intermediaries, namely business angels and venture capitalists. The report presents an overview of the major trends in financing provided by these intermediaries.

A comprehensive framework - the early-stage equity financing cycle - is introduced as a reference that allows individual countries to evaluate their own infrastructure for innovation finance and to identify areas where policy initiatives are required to address deficiencies. Four levers (potential areas of policy intervention) are discussed:

- The **fund-raising** stage of the cycle, which pertains to the availability of funds for allocation to innovative enterprises by specialized financial intermediaries.

- The **investing** stage of the cycle, which includes the flow of investment opportunities to business angels and venture capital firms as well as the availability of requisite investment skills to evaluate these opportunities.

- The **value adding** stage of the cycle, which concerns the availability of requisite skills for the oversight, management, and development of innovative enterprises.

- The **exiting** stage of the cycle, which pertains to the opportunity for investors to convert the value added into funds that can be deployed in another wave of innovative enterprises.

The reviewed government initiatives are grouped by country, in order to provide the necessary national context for the evaluation of these programmes. This includes the different degree of development of each of the components of the equity financing cycle. The comparative review allows the identification of good practices in the different stages of this cycle.

The review concludes by making policy recommendations concerning the four identified levers of early-stage equity financing, while underlining the importance of paying due attention to national circumstances and the complementary character of the various elements of the private financing cycle.

I. INTRODUCTION

Entrepreneurship and innovation are by now widely recognized as pillars of economic growth and job creation. Small firms in particular have been the main source of innovative activity and have consistently accounted for the vast majority of new jobs. Yet, entrepreneurship and innovation dynamics also imply a high rate of business churning, whereby enterprises start, succeed, and fail in continuous strive to resolve market and technological uncertainty, and in turn create a better economic landscape. Because of such uncertainty and uneven distribution of market and technology information across economic actors, mainstream financial institutions find it difficult to support individual innovative enterprises within their understanding and management of risk and return. For this reason, innovative enterprises depend on private individuals or specialized intermediaries for financial support throughout their most uncertain development phases. Where such "alternative" financing is available, innovation systems function effectively to create and recycle wealth, thereby fuelling economic growth and job creation.

However, the emergence and development of a financing infrastructure for early-stage support of innovative enterprises is a complex process, depending on many enabling conditions and requiring efficient allocation and recycling of capital. For this reason, there are significant differences across countries in the existence and functioning of such infrastructure. In view of this, public policy is becoming increasingly attuned to the financial needs of innovative enterprises. As a result, as innovation and new firm creation become major thrusts of public policy across countries, a more focused consideration of the accompanying financing process inevitably follows. For example, in 2000, EU's Lisbon Strategy set the goal of making the EU the "most competitive and dynamic knowledge-based economy by the end of the decade". This objective was reiterated and strengthened in 2005 in the renewed Lisbon Strategy "Partnership for Growth and Jobs". Currently, the Entrepreneurship and Innovation Programme is one of the three operational pillars of the "Competitiveness and Innovation framework Programme" (CIP) for the period 2007-2013. It continues previous extensive programmes oriented towards entrepreneurship and innovation and aims to help enterprises innovate by providing access to finance and business support networks, with new focus on risk capital for high growth and innovative companies. It is also complemented by other programmes, such as the 7th Framework and JEREMIE, focusing on the "Partnership for Growth and Jobs" priorities.

The issues of entrepreneurship, innovation, and competitiveness are of particular importance to the catching up economies of the UNECE region. Having emerged from a series of fundamental institutional, macroeconomic, and market reforms, these countries seek to install and activate engines of solid economic development and job creation. To this end, there is an increased awareness among these countries that policy initiatives to support innovation and competitiveness need to address the particular challenges that innovative enterprises face in raising finance.

Because the policy experience related to financing innovation is relatively limited, policymakers in individual countries face a particular challenge in designing national programmes and in learning from the experience of other countries. As countries vary in their

economic and innovation history, in the conditions and institutions that support the cycle of innovation finance as well as in the nature and sequence of measures to address the deficiencies of that cycle, there is much causal ambiguity in making attributions to particular policy actions and drawing recommendations for further initiatives.

The purpose of this report is to provide a comparative review of policy initiatives in the UNECE countries that have sought to improve the financing environment for innovative firms and develop self-sustaining financing infrastructures, and to develop a set of policy recommendations. The review goes beyond a simple comparison and classification of programmes to provide a comprehensive framework – the early-stage financing cycle – against which individual countries can evaluate their own infrastructures for innovation finance to identify deficient areas and adapt the suggested policy initiatives as well as develop new ones to address such deficiencies.

The report focuses most prominently on business angels and venture capital firms as major players in the innovation finance environment. Nevertheless, there is extensive discussion of other informal investors as well as other early-stage intermediaries as playing a fundamental part in the early-stage financing cycle. Indeed, venture capital firms and business angels typically reach the "cream of the crop" – the group of most promising high-growth enterprises – yet, for such enterprises to emerge, a large enough crop of innovative enterprises need to be "seeded". It is in this seeding process that informal investors, incubators, technology commercialization programmes as well as other seed-stage agencies play a crucial role.

The report is structured as follows. Section 2 provides a brief overview of innovative enterprises, discussing their nature, financing needs, and the challenges to meeting those needs at their earliest stages of development. Section 3 provides an overview of the nature and current trends in the two major forms of equity financing for innovative enterprises, namely business angels and venture capital. Section 4 discusses the early-stage financing cycle and the factors that affect the smooth operation of each of its four stages: fundraising, investing, value adding, and exiting. Section 5 provides a comparative review of policy initiatives in individual countries aimed at improving the financing infrastructure for new, innovative enterprises. Finally, Sections 6 synthesizes the discussion of the early-stage financing cycle and the review of policy initiatives into a set of policy recommendations for countries to develop or improve their provision of early-stage financing for innovative enterprises.

II. THE NATURE AND FINANCING OF INNOVATIVE ENTERPRISES

A. The Nature of Innovative Enterprises

Innovative enterprises seek to successfully exploit novelty in the economic and social spheres. As such, they are the engines of innovation and solid contributors to economic growth and job creation. Because innovation is a diverse, multi-faceted activity, there is a variety of innovative enterprises, distinguished by the type of innovation in which they are engaged. The *source* of novelty may be new scientific knowledge (i.e. invention), the transfer of business knowledge from one sector to another, or different appeal to new or existing customers. The *application* of the novelty may be in the form of new or enhanced products, new or enhanced businesses processes, new or enhanced organizational processes, and new sources of raw materials. Finally, in its *magnitude* and continuity to existing market processes, the novelty may be incremental or radical, in which the existing economic order may be "destroyed" and new ways of doing business established.

Most innovative enterprises start out small and private, whereby an individual or a group of people – attracted by the commercial promise of a novel idea – take formal actions to make that promise a reality. Because of the resistance of the existing order to novelty, the commercialization of novel ideas goes through several hurdles that can be loosely captured by the following development stages: (1) exploration of the market potential, technical feasibility, and economic viability, (2) product development, (3) market introduction, and (4) market expansion. In the earlier stages there is much technical, market, and economic uncertainty that makes it difficult to determine the enterprise potential. Once an enterprise reaches the market stage, there is much less doubt about its potential and its appeal to resource providers. Thus, innovative enterprises are distinct in their need to resolve fundamental uncertainty and to reveal, as well as create, their economic potential.

B. Financing of Innovative Enterprises

1. Financing needs of innovative enterprises

The development of innovative enterprises varies according to their upfront product development costs and the length of their market development and entry process. There are several early, critical milestones in this development process for which sufficient financing is crucial: product R&D, product conception and prototype development, market definition and testing, and initial production. The amount of financing needed is often sufficiently large to exhaust the immediately available sources such as founders' own funds and funds from family, friends and "fools" (also known as 3Fs).

Based on these development milestones and financing needs, several financing stages can be distinguished, each characterized by its specific amount and use of financial resources. The *seed* stage covers the initial research and development of an idea or business concept; focused on determining its technical feasibility, market potential, and economic viability. The *start-up* stage covers the development of product prototypes; initial market research as well as market-

reach activities, and the establishment of a formal business organization. The *early-growth* stage pertains to small-scale commercialization and growth as well as to the development of the pillars for the scalability of the business. Finally, the *expansion* stage of the business covers the substantial growth in the scale and market impact of the business.

Figure 1 provides a representation of the cash flow pattern of a typical innovative enterprise across its development stages and maps the various sources of finance according to the stages at which they are available or most suitable. The cash flow follows a "J-curve" pattern over time, with an initial drop at the seed stage (known as the "Valley of Death"), related to the financial resources spent on the proof of the business concept. If the business emerges from the "valley" and becomes established, the cash flow turns positive and the business gradually generates market momentum and moves to the early-growth and expansion stages. In these stages the financial resources needed by the business are significantly larger.

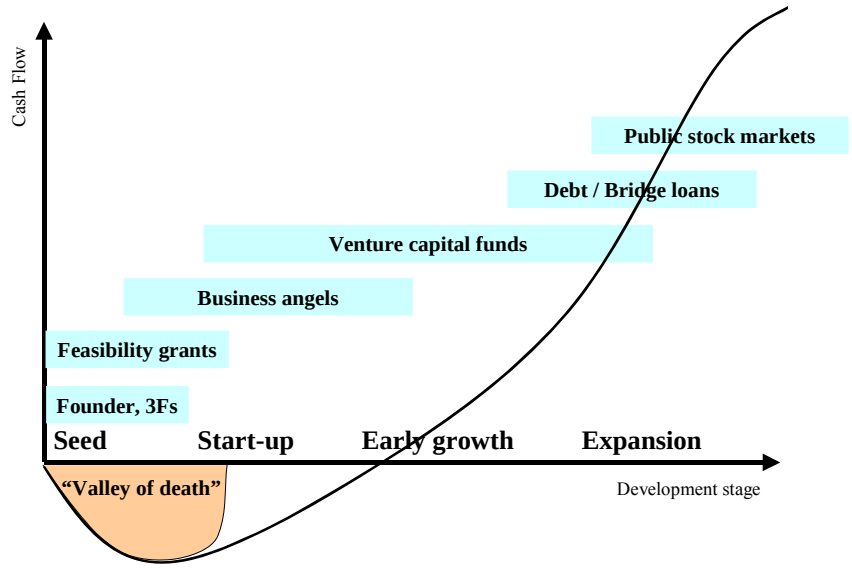

Figure 1: Development Stages, Cash Flow, and Sources of Finance

Although the financing requirements are generally lower at the seed and start-up stages, these stages are critical for the development of the business. For example, an analysis of the fastest growing private companies in the US in 2000 revealed that 16 per cent started with less than $1,000, 42 per cent with $10,000 or less, and 58 per cent with $20,000 or less.[1]

[1] Inc. Magazine, Inc. 500 list.

2. The challenges of attracting mainstream finance

There is much uncertainty surrounding innovative enterprises in their seed and start-up stages. Such enterprises lack track record and, often, tangible evidence of product or service feasibility. In addition, there is limited market evidence for the potential of their products or services. Finally, in technology and especially in knowledge-intensive fields, products often have relatively high rates of obsolescence or are subject to knowledge spillovers that prevent the enterprise from capturing the full economic value of its innovation. These characteristics make the perceived risk of such enterprises prohibitive to mainstream investors, raising the opportunity cost of such investments.

Another feature of the early development of innovative enterprises is the presence of information asymmetry. Based on their experience, knowledge, skills, and inter-personal relationships, entrepreneurs are uniquely positioned to perceive business opportunities and anticipate their market potential. Because of this, potential investors cannot verify that the premises of the opportunity are indeed sound and cannot distinguish between high- and low-quality opportunities. In a knowledge-driven economy, this is due to the difficulty of appraising the value of the knowledge or other intangible assets owned by the entrepreneur. This leads potential investors to either set prohibitive financing costs or withdraw entirely from this early-stage enterprise space (i.e. market failure).

The value of an innovative enterprise is based on the long-term growth potential derived from scientific knowledge and intellectual property. This creates a distinct pattern of cash generation that requires tremendous stamina and patience of investors in receiving their payback. The cash flows are uncertain and volatile, with long periods to initial cash generation. In addition, innovative enterprises lack tangible assets that may serve as a financing collateral.

3. Early-stage financing of innovative enterprises

Many of the traditional sources of early-stage finance are not immediately or sufficiently suitable for innovative enterprises. The personal funds of the founders as well as of their families and friends represent an important source at the seed stage of enterprise, but are often insufficient to cover the needs of the enterprise as it shows increasing promise, as illustrated in Figure 1.

Given the longer periods that innovative enterprises take to generate cash, bootstrapping techniques such as trade credit and customer advances – which are very effective for businesses looking to fill niches in established markets and industries – are inappropriate. In addition, the uncertainty associated with feasibility studies, the intangible nature of the assets of innovative enterprises, the volatility of their cash flows, and the lack of sufficient operating history make them unsuitable for debt financing. While founders may draw personal loans, such loans, if used to fund seed-stage activities from which there are no payoffs in the short-term, may quickly recourse to and deplete the founders' personal assets.

Merit-based awards (e.g. grants) are viable options for funding early concept development or market research. They do not have to be repaid and often provide important certification to

the enterprises receiving them when they seek to raise private capital for their further development.

Perhaps the most suitable form of financing of early-stage innovative enterprises, one that matches the risk profile of the enterprise with its potential payoffs, is external equity or equity-type financing (such as convertible debt or capital loans). The main providers of such financing are business angels and venture capital funds, although most venture capital funds typically focus on companies with already developed products.[2] They receive a portion of the firm's equity in exchange for the financing they provide, allowing them to fully share the upside potential of the enterprise, if realized. In addition, these equity investors receive significant control rights and exercise extensive monitoring that help them manage the downside risk of the investment. Finally, they often provide valuable expertise and networking opportunity to the enterprise, thereby increasing its commercial potential. The next section provides a detailed overview of these two types of equity investor.

[2] See, for example, Branscomb and Auerswald (2002).

III. EQUITY FINANCING OF EARLY-STAGE INNOVATIVE ENTERPRISES

A. Overview of Business Angel Financing

1. Nature and recent trends

Business angels are wealthy individuals that make equity investments in promising ventures. In addition to capital, they also bring their business experience and network of contacts to the benefit of the entrepreneur. They provide the majority of the seed and start-up capital to high-tech entrepreneurial ventures.[3] To illustrate the scale of their importance, in 2006 in the US, angels invested $25.6 billion in 51,000 ventures,[4] while VC firms invested $26.1 billion in approximately 3,500 ventures.[5] The difference is even more pronounced at the seed and start-up stages: whereas almost 46% of the angel funds went to such early-stage companies, only 20% of the VC funds went to such companies. The number of active angel investors in the US has been estimated at 234,000.[6] While large-scale, pan-European data is not available, based on the scant available data and consistent with the US evidence, European business angels are more active in the seed capital market than their VC counterparts, investing both in a higher number of deals and larger amounts: in 2005, angels invested €127 million in 687 deals versus venture capital funds' investing €97 million in 416 deals.[7] Based on estimates from national federations of business angel networks, the European Business Angel Network (EBAN) argues that 50,000 to 75,000 angel investors invest at least €3 billion per year in early-stage ventures, an amount commensurate with the total venture capital invested in such ventures. An increasing number of European angel investors consider cross-border deals.

Business angels represent a distinct subset of informal investors. In addition to business angels, informal investors include family, friends and relatives as other sources of early-stage financing. Considering the full set of informal investors reveals a much more substantial impact. Latest estimations show that in the 42 countries participating in the Global Entrepreneurship Monitor (GEM), 208 million informal investors provided over $600 billion to entrepreneurial ventures in 2006, exceeding the total amount of venture capital invested in these countries for the same period by a factor of 15.[8] Figure 2 shows the amount of informal financing as a percentage of GDP for selected countries from the GEM study. For many countries the impact is close to or exceeds 1% of GDP. Figure 3 shows the prevalence of informal investors. Again, the numbers are significant, implying that one in thirty adults is an informal investor. According to some estimates, on a global scale, informal investors funded 99.9% of all companies and provided 91% of the funding amounts.[9] A closer profile of these

[3] Branscomb and Auerswald (2002); Sohl (2006).
[4] Source: Center for Venture Research.
[5] Source: PWC MoneyTree.
[6] Source: Center for Venture Research.
[7] Sources: EBAN (Statistics Addendum), EVCA.
[8] Bygrave and Quill (2007).
[9] Source: Global Entrepreneurship Monitor.

investors reveals 57.3% of them to be close or other relatives, 34.1% to be friends, neighbours or colleagues, and 5.8% to be strangers.[10]

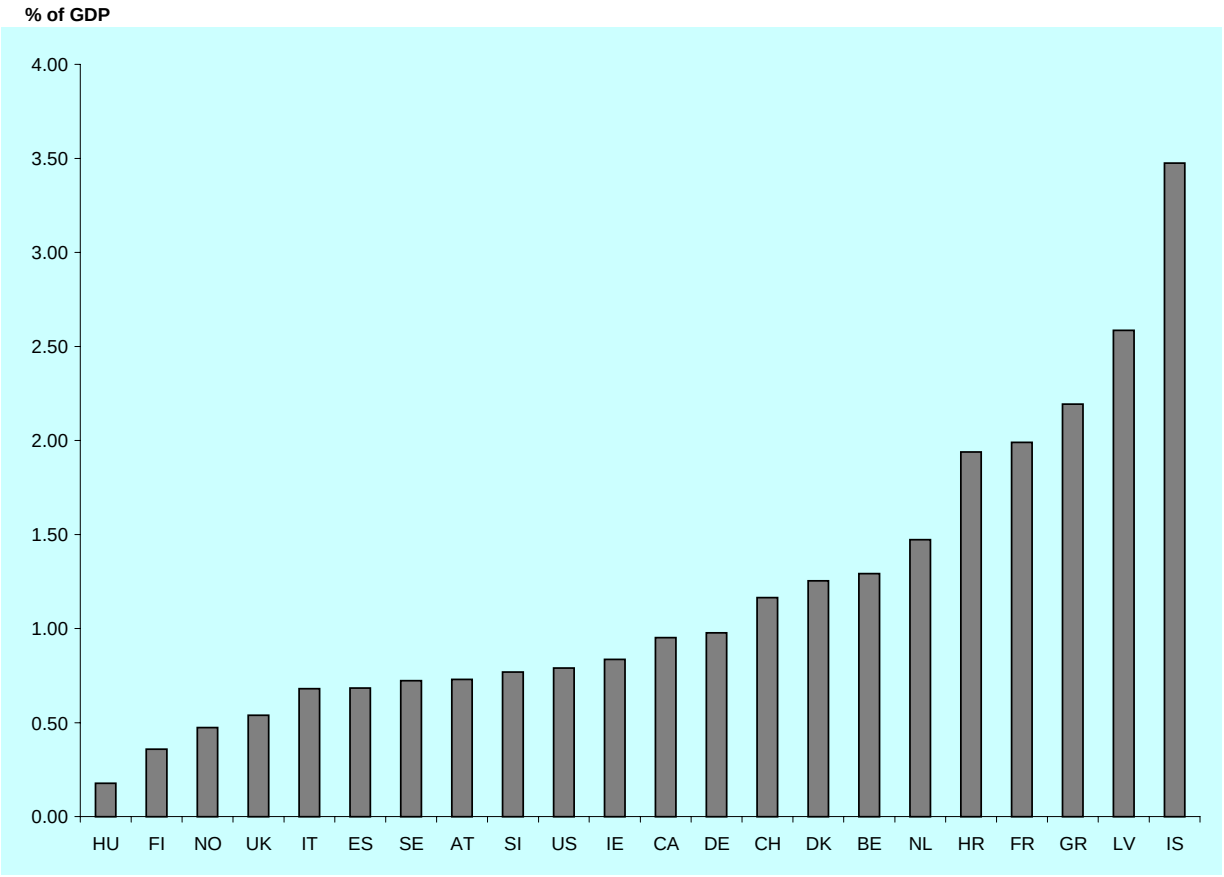

Figure 2: Informal Investment as percentage of GDP, 2005[11]

These figures reflect the distinct space that informal investors occupy in the entrepreneurial finance process: "seeding" a high number of high-uncertainty ventures, of which a limited few reach more advanced stages and are able to attract venture capital to sustain further growth. The critical point here is that, *ex ante*, it is very difficult to discern the high-potential ventures, hence the high number approach. The figures also suggest that there is a solid base of informal investors across countries which, once enticed to step forward and finance new ventures, will have a substantial impact on the entrepreneurial and innovation climate within those countries.

[10] Bygrave and Quill (2007).
[11] Source: Global Entrepreneurship Monitor.

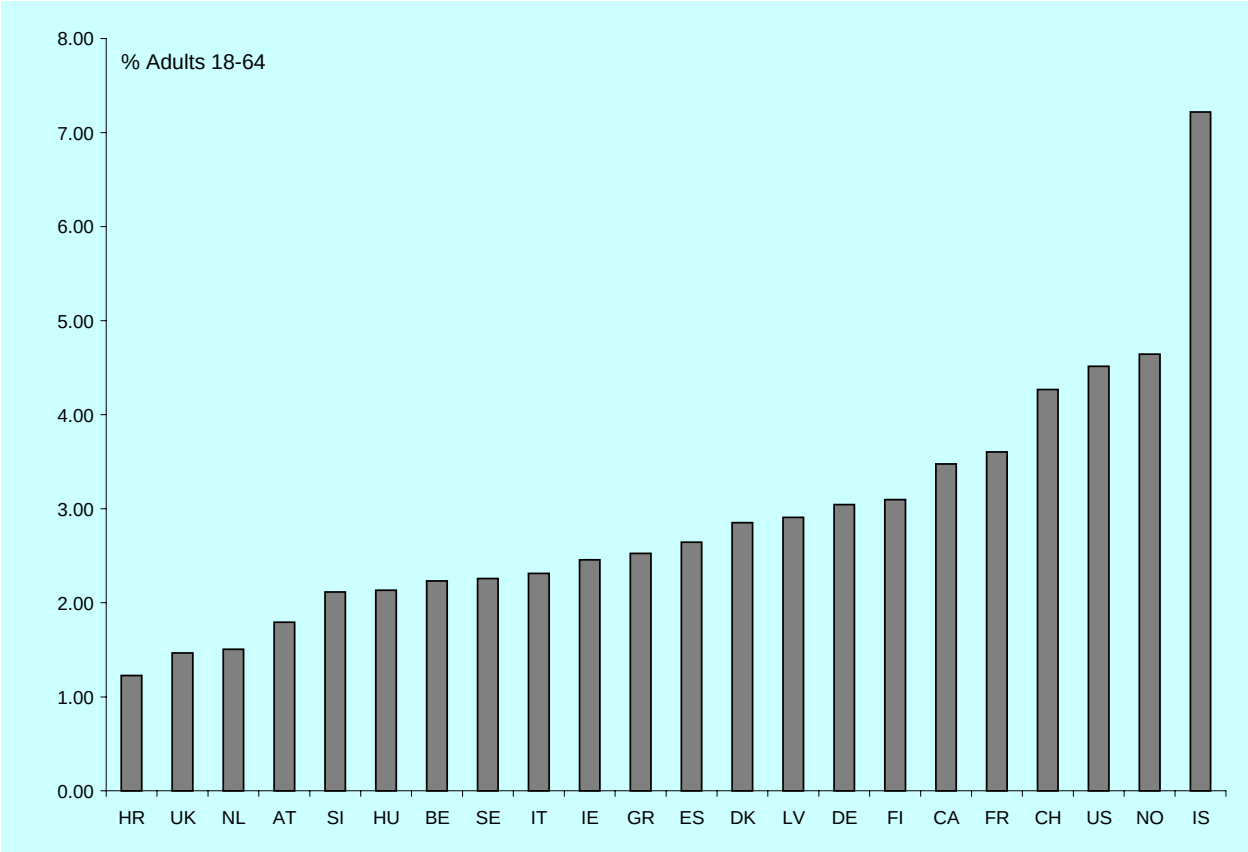

Figure 3: Prevalence Rate of Informal Investors, 2005[12]

Perhaps the main difficulty that business angel markets experience has to do with the inefficient flow of information between business angels and entrepreneurs: business angels are hard to find and so are high-quality entrepreneurs; in this way information about financing sources and investment opportunities remains mismatched.[13] One trend towards dealing with this inefficiency has been the establishment of business angel networks (BAN), which pool the financial, knowledge and information resources of groups of angels to become more visible to prospective entrepreneurs, to attract bigger deal flow and thus sift better-quality deals, and to apply more formal screening and investment selection. In Europe, the European Business Angel Network (EBAN) was created in 1999 and the number of national BAN has increased from 66 in 1999 to 211 in 2006, with the number of active angels registered in responding networks increasing from 470 to over 8,000.[14] Five countries – Germany, France,

[12] Ibid.
[13] Sohl (2006).
[14] EBAN (2007).

UK, Sweden, and Spain – account for almost three-quarters of the European BAN. In the US today, there are around 250 active angel groups, half of which are members of the Angel Capital Association,[15] the equivalent of EBAN in North America.

2. Amount and value added

In 2005, the average deal amount funded by European angel groups was €192,000, while the average investment amount for US angel groups was €266,000.[16] Looking at the amounts that the broader groups of informal investors provide annually, half of them invest less than $2,000, 10% invest over $19,000 annually, 5% invest over $38,000, and 1% invest over $118,000.[17] Although estimates vary, business angels typically fund deals in the $50k to $2 million range. The upper limit of this range is typically reached when several individuals pool their financial resources (a syndication process, facilitated through angel involvement in BAN) and thus fund larger deals and build more diversified portfolios of investments. This also allows them to invest in sectors, such as biotechnology, which are not considered by individual investors due to the high deal amounts involved. The extent of business angel syndication is increasing, leading to higher overall deal sizes and lower amounts provided by individual investors. In addition, co-investment funds with public sector involvement further enable the funding of larger deals.

Angels typically provide more than just capital, actively participating in the development of the ventures by providing valuable strategic, operational and market advice. The extensive business and entrepreneurial experience that many angels have makes their role in the early development of the venture invaluable. Of course, there is a wide diversity of business angels – active versus passive, novice versus experienced – suggesting that the actual value added (in addition to financial resources) is also likely to vary substantially. In this regard, BAN and other professional angel networks provide an opportunity to match the skills of particular individual angels with the needs of particular ventures. Some business angel networks develop as sophisticated matchmaking platforms, providing not only a space for quality projects and knowledgeable investors to meet, but also trainings for investors and entrepreneurs.

B. Overview of Venture Capital Financing

1. Nature and recent trends

Venture capital (VC) financing pertains to the provision of professionally managed capital to promising firms in exchange for equity stakes, with the anticipation of selling those stakes in five to seven years at substantial premium, following a successful development of the company. VC firms perform an important intermediary function, enabling funds from institutional investors to reach high-potential enterprises that could otherwise be ignored by these investors and other traditional financial institutions. By its nature, VC is "patient"

[15] Source: EBAN.
[16] Source: EBAN Statistics 2006, based on activity recorded by responding networks in 2005.
[17] Source: Global Entrepreneurship Monitor.

capital in that VC investments are illiquid and subject to a long process of "fruition". Whereas venture capital covers a wide range of companies, the bulk of it (70-80%) goes to expansion-stage companies for which the uncertainty regarding their high potential has been largely resolved. In this regard, early-stage venture capital – although modest in its share of total venture capital investments – is the critical link providing the continuity between business angels and expansion stages.

Venture capital has undergone a true revolution in the past 25-30 years.[18] It first emerged in the US in the late 1940s, greatly accelerating its pace in the early 1980s following key, enabling legislative changes and fed by the emerging revolutions in computing, communications and biotechnology. The VC industry has eventually developed in other countries and today VC is essentially a global phenomenon. In the US, the economic impact of venture capital is hard to overlook: by 2005, over 23,500 VC-backed companies have created $2.1 trillion in revenue (representing 16.6% of the US GDP) and 10 million jobs, accounting for 9% of the private sector employment.[19] In addition, over 3,000 public companies have emerged from the ranks of VC-backed companies.

The impact of venture capital in Europe, while substantial, has been more subdued. VC-backed companies created 630,000 new jobs between 2000 and 2004, enjoyed an annual growth rate in employment of 30.5% between 1997 and 2004, and spend substantially more on R&D activities.[20] In addition, venture capital has been associated with economic growth.[21] A particular characteristic of the VC market in Europe is its fragmentation along national lines, which hampers cross-border investments and leads to a lot of unexploited potential. As a result, most of the European VC funds are small, especially in more recently developed markets.[22] Whereas the figures for the US suggest that each VC-backed company has created, on average, 425 jobs, the comparable figure for Europe, based on a more limited number of respondents, is 46 jobs.[23] Country-specific evidence, while lacking on a large scale, reinforces the positive impact of venture capital. In Ireland, VC-backed companies had €1.63 billion in revenue in 2004 and employed 14,500 people, enjoying above average growth in both revenue and employment.[24] Evidence from Spain also shows that VC-backed companies outperform their counterparts in revenue, employment, and asset growth.[25]

Of particular interest to policymakers is the link between venture capital and innovation. Many of the most successful technology companies have been backed at start-up or early in their lives by venture capitalists. Classic venture capitalists, armed with patience and business acumen, have been a good match for cash constrained companies exploring new technologies. Despite this stylised generalization on the positive role of venture capital, evidence shows that venture capital is not a major source of capital for early-stage technology development.[26]

[18] Gompers and Lerner (2001).
[19] Global Insight (2007).
[20] EVCA (2005c).
[21] Meyer (2006).
[22] EC (2007).
[23] EVCA (2002).
[24] IVCA (2005).
[25] Alemany & Marti (2005).
[26] Branscomb and Auerswald (2002).

Nevertheless, it has substantial effect – such as higher patenting rates[27] – on the companies receiving it. For example, in the biotechnology industry, VC-backed firms account for the vast majority of awarded patents and approved drugs, despite their modest share of the firm population.[28] At a macro level, a study of 16 OECD countries revealed not only that venture capital investment positively influences multi-factor productivity but also that its intensity facilitates the absorption of knowledge generated by universities and firms.[29]

Naturally, such positive impact has created a lot of excitement about venture capital outside of the US. Mesmerized by the gap between the US and Europe in terms of VC investment patterns and impact, many policy directives prescribe the establishment of well functioning VC markets. In view of such recommendations, it is important to understand the historical context in which the VC industry has emerged and appreciate the pace at which it has developed. This helps appreciate the progress made in Europe but also understand what lies ahead.

Figures 4 and 5 provide a snapshot of the early-stage VC activity in select countries in 1995 and 2005. Although most countries have experienced a sharp increase and then decrease in venture capital activity in between,[30] it is possible to see how early-stage venture capital has advanced over the past ten years. Figure 4 shows the absolute amount of early-stage venture capital invested in these years (in million Euros). Several patterns emerge from this chart. First, the US was clearly dominating the venture capital scene in 1995, but over the 10-year period Europe, Canada, and Israel have made significant progress and have greatly narrowed the gap with the US.[31] Second, venture capital activity in Europe is very concentrated, with UK, France, and Germany accounting for over 70% of the EU15 activity; further adding Sweden, Spain, and Denmark, these six countries account for almost 90% of the early-stage venture capital activity. Third, there is very little early-stage venture capital activity in the countries of Central and Eastern Europe that have recently joined the EU, with less than ten million Euros invested in 2005 in the reported countries. Finally, there is the impressive development of the Israeli VC industry, from humble origins in the early 1990s to over half a billion Euros invested in early-stage ventures in 2005.

Recent data for 2006 show a 13% increase in early-stage venture capital investments in the US (to $5.1 billion)[32] and a 246% increase of such investments in Europe (to €5.9 billion),[33] with Europe overtaking the US for the first time. 97% of the increase in Europe comes from investments at the start-up stage.

[27] Kortum and Lerner (2000).
[28] Lerner (1999).
[29] Romain and Pottelsberghe (2004).
[30] The amount of early-stage venture capital invested in 2005 represents only a fraction of the capital invested at the peak of the investment boom in 2000: 16% for the US and 36% for Europe (Source: MoneyTree, EVCA).
[31] Europe largely remains dominated by late-stage venture capital and buyout capital. In 2006, early-stage venture capital represented 34% of the total venture capital invested, up from 19% in 2005 and following annual decreases since 2001. Overall, early-stage venture capital has represented 28% of the total venture capital invested since 1995. On the other hand, buyout capital represented almost 76% of the total private equity capital invested in 2006, up from 73% in 2005 (Source: EVCA).
[32] Source: MoneyTree.
[33] Source: EVCA.

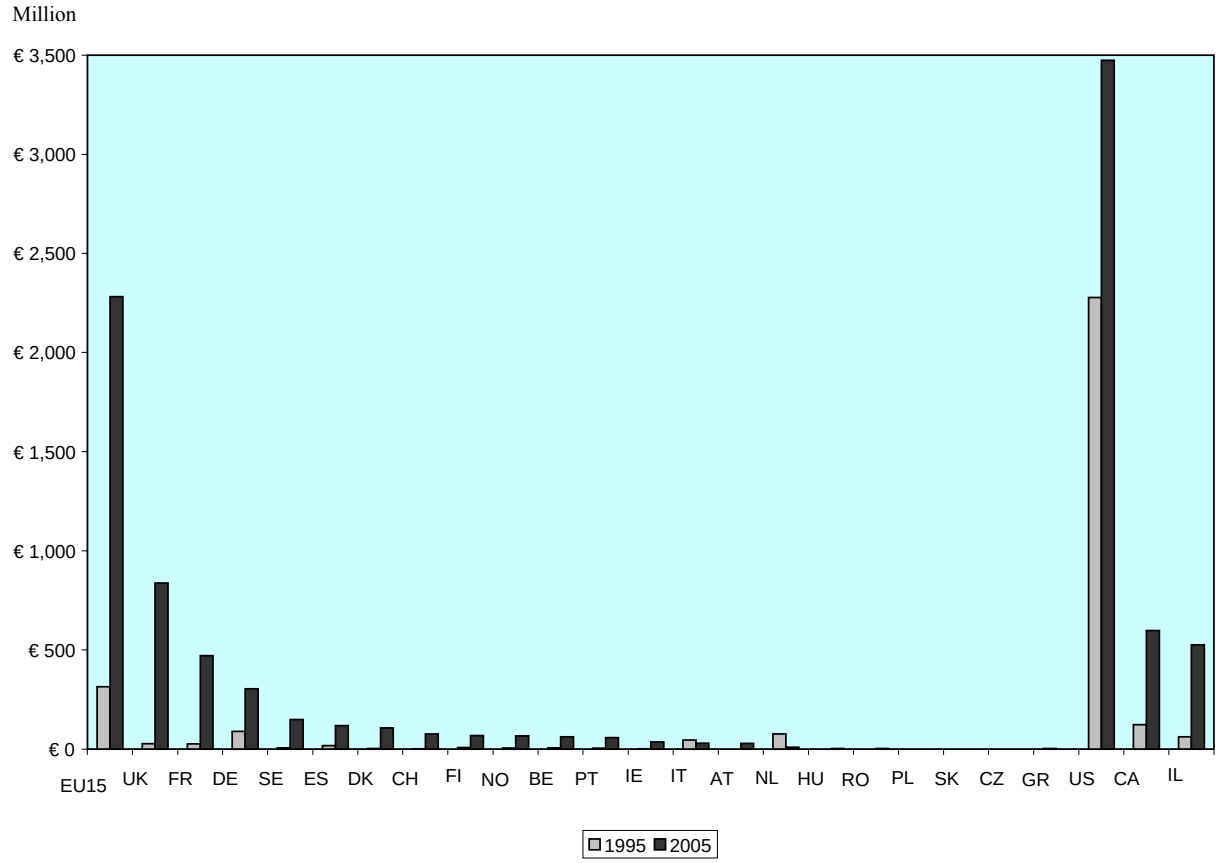

Figure 4: Early-Stage Venture Capital Investments in Select Countries[34]

Figure 5 provides similar snapshots, 10 years apart, of the early-stage venture capital activity as percentage of GDP, thereby accounting for the size of each economy. The progress in European countries is again evident, with the levels in the UK, France, Sweden, Norway, Denmark, Finland, Switzerland, Belgium, Portugal and Ireland comparable to or even exceeding the US level. Israel is a clear outlier, with early-stage venture capital representing 0.45% of GDP in 2005.

[34] Source: Eurostat. Data on Canada and Israel compiled from CVCA and IVC.

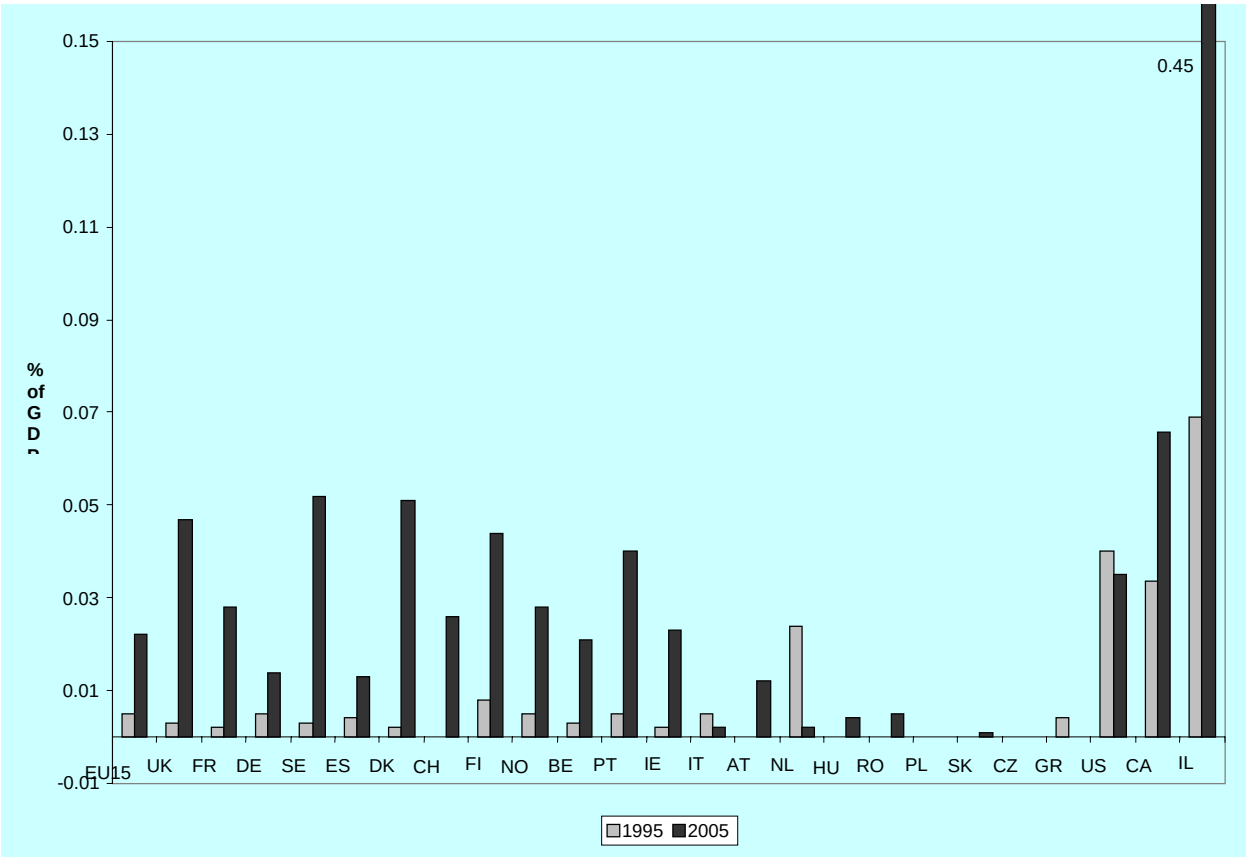

Figure 5: Early-Stage Venture Capital Investments as percentage of GDP in Select Countries[35]

2. Amount and value added

Figure 6 present the average deal size for early-stage venture capital investments in the US and Europe over the period 2001-2005. Whereas the average deal size in Europe has remained relatively stable, at slightly under €1 million Euros, the deal sizes in the US have decreased sharply after their "dot.com" peak in 2000 to stabilize after 2002 to their 1997 levels at around €4 million. There is an apparent gap in deal size between the US and Europe that can be attributed to several factors. First, the deal flow in the second half of the 1990s had not kept at par with the sharp increases in the amounts of early-stage venture capital raised and invested, thereby leading to higher amounts invested per deal. Over the period 1980-1992, the average early-stage deal in the US had stayed in the range of €1-2 million. Second, a more (and perhaps increasingly) active business angel market in the US may have gradually moved to occupy the deals under €4 million. Third, the greater experience of US venture capital firms with early-stage investing as well as a better-quality deal flow resulting from stronger entrepreneurial culture, more active financing agents in the pre-VC stage, and stronger

[35] Source: Eurostat. Data on Canada and Israel compiled from CVCA and IVC.

support network in the Silicon Valley and Route 128 clusters may have enabled them to place bigger bets on promising ventures.

The figure also shows the number of early-stage VC deals in US and Europe over the same period. In both places, the number of deals has reverted to pre-1999 levels. Interestingly, the number of deals in Europe substantially dominates the number of deals in the US over the period (by a factor of 3-4). One explanation for this, consistent with the above discussion, is that a more active business angel market in the US has occupied the early-stage deal space. Thus, European VC firms, perhaps not able to access a large number of quality investment-ready deals seek to fund a larger number of smaller-value deals.

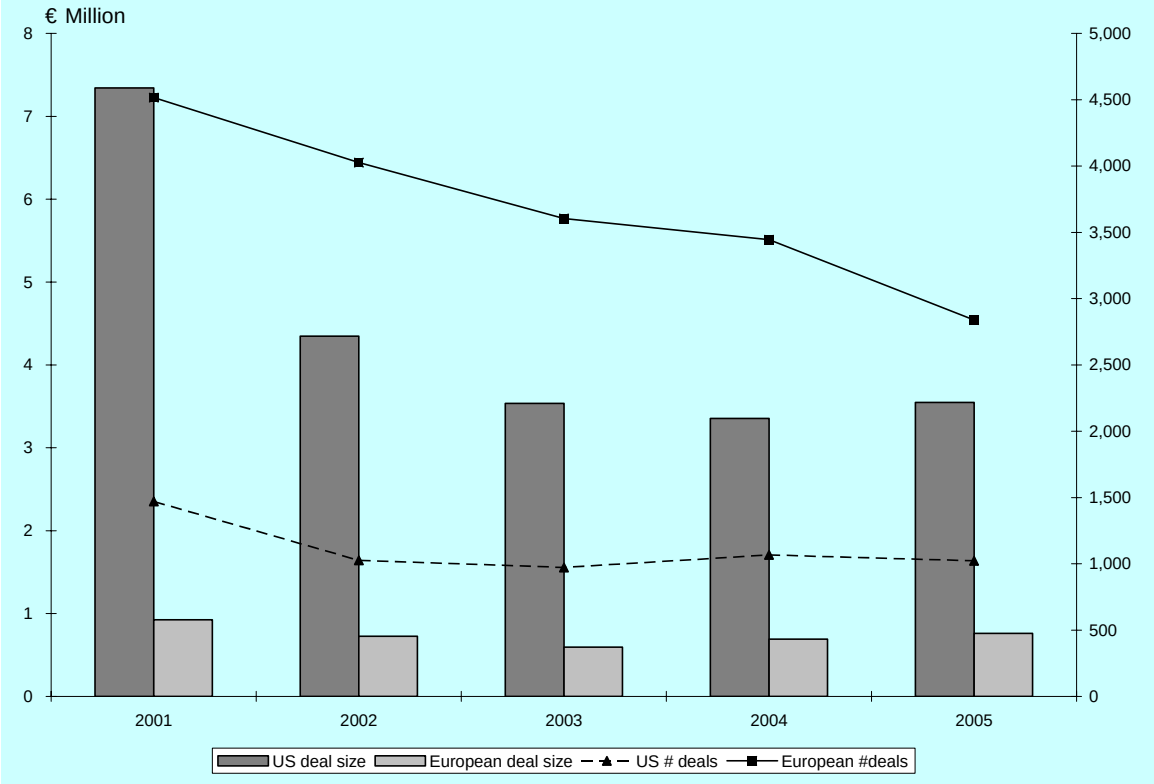

Figure 6: Average Deal Size and Number of Early-Stage Venture Capital Investments[36]

Unlike passive portfolio investors, venture capitalists typically become actively involved in the development of their portfolio companies, thereby increasing the value of these companies. The value that VC firms can add to their portfolio companies stretches well beyond the provisions of financial capital to include active governance such as monitoring company behaviour and performance, and providing strategic advice and network contacts to resource-constrained entrepreneurs.[37] Indeed, the most valued contribution by venture capital firms to early-stage companies is the provision of strategic advice and networking

[36] Source: MoneyTree, EVCA.
[37] See De Clercq, Fried, Lehtonen and Sapienza (2006), Sahlman (1990), Sapienza (1992), Wright and Robbie (1998).

opportunities.[38] In addition, VC firms assist with the recruitment and professionalization of management, often replacing the original entrepreneurs with more experienced managers better suited to the development needs of the venture.[39] These abilities of the VC firm to actively influence the strategic and operational decisions of a company are afforded by their active and significant board participation.[40]

Another important tool for managing the relationship with a portfolio company and for ensuring a continuing alignment between the entrepreneur's and the investor's goals is the staging of capital infusions. VC firms disburse funds to the company based on the achievement of pre-determined milestones and can use the round duration as an effective tool for managing the uncertainty of the investment.[41] By making subsequent infusions contingent on milestone achievement, VC firms not only energize the venture's management team but also protect their downside exposure by being able to cut their losses once the performance or development signals of the venture become negative. The negative aspect of this, from the point of view of the entrepreneur, is that the venture can be deprived of much needed funds when the promise of successful exit wanes, yet the venture is still viable.[42]

3. Various VC fund types

Below the surface of the aggregate VC data, there looms much diversity in the nature of VC firms operating in the early-stage financing space. An understanding of the ecology of the venture capital space is important as different types of VC firms have different considerations and abilities in regard to early-stage investments. Figure 7 compares the distribution of VC firms across various types in Europe and the US. The composition of the VC firm population is similar across the two regions, with private VC firms dominating both landscapes (73% and 60% respectively). To understand further the ecology of early-stage investors, the figure also illustrates the composition of US VC firms that have made at least one early-stage investment and those that have made at least 50 early-stage investments. Whereas the firms making at least one early-stage investment are identical in composition to the population of active VC firms, the set of firms making at least 50 early-stage investments is essentially composed of private (75%) and bank-related (12.5%) VC firms.

[38] EVCA (2002).
[39] Hellman and Puri (2002).
[40] See Lerner (1995).
[41] See Gompers (1995).
[42] Ruhnka, Feldman, and Dean (1992) refer to such investments as "living dead".

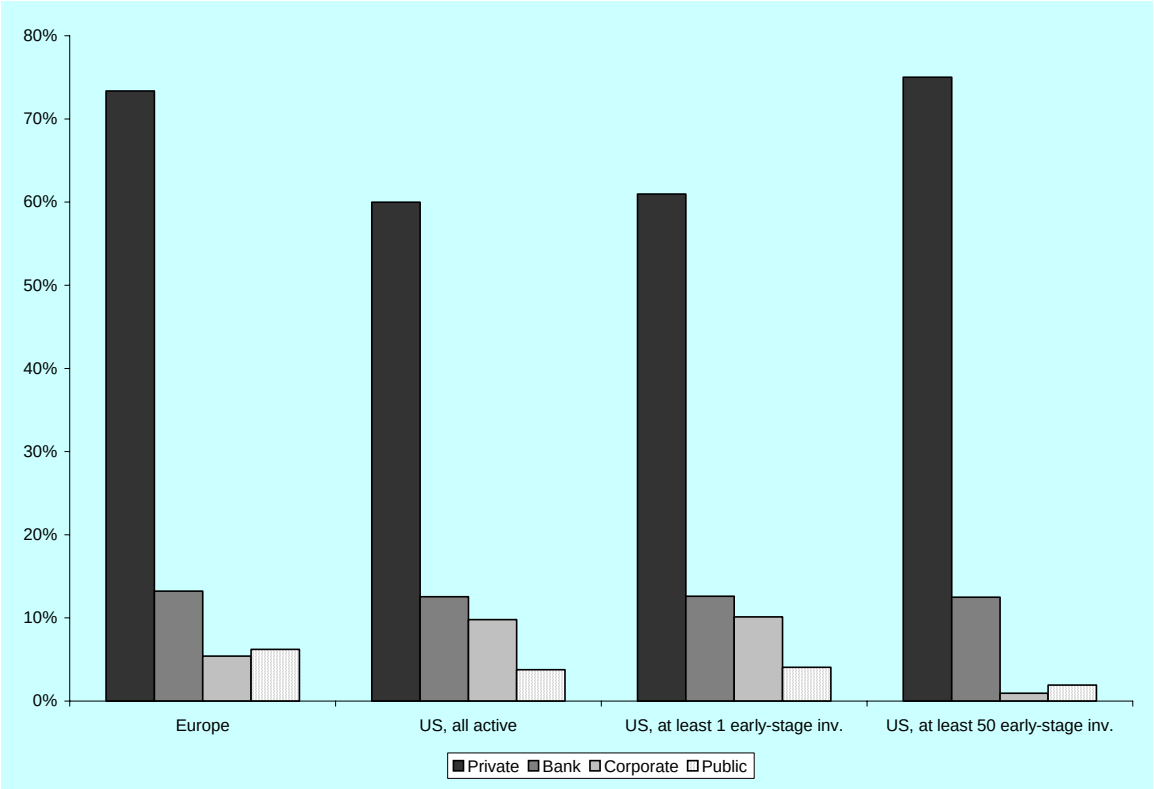

Figure 7: Distribution of VC firm types[43]

On one hand, this pattern suggests that private and bank related VC firms are better positioned to have a sustained early-stage investment activity. Private VC firms, spurred on by their incentive compensation structure are more prone to explore novel or emerging investment niches.[44] In addition, given their need for continuous renewal through raising new funds, they are subject to higher performance pressure[45] and thus on the alert for continuously learning, improving their investment skills, and attracting high-calibre investment managers. Bank-related VC firms may view early-stage ventures not only as a diversifying aspect of their portfolio but also as potential generators of future demand for banking services.[46] On the other hand, the pattern reflects the fact that corporate and public VC firms rarely reach a large scale, thus being less likely to have made a large number of investments.

As a similar decomposition data is not yet available in the European context, it is important to consider whether the same investment patterns hold there. There are suggestions that bank-related VC firms, lacking in early-stage investment skills, in fact avoid such investments.[47] More generally, when captive funds are formed with non-financial goals, such goals may take precedence over the financial considerations of the venture capitalist. For example, an

[43] European distribution is based on the composition of current EVCA members. The US distribution is derived from Venture Economics data on the VC firms making at least one investment in the 2003-2004 period.
[44] Gedajlovic and Dimov (2007); Dimov and Murray (2007).
[45] Van Osnabrugge and Robinson (2001).
[46] Fenn, Liang, and Prowse (1995); Gedajlovic and Dimov (2007).
[47] See Tykvova's (2004) study of German VC firms.

evaluation of the EU seed capital pilot scheme revealed systematic differences in both fund capital and deal flow between funds established for financial (i.e. return maximization) purposes and those established for social purposes (i.e. regional development).[48]

A consideration of the location effects of California (Silicon Valley) and Massachusetts (Route 128), the original hotbeds of early-stage VC investing in the US, sheds further light on the US data. The active VC firms in these two states comprise approximately a quarter of all active US VC firms and their share is similar when VC firms making at least one early-stage investment are considered. However, the 104 VC firms accounting for at least 50 early-stage investments are dominated by those based in California (34%) and Massachusetts (18%), which together account for over half of these firms most active in early-stage companies. This suggests that the emergence of the Silicon Valley and Route 128 cluster has had long-term reverberations on the ecology of venture capital investing in the US. Given the concentrated nature of early-stage venture capital activity in Europe, this suggests that a more even distribution may not be feasible within relatively short time periods.

[48] Murray (1994).

IV. THE LEVERS OF EARLY-STAGE EQUITY FINANCING

Any policy directed at promoting or facilitating the development of an effective infrastructure for financing innovative enterprises needs to be based on a sound understanding of the major private players in the early-stage financing process as well as the "levers" that affect the smooth functioning of this process. As discussed in the previous section, business angels and venture capital firms play central, complementary intermediary roles in the early-stage financing of enterprises, providing capital, expertise and legitimacy to ventures that the traditional financial intermediaries find too risky. For business angels and venture capital firms to be effective and self-sustaining in their intermediary roles, they need to operate in an environment that allows them access to money, investment opportunities and harvesting opportunities that in turn enable them to generate returns commensurate with the risk they undertake and to re-deploy their capital to a new wave of enterprises. The early-stage financing process can thus be regarded as a self-reinforcing cycle consisting of four main stages: fundraising, investing, managing / value adding and exiting.[49] While each of these stages represents a policy lever, all four stages need to be developed and active for the early-stage financing process to function and create its impact. In addition, because each lever engages differently with business angels and venture capital firms, it needs to be attuned to the operating specifics of each of these players.

A. Fundraising

1. The attractiveness of private investments to business angels

Business angels are individuals who have taken the decision to use part of their wealth to invest in start-ups. Such investments are risky and therefore, as a rule, business angels only invest amounts that they can afford to loose. For many angels, the source of their wealth is the sale of businesses that they had founded and operated, so a vibrant, dynamic entrepreneurial environment is an important pre-requisite for the emergence of many business angels. Business angels do not engage in fundraising *per se*, but rather consider whether private investments represent a viable alternative to preserve and increase their wealth. Although many angels make investments for reasons beyond achieving financial returns – such as the opportunity to continue their entrepreneurial experience – the absence of promising returns will likely undermine their appetite for private investments. In this regard, the fundamental factor affecting the scale and intensity of business angel activity is the supply of high-quality entrepreneurial enterprises. There are actual reports that, despite their desire to make more private investments, business angels are discouraged by the limited number of deals meeting their investment criteria as well as the poor quality of the majority of the investment proposals they receive.[50] This problem is tackled, in some cases, by "investment readiness" programmes, which help entrepreneurs to prepare a suitable business plan and understand the different sources of finance available to their businesses.

[49] Gompers and Lerner (1999) discuss these stages in the context of the venture capital cycle. They can also be applied to the broader financing process, which includes players other than VC firms.
[50] Mason and Harrison (2002a).

The viability of private investments is particularly relevant if one considers that some angels are passive investors and may look purely to achieving satisfactory returns. Indeed, angels can invest their money in a wide range of alternatives: publicly traded stocks, bonds, property, art, antiques, etc. Surveys of active angels have outlined tax, economic, and stock market conditions that affect the desire of business angel to invest in private businesses. Tax concerns seem to be most important. In particular, the availability of tax relief on private investments has been shown the have the highest effect, followed by capital gains tax and dividend tax.[51] Higher upfront tax relief encourages investments while higher tax rates on capital gains or dividends discourage investments. Economic conditions, interest rates, and inflation also affect investment activities, albeit to a less degree than taxes. Stock market conditions – affecting the amount available for private investments as well as the opportunity cost of such investments appear to be the least important factors.

Novice or virgin angels – i.e. those who have not yet made private investments but do have the ability and desire to do so – represent a subset of business angels for which additional factors may affect whether they do become active investors. Indeed, in most surveys of business angels, the majority of the respondents have made no or only few private investments.[52] Compared to more seasoned angels, novices may lack knowledge of the investment process and thus hold unrealistic expectations about the nature of entrepreneurs and their investment proposals. Access to business angel networks or to other forums for interaction or knowledge exchange with fellow business angels may be important for overcoming the hurdles associated with initial private investments. Business angel academies and investor readiness programmes help virgin angels to become serial angels by increasing their understanding of the angel market, and also provide investment support to seasoned angels.

2. Providers of VC funds

The funds invested by VC firms in promising entrepreneurial ventures are typically provided by institutional or other investors. Because VC firms do not invest their own funds, fundraising is a critical component of the VC cycle. In this regard, allocation of funds to VC firms makes economic sense only to the extent that the returns achieved by VC firms exceed the investors' opportunity costs and adequately compensate them for the undertaken risks.

Venture capital is often referred to as "patient" capital, reflecting the length of time (10-12 years) over which VC investment can be made, matured, and successfully exited. Such reduced liquidity, combined with the attractive returns that VC funds can provide, make venture capital an attractive asset class to institutional investors such as pension funds, insurance companies, endowments, family wealth trusts, etc. In the early periods of the VC industry, provision of VC funds was dominated by families and wealthy individuals. However, following the emergence of the limited liability partnership (LLP) as a fundraising vehicle and important regulatory changes governing the investment allocations made by institutional investors, VC fundraising has successfully reached out to these investors.

[51] See Mason and Harrison (2000; 2002a).
[52] For example, Mason and Harrison (2002b), Stedler and Peters (2003).

Figure 8 shows the contribution of major classes of investors to VC (private equity) fundraising in the US and Europe. The most visible difference on the two sides of the Atlantic seems to be in terms of the proportion of funds raised by pension funds, an aspect in which the US still dominates (42% versus 24%). Nevertheless, while these differences have historically conferred an advantage to the US, there are many positive trends in Europe that point to the closing of this gap. In 2005, in the US, up to 7% of pension and insurance funds were allocated to private equity, while the corresponding figure in Europe was 4.5%, continuing an increasing trend.[53] The forecasts for 2007 show further narrowing of the gap, at 7.6% in the US and 6.1% in Europe.[54] There are other signs of converging preferences for private equity as well: in 2005, 57% of survey respondents in the US utilized private equity, with the number in Europe higher, at 63%. However, whereas, 53% of the alternative investment allocation in the US was made in private equity, the corresponding figure in Europe was 30%.[55] This suggests that there is a great deal of potential for increasing the pool of venture capital available in Europe.

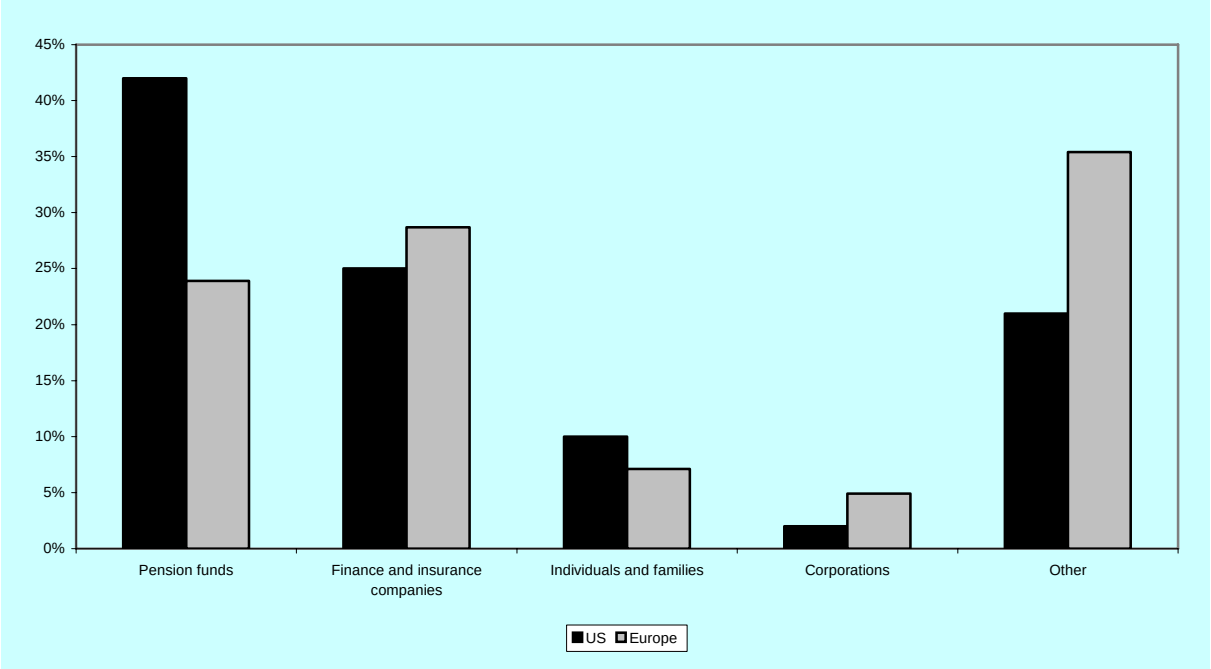

Figure 8: VC Funds Contributed by Source[56]

There are other differences in fundraising patterns across countries. In the US, endowments and foundations provide 21% of the venture capital funds (the category "other" in Figure 8) and do not have direct counterparts in other countries. As they are similar to pension funds in

[53] Russell Research (2005).
[54] Ibid
[55] Ibid.
[56] Sources: NVCA (2004 data) and EVCA (average for 2002-2006 period). The different research and reporting methodologies of NVCA and EVCA make the data difficult to compare across regions. The EVCA data are aggregate for private equity and thus includes both venture capital and buyout funds. Over the 2002-2006 period, venture capital funds represented 20.5% of the total private equity funds raised. This suggests that the share of individual sources may be much higher (or lower) if only venture capital fundraising is considered. In addition, the EVCA data attributes a significant share of the fundraising to fund of funds (16%) and thus does not specify the ultimate source of these funds.

terms of their investment objectives and strategy, this source of funds gives an enhanced edge to US VC firms in their access to institutional funds. In Europe, government agencies account for 9% of the total private equity funds raised, although their share is likely to be above 40% if only venture capital fundraising is considered.[57] VC fundraising is quite distinct in Canada, reflecting the existence of a specific type of VC funds, Labour Sponsored Venture Capital Corporations (LSVCC), which raise funds directly from individual investors. In 2006 LSVCC accounted for 57% of the new funds raised in Canada.[58] In the UK, Venture Capital Trusts represent a similar fundraising vehicle.

3. VC fund structure

In many developed VC markets, VC funds are structured as limited liability partnerships (LLP), with the institutional investors serving as limited partners and the VC firm partners serving as general partners, providing a small part (typically 1%) of the fund's capital. Limited partners are prohibited from active management of the fund, although they use a variety of covenants to govern the behaviour of the VC managers.[59] LLPs have a fixed-term life, typically 10-12 years. Transfer of partnership stakes and early withdrawals from the partnership before the termination date is prohibited. LLPs allow distributions to flow through the partnership structure to the limited partners and be taxed at the limited partners, thereby avoiding the double taxation associated with a corporate form. They also allow for securities to be distributed to the partners without incurring tax liability before the security is actually sold.

In a typical compensation arrangement, the VC firm receives a management fee of 2-2.5% of the committed capital during the life of the fund and 20%-25% of the distribution to the partners beyond a minimum (the nominal amount plus a statutory minimum return). The compensation structure provides a strong incentive for the VC managers to invest in risky projects. Because VC firms do not borrow funds and incur few liabilities, there are few detrimental consequences to the unlimited liability of the general partners.[60] Given that they provide a small portion of the fund's capital, their downside exposure is limited. Yet, given their disproportionate share of the fund's distribution, they have significant exposure to the upside of the fund and thus have a strong incentive to increase it.

The history of the LLP is relatively short.[61] Between 1977 and 1994 the share of private equity managed by LLPs in the US grew from under 20% to over 80%, while the venture capital under management grew from less than $3 billion to $30 billion. Although the LLP

[57] Assuming that government agencies do not support buyout funds, government agencies would account for 43% of the venture capital raised in the EVCA countries over the 2002-2006 period.
[58] Source: CVCA.
[59] For example, they can restrict fund managers from coinvesting in the projects, from investing follow-on funds in companies funded by previously raised funds, from raising new funds, from investing more than a given portion of the fund in any given company, etc. For detailed discussions, see Sahlman (1990) or Gompers and Lerner (1996).
[60] Sahlman (1990).
[61] The first non-single family limited partnership was formed in 1959 (Hsu and Kenney, 2005) Between 1969 and 1975 – a period of still early yet accelerating development of the US VC industry, 29 limited partnerships were formed, raising $376 million (Source: Venture Economics).

structure is predominant in the US, it is less so outside of the US where various structures can be observed, particularly across European countries. Some VC funds are structured as public-type mutual funds, where many individual investors can invest (e.g. LSVCCs in Canada, VC Trusts in the UK). Others are structured as joint stock companies (e.g. AG in Germany, Austria, Switzerland) or as evergreen investment funds. Yet, over the last few years, most European countries have established dedicated domestic fund structures to facilitate the attraction of both domestic and foreign capital.[62] Whereas most of these structures are indeed forms of limited partnerships, others (Poland, Romania) involve investment funds or corporations. Alternative structures often put pressure on the fund to generate periodic cash flows and provide no competitive compensation for the fund managers,[63] which in turn affects the fund's ability to attract or retain competent managers.

4. Major factors affecting VC fundraising

The factors affecting the fundraising process can be summarized as regulatory, tax, macroeconomic stability, and market.

(a) Regulations

Regulations affect fundraising through their allowance of pension funds and insurance companies to allocate funds to venture capital. In this regard, the official recognition of venture capital (private equity) as an asset class has helped in attracting institutional investors. In the US, 1980 is regarded as a watershed year for the development of the VC industry. It followed the passages of key pieces of legislation that facilitated the flow of pension and other institutional investor funds to venture capital companies as well as eased the regulatory burden on VC firms (as discussed in the next section).

As an overall European trend, there has been significant improvement in the VC fundraising environment over the last four years, with the majority of regulatory obstacles to such investments abolished, in compliance with EU Directive 2003/41/EC on the activities and supervision of institutions for occupational retirement provision.[64] As a result, pension funds and insurance companies in Europe become increasingly open to allocating funds to venture capital. Nevertheless, there are significant variations across countries. Ireland and the UK are clear providers of the most favourable regulatory environment, followed by France, Belgium, Spain, and Luxembourg. A third group of progressive followers includes Denmark, Austria, and Finland. The groups of Central and Eastern European countries are laggards in this area, with Hungary being the most advanced among them.[65]

There are still several areas in which the regulatory environment in individual European countries negatively affects VC fundraising.[66] First, there are quantitative restrictions on the

[62] EVCA (2006).
[63] Hsu and Kenney (2005) offer these reasons as an explanation for the demise of American Research and Development (ARD) – the first US VC company – in the face of competition from limited partnerships.
[64] EVCA (2006).
[65] Ibid.
[66] The comparisons that follow are based on the latest tax benchmark report by EVCA (EVCA, 2006).

allocation of pension funds to venture capital in addition to those provided by the EU directives (all CEE countries except Hungary and Latvia have such restrictions). In addition, some of the more developed European countries (Austria, Belgium, Greece, Italy, Luxembourg, Norway, Portugal, and Sweden) also have such restrictions. For the most part, insurance companies face fewer additional quantitative restrictions on their investments in venture capital, with the heaviest restrictions imposed by some of the CEE countries (Czech Republic, Latvia, Romania). In a few countries, pension funds face geographic restrictions for their investments (Hungary, Poland, Romania, Switzerland), while in other it is insurance companies that face such restrictions (Czech Republic, Latvia, Romania).

Finally, it is an acknowledged problem that the VC sector in Europe does not benefit from a single market: there is significant fragmentation along national lines that makes cross-border investments by venture capital funds unnecessarily complicated. Recent recommendations stress the importance of recognizing VC funds registered in other jurisdictions, without the need for separate registration, regulation or investment structures.[67]

(b) Taxation

The taxation of the gains achieved by VC funds can have a significant impact on the net returns achieved by the VC fund providers. In this regard, tax policies can affect VC fundraising. One important aspect of such policies, and quite potent in its affect on VC fundraising, is the capital gains tax.[68] Parallel with all the regulatory changes in the US in the late 1970s, the maximum capital gains tax rate was lowered from 49.5% to 28% in 1978 and further to 20% in 1981. Interestingly, it increased to 28% in 1986 – without affecting much the trends in VC fundraising – and was reduced to 20% in 1997 and further to 15% in 2003. In the European countries, capital gains regulations vary significantly among countries, with the rates generally ranging between 15% and 50%,[69] based in many cases on the marginal personal income tax rates.

Another aspect of tax policy concerns the tax status of VC funds. Whereas the LLP structure in the US allows for profits to flow through to the individual investors, the picture in Europe is more complex. Given the diversity of tax regimes, regulations, and rates across European countries, a particular concern for European funds is the permanent establishment exemption, under which funds established in the country and funded by international investors are not subject to local country tax. Such exemption currently does not exist in Czech Republic, Netherlands, Norway, and Sweden. In some countries – Austria, Belgium, Estonia, France, Italy, Poland, Romania, Slovakia, Spain – there lacks sufficient tax transparency for domestic or non-domestic investors. Finally, in some countries – Czech Republic, Denmark, Estonia, Germany, Portugal, Romania, Slovakia, Spain – VC managers face the issue of having VAT levied on their management or incentive fees.[70]

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[67] EC (2007).
[68] Cumming, (2007); Jeng and Wells (2000).
[69] EVCA (2005b). There also exist indexation, taper, and exemption relieves that may reduce the actual capital gains taxes paid. For example, in the UK, there is a generous taper relief of 75% for business assets sold after 2 years, resulting in an effective capital gains tax of 10%.
[70] EVCA (2006).

(c) Macroeconomic stability

Once allowed to invest in venture capital, institutional investors do not automatically make such allocations. At the country level, the legal environment, particularly the protection of property rights, as well as the macroeconomic stability play a major role, especially when emerging markets are concerned.[71] Although this aspect of fundraising is typically taken for granted in devising VC-focused policies, it remains particularly important in the context of the catching up economies of the UNECE region. EU accession has been a strong factor for the harmonization and stability of many of these countries, yet concerns still remain for non-accession countries.

(d) Market factors

Even if the regulatory, tax, and macroeconomic conditions are conducive to VC fundraising, institutional investors seek market-based evidence that VC funds can achieve returns commensurate with their inherent risk. In this regard, institutional investors look at the private equity investment and exit activity[72] as well as the quality of the local general partners and the expected deal flow.[73] In particular, past fund performance and reputation are major drivers of fundraising.[74] This makes it harder for funds that are relatively new or do not have a solid performance record to raise funds.

Figure nine provides evidence for the relationship between VC returns and fundraising in US and Europe over the period 1980- 2001. In both regions, returns and funds raised have moved in close unison from the late 1980s onwards, with fundraising trailing by about four years. This is roughly the time period after which there emerges an indication of the magnitude of the returns to be achieved by funds raised in a particular vintage year. For example, the record fundraising in 2000 reflected the stellar returns of funds raised in 1996 (particularly those in the US), riding the Internet and communications wave of the late 1990s.

[71] Almeida Capital (2005); Groh, Liechtenstein, and Canella (2007).
[72] Almeida Capital (2005).
[73] Groh et al. (2007).
[74] e.g. Cumming, Fleming, and Suchard (2005); Kaplan and Schoar (2005).

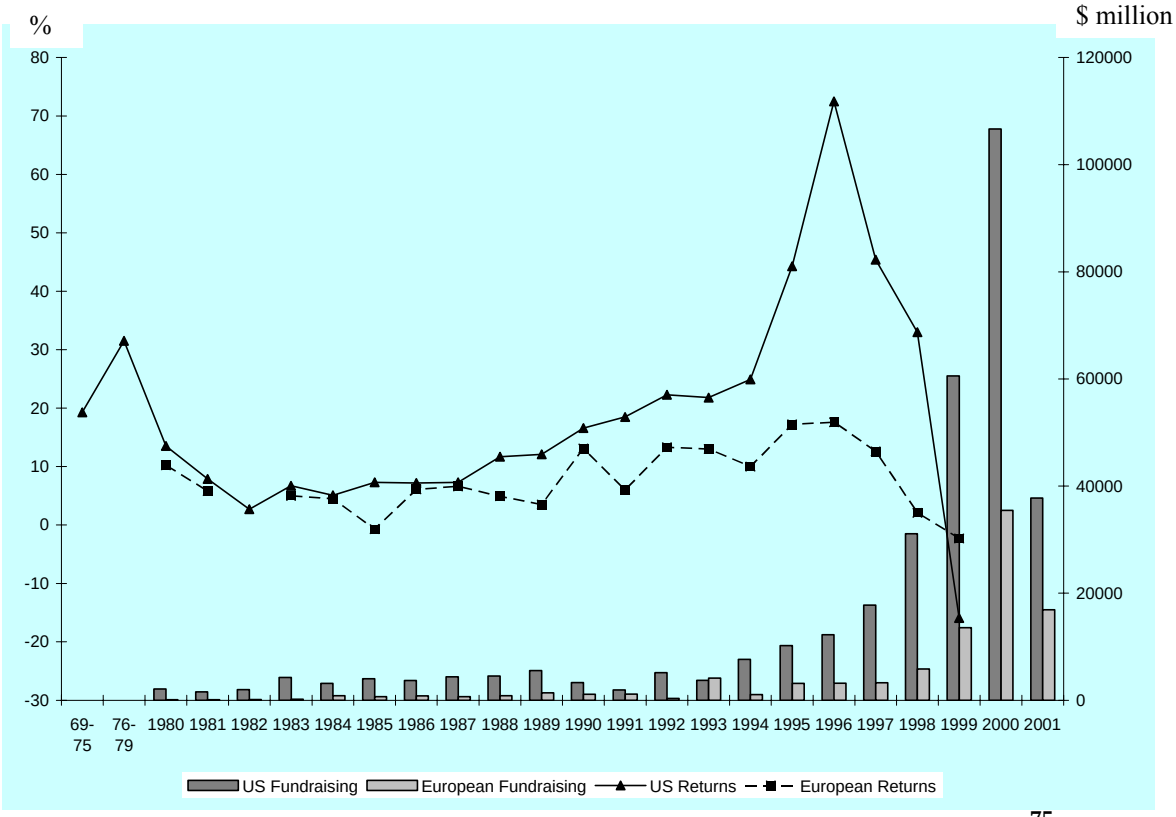

Figure 9: VC Vintage Year Returns and Fundraising Over Time[75]

The Figure also allows a historical comparison of US and European vintage year returns. Interestingly, while the returns overlap for much of the 1980s, there is a significant divergence in favour of the US after 1990, and particularly after 1993, when the latest technology boom started gathering momentum. It is clear that European VC funds have not capitalized on this boom to the same extent as their US counterparts, reflecting the relative immaturity of the European VC industry in the 1990s.

The Figure also allows a glimpse at the importance of regulations for VC fundraising. Whereas US funds raised in the 1976-79 period achieved returns in excess of 30%, there was no surge in fundraising following such impressive performance. This reflects the rigid fundraising environment of the early 1980s, when the regulatory changes for the allocations of institutional funds to venture capital had just been implemented.

Finally, as recent VC returns in the US have remained relatively suppressed – attributed to the inefficient combination of large funds and fewer deals, there has been recent indication that institutional investors may reduce their allocations to venture capital.[76] This reinforces the sensitivity of fundraising to VC returns.

[75] Source: Venture Economics.
[76] Venture Wire, May 23, 2007.

B. Investing

In broadest terms, there are several factors that ensure the smooth functioning of the investing stage of the early-stage financing cycle: (1) the availability of investment opportunities, (2) the ability of business angels or VC firm managers to recognize and select these opportunities, and (3) the ability of business angels and VC firm managers to structure investment deals in ways that align the interests of entrepreneurs and investors.

1. Availability of investment opportunities

Business angels and VC funds cannot succeed without a strong supply of high quality entrepreneurs. Strong deal flow ensures an effective selection of high-potential enterprises. A strong supply of high-potential, innovative enterprises to business angels and VC funds is in turn determined by the overall R&D environment in a country, the attractiveness of entrepreneurship as a career option, and the availability of critical support context in the very early stages of venture formation.

(a) Overall R&D Environment

There is much variation in overall innovation environment across countries. Figure 10 provides a snapshot of the R&D intensity[77] across countries. It shows that it is highest in Israel and the US. In addition, although it is 1.86 in EU25, it is significantly lower in the new EU countries (as shown in the figure), with the latter exhibiting significantly higher growth rates.[78] Among the EU countries, only Sweden and Finland had R&D intensity above 3%, i.e. the goal set by the "Partnership for Growth and Jobs" strategy.[79] In Russia, R&D intensity falls well below this level but compares well with the Mediterranean countries as well as the new EU members. However, the business sector accounts for only around one third of total expenditures, in sharp contrast with the distribution observed in more advanced economies.

The European Innovation Scoreboard classifies countries, based on their Summary Innovation Index and trends, into five categories: innovation leaders, innovation followers, catching-up countries, trailing countries, and fast growing catching-up countries. The innovation leaders include Sweden, Switzerland, Finland, Denmark, Japan, and Germany.[80]

[77] R&D expenditures as percentage of GDP.
[78] Eurostat (2007).
[79] Ibid.
[80] European Innovation Scoreboard 2006. http://www.proinno-europe.eu/doc/EIS2006_final.pdf.

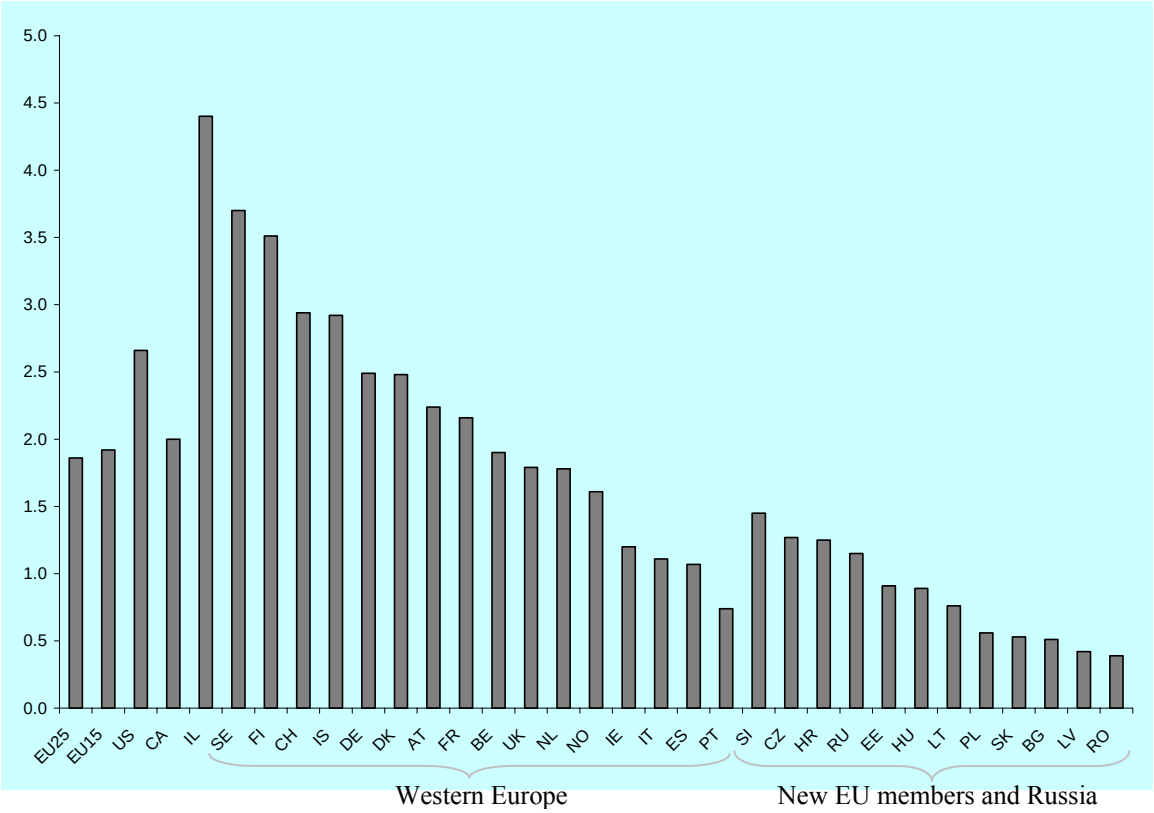

Figure 10: R&D Intensity in Select Countries, 2004[81]

(b) Entrepreneurial activity

The second aspect of the availability of investment opportunities strikes at the core of the so-called "European Paradox": while European countries generate world-class, top-level scientific output, they lag behind in the ability to convert this output into wealth-generating innovations.[82] For example, as the experience in Germany shows, the lack of high quality entrepreneurs and entrepreneurial incentives played a key role in the failure of the first venture capital funds in Germany in the late 1970s and early 1980s.[83]

The nature of the entrepreneurial "buzz" within a country can be captured by its early-stage entrepreneurial activity, i.e. the percentage of adults that have started new businesses or are in the process of doing so in a particular period. Figure 11 shows recent total early-stage entrepreneurial activity across countries participating in the Global Entrepreneurship Monitor study. Among the countries presented, early-stage entrepreneurial activity is highest in

[81] Source: Eurostat, OECD.
[82] According to the EC, "Europe's research and industrial base suffers from a series of weaknesses. The greatest perceived weakness, however, is Europe's comparatively limited capacity to convert scientific breakthroughs and technological achievements into industrial and commercial successes" (European Commission, 1994). This assessment has served as major catalyst for making innovation policy a strategic priority for the EC.
[83] Becker and Hellman (2003).

Iceland, the US, Norway, and Croatia, where at least one in 12 adults is an active or nascent entrepreneur. Many of the CEE countries show relatively high levels of entrepreneurial activity. In Western Europe, entrepreneurial activity is highest in Iceland, Norway, Greece, Ireland, and Spain, and is relatively subdued in Belgium, Italy, Sweden, Germany, and France. Although these rates vary from year to year, often in response to political developments or business regulations, some trends are evident over the last six to seven years. Over this period, the US and Canada have exceeded significantly their European counterparts in terms of entrepreneurial activity, despite the drop in Canada in 2006. In Europe, this activity has seen the biggest increase in Croatia, Russia, France, and the Netherlands, while Italy and Belgium have experienced the biggest decreases. In the remaining countries, this activity has varied in relatively narrow bands.

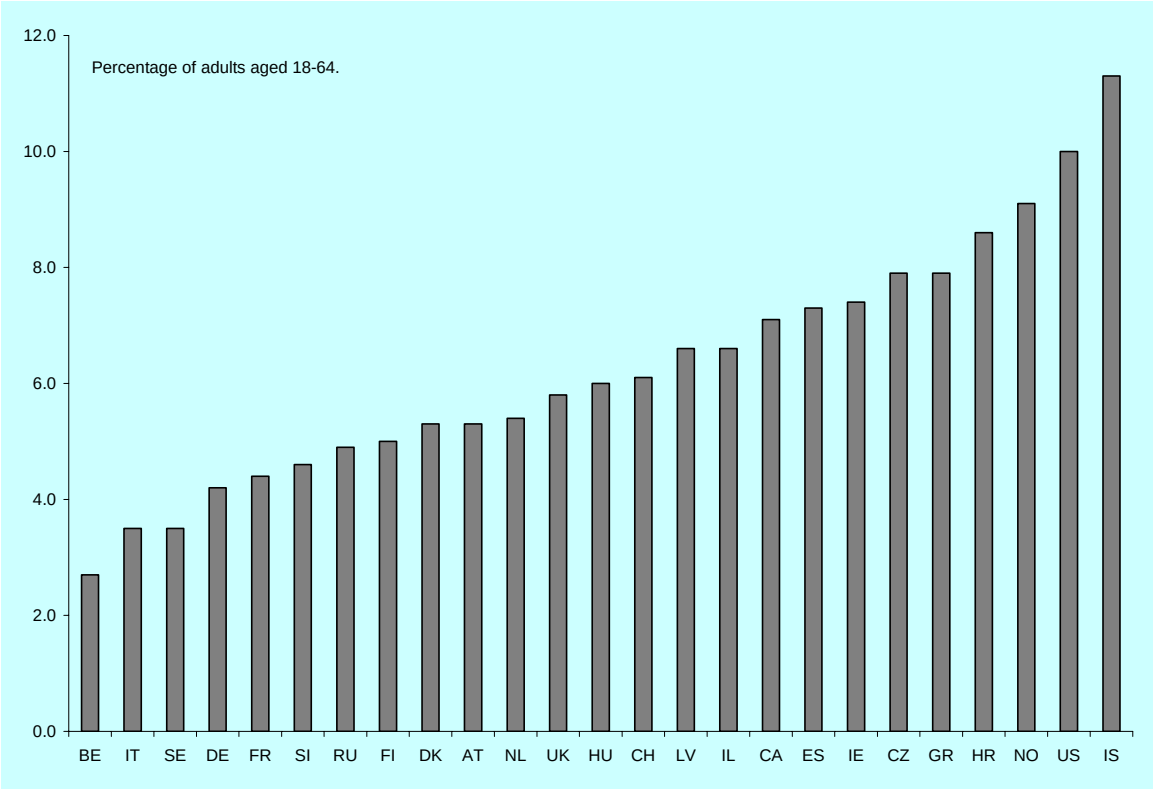

Figure 11: Early-stage Entrepreneurial Activity across Select Countries, 2006[84]

(c) Availability of finance at the earliest stages

Business angels and VC firms occupy different, consecutive places on the development continuum of the enterprises they back. Business angels back less developed businesses with smaller funding amounts, whereas VC firms typically provide larger, follow-on investments to these businesses. Business angels and VC firms have important complementarities: VC firms provide further funding for the businesses that business angels back, while angels

[84] Source: Global Entrepreneurship Monitor. The figure for Austria and Switzerland is for 2005. The figure for Israel is for 2004.

provide important deal referrals to VC firms.[85] This suggests that an effective interface between business angels and venture capitalists as well as the operation of each of these investment agents on a sufficient scale is an essential link in the early-stage financing cycle.

As earlier-stage investors, business angels face substantial uncertainty in the investment proposals and are most often turned away by the lack of credibility of the management team as well as the insufficient development of the business concept.[86] Having enterprises meet their investment criteria and inspire confidence in the management team and business concept thus requires substantial prior efforts in product development, market feasibility studies, and management team composition, all financed by various forms of pre-seed and seed capital. In this regard, the sourcing of business angel, and subsequently VC deals, is dependent on there being sound conditions for providing promising firms / ideas with vital seed-stage funding. Therefore, the successful development and sustenance of an early-stage financing industry critically depends on there being a favourable ecology of providers of seed financing. Perhaps the most prominent among them are business incubators, and, in the case of science-based businesses, feasibility and commercialization grants awarded by public or private institutions.

2. Selection of investment opportunities

The selection of investment opportunities by both business angels and VC firms is a multi-stage process, involving initial deal screening, detailed evaluation, and due diligence. Business angels often do the due diligence themselves, or with the help of a business angel network. At all stages, the experience and network connections of the investors are critical for an efficient investment selection. In addition, much of this process depends on there being an effective support network (IP lawyers, technology due diligence and market research firms, executive recruitment firms with expertise in new ventures, accountants, etc.) that provides both deal referrals and due diligence feedback. In this regard, the location of the investors has an important influence on their ability to access and select investment opportunities. For both business angels and VC managers, personal referrals of potential investment opportunities play an important role in capturing the investor's initial attention. This is the reason why even larger funds, which are recommendable to produce economies of scale, work best with regional/local actors/investors to assure a quality deal-flow.

Given their focus on different development stages as well as different organizational forms, business angels and VC managers emphasize different aspects of the enterprises seeking their equity backing. Business angels emphasize the quality of the management team – looking for favourable personal impression and evidence that the person(s) can be trusted to lead the venture in the face of adversity – whereas VC managers emphasize the market risks faced by the venture such as the potential market size, profitability, and competitive pressure.[87] In addition, consistent with their non-economic incentives to make private investments, business angels consider more strongly their involvement in the business after making the investment and thus their ability to contribute to the development of the venture.[88] Because of this, they

[85] Harrison and Mason (2000).
[86] Mason and Harrison (2002).
[87] Fiet (1995).
[88] Van Osnabrugge (2000).

tend to screen out ventures that are based in unfamiliar industries or are located far from the business angel's residence.

An increasing number of business angel investments are made through business angel networks (BANs).[89] Such networks operate both locally and nationally, and provide significant information and financial leverage to individual angels, giving them exposure to a larger number of deals and enabling them participate in syndicated deals. Increasingly, BANs are organized around investor interests in particular sectors and are thus able to combine and leverage the expertise of the individual investors. BANs typically provide matchmaking services, sometimes free of charge – by organizing networking events or investment forums – but some networks also charge fees. In addition, BANs can provide business plan coaching to prospective entrepreneurs to help them with their presentations to potential investors. BANs increasingly provide training for their investors and entrepreneurs, support for the syndication of their investors, connections to other financiers for co-investment opportunities as well as set-up co-investment funds.

In venture capital investing, the background of the VC managers plays a substantial role in their ability to detect investment opportunities.[90] In the absence of historical information on the ventures and, often, when facing emerging, not yet established industries, positive investment judgement is largely based on the VC manager's level of comfort with the science or technology space as well as the environment of early-stage ventures.[91] In particular, there is much value in having industry-specific skills and network connections that allow for effective deal evaluation and due diligence. Such experience fosters relationship between the VC managers and the local research base (universities, research institutes) that not only provide valuable and timely deal flow information but also facilitate efficient due diligence. A good example here comes from the Silicon Valley experience, in which the current complex interrelated social structure can be traced back to a few "spawning" companies that have created a far reaching tree not only on the enterprise side but also on the venture capital side. Indeed, some of the founders of what are now some of the most prominent VC firms are ex-entrepreneurs from some of the flagship enterprises of Silicon Valley or the early pioneers in the VC industry.[92] An emergence of VC funds around innovation clusters has been recently observed also in Europe and such a development is expected to continue.

Anecdotal evidence suggests that in the US there is a strong career path into venture capital firms for people with entrepreneurial, science or engineering backgrounds. In some contrast, in Europe VC managers tend to come with finance backgrounds – investment banks, commercial banks, accounting firms. There is an indication that when VC management teams are dominated by people with finance backgrounds, they tend to avoid early-stage investments

[89] See Lange, Leleux, and Surlemont (2003) for an overview and classification.
[90] See Dimov and Shepherd (2005); Dimov, Shepherd, and Sutcliffe (2007).
[91] A study by Tykvova (2004) of German VC firms, revealed that bank-sponsored or public VC funds, lacking in critical early-stage investment skills, tend to focus on later stages and assume less active role in the management of their investments.
[92] For example, Eugene Kleiner of *Kleiner, Perkins, Caulfield, and Byers* was one of the co-founders of Fairchild Semiconductor (the pre-eminent "spawner" of Silicon Valley); Tom Perkins came from Hewlett Packard. Other founders can be traced to the Harvard Business School class taught by George Doriot.

and focus instead on later-stage investments.[93] Such differences in backgrounds and skill set may be conjectured to partially explain the distinct patterns of investment allocation of the US and Europe: stronger VC and early-stage focus in the US and stronger buyout and later-stage focus in Europe.

3. Contracting

The importance of contracting lies in ensuring that the interests of investors and the entrepreneurs they back are well aligned and that the entrepreneurs have proper incentives to grow the venture. For business angels in particular, the inability to negotiate a favourable deal structure – such as the valuation of the enterprise and the shareholding structure – represents a major investment barrier.[94] Lack of sufficient knowledge on security types or valuation methods as well as the inability to utilize a particular form of security or contractual agreement in some legal environments serve to exacerbate this problem.

In venture capital investments, convertible preferred shares play an important aligning role between investors and managers.[95] In particular, convertible preferred stock not only aligns the interests of VC managers and entrepreneurs, but also provides powerful performance-related incentives that are enabled by certain tax treatments of stock and stock options compensation.[96] In the US, this security accounts for almost 95% of all securities used in venture capital transactions.[97] It is not so popular outside of the US, where it tends to be dominated by straight equity and even straight debt.[98] The reasons offered for this relate to the legal regimes of the host countries – the rule of law and the ensuing ability to enforce contractual protections – as well as to taxation issues. The absence of similar tax treatments in other countries can explain the lower usage of convertible preferred stock.[99]

C. Managing / Value adding

Of course, simply because a business angel or a VC firm exists does not automatically mean that they are able to value add to a venture. For a venture backed by active angels (as opposed to passive, uninvolved) with extensive experience in the venture's industry, there is much value added, as the angel develops a good working relationship with the entrepreneur. This is reinforced by the fact that angels carefully select the persons they back, in view of the extensive personal interaction that is to follow. These angels can offer valuable insights on the complexities of the industry and can be instrumental in introducing the entrepreneur to major stakeholders such as customers and suppliers. In addition, early-stage entrepreneurship is a lonely, dedicated process and, in this regard angels can offer much moral support to an entrepreneur facing adversity and strained personal relationships. Just like VC firms, business

[93] Dimov, Shepherd, and Sutcliffe (2007).
[94] Mason and Harrison (2002a).
[95] See Cassamata (2003); Sahlman (1990).
[96] Gilson and Schizer (2003).
[97] Kaplan and Stromberg (2003).
[98] Cumming (2005); Lerner and Schoar (2004).
[99] Cumming (2005).

angels develop reputations that carry a lot of weight in attracting high-quality deals and bestowing legitimacy to new enterprises in the market space.[100]

On the negative side, when several angels fund a single enterprise there is potential for conflict among them as disagreements on specific decisions or strategic directions may emerge. In addition, it is often hard for the entrepreneur to coordinate meetings and communicate with a large number of angels, leading to frustration and conflicting advice. In general, a lead angel is appointed by the angel syndicate to have the main contacts with the entrepreneur.

For VC firms, the ability to engage in and perform any of the governance, monitoring, investment staging, and recruitment functions outlined above depends on the skills and experience of the VC managers. There is evidence that when the VC managers lack the proper experience, they compromise some of their value adding activities.[101] Some of the relevant knowledge, skills and network contacts of the VC managers come from their own experience prior to VC.[102] The rest comes from their learning experience in making VC investments. Continued investments in particular sector help VC understand these sector and manage the information asymmetries within them as well as provide valuable assistance to the entrepreneurs.[103] Yet, there is a closed circle in this learning process: effective learning depends on extensive investment activity; such activity depends on the VC firm's ability to raise new funds; this in turn depends on the performance of the VC firm's prior investments, which in turn depend on the skills of the VC managers. In this regard, the process of learning and expertise accumulation is relatively slow. To this end, the mobility of VC managers across firms and countries is a significant factor for the dispersion of VC investment knowledge.

As a result, investment and value adding skills are unevenly distributed across VC firms. Indeed, there is wide variation across VC managers in the degrees of their involvement with the ventures they back.[104] Perhaps the major attestation of the importance of VC skills and experience is the very skewed nature of VC fund returns. The spread between upper quartile and median fund returns is particularly high in the context of venture capital, at almost 15 percentage points, significantly exceeding the eight-point spread of buyout funds and the less than five-point spread of equity mutual funds.[105] In addition, there is a much higher serial persistence of high VC fund returns, largely attributed to the skills and reputation of the VC

[100] For example, in its fledgling stage, Google was backed by a $100,000 investment by Andy Bechtolsheim, one of the founders of Sun Microsystems. In total, Google raised almost $1 million from friends, family, and acquaintances (http://www.google.com/intl/en/corporate/history.html).
[101] Tykvova (2004) provides evidence from Germany that bank- and government-sponsored VC firms engage in less value adding activities.
[102] Dimov and Shepherd (2005) show that the industry background of the VC managers has a significant influence on the VC firm's portfolio performance.
[103] Amit, Brander, and Zott (1998) develop and test a formal argument of the role of industry specialization. DeClercq and Dimov (2007) and Dimov and DeClercq (2006) show the positive role of industry specialization in managing both the upside and downside of the investment portfolio.
[104] For example, Perry (1988) classifies VC managers as "investors", "advisers" and "partners".
[105] These figures are based on US Data over the period 1981-2005. Source: Cambridge Associates and Venture Economics; as reported by Little Hawk Capital Management (www.littlehawkcapital.com).

managers.[106] These characteristics not only attract the best entrepreneurs[107] but also ensure that these entrepreneurs are given the best chances once the investment is made and also access more attractive exit routes.

Attracting high-calibre VC managers has been a major challenge to the early development of the VC industry[108] and perhaps an ongoing challenge outside the US.[109] A hereto-unexplored aspect of the challenge of attracting VC managers relates to the career paths leading into the venture capital industry. In this regard, interesting differences emerge between Europe and the US. Whereas in the US, many general partners are former, cashed-out entrepreneurs or former executives in industrial companies, in Europe the best-oiled career paths come from finance-related industries (investment banking, commercial banking, audit and accounting, etc.).

D. Exiting

The *raison d'être* of equity investing in private, unquoted companies is the potential opportunity for the investors to sell their stake at a future point in time at a price that amply compensates the investor for the undertaken risk. Although there are several ways in which stakes could be sold – IPO, acquisition, secondary sale, buy-back, or a write-off – IPOs and acquisitions provide the most lucrative routes. In this regard, the presence of an active stock market open to issuance of new securities is essential for a well functioning early-stage equity financing industry: both business angel and venture capital investments by their nature necessitate the subsequent cashing-in of control rights, a process facilitated by stock markets.[110]

To appreciate the importance of lucrative exits, it is important to consider that a significant portion of the investments made by these equity investors results in total or partial loss: while estimates vary across samples, a reasonable estimate would be that negative returns occur in around half of the business angel investments[111] and between a third and half of venture capital investments, with early-stage funds more severely impacted.[112] Given this negative skewing of the returns on individual investments, a lucrative exit on one or few investments can raise the return of the entire portfolio. Perhaps the most notable and widely quoted example of this is the investment by the first venture capital firm, American Research and Development Corporation (ARD), in Digital Equipment Corporation. ARD invested $70,000 in 1957 and sold its stake in 1971 at a gain of $355 million, raising the 25-year return of the entire ARD portfolio from 7.4% to 14.7%.[113]

[106] Rouvinez (2006).
[107] Hsu (2004).
[108] Fenn, Liang, and Prowse (1995) discuss this as one of the major problems associated with the SBIC programme.
[109] A recent survey of Canadian VC firms revealed the biggest challenge to be the dearth of skills related to investing and managing early-stage ventures (MacDonalds and Associates, 2005).
[110] Black and Gilson (1998).
[111] See Mason and Harrison (2002b) for a detailed discussion.
[112] See Sahlman (1990) and Murray (1999).
[113] Hsu and Kenney (2005).

1. Importance of stock markets for an equity financing industry

Historically, stock markets that have provided much needed liquidity for VC investors at key junctions of the industry development and, as a result, have served as a major pillar of the development of the VC industry in both the US[114] and Israel.[115] In particular, the strong appetite of the NASDAQ market for financing innovative companies has made it the envy of non-US policymakers. However, as the Israeli experience shows, it was not necessarily the domestic stock market that proved essential for the development of the local VC industry. In the 1990s many Israeli firms had access to the NASDAQ market in the US, greatly spurring the development of the Israeli VC industry by providing crucial exits for some of the early VC investments.[116] Stock markets matter through the access to them rather than through their location.

It is well accepted that active stock markets as well as markets targeting smaller, innovative companies have significant positive influence on the scale of early-stage venture capital activity[117] and, as such, affect the opportunities of innovative companies to successfully transition from business angels to venture capital investors and beyond. In addition to providing attractive exit routes to business angel and venture capital investors, stock-market environments put high weight on accurate financial performance data. This allows for objective comparisons between companies and industries in order to identify under-performers. Therefore, a stock market both acts as a catalyst for venture capital industry development and imposes common valuation methods for standardized performance comparison.

2. Factors affecting the role of stock markets in equity financing

The ability of stock markets to serve as active exit routes for business angel and venture capital investors depends on the regulations and liquidity of the markets as well as the supply of new businesses. For example, in Canada securities regulations has significantly impeded the development of a secondary market for the stock of less developed firms through stringent escrow requirements, disclosure requirements, and resale restrictions, making the IPO a costly form of exit and leading to lower returns experienced by Canadian VC firms.[118] In addition, countries vary in their legal foundations of investor control, i.e. in their prevailing legal regimes (e.g. Common versus Roman law), and in their degree of law enforcement, which in turn influence the degree of investor protection and, ultimately the size and dynamics of the countries' stock markets and the available sources of external financing.[119] As another example, the strength and prevalence of the banking system (e.g. in Germany) has been seen as a deterring factor for the development of a strong venture capital industry in the 1980s.[120]

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[114] Fenn, Liang, and Prowse (1995) argue that the hot new issues market of the late 1960s was instrumental for the success of the first LLPs.
[115] Avnimelech and Teubal (2004).
[116] Ibid.
[117] Da Rin, Nicodano, and Sembenelli (2006); Jeng and Wells (2000).
[118] Cumming (2005); Cumming and MacIntosh (2003).
[119] La Porta, Lopez-de-Silanes, Shleifer, and Vishny (1997); Cummings, Flemming, and Schwienbacher (2006).
[120] Pfirmann, Wupperfeld, and Lerner (1997).

Trading liquidity is essential for exits from equity investments as it allows the business angels or VC firms to sell their stakes without severely impacting the share prices. In this regard, although there have been several efforts to provide capital market access to promising new or small firms (AIM, EASDAQ, Neuer Markt, Nouveau Marche), all these have suffered from low liquidity. Such lack of liquidity has been attributed to fragmented stock exchanges, in turn characterized by diverse regulations, listing and reporting requirements, and trading systems.[121] The lower liquidity and limited listing opportunities on European exchanges has long been considered a weakness in the development of a sound European VC market. As a recent EVCA report states, "EVCA believes that one of the biggest barriers to success for European Venture Capital, in comparison with that in the US, is the lack of European capital markets to provide capital for small capital growth companies".[122]

In addition to sufficient liquidity for their listed companies, stock markets also need a strong supply of new businesses. For example, early attempts to create a market for VC-backed firms in Germany – the Geregelter Markt introduced in 1987 – had no effect on the development of the VC industry in the midst of social apathy towards entrepreneurship; yet, when Neuer Markt was introduced in an environment more inclined towards entrepreneurship, it was successful,[123] not only allowing many new firms to raise capital but also enabling them to grow fast.[124]

3. Recent pan-European stock market trends

Despite the persistent assessment of the lack of sufficiently active capital markets in Europe in regard to smaller, innovative companies, there have been positive recent developments that show significant promise for creating a solid ground for spurring the further development of the European VC industry. First, recent IPO activity in Europe has surpassed that in the US[125] and several trends and developments point to a favourable outlook on the European scene. European stock markets dominate the US in terms of international IPOs (118 versus 28 in 2006), reflecting the growing appeal of European capital markets.[126] In addition, several avenues have been opened for small and medium size companies to access capital markets. The Alternative Investment Market (AIM) in London has been dominant on the European scene in recent years and continued to be so in 2006 (241 IPOs, or 37% of all IPOs). Alternext, the Euronext market for SMEs and operating in Paris, Amsterdam, and Brussels (and soon in Lisbon) was a solid performer with 52 IPOs in 2006 (up from 14 in 2005). Deutsche Borse's Entry Standard, introduced in 2005 as a capital market access for small and medium size companies, also showed solid performance with 47 IPOs in 2006 (up from four in 2005). Thus, these three markets accounted for over half of the European IPOs in 2006 and are legitimate competitors of NASDAQ (140 IPOs in 2006). This shows a growing promise for exit routes in Europe. Indeed, the biggest biotech IPO in US and Europe in the last three

[121] EVCA (2005a).
[122] EVCA (2005a p. 2).
[123] Becker and Hellman (2003).
[124] Audretsch and Elston (2006).
[125] There were 653 IPOs in Europe in 2006, raising €65.4 billion versus 217 IPOs raising €36.1 Billion in the US (PriceWaterhouseCoopers, 2007).
[126] PriceWaterhouseCoopers (2007).

years has just been completed on the Swiss Stock Exchange, reflecting its growing importance as a biotechnology platform.[127]

Second, and perhaps most importantly, the markets for small and medium size companies (most notably AIM) have shifted their strategic focus to pan-European activity in order to broaden their investor base and achieve higher trading liquidity. To this end, in 2006 the fundraising activity within Europe has been truly pan-European, with companies from 16 countries seeking capital on Europe's stock exchanges.[128] Coupled with increased mobility of capital and stirring up of entrepreneurial attitudes, this development should have a positive effect on the development of the VC industry across European countries. It is of particular value to new EU member countries, where the national stock markets are still less developed.

Third, the recent purchase by NASDAQ of OMX, the Scandinavian Exchange covering Sweden, Denmark, Finland, Iceland, and the Baltic states, continues a trend in stock market globalization and is likely to give not only NASDAQ a strong foothold in Europe but also European VC firms a new exit route.

Finally, there is increased policy discussion and exploration of the issue of fragmented markets for growth capital and the desirability and feasibility of a single pan-European market for high-growth companies.[129]

4. Exits through acquisitions

Acquisitions (trade sales), although on average less lucrative and less visible, represent a more frequent form of exit for both business angels and venture capital firms. Both motivation and opportunity can explain why existing companies acquire new, innovative, less established counterparts.

For established companies acquisitions represent an important strategy for enhanced competitiveness and strategic renewal. In entrepreneurial, dynamic environments, in which new firms frequently emerge and overtake or disrupt the business models of established companies, acquisitions allow the currently better entrenched and financially savvy firms to preempt their eventual demise by building competitive positions in the "new economic order". They also create avenues for existing firms to pursue new opportunities that could potentially become major revenue streams. Because existing firms typically find it difficult to develop radical innovations in house, acquisitions represent an important intelligence mechanism for existing firms to anticipate and respond in time to emerging technological or socio-economic trends. In other words, not only does the equity financing of innovative enterprises depend on acquisitions for its sustenance, but also the intensity of acquisition activity depends on the supply and growth of innovative enterprises.

[127] Addex Pharmaceuticals SA, backed by several private and venture capital investors, raised CHF 137 Million on May 22, 2007. (Venture Wire, May 22, 2007).
[128] Ibid.
[129] EC (2005).

The actual opportunities for acquisitions in turn depend on the existing firms' abilities to both identify promising acquisition targets and finance the actual acquisitions. The former is facilitated by an active and internationally oriented investment banking and consulting communities, for which acquisitions represent a major source of advisory fees. In addition, active stock markets, particularly those better attuned to the needs of new, innovative, high-growth enterprises, spur the acquisition environment by facilitating the development and ascend of the new generation of businesses, which in turn pose a continuous threat to the competitive position of established firms. The ability to finance acquisitions depends on the existence of active stock markets, enabling existing firms to raise acquisition capital or use the value of their shares to enhance the acquisition value of their target. The existence of well developed bond markets or project lending by commercial banks also facilitates the financing of acquisitions.

E. Summary

This review of the early-stage equity financing landscape reveals important potential differences across countries.

(i) The scale and intensity of business angel activity, given sufficient supply of potential deals, is potentially sensitive to the tax and economic environment in a country. It is thus important that individual countries identify and alleviate their perceived barriers to business angel investing, including in the context of cross border investments.

(ii) Whereas many of the regulatory hurdles have been removed, leaving institutional investors "free" to invest in venture capital funds, their actual desire to do so is entirely dependent on the return prospects of these funds. Thus, where funds are not yet available, the VC industry needs to be given the opportunity to create returns and learn. A more serious commitment by institutional investors can only appear at a second stage.

(iii) There are wide variations in entrepreneurship attitudes and prevalence of early-stage financing and support for innovative enterprises as well as of informal investors. These factors work hand in hand to create a strong supply of high-quality entrepreneurial firms and, consequently, increase the demand for business angel and venture capital investment. They also interfere with other aspects of national economic policy, such as labour laws and taxation. While difficult to initiate, a wave of successful entrepreneurs is likely to have an energizing, momentum generating effect on future entrepreneurship as it inspires conversation and new aspirations, encourages investing, and creates a new stream of opportunities.

(iv) Critical business skills are needed for value added management of equity investments. While many of these skills emerge through hands-on experience, the industry learning effects are generally slow to materialize. Such learning is impeded by the fact that, in many countries, venture capital investing is seen as an offspring of financial and investment services and thus places more emphasis on capital- and risk-management skills and less emphasis on business-building expertise. The mobility of VC managers, interaction with experienced VC funds, and recruitment of experienced managers from a variety of industries are viable ways to accelerate the industry learning curve.

(v) The European VC industry is faced with current fragmentation of venture capital markets along national lines. As a result, cross-border VC investments are limited and hampered by divergent national VC frameworks. In this regard, the full potential of VC funds for investing innovative SMEs has not been exploited.

(vi) Historically, the NASDAQ market in the US has provided the most viable exit route for VC investments and thus given a significant boost to the development of the US VC industry. Regulatory burdens, fragmentation, and trading liquidity have prevented other exchanges from emerging as attractive capital markets for small, innovative, high-growth firms. Despite this chasm in exit prospects, recent trends of globalization, market consolidation, and deregulation, as well as the (re-)emergence of alternative markets in Europe, point to a brighter future for exits from the equity investments made by business angels and venture capital firms.

(vii) While the viability of an early-stage equity-financing infrastructure depends on the supply of innovative enterprises and the availability of exit opportunities, the exit opportunities themselves depend on the supply of innovative enterprises and availability of early-stage financing infrastructure. This attests to the circular nature of innovation finance.

V. REVIEW OF POLICY INITIATIVES TO ADDRESS EARLY STAGE EQUITY FINANCING OF INNOVATIVE FIRMS

A. Summary Overview

The equity financing cycle interfaces with several major aspects of a country's institutional and innovation environment and, as such, is naturally sensitive to government policies that affect institutional investing, capital markets, innovation and entrepreneurship. Indeed, governments have played a key role in the development of VC industries, either indirectly by affecting the conditions that ease and propel the equity financing cycle or directly, by providing capital and incentives to entrepreneurial firms, business angels, and VC funds. They have played major roles in jump-starting or facilitating the development of the VC industries in the US, UK, Germany, Denmark, Ireland and Israel, among others.

This section reviews a set of government initiatives across a group of countries, selected to represent the prevailing as well as varying approaches to government intervention across these countries. Evaluating each initiative requires sufficient understanding of the context in which it has been enacted, in particular the set of initiatives preceding it as well as the degree of development of each of the components of the equity financing cycle within the particular country. For this reason, the reviewed initiatives are grouped by country and cover both current initiatives and initiatives introduced previously and no longer active. In addition, appreciating the development of a country's formal or informal VC industry at a particular point in time requires understanding of its proper historical context in terms of economic development and set of enabling conditions. Where appropriate, these have been discussed.

The rest of this section provides a summary of the reviewed schemes in terms of their goals, focus, mode of delivery, comprehensiveness, and sustainability. This summary allows the reader to appreciate the diversity of schemes currently used in policy circles as well as to develop specific recommendations for individual countries.

1. Goals and focus

In their overarching goals, government initiatives seek to foster economic development, innovation, and job creation. Their more immediate goals tend to focus on (1) closing the equity gap for small and medium size enterprises (SMEs), (2) facilitating SMEs access to finance (both equity and debt), or (3) improving the country's innovation and competitiveness by encouraging the creation and development of innovative enterprises and by providing early-stage financing and support services.

Schemes vary significantly in their espoused focus. Whereas most programmes aim to support *innovative* enterprises, there may be additional restrictions pertaining to the size, stage of development, industry sector, origin (e.g. spin-offs from universities and other public research institutions), and geographic location of the recipient enterprises.

The specificity of the goal and focus of each initiative has important implications for its implementation and ultimate effectiveness. To the extent that initiatives seek to spur or

leverage private investing, those targeting potentially broad and undifferentiated sets of firms run the risk of allocating resources to enterprises that, while in need for capital, may not be in sectors, regions, or stages that match the interests of private investors.

2. Mode of delivery

Government programmes allocate resources either directly to the target enterprises, through publicly managed investment funds or grant agencies, or indirectly, through specially selected intermediaries such as private individuals (business angels), venture capital funds (including seed capital funds), incubators and technology transfer offices. The choice of intermediary is typically related to the specific focus of the programme. One form of engagement with intermediaries is based on funding their establishment and initial capital through loans, business development grants or equity. In some cases the funding of venture capital funds requires a matched participation by private investors. Another form of engagement encompasses the provision of debt or equity guarantees to private investors as well as the provision of tax incentives to individual, corporate or institutional investors for investments in specific types of enterprise.

The main modes of providing equity or equity-type investments to target firms include the following:

- Direct funding through government VC funds
- Direct funding through other government agencies
  - Feasibility studies and other seed-stage activities
  - Innovative SMEs
  - Co-investment with private investors in innovative SMEs
- Providing capital to privately managed VC funds
- Financing incubators and other early-stage intermediaries
- Providing debt or equity guarantees for investments in innovative SMEs
- Providing tax incentives for investments in private enterprises or in venture capital funds

The table provided in the Appendix shows the types of programme operated in each of the countries reviewed in this report.

There are wide variations across countries and schemes in terms of the amount of public funding provided and the amount (if any) of required matching private funds. It is interesting to note that the programmes in the countries with the biggest early-stage VC markets tend to have significantly higher budgets and a higher degree of co-funding by private investors compared to programmes in countries with less developed early-stage VC markets.

A major issue to consider in regard to the mode of delivery of each programme is whether the government assumes the funding decision or delegates it to the private market. Where governments handle the funding decisions, whether such decisions are made centrally by a single agency or are handled by multiple local agencies is of prime importance for balancing bureaucratic efficiency and programme effectiveness.

3. Comprehensiveness

When there is a multitude of programmes running in a country, the issues of synergies and complementarities among these programmes deserve special attention. The effectiveness of a country's set of initiatives depends on whether all stages of the equity financing cycle are properly addressed. Achieving the latter requires utilization and coordination of policies in the areas of regulation, tax, innovation and early-stage financing. Should there remain gaps in the smooth raising of funds, investing, value adding, or exiting, government programmes are doomed to fail in their aim to establish a self-sustaining innovation finance industry.

In this regard, there are great variations across countries in the comprehensiveness and coordination of the various programmes within the country as well as the government's continuous sensitivity to the changing needs of the early-stage financing market. In addition, in some countries (e.g. US, UK, Israel, Finland) there is continuous learning from experience with previous programmes, whereby new programmes are designed to address the deficiencies of their predecessors. In this regard, a programme's effectiveness and success are due not necessarily to the foresight of its designers but to the designer's ability to learn from previous experience and continuously track and evaluate the market impact of the programme.

Looking at the experience of individual countries, it is possible to distinguish *ad hoc* approaches in which money is put into the innovation systems (typically through grants) without careful consideration or support for the conditions in which the recipient enterprise will operate before and after receiving the grant. In contrast, *coordinated* approaches introduce series of schemes, each building on the experience of previous or seeking to complement concurrent schemes in addressing new constituents or providing increased support for existing constituents. In Europe, the UK is a clear example of a coordinated approach, in which efforts to encourage business angel investing and university-related entrepreneurial activity are followed by efforts to promote venture capital funds with different stage, sectors, and regional focus. Similarly, Finland, Sweden, Denmark, Norway, Ireland, and France are examples of countries in which large-scale public venture capital activity is complemented by support for seed-stage and incubator activity.

4. Sustainability

Where national programmes aim to foster the creation of a national VC market, their success depends on their ability to leverage private funding and thus encourage active business angel activity and create self-sustaining VC firms. The economic viability of small seed funds has long been in question, based not only on the magnitude of their operating expenses in relation to their size but also on their inability to provide follow-on funding to their companies as these companies develop towards successful exit. In addition, there is a fine balance between the size of a fund and the practicality and feasibility of making seed- or early-stage investments.[130] Creating larger funds runs the risk of their moving towards expansion-stage financing; creating smaller funds runs the risk of their being unsustainable.

[130] See Dimov and Murray (2007).

Many fund-of-funds programmes address the size and sustainability issue by leveraging private capital as well as providing a compensation structure, such as capping the returns on the government funds, with excess returns accruing to the VC managers. Such an approach increases both the fund's ability to provide follow-on financing and the VC manager's potential returns from early-stage investments. In addition, it links the fund with institutional investors, which can serve as the basis for future fundraising activity. In programmes where such mechanisms are lacking, and funds are entirely funded by public money, the issue of long-term sustainability is particularly potent. This is particularly the case of incubator and seed capital programmes, most of which – due to their recent implementation – are yet to seek a new wave of funding.

Another aspect of sustainability concerns the regional nature of many programmes and the supply/demand for venture capital. Many of the SME financing programmes of European countries have explicit regional focus. Policymakers face the difficulty that a dearth of venture capital finance might constrain the economic development of an area but the state's provision of equity finance cannot resolve related issues of, for example, the local level of entrepreneurial experience, the quality of intellectual property and the role of local universities in the development process.

B. North America

1. Canada

Canada has a vibrant entrepreneurial culture, as evidenced by its consistently high scores on total entrepreneurial activity as reported by the Global Entrepreneurship Monitor. On the negative side, Canadian capital markets have been characterized by heavy regulations, making them inappropriate for young, high-growth firms.[131] In November 2000 NASDAQ Canada became active. Also in 2000, the Canadian Government restructured its four main stock exchanges in order to enhance their competitiveness. In particular, it simplified the trading rules and regulations, and lowered costs for smaller participants. The Canadian Venture Exchange (now TSX Venture Exchange) emerged from this process to specialize in junior securities. To address the needs of early-stage companies, TSX Venture introduced the Capital Pool Company (CPC) Programme, which brings together an experienced management team with small firms in need of capital and expertise, and as such offers an alternative to IPO. The programme enables people with extensive business and public market experience to form a "Capital Pool Company" with no assets other than a small amount of seed capital and then list it on the TSX Venture Exchange to raise additional capital. The CPC then seeks an investment opportunity in a growing business and uses the raised funds to acquire the business in a "qualifying transaction". Following this, the shares of the CPC continue to trade as a regular listing on the Exchange.

In the 1980s and early 1990s the venture capital activity in Canada was relatively small. Explosive growth in the industry occurred between 1996 and 2001, in line with other VC markets, when over 200 VC funds were created. One distinct feature of the Canadian VC

[131] The overview of Canadian policy is based on Cumming (2007) and OECD's Venture capital policy review: Canada (2003). The amounts provided refer to Canadian Dollars (CAD).

industry is its proximity to the US and, inevitably, its influence by the US. Whereas in 1996 less than 5% of the VC investments in Canada were from foreign sources, in 2001 this figure was almost 30%.[132] This has offered significant opportunities for Canadian VCs to learn from their US counterparts.

Although the Canadian Government stepped in early to help develop the Canadian VC industry, its main efforts have enjoyed limited success. The primary government support mechanism for venture capital has been the Labour Sponsored Venture Capital Corporations (LSVCC)[133] – tax-subsidized investment funds designed like mutual funds and mandated to invest in privately held companies. Investments in LSVCCs were only open to individuals, attracted by the tax subsidies savings offered by the Government. The overall goal of LSVCCs has been to maximize employment, shareholder value, and economic development. The programme was introduced in 1984 and, for over 10 years accounted for the bulk of VC activity in Canada. By 2005, there were 125 LSVCC-managed funds, managing almost half of the venture capital in Canada, and showing poor returns and high administrative costs. The programme has cost over $3 billion over the period 1992-2002[134] and has been largely viewed as unsuccessful.

The poor returns of the LSVCCs have been attributed to: (1) dispersion of investor leads to poor oversight of fund managers, (2) rigid investment restrictions, leading to investments in inferior companies, (3) more portfolio companies per managers, inhibiting learning. In addition, the programme has incurred significant indirect costs, whereby LSVCCs have competed with, and crowded out, private VC funds by being able to outbid them for investments due to their tax subsidies. This process leads to higher deal values and, consequently, lower returns. In 2004/5 several Canadian provinces started to monitor the LSVCCs more closely and to consider the discontinuation of the tax subsidies.

In 2001, Canadian policy shifted more towards stimulating the formation of private venture capital funds as well as encouraging institutional investment. Three funds of funds were established in 2002 to become an important part of the infrastructure of Canadian private equity markets. In addition, the Federal Government introduced new rules for establishing Qualified Limited Partnerships (QLP) to facilitate their use by tax-exempt and foreign investors in structuring their venture capital investments. Under the new rules, non-residents will not be subject to Canadian tax when investing through partnerships using Canadian investment managers.

At the provincial level, there have been several tax schemes that encourage the financing of young businesses in the local regions. Tax incentives are given to individuals and corporations that purchase equity shares in registered venture capital funds at provincial level. For example, the British Columbia Equity Capital Programme provides tax credits to resident investors who purchase equity shares in registered Venture Capital Corporations (VCCs). The tax credit for both individuals and corporations is equal to 30% of the investment in the VCC

[132] OECD (2003), Venture capital policy review: Canada.
[133] Cumming (2007).
[134] Cumming and MacIntosh (2004).

subject to investment ceilings and other restrictions on amounts deducted. The actual tax incentives vary both by investment vehicle and region.

The Business Development Bank of Canada (BDC) has operated a venture capital arm (BDC Venture Capital) since 1975. It makes investments of between $500,000 and $5 million across all development stages for both private and publicly listed companies. BDC participates on the Board of Directors of the firm and provides management support. To date it has supported more than 400 companies.[135] There are also a few regional venture capital funds backed by provincial governments, with main objectives of enhancing technology development, increasing firm competitiveness, and contributing to job creation and economic growth. They back start-up companies, many in the technology sector, with first round investments ranging from $250,000 to $2.5 million. In addition to advice and monitoring, these funds provide important leverage with banks and other lending institutions.

In 1995, the focus of BDC shifted towards addressing the financing needs of small firms by leveraging private sector funding. The BDC Seed and Commercialization Funds initiative sought to establish seed capital funds together with private partners to finance the pre-start-up phase for young companies developing new technologies across Canada. Up to 2001, four seed capital funds have been established with a total capital of $112.5 million. In a new round of this initiative, BDC seeks to invest $100 million in 5 new independent seed and commercialization Venture Capital funds across Canada. Each fund must have a minimum size of $40 million, with the BDC investing $20 million per fund. The funds are to make all initial investments in Canada in the commercialization of technology.

BDC also offers venture loans – a hybrid financing instrument incorporating elements of both debt financing and venture capital. These instruments are designed for firms with little or no collateral and that do not want to dilute their ownership structure. The loan repayment is based on a combination of interest payments and a share of the company's cash flow.

At the deal flow end, the Canadian Government has attempted to increase the number of "investment-ready" small firms and to link them with potential angel investors. In 1995, the Canadian Community Investment Plan (CCIP) was launched as a seven-year programme aimed at building investment development expertise in communities. Its Internet-based component provides entrepreneurs with improved skills to structure and present their investment opportunities and to attempt to match qualified firms with local, regional or national sources of capital. Its second aspect established 22 community-based projects to improve access to capital for local growth firms. Each project receives up to CAD 600 000 over a five-year period and act as intermediaries between local businesses and various sources of risk capital. The success of these projects has been attributed to the existence of a critical mass of growth-oriented entrepreneurs and private investors.

2. United States

The development of the US VC industry cannot be detached from its historical context and its surrounding enabling conditions. One of the pioneers of the US venture capital industry,

[135] Source: BDC. http://www.bdc.ca/en/business_solutions/venture_capital/about_us/default.htm.

William Hambrecht, outlines three catalytic events that have established the technological leadership of the US and have greatly contributed to the strong development of the US VC industry: the emigration of prominent scientists and engineers from Europe in the 1930s, the massive investment in government research and development during WW2, and the G.I. Bill.[136] In this regard, the emergence of the first VC company, American Research and Development (ARD), in 1946 reflected a growing strive for commercialization of the technologies developed in public research institutions.

Equally crucial for the industry development has been the presence of an active stock market, offering a lucrative exit route for VC-backed companies at critical junctions of the industry development, thereby spurring further VC fundraising and investing. Notably, ARD's success and iconic role in the VC industry is largely associated with its investment of $70,000 in Digital Equipment Corporation in 1957 that generated a gain of $355 million in 1971, raising the 25-year return of the entire ARD portfolio from 7.4% to 14.7%.[137] The NASDAQ market has been the underpinning of the US VC industry, exemplifying its well functioning exit mechanisms. Since its creation in 1971, it has outpaced all other US markets in IPO listings and has been, by far, the most successful secondary market in the OECD. At its height in 1999, it listed nearly 5,000 firms and had a market capitalization of over 50% of GDP.[138]

Finally, the US VC market today reflects a learning and knowledge diffusion process that spans more than half a century and generates subsequent generations of investment managers. For example, the founders of some of the most prominent US VC firms can be traced back to the class on venture capitalism taught by one of ARD's founders, George Doriot, at Harvard Business School or to ARD itself.[139]

In this context of spectacular development, the US Government has played a key role by providing incentives and support as well as changing regulations at key junctions of the industry development. Perhaps the sequence of government initiatives is as important as the substance and outcome of these initiatives.

(a) Late 1950s – the Small Business Act

The impetus for government programmes facilitating the financing of new ventures was the growing concern that the innovative performance of the US was falling behind.[140] From the mid-1950s, with the passage of the Small Business Act in 1953, the attention of US policy was directed towards the financial needs of small businesses. The Small Business Investment Company programme, launched in 1958, was designed "… to stimulate and supplement the flow of private equity capital and long-term funds which small-business concerns need for the

[136] Hambrecht (1984).
[137] Hsu and Kenney (2005).
[138] OECD (2003). Venture capital policy review: United States.
[139] As Hsu and Kenney (2005) discuss, two class alumni, Arthur Rock and Thomas Davis, formed one of the earliest limited partnership funds (Davis & Rock) in 1961 (liquidated successfully in 1970, turning a $3 million investment into a $100 disbursement). Thomas Davis later founded the Mayfield fund. Arthur Rock is one of the legends of Silicon Valley and credited with coining the term "venture capital." William Elfers left ARD to found Greylock in 1965.
[140] The launch of Sputnik in 1957 by the Soviet Union was a major event reinforcing this impression.

sound financing of their business operations and for their growth, expansion, and modernization, and which are not available in adequate supply".[141] It led to the establishment of Small Business Investment Companies (SBIC) designed to increase the availability of funds to new ventures.

SBICs were private corporations specially licensed to provide capital to risky ventures. SBICs were allowed to supplement their capital with special loans from the Small Business Administration (SBA) that were subject to certain tax benefits. In exchange for the loans, the SBA placed restrictions on the investment activity of the SBICs, toward risky ventures. In the first five years of the programme 692 SBIC licences were granted, leading to the management of $464 million in venture capital.[142] Between 1958 and 1969, SBICs provided more than $3 billion to small firms, over three times the amount of private venture capital over that period. Some of the identified flaws of the programme included (1) (unintended) provision of debt financing to small businesses with positive cash flows, (2) attraction of individual rather than institutional capital, especially through publicly traded SBICs, and (3) inability to attract investment managers of high calibre and with the requisite investment skills. By 1977 the number of SBICs fell to 276. Despite these drawbacks, the SBICs provided record amounts of capital to fast-growing companies and served as a springboard for the establishment of a solid VC industry.

The SBIC programme underwent a fundamental redesign in 1994 to address its perceived shortcomings. It created a new method for SBICs to raise funds, through Participating Preferred Securities, which defer a portion of the interest payable to the Federal Government in the earlier years of the fund's life in exchange for the Government's participation in the profits of the SBIC. This arrangement corrected the problem of the mismatched assets and cash flow problems when making equity investments with borrowed funds, inherent to the original scheme. As a consequence, SBICs were able to invest in younger small businesses, while the Government could take the role of a limited partner. Under this new design, the programme experienced a revival and tremendous growth. From 1994 through 1999, SBA licensed 194 new SBICs with over $2.7 billion in initial private capital – more private capital raised than in all of the preceding 36 years of the programme combined! More importantly, whereas SBICs accounted for only 8% of the total venture capital invested over the period 1994-2002, they accounted for 65% of the seed financing in the US over that period, with $9.3 billion in seed investments.[143]

Another key legislation from this period was Section 1244 of the Internal Revenue Code, allowing $25,000 invested in new / small businesses to be written off against ordinary income. It has served to encourage informal investments by individuals in private ventures. The current write off limit under this rule is $50,000 ($100,000 for joint returns). The rule applies to investments in small business corporations (i.e. those with paid-in capital of less than $1,000,000) with less than 50% of revenues derived from passive sources (royalty, rent, dividend, interest, etc.).

[141] Widicus, Jr. (1966).
[142] Fenn, Liang, and Prowse (1995) provide a detailed history of the U.S. private equity industry.
[143] SBA (2002).

(b) Late 1970s – Regulatory changes

With the industry gaining momentum and the limited liability partnership emerging as a fundraising vehicle aligning the interests of investors and managers, several key legislations were enacted in the late 1970s that facilitated the flow of institutional funds to VC companies. First, a clarification by the US Department of Labor of the Employee Retirement Income Security Act's (ERISA) "prudent man" rule lifted barriers to the allocation of pension funds to venture capital or securities of small or young companies. This ruling initially revived the new-issues market for small company stocks and eventually provided a strong impetus for pension fund allocations to venture capital. The second piece of legislation pertains to a ruling in 1980 by the Department of Labor that granted VC partnerships a "safe harbour" exemption from plan asset regulations.[144] Finally, the Small Business Investment Incentive Act of 1980 redefined VC partnerships as business development companies, thereby making them exempt from the Investment Advisers Act.

In addition, the Economic Recovery and Tax Act of 1981 established Incentive Stock Options (ISO) as a tool for aligning the interested of employees and shareholders. ISOs have been a fundamental part of the relationship between entrepreneurs and VC managers.

(c) Early 1980s – Fostering innovative enterprises

The Small Business Innovation Research (SBIR) was launched in 1982 in response to the loss of competitiveness of the US in the global economy and with the goal of promoting innovative and high technology small firms. It represents 60% of the public SME finance programmes in the US. Notable companies such as Apple, Compaq, and Intel have received SBIR funding.

The SBIR programme provides up to $850,000 in early-stage R&D funding directly to small technology companies (or individual entrepreneurs who form a company) in two phases. Phase I awards $100,000 for up to six months intended for project feasibility study. With positive feasibility results, companies can apply for Phase II funding of $750,000 intended for project and prototype development. This phase lasts up to two years. It is expected that beyond Phase II, the SBIR recipients launch commercialization efforts with external, private funding, often provided by VC funds. The SBIR programme is administered by the Office of Technology of the Small Business Administration. The awards are funded and selected by 11 federal agencies. Each agency allocates 4% of its funds to small innovative firms. The total federal funding for the SBIR/STTR programme in 2007 is $2.315 billion of which almost 55% is provided by the Department of Defense.

Recent evaluations of the SBIR programme[145] show that the survival and growth rates of SBIR recipients exceed those of the non-recipients. In addition, the SBIR programme induces

[144] Under plan asset regulations, fund managers are required to register as investment advisers and are prohibited from receiving performance related compensation as well as subject to "prohibited transactions" regulations (Fenn, Liang, and Prowse, 1995).

[145] Audretsch, 2003; Audretsch et al, 2002, Lerner, 1999. Wallsten (2000) presents a counter-view, attributing some of the positive effect of SBIR funding to the fact that recipients tend to be larger firms, and arguing that SBIR funding displaces the firms' own R&D spending.

scientists to engage in entrepreneurship and represents a major source of funding for ventures launched by scientists. Most of the founders of the companies receiving SBIR awards came from universities. Without the SBIR award, 20% of the founders would not have started their firm and 40% would not have continued it. Furthermore, SBIR awards have an important inducement effect on other scientists in the institution. One of the major strengths of the programme and a key factor for its success is the decentralization of the funding decision, spread around the 11 federal agencies.[146]

The Small Business Technology Transfer (STTR), established by the Small Business Technology Transfer Act of 1992 and administered by the SBA, aims to induce public/private research partnerships for commercialization of new technologies. Five federal agencies reserve a portion of their R&D funds for awards to small firms of up to $100,000 for technology feasibility studies and up to $750,000 for subsequent research and project development. The award recipients work cooperatively with researchers at universities and other research institutions. The funding of the programme for 2007 is $131 million.

The Advanced Technology Programme (ATP) was established in 1988 by the National Institute of Standards and Technology (NIST) to help with the development of early-stage, innovative technologies by funding high-risk R&D performed by public-private partnerships. Between 1990 and September 2004, the ATP gave 768 awards totalling $2.27 billion and ranging between $434,000 and $31 million.[147] The supported projects received matching private funding of $2.1 billion. Of the 768 awards, 433 (56%) went to single-recipient small businesses, while a further 75 (10%) went to joint ventures led by small businesses.

(d) State initiatives

There is a growing number of state-assisted VC programmes that fall under five main categories: publicly funded and publicly managed funds, public funding of privately managed funds, tax credits or incentives for individuals or businesses making venture capital investments, state-sponsored or assisted angel networks, and state-sponsored or assisted venture capital fairs.[148]

The oldest of the state managed VC funds, the Massachusetts Technology Development Corporation (MTDC) was created in 1978 to help create employment in technology-based industries in the state. It targets early-stage capital, technology commercialization and mezzanine investments, typically in the $250,000 - $500,000 range. In each investment, the funds provided by MTDC are matched by private funds, which on average amount to 4.5 times the amount invested by the state. The California Emerging Ventures (CEV) programme was founded in 1998 by the California Public Employees' Retirement System (CalPERS), the largest public pension fund in the United States. CEV is structured as a fund of funds and has invested over USD 2 billion in early-stage companies. CalPERS also manages the California Biotechnology Programme, with initial funding of $500 million. Another programme in the

[146] Lerner (2002).
[147] Source: ATP. http://www.atp.nist.gov/eao/statistics.htm.
[148] Barkley, Ferland et al. (2000).

state, the California Technology Investment Partnership (CalTIP) provides grants of up to $250,000 to technology companies that receive competitive federal grants.

There are various tax incentives available in individual states for private investments. Perhaps the most generous of these is the tax credit given to insurance companies for investments made in "certified capital companies" (CAPCOs), amounting to 100% to 120% of the amount invested and spread over a 10-year period. A CAPCO is a for-profit entity that provides venture capital funding to "qualified" local businesses with the ultimate goal of creating new jobs. This programme originated in Louisiana in 1983, but has been introduced in a growing number of states since the late 1990s. This scheme is perhaps the most generous fiscal incentive for venture-investing in the OECD area.[149]

C. The European Union

1. Programmes at the EU Level

In Europe, while the earliest VC activity emerged in the late 1970s and early 1980s, the development of the venture capital industry began in earnest in the 1990s. Although the prevalence of venture capital in the financing of innovative firms in Europe has generally been low,[150] public policy at both the EU and country levels has increasingly seen venture capital as an important factor for sustained innovation. A major policy driver has been the eagerness to replicate US innovation successes by developing well functioning venture capital markets within Europe.[151] In this regard, public policy has played an important role in the development of the venture capital industries in Europe. The EC's Green Paper on Innovation and its First Action Plan[152] signalled a substantial commitment towards fostering an innovation culture and establishing a framework conducive to innovation. In this sense, 1995-1996 was a watershed period for public policy and the development of European VC industries. In 1998, the Risk Capital Action Plan (RCAP) was launched with the objective of "eliminating persistent regulatory and administrative barriers, at Community and national levels, which may impede the creation of a truly single market in the risk capital area".[153] The latest assessment of the RCAP revealed that significant progress and attainment of many of its objectives, while also highlighting remaining obstacles.[154] In addition, the EC supported the set-up of EBAN in 1999, and published in 2003 a BEST Report on "Benchmarking business angels".

At the EU level, the European Commission has been the main policy making institution. Until 2000, the European Investment Bank (EIB), and since 2000 the European Investment Fund (EIF) as EIB's implementation arm, has been the exclusive vehicle for implementation of venture capital initiatives on behalf of the European Commission, most recently through the Multiannual Programme for Enterprise and Entrepreneurship (MAP). As a complement to the mandates it manages, the EIF has invested a substantial amount (340m Euros) of its own

[149] OECD (2003). Venture capital policy review: United States.
[150] See for example, Manigart and Struyf (1997) and Bank of England (2001).
[151] European Commission (1995).
[152] European Commission (1995; 1996).
[153] EC (2003).
[154] Ibid.

funds by the end of 2006. The economic impact of these institutions has been substantial. Since its launch in 1994, the EIF has supported indirectly approximately 670,000 SMEs of which more than 3,000 were VC portfolio companies.[155] At the end of 2006, its equity portfolio stood at 3.77 billion Euros invested in 244 funds. These funds have in turn raised additional private capital of over 21 billion Euros. Over 40% of the fund's portfolio is allocated to early-stage funds, reflecting the fund's early-stage priority. In addition, the fund's cumulative guarantee portfolio stood at 11.1 billion Euros at the end of 2006.

(a) Pilot initiatives

Several pilot initiatives were introduced in the late 1980s and 1990s, which have been an important policy learning mechanism and, as such, have influenced subsequent policy efforts. The European Seed Capital Fund Pilot Scheme (ESCF), active in the period 1988 - 1995, was the progeny of many subsequent schemes aimed at facilitating financial support for early-stage enterprises. Under the ESCF, 23 seed funds were created with total capital of ECU 50 million (41 million of institutional money raised and 8.76 million of funds provided by the programme). Although the programme was broadly viewed as successful, the stand-alone viability of the created seed funds was low.[156] A major impediment to the successful operation of the funds was their small size relative to their annual operating costs of approx. ECU 150,000.[157] In addition, the small fund size prevented the fund from providing follow-on financing and thus made it dependent on outside (commercial) sources for follow-up investments.

The ESCF scheme was succeeded by the CREA[158] programme, supporting the establishment of seed capital funds. In particular, CREA helped cover up to 50% of each eligible fund's operating costs by providing a repayable loan for a maximum period of three years. Participating funds were selected based on a call for proposals announced in 1998. Of 20 pre-selected funds, 12 completed their fundraising in 1999 and signed a contract with the Commission the same year; eight contracts were signed in 2001. Most of these funds are currently still active. An evaluation of the programme revealed that it has helped create 2,500 jobs at a cost of 17,000 Euros per targeted and surviving business and 1,200 Euros per job. However, administrative complexity and application rigidity had slowed the initial progress of the programme. Only larger grant beneficiaries had found an engagement with CREA worth the effort. Smaller funds favour financial guarantees over management subsidies. The overall conclusion of the evaluation was that the direct management of such a programme was inefficient and ineffective.[159]

The core design of the ESCF scheme has essentially persisted in subsequent schemes – public funds are co-invested in venture capital companies with the hope of achieving leverage in the attraction of private capital for investment in innovative companies. The leverage is designed to compensate the limited partner for the increased risk to which the investor is exposed. The partner role of the Government, however, is limited primarily to providing investment

[155] EIF (2007).
[156] Murray (1994; 1998).
[157] Murray (1994).
[158] Capital Risque pour les Enterprises d'Amor3age.
[159] The Evaluation Partnership (2006).

directives and determining the nature and scale of the gearing. However, the issues of the size and performance of early-stage technology venture funds have been a persistent theme for policy debate to date. In many cases, the regional focus of a venture fund as well as the relative immaturity of the national risk capital industry contribute to inefficient fund design in terms of size and deal flow.

The EC implemented another pilot programme, Eurotech Capital, in 1989 aiming to support larger funds in backing high-technology projects. 14 VC firms participated, with almost 1 billion Euros of funds under management and seeking to allocate around 200 million Euros in transnational high technology projects. Eurotech provided both a 4% capital contribution and free access to Eurotech Data, an information service on technologies and technology markets.

A third pilot scheme, I-TEC (Innovation and Technology Equity Capital), was launched in 1997 to encourage early stage investments in technologically innovative SMEs. It was implemented in collaboration with the European Investment Fund. Each of the 28 participating VC firms agreed to devote at least 25% of their funds in at least five early stage investment in technologically innovative SMEs. In return, I-TEC covered up to 50% of the costs related to the appraisal and management of these investments, with a maximum of 5% of the investments made or 500,000 Euros per fund. By September 2003, 24 of the participating funds invested 666 million Euros in 349 companies, exceeding the 493 million Euros originally committed to early-stage technology investments.[160] 56% of the supported ventures were less than a year old, and 94% were less than three years old. 95% of the investments were made domestically. 24% of the companies were in France, 21% in the UK, 21% in Germany, and 11% in Italy. 63% of the companies had 10 employees or less.

(b) Recent programmes

The bulk of the EIF activity is related to EIB mandates. The Risk Capital Mandate (RCM), established in 2000, is an evergreen mandate of 4 billion Euros. Its main objective is "to support technology and industrial innovation throughout early stage, expansion and development capital, with emphasis on innovative EU companies and generalist funds in Accession Countries and in various neighbouring countries".[161] By the end of 2006, 3.2 billion Euros had been invested through this mandate in over 200 funds.

An example of EIF's impact is the UK-based Environmental Technologies Fund (ETF), which raised 50 million Euros in August 2006 and in which the EIF invested 15 million Euros under its MAP mandate. ETF is the first sustainable clean-tech dedicated fund to receive EIF support. The fund is led by a first-time team that, despite its extensive industry and VC experience, faces a legitimacy hurdle with institutional investors. In this regard, ETF has played a key role in securing a stable investor base. Such a high quality investor base is seen as a vote of confidence in the team.

In addition, the EIF manages EC financial instruments as part of the Multiannual Programme (MAP) initiative, aiming to improve the financial environment for businesses. The *Start-up*

[160] Source: I-TEC. http://cordis.europa.eu/finance/src/i-tec-results.htm.
[161] EIF (2007).

Scheme of the European Technology Facility (ETF) invests in funds providing risk capital to smaller businesses. The *Seed Capital Action* is a facility designed to stimulate the supply of capital for the creation of innovative new businesses with growth and job creation potential, through supporting seed funds, incubators or similar organizations. In total, through these two initiatives, 35 funds have been supported with a total of 265 million Euros. In addition, the EC has implemented several guarantee instruments (SME Guarantee Facility; Growth and Environment Facility), designed to facilitate the access to debt financing.

In order to ensure continuity, the MAP financial instruments will be succeeded by the instruments of the Competitiveness and Innovation Programme (CIP). The CIP financial instruments should be available from the second quarter 2007 and have a budget of over 1 billion Euros for the period 2007-2013. These programmes expect to leverage around 30 billion Euros of new finance for SMEs. Among these instruments, there is increased focus on risk capital for high-growth enterprises and on the development of innovation and business support networks. For example, the High Growth and Innovative SME Facility (GIF) aims to increase the availability of risk capital to innovative enterprises at their early stages. Through this programme, the EIF invests up to 10 million Euros, intended to represent between 10% and 25% of the recipient fund's capital, in specialized VC funds or business incubators.

In 2005, the EC together with EIB and EIF launched the JEREMIE[162] initiative to promote increased access to finance for the development of micro, small and medium-sized enterprises in the EU regions over the period 2007-2013. Under this initiative, national and regional authorities can use financial resources from the European Regional Development Fund (ERDF) to create a professionally managed Holding Fund to provide a portfolio of market-driven financial instruments, such as venture capital investments and guarantees. Each Holding Fund will select and accredit financial intermediaries and provide them with equity, loans, guarantees as well as technical assistance. In turn, the financial intermediaries will make funds available on competitive terms to micro, small, and medium enterprises, with special emphasis on those that advance the Lisbon agenda. To assess the potential needs for the programme, EIF carried 24 SME 'gap analyses' in 18 Member States. A growing number of Member States have been stating intention to establish a Holding Fund and apply the financial instruments proposed by EIF. In a number of cases, the EIF has been asked to become the manager of the Holding Fund.[163]

In 2006, the European Commission made several regulatory changes affecting the flexibility of member states to provide financial support for young innovative companies and early stage venture capital funds. In particular, these changes have made it easier to set up early-stage VC funds with public support in areas where private financing is insufficient. The new *de minimis* regulation exempts aid notification for amounts below 200,000 Euros as well as loan guarantees of up to 1.5 million Euros. In addition, a new state aid framework for research, development, and innovation allows for aid of up to 1 million Euros to young, innovative R&D intensive enterprises. Finally, new guidelines on state aid to support risk capital

[162] Joint European Resources for Micro to medium Enterprises. http://ec.europa.eu/regional_policy/funds/2007/jjj/jeremie_en.htm.
[163] EIF (2007).

investments in SMEs include a 'safe harbour' of 1.5m Euros investment per SME over 12 months and simplified decision procedures.

Finally, the Commission has been supporting various innovation networks, such as Europe INNOVA[164] and PRO INNO Europe[165] and an on-going action (EASY)[166] aiming at improving connectivity among business angels, seed funds and venture capital providers.

(c) Summary

There has been a significant and increasing commitment at the EU level towards improving the environment for early-stage financing. In particular, the EIF has established itself as a major "player" in the venture capital space, a major source of investment experience, and a significant legitimizing force for VC funds in their relationship with institutional investors. In addition, the EIF has been performing VC activities on behalf of the EC under the Multiannual Programme (MAP) and will continue to do so under the Competitiveness and Innovation Programme (CIP).

It is important to note that, despite the scale of the EC/EIB/EIF activities, their involvement is indirect. Their effect in individual countries is dependent on there being functioning national VC markets, i.e. funds with the experience and aspirations to qualify for EIF support. Not surprisingly then, most of the EIF investments are made in countries with better developed VC markets. In this sense, EU-level initiatives complement rather than substitute initiatives at the country level.

The following sections review the government programmes in individual European countries.[167] The countries are grouped by world regions and listed in alphabetical order within regions, with the new EU members reviewed en bloc.

2. Austria

The VC industry in Austria is relatively new, with most of the VC firms emerging following Austria's accession into the EU in 1995. Austria is very similar to Germany in the prominent role that banks play in the economic sphere. For this reason, debt has been a predominant form of financing in Austria. In this context, government programmes aiming to encourage equity investments in new, innovative firms have contributed to the emergence of the Austrian VC industry.

The Seed Financing programme was introduced in the early 1990s to provide funds and facilitate the access of cutting-edge high-tech companies to the capital markets. It provided a special mezzanine loan of up to 730,000 Euros to high-tech start-ups. In addition to funding, the programme offers coaching and monitoring for the new entrepreneurs by highly qualified

[164] http://www.europe-innova.org/index.jsp.
[165] http://www.proinno-europe.eu/.
[166] http://www.earlystageinvestors.org/.
[167] Most of the reviewed initiatives have been identified from the Trendchart Innovation Policy Measures Database available at http://trendchart.cordis.europa.eu.

seed-financing staff. A total of 36.3 million Euros have been invested through this programme. The overall evaluation of the programme has been positive.

Since 1996, subsidies and guarantees have been offered to innovative SMEs in the total amount of 16 million Euros. Since 1997, equity capital guarantees have been provided to private, non-institutional investors for their investments in SMEs. To date, investments totaling 70 million Euros have been guaranteed.

In 1999, the "LISA" programme was introduced to provide services to researchers and entrepreneurs to exploit innovative ideas in the life sciences space. The programme offers business consulting for founders, financing of start-ups, business training for scientists, creation of awareness, cluster management and international location management. It also organizes business plan competitions. Since 2002, the programme also offers a pre-seed subsidy (grant) and seed financing in the form of a mezzanine loan, with interest capped at 8.5%, repayable as a portion of the company profits.

The Government is currently reviewing the Finnish experience and considering establishing a venture capital fund that would indirectly provide funds to start-ups and SMEs by investing in private VC funds.[168] Government experts estimate that the capital of such fund would need to be in the range of 150 - 200 million Euros for it to be effective.

3. Belgium

Since 1999, the Walloon Region has been running a Venture Capital for University Spin-offs programme providing equity and loans to enterprises wishing to exploit the results of research. So far, 20 enterprises and 14 spin-offs have been supported.

The Flanders region introduced in 2006 tax incentives for friends and relatives of entrepreneurs willing to invest in their start-ups in the form of a “win-win” loan, a subordinated loan of maximum 50, 000 Euros with an eight-year term and repayable in one instalment. The investors get a tax reduction of 2.5% of the loan. If the loan is not repaid the investor receives an additional fiscal reduction of 30% of the loan.

Since 2005, another Flemish initiative, the ARKimedes Fund, offers tax incentives to attract investments from private individuals. The raised funds are invested in private, professionally managed VC funds with successful track records that invest up to 1 million Euros in start-up or expansion businesses in Flanders. ARKimedes provides up to 50% of a fund’s capital.

In 2005, a Flemish Innovation Fund was established with capital of 75 million Euros to provide pre-seed and seed funding to young, innovative companies. The fund co-finances IPR, feasibility studies, market orientation studies, prototype development, initial marketing, etc. with the goal of making these start-ups attractive to private investors. It can provide up to 500,000 Euros of seed capital either directly or through partner funds, whereby it co-invests with the partner fund up to the same amount and at the same terms.

[168] AFX-Europe / Thomson Financial, 29 May 2007.

4. Denmark

The first VC companies in Denmark were established in 1983, yet the Danish VC market was small and sluggish until the late 1990s. The earliest policy initiatives in Denmark sought to provide guarantees for investments in small firms. The Danish Development Finance Corporation (DUF)[169] was established in 1988 with total capital of DKK 500 million. The Government provided equity guarantees for the investments that DUF made in small firms. DUF was liquidated in the late 1990s and its portfolio was taken over by an asset management company.

The Equity Guarantee Programme for Development Companies (Venture Capital Companies) was established in 1994 with funding of DKK 1 billion, with the primary purpose of creating a venture capital market in Denmark. 16 VC companies were approved to receive a 50% risk sharing by the state on their equity investments in emerging growth companies. After eight years, the guarantee was reduced by 10 percentage points per year for five years. The programme is due to be phased out.

The Business Development Fund[170] was established in 1992 to provide high-risk loans to high-technology projects in new and established companies. The fund provided soft loans, sharing the downside risk and receiving only a fixed return in case of commercial success. Under this approach, more than 60% of the total funding was lost on more than 900 supported projects.[171] It would write off the loan when a company could not repay it.

In 2000, with the policy objective of developing an internationally competitive private equity environment in Denmark, the Business Development Fund was restructured as VækstFonden (Danish Investment Fund) and changed its mission to providing seed and start-up financing for small innovative firms in the form of equity capital and mezzanine loans. With a capital base of 400 million Euros, Vaekstfonden is one of the largest Danish VC players. It both provides direct funding to fast-growing Danish companies and acts as a fund-of-funds investor in the private equity sector in the Nordic region. Through its fund-of-funds activity, VækstFonden established six new venture companies in 2001/2002. Under the terms of these investments, the private fund investors obtain one-third of the returns accruing to the VækstFonden capital and have the option to purchase all shares if the company becomes viable. Overall, VækstFonden has had a substantial impact on the increase of early-stage VC activity in Denmark since. It is currently invested in 14 VC funds, has provided equity investments and mezzanine loans to 140 enterprises, and has made 700 loan guarantee commitments.[172]

In 1997, the Technology Incubators programme was launched, aiming to bring together research institutions, entrepreneurs, and finance providers in order to facilitate the commercial transfer of research via the creation of new enterprises. The Ministry of Science, Technology, and Innovation originally approved eight such incubators located at universities or

[169] Dansk Udviklingsfinansiering.
[170] Erhvervsudviklingsfonden.
[171] OECD (2003), Venture capital policy review: Denmark.
[172] Source: Presentation at NORFACE conference, Berlin, 21-23 May, 2007.

science/research parts. Currently, there are seven active incubators. The incubators provide a channel for state-financed seed capital in the form of grants, loans, and equity as well as administrative support and training to selected entrepreneurs in companies that are no more than six months old. The maximum funding per company is 100,000 Euros. The initial funding for the programme was 40 million Euros for a period of three years, with an additional 54 million Euros approved for 2001-2004. After 2004, the incubators were to become self-financing. By 2000, 172 new innovative companies were started in high growth industries. However, only 38% of the funded projects were research-oriented.

5. Finland

The environment for financing young innovative companies in Finland has improved significantly since the late 1990s, driven by Finland's excellence in innovation and enabled by the introduction of several public financing programmes aimed at smoothing the impact of the financial markets decline following the bursting of the dot.com bubble.[173]

The TULI programme was established in 1993 to promote the launch of new, technology-based businesses that originate from research. It seeks out research ideas or innovations with commercial potential and promotes awareness of such possibilities in the local community as well as provides funds for feasibility studies or market analysis. TULI is financed by the Finnish Funding Agency for Technology and Innovation (TEKES). Originally, the programme was comprised of regional technology transfer companies, each with a full-time project manager and a team of independent consultants focusing on identifying, assessing and developing potential new business concepts. Typical services included market research, competitor analysis and issues related to intellectual property rights. The services are free for researchers and research groups, and participation in the programme does not restrict the proprietor's rights to his/her idea. In 2002, the regional operations were consolidated into a national operation administered by the Finnish Science Park Association (TEKEL).

Finnish Industry Investment Ltd. (FII) was established in 1995 as a government-owned investment company, with the purpose of stimulating the development of the Finnish venture capital industry, particularly in regard to high potential SMEs.[174] FII invests in young firms directly as well as indirectly, by participating as a cornerstone investor in new funds raised by venture capital firms. At the end of 2005 its investments totaled 325.6 million Euros.[175] However, due to its mandate to maintain profitability, the programme has tended to finance later-stage companies and thus has been ineffective in addressing market failure in early-stage finance. The formal evaluation of the programme led to recommendations to discontinue its direct financing mode and focus on using its indirect mode to enhance the functioning of the market for early-stage venture capital.

Over the 1996-2001, TEKES ran a Capital Loans programme, providing low-interest funding for starting and growing technology intensive SMEs. The loans are granted without collateral and strengthen the recipient's balance sheet. Loans can be partially or fully forgiven if the

[173] Maula, Murray, and Jaaskelainen (2007).
[174] See Maula and Murray (2003) for a detailed description and formal evaluation of the programme.
[175] Maula, Murray, and Jaaskelainen (2007).

technological development fails or is commercially unsuccessful. In addition, they allow for early repayment. In exchange for the loans, TEKES typically received 25-50% of the company's equity. Over the five-year period, TEKES spent 146 million Euros on this programme.

The PreSeed Finance programme, managed by SITRA, the Finnish Innovation Fund, was launched in 2001 to help people with good business ideas to find sources of venture capital. It serves potential businesses in three ways. It provides pre-seed funding for the development of technology-oriented ideas (LIKSA). It then operates a marketplace (INTRO), serving private investors and businesses that are seeking initial investment through company presentation forums, focused investment negotiations and a Web service. Finally, it operates an expertise exchange (DILLI), helping entrepreneurs access needed expertise from experienced business professional prepared to share the risk of the venture as well as helping business experts exchange their know-how for a share in the company.

The Seed Financing programme was established in 2004 to encourage equity investments in early stage (seed, startup and early growth) companies in Finland and to promote the productization and commercialization of innovations by investing in seed and growth stage enterprises with private investors. Through the programme, Finnish Industry Investment (FII) makes co-investments with authorized local lead investor who manages the investment. FII's maximum participation is limited to 50% of the total investment. The size of a single investment may vary between 50,000 and 1 million Euros. Investments are made under the same terms as the lead investor. However, FII receives no management fees.

The Start-up Loan for Technology Companies, offered from 2004, is an unsecured loan provided by TEKES to new, technology-based businesses with growth aspirations. It provides a maximum of 100,000 Euros or 80% of approved expenses and has a term of 10 years, with no repayment due in the first five years. The loan interest is as high as the base rate or at least four per cent.

The Start Fund Vera Ltd was established in 2005 as a nation-wide seed fund for enterprises at their early stages, seeking to make them investment-ready. The fund makes minority (15-40%) equity or equity-related investments in the target enterprises. The maximum investment in an enterprise is 500,000 Euros, with an initial investment of 100,000-250,000 Euros.

6. France

France has a relatively well-developed VC industry. Equity finance at the regional level dates back to the 1980s. The real start of a national venture capital industry came with the introduction in 1996 of a dedicated tax transparent vehicle, the FCPR.[176] Prior to that, most venture capital deals had been done through holdings with a specific tax status (Societes de capital risque). A national policy emerged with the involvement of the Caisse des Depots group in 1994. Several programmes launched during the 1997-1999 period have been particularly instrumental for the industry development. In 2005, the OSEO group was

[176] Fonds communs de placements à risques.

created, a public holding that manages BDPME,[177] Sofaris and ANVAR.[178] In 2006, these were renamed OSEO-Financement, OSEO-Garantie and OSEO-Innovation respectively.

The oldest SME scheme – OSEO-Garantie (formerly SOFARIS guarantee scheme) – dates back to 1982 and has provided 4.2 billion Euros in guarantees to date. The programme provides a guarantee to entrepreneurs who do not have easy access to the banking system but who need a bank loan to start up or take over a new business. There are different funds to guarantee creation, transmission, development, as well as short term financing needs or financial consolidation of SMEs. In addition to helping entrepreneurs, OSEO-Garantie provides guarantees to venture capital funds making equity investments in innovative SMEs in exchange for a share of the fund profits. If these guarantees are activated, the amount reimbursed to the VC funds should be reinvested in its portfolio. The guarantees cover between 30% and 50% of the bank loan amount and up to 50% of the equity investments by venture capitalists. This proportion can go up to 70% in case of new start-ups. OSEO-Garantie now also provides guarantees on business angel investments, covering up to 70% of the investment amount.

The Mutual Funds for Innovation (FCPI)[179] programme was established in 1997 to provide tax incentives (an income tax reduction of 25% of the invested amount) to individual investors investing in funds targeting innovative, private SMEs. The FCPI must invest at least 60% of their capital in innovative SMEs. By the End of 2004, 146 FCPI belonging to 29 companies had raised approximately 2.7 billion Euros. Under a similar tax incentive logic, investments in regional venture capital firms are promoted through an FIP[180] programme.

In 1999, France launched its Regional Incubator Structures programme aiming to support co-operation between public research bodies and enterprises and encourage the creation of technology-based firms. The selected incubators have to include partnerships between universities and/or public research organizations as well process consultants or associations for the development and creation of innovative companies. Public grants covered 50% of the incubation expenses and was linked to there being a certain number of supported projects. Out of the 31 originally established incubators (funded by 37 million Euros), 29 are still active, with at least one per administrative region.

Also in 1999, a National Competition for Creation of New Technology-Based Firms was launched, open to anyone willing to set up a new technology-based firm. To date, the distributed awards have totalled 165 million Euros. In 2005 alone, there were 178 awards.

In 1999, the Seed Capital Funds measure sought to increase the amount of seed financing to innovative start-ups by assisting funds that invest in innovating companies, particularly those connected to public research activities. The seed capital funds are private companies, in which research organizations and universities are allowed to contribute up to 40% of the fund's capital. The support constitutes an advance of capital to the funds reimbursable in a time span

[177] Banque de developpement des PME
[178] Agence Nationale de VAlorisation de la Recherche.
[179] Fonds Communs de Placement dans l Innovation.
[180] Fonds d'investissement de proximite.

of 12 years. CDC-Entreprises – a subsidiary of the Caisse des Depots et Consignations (CDC) – is the major investor, with 30% of the total funding for seed-capital. At the end of 2004, the Government had committed 22.9 million Euros to this scheme. In September 2005, there were eight national seed-capital funds and ten regional seed-capital funds managing 275.3 million Euros and supporting 176 companies, mostly in the ICT and life sciences sector, 34% and 66% respectively.

In 2000, policy attention shifted to venture capital with the establishment of the Fund for the Promotion of Venture Capital (FPCR-2000).[181] The Fund, managed by CDC-Enterprises, takes minority shares in private venture capital funds targeting French and European innovating companies less than 7 years old in sectors where it is difficult to obtain private funding: life sciences, ICT, electronics, new materials and environment and sustainable development. These funds invest more than 50% of their capital in French companies and more than 75% in European countries. The FPCR-2000 preferentially invests in funds that are set up and managed by new teams composed of scientists with industrial or financial experience, but also in national and regional venture capital funds. It is not to hold more than 30% of the funds capital within a limit of EUR 12 million. Ten new venture capital funds have been created under this programme.

The Co-Investment Funds for Young Enterprises was implemented in the 2002-2005 period to take minority participations in the young technological enterprises (less than 7 years old) together with the investment funds established in European Union countries. It invests at the same conditions as the private investors. Around 90 million Euros has been invested in 50-60 enterprises. Since the investment period ended in 2005, the fund's activities have focused on the oversight and management of its investments.

A 25% tax break exists for investments in SMEs under the condition that stakes are not sold before 5 years. It has been extended to investments made through holdings in 2007. The tax break is capped at 5,000 Euros per year (i.e. for an investment of 20,000 Euros). Amounts that are over the 5,000 Euro limit can be deducted from taxes paid in the four fiscal years following the investment. This yields a total break of 25,000 Euros spread over five years.

A new fiscal incentive has been approved by the Assemblée Nationale, and is awaiting confirmation by the French Senate. It concerns all individuals paying additional income tax (Impôt sur la Fortune). These eligible individuals will be able to deduct 75% of investments into unquoted SMEs, up to an annual limit of 50,000 Euros.

In 2006, France Investissement was created to consolidate all the fund-of-funds managed by CDC-Entreprises. Over the next 6 years, it will invest about 2 billion Euros of public money at market conditions. In addition, through a partnership with private fund-of-funds, it is expected that 1 billion Euros of private funds will be invested in VC firms. Each party has agreed to follow investment guidelines, mainly that investments must address market inefficiencies.

[181] Fonds de Promotion pour le Capital Risque.

7. Germany

The development of the German VC market has been inherently linked to the country's changing attitude towards entrepreneurship and held back by the long predominance of relationship lending in the German banking system. The German experience has emphasized the intertwined roles of entrepreneurs, money, and exit possibilities and has shown that missing links can render VC-directed policies ineffective. The lack of high quality entrepreneurs and entrepreneurial incentives played a key role in the failure of the first venture capital funds in Germany in the late 1970s and early 1980s as well as in the subdued effect of the newly introduced market for VC-backed firms (the Geregelter Markt) in 1987.[182] Just ten years later, perhaps in the context of the EU's growing infatuation with entrepreneurship, the picture had changed. Parallel with its programmes to improve the financing conditions of early-stage enterprises, Germany has been actively encouraging the formation of such enterprises, particularly start-ups from research institutions. For example, the EXIST programme,[183] launched in 1997, has sought to improve the entrepreneurial climate at higher educational institutions in Germany and to increase the number of start-ups from these institutions. By 2006, 20 regions have been designated as EXIST partners, encompassing extensive networks of cooperation between educational, research, economic, and political institutions that sought to motivate, develop, and support entrepreneurship, and offering financial and professional support for students, graduates or researchers at the universities in these regions to develop their business ideas.

After 2001, there was a big decline in the German VC market, with private investment in early-stage companies decreasing to very low levels.[184] The Government suffered heavy losses through its support programmes. In addition, the closure of the Neuer Markt in 2003 further exemplified the dire conditions in the industry. Nevertheless, government policies have been swift to adapt to the new conditions. The Entry Standard exchange, introduced by the Deutsche Borse in 2005 as a capital market access for small and medium size companies, has shown solid performance.

Perhaps the most prominent programme in Germany has been its technology venture capital programme, BTU,[185] which has been credited with jump-starting the German venture capital market.[186] The programme has been active since 1990 and has been re-designed several times to meet the current challenges in the market for early-stage finance. Originally, the BTU programme was launched to address a perceived shortage of venture capital for start-up and small technology-based firms in Germany. Designed to lower the risks for the limited and managing partners of VC investment in technology-based firms, it offered two types of support: (1) co-investment – TBG[187] invested in technology-based firms provided that a private investor provided the same amount of money; (2) refinancing – the KfW Bank[188]

[182] Becker and Hellman (2003).
[183] www.exist.de.
[184] In 2003, the volume of private VC activity in the seed and start-up stages fell from 1.6 billion Euros to 300 million Euros. (Source: TrendChart Newsletter, January 2005).
[185] Beteigungskapital für Technologieunternehmen.
[186] Lehrer (2000).
[187] Technologie-Beteiligungsgesellschaft.
[188] Kreditanstalt für Wiederaufbau.

provided low-interest loans to refinance venture capital investments in NTBFs.[189] The volume of venture capital mobilized by BTU grew from less than 90 million Euros in 1990 to 234 million Euros in 1997, 404 million Euros in 1998, 650 million Euros in 1999, and 1.1 billion Euros in 2000. In 2001, BTU – Early Stage was launched, specifically targeting start-ups from science. It provided pre-seed and seed stage venture capital for technology-based firms in the form of equity of up to 150,000 Euros. The selected companies worked with a "coaching investor" and were encouraged to find other investors. According to some estimates, nearly 75% of the early-stage venture capital directed to technology-firms at the end of the 1990s was BTU-financed. The overall assessment at that time was that the BTU programme had directly contributed to Germany's becoming the fastest growing early-stage technology sector in Europe and developing a private VC market.

In response to the decline in the VC market after 2001, the Federal Government redesigned its VC programmes in 2004. It introduced a new public VC fund – the ERP-Start-Funds managed by KfW – to provide fresh capital for young, technology-based companies together with private lead investors. The new ERP-Start-Funds replaced the former BTU programme and is focused solely on co-funding with private VC firms.

In 2005, the German Government and KfW launched the High-Tech Start-Up Fund as a public-private partnership with BASF, German Telekom and Siemens, as part of the "Partner for Innovation" initiative. The programme has explicit focus on seed and start-up stages – i.e. before VC investors are likely to become interested – and offers VC investments (up to 500,000 Euros) to founders of technology start-ups. Its main targets are spin-offs from public research institutions. 262 million Euros have been set aside for the programme over a five-year period, with 240 million Euros coming from the federal budget. In 2006 three more private partners (Daimler, Carl Zeiss, Bosch) joined, increasing the funds to 272 million Euros. The private partners provide not only funds but also networks for the start-up companies.

Also in 2005, a fund of funds, ERP-EIF Dachfonds, was established with total capital of 500 million Euros, jointly financed by the ERP Funds and the EIF, and managed by the EIF. It targets venture funds focusing on early-stage technology companies located mainly in Germany. The supported funds have an investment period of up to five years and a divestment period of up to ten years (three times extendible for one year). The principal aim of the programme is to support the establishment and financing of venture capital funds specialized in early and development stage technology companies in Germany. The second focus is to provide finance for funds that ensure follow-on financing for high-tech companies. In managing the programme, the EIF acts as a pari-passu, cornerstone investor, with an average participation in a fund of 30%. At the end of 2006, the ERP-EIF Dachfond had committed 213 million Euros to eight funds, helping to raise additional 912 million Euros from private investors.[190]

[189] TBG and KfW merged in 2001.
[190] EIF (2006).

8. Greece

The Reinforcement of Youth Entrepreneurship programme was established in 2001 to provide financial support to young persons (18 to 36 years old) who are starting a new venture. The amounts provided between 30,000 and 150,000 Euros and cover eligible costs. The total budget for the measure is 127 million Euros.

The legal framework for venture capital is relatively recent. The reform of 1995 provided incentives of up to 20% of investments in high-tech companies. New regulations were introduced in 2002 to support further the development of the venture capital industry, with the definition of a new structure, AKES, which is a closed-end venture capital fund, formed as a partnership. Management fees and carried interest are exempt from VAT while reinvested corporate profits are tax-free.

The New Economy Development Fund (TANEO) was established in 2001 with a mandate to produce financial returns as well as to jump-start the venture capital industry and boost the Greek economy by investing in Greek private equity funds. It was structured by Westport Private Equity, a UK fund-of-funds group, and raised 150 million Euros in 2003, of which 105 million Euros came from overseas investment institutions and private Greek investors and 45 million Euros came from the Greek Government. TANEO invests in all types of funds, from early-stage VC to buy-outs, and offers investors government guarantees. To date, it has invested in four VC funds. The Fund suffered a management crisis after a change in government in 2004. A new Board was put in place in 2006 and in 2007 the fund was repositioned towards SMEs.

The Digital Leap Fund was announced in 2005. Resources available to this state-sponsored VC fund amount to 100m Euros, to be invested in around 30-50 companies within two years.

9. Ireland

Since 1985, Ireland has run the Business Expansion Scheme (BES) and Seed Capital Scheme (SCS). These measures offer tax incentives to individuals who invest in private companies. The SCS scheme is designed for people starting their business with own funds (i.e. the investor is also the entrepreneur) and offers them refunds from previously paid taxes. Both schemes have been recently renewed for another seven-year period (until December 2013), with the investor limit increasing from 31,750 to 150,000 Euros for BES and from 31,750 to 100,000 Euros for SCS.

Enterprise Ireland was established in 1998 to foster the development of Irish companies through providing financial and other support. It has run a set of initiatives to address shortages of venture and particularly early stage/seed capital for innovation. The approach has been for the state to act as catalyst and/or co-founder with private sector sources of finance. Over the period of these programmes, early-stage VC investment in Ireland has gone from under 1 million Euros in 1995 to 36 million Euros in 2005. Almost all the early-stage investments in 2005 were made by Enterprise Ireland partner funds.

The EU Seed and Venture Capital Measure (1994-1999) was set up to establish VC funds to provide early-stage, growth-oriented enterprises in Ireland with equity capital. A total of 16 VC funds were established – three in 1996, six in 1997, four in 1998, and three in 1999 – of which fifteen had made investments by the end of 2005.[191] Enterprise Ireland allocated 43.9 million Euros under the programme, which attracted private capital commitments of 104 million Euros. Of the available funds, 125 million Euros had been invested in 174 companies by the end of 2005.[192] 78% of the funds were invested in early-stage companies. Although Enterprise Ireland manages this programme, all investment decisions are made by the private VC fund managers.

In the Seed and Venture Capital Programme (2000-2006), Enterprise Ireland committed 98 million Euros to continue to develop the venture capital market for SMEs in Ireland by investing in 15 funds. By the end of 2005, Enterprise Ireland had invested 50.5 million Eros, while the funds' total capital amounted to 408.3 million Euros. Through the end of 2005, these funds had invested 186 million Euros in 123 companies. 90% of the investments made (both initial and follow-on) had been early-stage.[193]

Since the late 1990s, Enterprise Ireland has also managed the Business Incubation Centre programme, designed to develop and expand incubator facilities on college campuses. To date, the programme has established 19 incubators (16 in technology institutes and three in universities) and six specialist bio-incubators. The total investment in campus business incubation activity has been over 46 million Euros.[194]

10. Italy

An Incubators for Start-Ups programme was established in 2000 to support innovative enterprises through financing and technical assistance. The measure covers expenses related to the following activities: feasibility studies, infrastructures, organizational and financial assistance, training, technical assessment of projects. The incubators are selected through tenders, the last of which concluded in 2005. A total of 22 million Eros in grants has been provided in this programme.

A High-tech Fund for SMEs was established in 2005 to provide risk capital to enterprises operating in high technology sectors. The beneficiaries of the measure are start-ups in high technology sectors, venture capitalists, institutional investors in Southern Italy. The available budget for the period 2005 - 2007 amounts to 100 million Euros.

The Ministry of Productive Activities (MAP) established a programme in 2003 to support innovative projects and promote the creation and development of enterprises operating in sectors with high technological impact. MAP supplies financial resources to intermediaries (banks, finance companies, finance companies for innovation) that invest in the innovative

[191] One fund did not make investments and was wound up.
[192] Source: Enterprise Ireland (2005).
[193] Source: Enterprise Ireland (2005).
[194] Source: Department of Enterprise, Trade, and Employment.

companies by acquiring minority shares for a maximum of seven years. The programme has a budget of 204 million Euros.

A Guarantee Fund for Digital Technologies SMEs was established in 2005 to promote innovations through the use of digital technologies. The offered guarantees are direct, explicit, unconditional and irrevocable and cover the investments made in such SMEs up to a maximum of 200,000 Euros.

A Fund for Entrepreneurial Finance was constituted in 2007, with an initial allocation of 50 million Euros, reaching 150 million Euros in 2009. The Fund provides financing guarantees and takes equity stakes in high technology enterprises and some other SMEs in priority areas. In addition, a fund of funds operating in the South of Italy has been established.

11. The Netherlands

The VC industry in the Netherlands represents an interesting case as it recorded one of the highest early-stage VC activity in 1995 and one of the lowest in 2005. In fact, the Dutch VC market was one of the most dynamic in the late 1980s and early 1990s.[195] The Government played an instrumental role in the rise (and fall) of the Dutch VC market. In 1980, a ban was partially lifted for Dutch banks to make equity investments, enabling Dutch banks to invest in venture capital. For example, in 1992, the majority of venture capital was provided by banks (32%) and the Government (22%).[196] A secondary stock market (the Amsterdam Parallel Market) was opened in 1982 and showed strong IPO activity in the mid-1980s, only to be closed in 1993 as a result of a bad image, following a series of bad news in the early 1990s.[197]

The most significant government programme of that period was the Guarantee Settlement Private Participation Societies,[198] introduced in 1981. It gave qualified VC firms (PPMs) up to a 50% compensation for losses suffered on venture capital investments exited within ten years. Many private VC firms were created when the maximum guarantee was raised to NGL 4 million per deal in 1986, leading to a surge in compensation payments. In 1988, exits within one year of investment were prohibited. The programme budget was reduced in 1990 and in 1991 and the programme was terminated in 1995. While it did contribute to the supply of venture capital in the Netherlands, it failed to create a self-sustaining VC industry; hence the decrease in activity after the programme's termination. Another contributing factor has been the prevailing evergreen structure of Dutch VC funds over the period.[199] Such structure created a constant, short-term performance pressure on the VC managers, leading to the overheating of the secondary stock market and the eventual concerns over the quality of the listed companies. In addition, it may have encouraged the quicker recognition of (guaranteed) losses, thereby increasing the government's expenditure on meeting the provided guarantees and prompting the eventual closure of the guarantee programme. With the demise of many

[195] See Brouwer and Hendrix (1998) for a detailed overview of the development of the Dutch VC market.
[196] Ibid.
[197] Ibid.
[198] Garantieregeling Particuliere Participatiemaatschappijen.
[199] Ibid.

small, private VC firms, the concentration of the VC industry significantly increased after 1995, leading to a shift away from early-stage investments towards later-stage investments.

The SME Credit Guarantee scheme has been operating since 1994 to stimulate the provision of credit to SMEs. The Ministry of Economic Affairs (EZ) provides security for a portion of the credit extended by banks to SMEs, with a maximum guarantee of 1 million Euros per SME. The credit guarantee has a typical duration of six years (or 12 years in case of real estate). In exchange for the guarantee, the bank pays EZ a commission (2 to 3.6%). For start-up firms, EZ can guarantee a larger portion of the credit. Each year, around 3,000 entrepreneurs receive the guarantee. The European Investment Fund (EIF) participates in the scheme. The Credit Guarantees can be applied via the bank that provides the credit. To date, the amount of guarantees provided stands at 530 million Euros.

The TechnoPartner programme was introduced in 2004 to promote more and better technology-based start-ups ("technostarters"), through the creation of a better climate for technostarers inside and outside knowledge institutes. It provides comprehensive services to start-ups that include: (1) seed financing through specially created Small Business Investment Company (SBICs) funds; (2) knowledge exploitation subsidy (SKE) that offers both pre-seed financing to potential technostarters and a patent facility for knowledge institutes to professionalize their patent policies; (3) certification for techno-starters to obtain bank credit guaranteed through the SME Credit Guarantee Scheme; (4) information and expertise to techno-starters, including a TechnoPartner Academy offering entrepreneurship courses.

In 2004, a pilot programme was launched, Valorization Grants, mirroring the SBIR programme in the US and seeking its effective application within Dutch knowledge institutes. The pilot will run for five years and, if evaluated positively, will be transformed into a final scheme. Through this programme, researchers at universities can apply for a grant to create a spin-off from a public knowledge institute. From 2006, SMEs can also apply for the grant. The grant can be used for product-market analysis, prototype development, skill development, intellectual property protection, etc. The grant is provided in two phases: (1) a feasibility study, funded by a maximum of 25,000 Euros; and (2) a development phase funded by a maximum of 200,000 Euros for two years. The third, commercialization phase has to be funded by private investors. Phase 2 applications can only be made after Phase 1 has been completed successfully. An annual budget of 1.3 million Euros has been provided for this pilot programme.

12. Portugal

The first VC initiatives in Portugal date back to its entry in the EU and were related to industrial development. The early funds set up by the Portuguese Government were regarded as “company hospitals” rather than VC firms.[200] Only after their re-orientation in 1999 did they become more focused on fostering high-potential enterprises.

Based on re-organization of the public VC funds, in 2001 PME Capital (one of two government VC funds) became exclusively focused on early-stage financing. It operates

[200] OECD (2003), Venture capital policy review: Portugal.

several regional and industry-specific funds seeking to provide financial support to start-ups or small businesses with high-growth potential. Its total capital is 79 million Euros.

VC related initiatives in Portugal are relatively recent, launched in 2002. The regulation of VC activity was simplified and relaxed in 2002 with lower capital and reporting requirements. In addition, several tax incentives for VC investment activity were introduced. On the fundraising side, the limitations imposed on pension funds to invest in private equity were also relaxed.

The New Technology Based Companies (NEST)[201] programme was established in 2002 to provide financial support to the creation, launching and development of technology-based firms that have a close relationship with domestic Science and Technology organizations and/or are expected to reach a high level of technological capacity. It helps projects obtain seed funding from VC funds by providing equity guarantees to the private investors.

The NEOTEC initiative was launched in 2004 to provide seed capital for the creation of new technology based firms in the ICT field, based on idea contests.

The FINICIA programme was launched in 2006 to improve companies' access to equity and credit, through the establishment of public-private partnerships to provide early-stage funding to innovative or emerging small companies. It aims to help develop an innovation and entrepreneurial culture as well as stimulate university technology transfer, and is the only co-investment scheme for business angels in Portugal. The programme facilitates debt financing by providing public counter guarantees to mutual guarantee companies, which in provide collateral to the recipient enterprises. It also provides equity financing through a FINICIA venture capital fund that operates in regional FINICIA Platforms (universities, incubators, and regional partners) and makes investments of up to 250,000 Euros. The programme is widely known among universities, incubators, banks, mutual guarantee companies and venture capital companies. In its first year of operation, FINICIA raised total funds of 96 million Euros (10 million Euros in equity and 86 million Euros in debt), helped start up 111 companies, facilitated investments of 17 million Euros, and created 381 new jobs.

13. Spain

Venture capital activity in Spain began in the early 1970s, when industrial development associations (SODI)[202] used public funds to invest in early-stage companies in an attempt to revive less developed regions. Spain has also benefited from European structural funds, following its entry into the EU in 1986 and by significant inflow of international private capital in more recent years.

In 1999 the Spanish Government began a series of initiatives to strengthen the country's technology sector and increase early-stage funding. These included not only tax incentives for VC companies but also programmes with more direct involvement. The Programme for the

[201] NovasEmpresas de Suporte Tecnológico.
[202] Sociedades de Desarrollo Industrial.

Encouragement of Technical Research (PROFIT)[203] was established to support innovative enterprises through direct subsidies and small no-interest loans payable over 15 years for technology-based projects at the conceptual stage of development. These seed loans are aimed at developing ideas into workable business plans. PROFIT funded over 4,000 projects in 2002.

The New Technology Firms (NEOTEC)[204] programme was launched in 2001 to provide no-interest seed loans of up to 300,000 Euros to potential technology-based firms. The loans cannot exceed 70% of the project's budget and are to be paid back at a rate of 20% of cash flow once profits are realized. In addition to financing, NEOTEC provides managerial advice and network contacts for the entrepreneurs with universities, research centres, business schools, regional development agencies, incubators and similar entities.

In 2001, a Public Venture Capital programme was established, whereby the National Enterprise of Innovation (ENISA) funds entrepreneurial projects by new technology based firms. The funds are provided by the Ministry of Industry, Tourism, and Commerce at preferential conditions. The Ministry bears the ultimate default risk for the loans.

In 2002, the Ministry of Science and Technology started providing interest-free, seven-year loans to VC funds investing in government-approved projects and firms. To qualify, the firm must be private, less than two years old and must not solicit more than 100,000 Euros in government financial support for a period of three years. The loans can be up to 500,000 Euros or 50% of total investment, which increases to 1 million Euros and 70% of total investment if the firm is located in a rural area in transition (based on EC rules). Upon maturity, the loan is to be repaid with a gain or loss proportional to the share of the investment in the current value of the firm.

The Center for Innovation and Business Development (CIDEM)[205] is a successful regional programme in Catalonia, managed by the Catalan Government. It was established in 1985 to provide equity funding and managerial advice to start-ups and also partners with private investors and VC funds. It functions as a "one-stop shop" for start-up businesses and potential investors and assists with feasibility studies, funding, project development and implementation and follow-up. The activities of the programme are carried out through several funds and initiatives catering to all stages of company development. CIDEM now acts as a federation of business angel networks located in the Catalan Region, having offered matchmaking services in the region for a number of years. It has also supported the development of a dozen of business angel networks in the region.

The Trampolines Tecnológicos programme has established incubators based in five technical universities and business schools, focusing on commercializing university research and know-how. They are modeled after similar programmes at MIT and Stanford University. Invertec makes equity investments, limited to ten years, of up to 300,000 Euros representing between 5% and 49% of total equity, in technology-based, seed-stage companies. It has a capital of six million Euros, managed by CIDEM and six universities and business schools. The aim of this

[203] Programmea de Fomento de la Investigación Técnica.
[204] Nuevas Empresas Tecnológicas.
[205] Centre d'Innovació iDesenvolupament Empresarial.

programme is to help firms "incubated" by the Trampolines Tecnológicos to raise seed funding. The Internova fund makes equity investments of between 300,000 and 1 million Euros in technology-based start-up. The equity stakes are help for a maximum of ten years and the maximum equity participation is 49%. The fund capital is 20 million Euros provided by CIDEM and private sector investors. Finally, CIDEM also invests in independently managed VC funds focusing on different stages.

14. Sweden

The Swedish VC industry dates back to the early 1970s when the first VC funds and regional investment companies were created to provide loan and equity financing to start-ups. Some of the initial favourable conditions in Sweden include the formation of the Swedish over-the-counter (OTC) market in 1982 and the strong performance of the main stock market after the financial liberalization in the mid-1980s. Three new OTC markets were created in the mid-1990s, after a financial crisis in the early 1990s. Overall, these second-tier markets have played a major role in financing the development of growth companies and offering exit routes to investors in Sweden. For example, in 2002, the capitalization of these stock markets relative to GDP surpassed that of the United States.

The Swedish Government has played an important role in the development of the domestic venture capital industry. The first venture capital fund, Företagskapital, was created in 1973 by the Government in partnership with merchant banks. In the late 1970s, regional investment companies were created, modelled after the SBIC programme in the US to provide managerial advice and seed capital for small businesses. By the mid-1980s, there were 20 private and 30 public VC funds in Sweden, albeit small in size.[206] Following a period of rapid growth in the 1980s, most of these funds were dissolved during the financial crises of the early 1990s.[207]

To revitalize the VC market, the Swedish Government created two investment funds – Atle and Bure, with total capital of SEK 6.5 billion – to invest in high-growth start-ups. However, mostly due to the risk-aversion and inexperience of management, these funds failed to fulfil their mandate and invested the majority of their capital in larger, later-stage firms. In 1993, Atle and Bure were listed on the Swedish Stock Exchange and the Government sold its shares in them. In 2001, Atle was purchased in its entirety by 3i.

In 1996, the Sixth Swedish National Pension Fund was created to provide risk capital for small and medium-sized businesses. The fund had an unrestricted mandate to invest in Swedish private equities and currently is one of the largest domestic venture investors. In 1999, the rules for other pension funds were similarly relaxed to allow greater investment in venture capital.

The Swedish Business Development Agency (NUTEK) launched several programmes in the 1990s aimed to provide early-stage financing for technology development projects. An evaluation of NUTEK programmes by Statistics Sweden in 2002 showed that firms that had received financing in 1996 had, on average, more than doubled their annual turnover and

[206] OECD (2003), Venture capital policy review: Sweden.
[207] Karaomerlioglu and Dahlstrand (2000).

number of employees by 2000.[208] In 2003, NUTEK supported the creation of regional business angel networks in Sweden with grant funding. SVCA now acts as the national representative of the business angel network community in Sweden. NUTEK's cooperation with other public financing bodies was consolidated in 2000 into the following VC programmes:

The National Industrial Development Fund (Industrifonden) provides seed financing to companies through three regional subsidiaries. Its total capital is SEK 4 billion. Applications for venture financing are first made to NUTEK, which, upon initial approval, works with the firm to develop a business plan and sends that plan for funding approval to the regional subsidiaries. This process is seen as laborious and time-consuming.

The Innovation Support Centers (SIC)[209] programme was established for the period 1994-2004 with total funding of SEK 500 million to support commercially interesting innovations in the early developmental phases.

The Technology Bridge Funds programme operates until 2007 to support technology-based spin-offs at Sweden's main universities. There are seven independent funds, located in different university towns in Sweden, with a total capital of SEK 1 billion.

In 2005, the National Incubator Programme was launched to increase the number of new R&D-intensive growth companies in the Sweden. They engage in the development of business ideas and support to companies in the pre-seed phase. The Government's vision for these incubators is as world-class forums where commercial demands and complementary cutting-edge competence can meet and interplay with leading researchers, innovators, investors and entrepreneurs.

15. United Kingdom

The UK has the most developed VC market in Europe, reflecting its close ties with the US, favourable institutional conditions, and a portfolio of government schemes aiming to encourage and sustain VC investing around the country by addressing multiple aspects of the VC cycle as well as by targeting multiple development stages and regions.

The UK is home to the most active second-tier stock market, the Alternative Investment Market (AIM). It was established in 1995 to attract and serve young, high growth companies with less stringent admission requirements and lower initial and continuing costs. UK's first major policy response toward venture finance came with the establishment of the Industrial and Commercial Finance Corporation (ICFC), the forerunner of today's 3i, in 1945.[210] Although the UK Government's small business initiatives date back to the early 1980s, VC-focused programmes were introduced in the 1995-2000 period.

[208] OECD (2003), Venture capital policy review: Sweden.
[209] Stiftelsen Innovationscentrum.
[210] OECD (2003), Venture capital policy review: United Kingdom.

Parallel to its programmes aimed to improve the financing conditions for innovative enterprises, UK has devoted significant effort to increase the supply of innovative enterprises. For example, the Science Enterprise Challenge was established in 1999 to fund the creation of enterprise centres at UK universities with the following three main goals: (1) to foster the commercialization of high quality research and new ideas, (2) to help stimulate a culture of scientific entrepreneurship within British universities, and (3) to incorporate more centrally the teaching of enterprise into the UK science and engineering curricula. In 2005, the remit of the programme was changed to cover entrepreneurship education across all curriculum areas. The programme has grown from 12 centres in 1999 to over 64 today.

(a) Guarantee and tax schemes

The oldest programme supporting small businesses is the Small Firms Loan Guarantee Scheme by the Department of Trade and Industry (DTI). It was established in 1981 to help meet the gap in the market, where small businesses with viable business proposals are unable to raise finance because of lack of security. Between June 1981 and March 2005, there were 97,000 guarantees issued with a total value of £4.2 billion.[211] The SFLG was changed in December 2005 to focus on newer businesses. Its main features include:

- A guarantee to the lender covering 75% of the loan amount, for which the borrower pays a two per cent premium on the outstanding balance of the loan.
- The ability to guarantee loans of up to £250,000 and with terms of up to ten years.
- It is available to qualifying businesses that are up to five years old and with an annual turnover of up to £5.6 million.

The Enterprise Investment Scheme was introduced in 1994 to help certain types of small higher-risk unquoted trading companies to raise capital. It provides income and capital gain tax reliefs for investors in qualifying shares of such companies as follows:

- Income tax rebate equal to 20% of investments up to £400,000.
- Exemption from capital gains tax on angel investments
- Income tax relief of 40% on failed investments
- Deferral of tax on capital gains if these are reinvested in EIS companies.

The Venture Capital Trust (VCT) scheme began in April 1995. VCTs are quoted companies, which attract funds from individual investors and invest these funds in qualifying companies. The individuals who invest in the VCTs as well as the VCTs themselves receive various income tax and capital gains tax reliefs. For individual investors, the income tax relief pertains to both the dividends received from the VCT shares and a relief against tax equal to 20% of the amount invested in a VCT, provided that the shares are held for at least three years.

The Corporate Venturing Scheme was introduced in 2000 to encourage venture capital investments by corporations. To be eligible for the specified tax incentives, the investing company must not hold more than 30% of the issuing company's ordinary share capital, and

[211] DTI (2005).

the gross assets of the issuing company in return should not exceed £15 million. The tax incentives consist of the following:

- Deduction against corporation tax at 20% of the amount invested, provided that shares are held for a minimum of three years.
- Deferral of corporation tax on any chargeable gains on disposal of investments
- Capital loss relief against income for any capital losses on disposal of investments

(b) Direct VC funding

University Challenge Seed Funds were established in 1999 to enable universities to access seed funding and thus facilitate the transformation of research ideas into business ventures. £45 million was allocated to 15 funds in 1999, with additional £15 million provided to four new funds in 2001. Although this programme has received no further funding, the focus on providing seed capital to university projects has been the cornerstone of the Higher Education Innovation Fund. Under this programme, 89 bids were funded in 2001, 124 bids in 2004, and 11 new bids in 2006. Most of the third-round funding in 2006/2007 went to the existing recipients to ensure their sustained funding.

The Enterprise Fund initiative was introduced in 1998 to stimulate the availability of finance for small firms as well as foster regional development. In addition to loan guarantees, it provided direct assistance through two focused programmes:

(i) The UK High Technology Fund was launched in 2000 as a "fund of funds". It has raised £126.1 million, with the DTI investing £20 million as a cornerstone investor and the remaining funds coming from institutional investors. It started investing in venture capital funds targeting the early stage high technology SME sector.

(ii) The Regional Venture Capital Funds programme was introduced in 2000 aiming to create a network of venture capital funds in England's nine regions. The requirement for each fund is to have a commercial focus, be managed by experienced fund managers and raise significant private sector investment. Each fund needs to raise and manage at least GBP 10 million. The funds are to make initial investments of up to £250,000 and follow-on investments of up to £250,000. The EIF has agreed to invest around 20% of the maximum programme size. The funds became operational in 2001 and 2002.

The Community Development Venture Fund (CDVF) was launched in May 2002 as a £40 million venture capital fund. It aims to increase private investment in enterprises in disadvantaged communities and expects to stimulate the provision (and benefits) of venture capital to viable and potentially high-growth SMEs located in the 25% most deprived wards in England. In addition to showing return promise as VC investments, business plans must demonstrate the benefits to the local communities in employment, sourcing or supply of goods and services. The Government is planning to invest up to £20 million on a pound for pound basis with private sector investors. Bridges Community Ventures Ltd has been appointed to manage the fund on a commercial basis.

The Early Growth Funds (EGF) programme was developed to encourage risk funding for start-ups and growth firms. Its objective was to increase the availability of small amounts of risk capital of on average £50,000 for innovative and knowledge intensive businesses, as well as for other growth businesses. Each of the funds will be managed on a purely commercial basis with each fund manager responsible for their own application processes. The funds will be able to make maximum initial investments of up to £100,000. Most funds require matched private sector investment of at least the same amount as Early Growth Fund investment. All EGF funds were active by March 2004.

The Enterprise Capital Funds (ECFs) programme was introduced in 2005 with a total budget of £200 million. The ECFs are designed as commercial funds, investing a combination of private and public money in small high-growth businesses that are seeking up to £2 million of equity finance. The main goals of the ECF programme are to increase the flow of private capital into the equity gap by adjusting the risk-reward profile for private investors and to lower the barriers to entry for risk capital managers by reducing the amount of capital needed to establish a viable venture fund. Out of 45 bids, five ECFs were launched. At the end of 2006, a second round was launched, with an additional £100m made available for (an expected) three more funds. In the structure of the fund, the Government receives a priority fixed return of 4.5% p.a., with all excess going to the private investors and managers.[212]

16. New European Union members

Over the past 15 years, the countries of Central and Eastern Europe have undergone economic transition, reorientation in macroeconomic policy, and harmonization of their economic institutional frameworks with their EU counterparts. As a result, the emergence and development of their venture capital industries has been relatively recent. With the development of financial markets and increase in the demand for equity financing in these countries, policy attention becomes increasingly focused on the financial problems of SMEs and the availability of early-stage finance to innovative enterprises. Overall, the programmes implemented in these countries are new and relatively limited in their potential effects due to their small budgets and isolated focus. Implementing more far reaching programmes, however, is crucially dependent on there being solid conditions for a self-sustaining VC cycle.

A few programmes take the form of generic innovation funds, aiming to provide grants to innovative projects in order to increase the competitive of the local economy. Examples of such programmes are: National Innovation Fund in **Bulgaria**, introduced in 2005;[213] the R&D financing programme in **Estonia**, established in 2001 to finance applied research projects and feasibility studies for product development, with a total budget of 4.8 million Euros. In **Hungary**, there is support for new, technology and knowledge-intensive micro-enterprises and spin-off companies available since 2004 with a total budget of 6.6 million Euros. This scheme supports the R&D activities of new, start up enterprises that operate in technology and knowledge intensive sectors, and spin-off companies that aim to exploit the results of R&D

[212] Source: DTI. http://www.dti.gov.uk.

[213] In 2001, Bulgaria adopted National Strategy for Encouragement of Small & Medium-Sized Enterprises Development for 2002-2006, which placed explicit emphasis on improving the financing environment and supporting innovations and technological development.

activities of higher education institutes. In **Poland**, loans for realization of innovative investments have been offered since 2004 (total budget of 3.5 million Euros) to assist enterprises in increasing their competitive position and market effectiveness by undertaking innovative projects. The loan covers 75% of eligible costs, up to a maximum of 500,000 Euros and is repayable in six years. In 2001 and 2002, Romania launched two programmes with total budget of 16.7 million Euros to develop industrial and software parks as well as stimulate the commercialization of inventions in technologically advanced fields. In **Slovenia**, a new initiative launched in 2006 offers financial assistance to institutions supporting innovation activity.

Some programmes provide direct financing to SMEs in general, with the goal of alleviating the difficulties of such firms to obtain external financing. The Progres programme in the **Czech Republic**, launched on 2005, offers subordinated loans to SMEs in selected sectors to realize their business plans. It expects that the supported projects will be co-financed by private investors. In **Hungary**, a public institution, the Hungarian National Development Bank, has been engaged since 2003 in the provision of direct equity financing to SMEs. The role of this institution is set to increase with the shift in financing methods for the support of SMEs introduced by the Competitive Economy Operative Programme, with an increased emphasis on equity provision. In **Latvia**, the Credit support for SME development has been active since 2002 with a total budget of 28 million Euros to facilitate the financing of SMEs through subsidized loans and guarantees. Since 2001**, Slovenia** has offered subsidized credit and guarantees to SMEs through the Slovene Enterprise Fund (SEF). SEF aims to improve the availability of and access to favourable sources of financing for SMEs to ensure that SMEs have greater orientation towards development and faster growth and to speed up the creation of new innovative companies. In **Slovakia**, Fond Fondov (Fund of Funds) was established in the early 1990s to coordinate the activities of individual funds established under the PHARE programmes and to stimulate the development of the SME sector. It currently manages eight funds, differentiated according to their geographical coverage or the stage of development of their target companies, and has supported more than 120 companies. The start up capital fund takes up minority stakes (10-40%) and offers loans to SMEs at the seed, start-up and development stages. The most recent addition to the set of financing possibilities offered by this organization, the Seed Capital Fund, focuses exclusively on the seed phase. It does not exclude taking majority stakes in supported companies. While private sector representatives are present in the fund's investment committee, the invested funds are exclusively public resources.

Other programmes offer guarantees to SMEs on their financing from private investors. In 2001, **Bulgaria** established a Guarantee Fund for Micro Lending (total budget of 30 million Euros) aiming to facilitate the access of start-ups to finance. The Zaruka programme, launched by the **Czech Republic** in 2005, aims to help SMEs implement their business plan and increase their competitiveness by guaranteeing their bank loans, leasing, venture capital, operational loans, etc. In **Lithuania**, since 2001 start-ups and early-stage innovative enterprises can obtain debt finance through the "Investment and business guarantees" (INVEGA) scheme. The maximum guarantee coverage is 80% (for investment loans) and 50% (for working capital loans) of the loan amount with only a 1-1.5% guarantee fee paid by SME (the other part of the guarantee fee is subsidized by the state). In March 2004 INVEGA

signed a counter-guarantee agreement with the EIF under the Multiannual Programme (MAP).

Some programmes focus on establishing technology incubators. The Enterprise Incubation Programme in **Estonia** was established in 2004 to support the development of incubators. It finances a feasibility study for the establishment of an incubator (up to 6,400 euros and maximum 80% of eligible costs) and the development and provision of incubation services (up to 192,000 Euros and a maximum 75% of eligible costs). In **Hungary**, the BIOINKUB programme was established in 2005 with a budget of 3.8 million Euros to establish a model biotechnology incubator. It supports investments to create incubator centres for biotechnology SMEs. The centres shall operate independently and offer supporting environment for the R&D activities of the hosted enterprises aimed at developing new products, processes and services, and promoting their growth. The project consists of two phases. In the first phase, the applicant should develop the specified infrastructure within two years, using the funds provided by the measure. In the second phase, the applicant shall operate the incubator under the agreed terms for five years. In 2002, **Slovenia** launched a programme to support the development of business incubators at universities, aiming to link students and professors from the universities with external capital and other facilities.

Programmes supporting seed or venture capital are relatively scarce. In 2004, **Latvia** launched a programme to support SME venture capital, aiming to encourage the financing of innovative start-ups through the state's co-investment role. The Latvian Guarantee Agency provides credit guarantees to innovative SMEs but it also acts as a fund of funds in the framework of this venture capital state aid programme, which was finally approved by the European Commission in January 2005. The LVG has invested 14.5 million Euros in three funds (of which three quarters come from EU structural funds). Fundraising of 15 million Euros from the private sector was completed in November 2006, with investment to take place in the period up to 2008. Profits accruing to the state are limited to 6% of the invested capital, with the remainder going to private investors. While the state defines overall investment rules, concrete decisions on companies to be invested are taken by private managers.

Poland launched in 2004 a set of interventions to improve the access to external financing, as part of the Sectoral Operational Programme for the Improvement of Competitiveness 2004-2006. The measures contribute capital to (1) micro-loan funds, (2) guarantee funds, and (3) seed capital funds. In addition, Poland sanctioned the creation of the National Capital Fund in 2005 to "provide financial support to risk capital funds which invest in enterprises established in the territory of the Republic of Poland, and especially in innovative or research and development enterprises".[214] It aims to capitalize seed funds as well as to reimburse some of their operating costs. The measure will be active over the period 2007-2013 and imposes a maximum of 1.5 million Euros that supported funds can invest into enterprises. The total budget for these interventions, which will build on the results of the 2004-2006 pilot, will total 180 million Euros.

[214] ACT of 4 March 2005 on the National Capital Fund.

In 1999 the EBRD and the EC, through the SME Finance Facility Special Fund, developed a framework for equity fund initiatives in Central and South East Europe. The primary objective of the programme was to support small independent funds investing in small sized enterprises (maximum deal size capped at 1 million Euros). During the programme, four funds were established for a total committed amount of 61 million Euros. At the end of 2006, the equity portfolio of the four funds stood at 26 million Euros invested in 27 companies, some of which in their early stage of financing. Technical Cooperation Funds were also provided by the EC to assist both the funds and the portfolio companies on a wide variety of matters.

D. Other Advanced Countries

1. Israel

The Israeli policy towards promoting venture capital cannot be viewed in isolation from the conditions in the county in the 1970-1990 period, in which the basic R&D/Innovation capabilities of the Israeli business sector were generated.[215] As a result, the most important background conditions emerging in the end of the 1980s were: (1) a large pool of qualified scientists and engineers as well as universities educating them; (2) well developed civilian high-tech industry; (3) significant presence of technology MNEs, (4) a number of communications equipment companies that generated spin-offs in the 1990s; (5) liberalization of the capital markets and the macroeconomic conditions. In addition, the emergence of the Israeli VC industry was immediately preceded by globalization of capital markets (enabling Israeli companies to raise capital on the NASDAQ in the US), internationalization of US investment banks, looking for opportunities in Israel, and an increased rate of start-up formation in the 1988-1992 period. Thus, when the most acclaimed programme, Yozma, was launched in 1993 there was an excess demand for venture capital from high-quality enterprises.

Against this background, the Israeli Government implemented several programmes aimed at fostering the development of a VC industry and increasing the stock of start-up enterprises. The Technological Incubators Programme was launched in 1991 to support novice entrepreneurs at the earliest stage of technological entrepreneurship and help them implement their ideas by turning them into viable commercial products. The programme has been very successful. In 2005 a new grant pool of $21 million was provided for the establishment of Biotechnology incubators.

Inbal was launched in 1993, aimed at stimulating the establishment of publicly traded VC funds by guaranteeing their downside. Four funds were established. Not very successful and burdened by various administrative hurdles, they all exited the programme. The failure of Inbal offered important lessons in the importance of upside incentives and appropriate management compensation, the need for involvement in the fund operations, and the importance of reputation for subsequent fundraising.

[215] The overview of Israeli policy is based on Avnimelech and Teubal (2004).

Yozma was launched in 1992 with the objective of creating a solid base for a competitive VC industry. It consisted of a $100 million government VC fund which invested in private VC funds ($80 million in "Yozma" funds) and directly in high-tech companies ($20 million). Each Yozma fund had to engage one reputable international financial institution and one domestic institution. The Government would invest up to 40% (up to $8 million) of the funds raised. Thus, $100 million of government capital was matched with $150 million of private capital. The $250 million was invested in over 200 start-up companies. The main characteristic of the Yozma programme was the upside incentive: each fund had a call option on the government shares for up to five years. A total of ten Yozma funds were created. These original groups of managers raised subsequent funds (without government involvement), and by early 2001 managed a capital pool of $5 billion. From 1996 onwards VC demand and supply enjoyed synchronous growth. The second wave of funds was larger and attracted pension funds and other institutional investors. The partnership with the foreign institutions was a great conduit for learning critical VC investment skills. In addition, in the second stage of the industry development strong links were developed with US VC firms.

The HEZNEK Fund was launched in 2002 with a budget of $2 million to provide support for start-up companies. It provides up to 50% of the funds necessary for operation of a start-up company for a period of two years. The remaining funds come from private investors. These investors have the option to purchase the government shares in the start up company.

Perhaps the main conclusion and policy lesson from the Israeli experience is that, while government can certainly play a major role in the development of a VC industry, specific policies targeted towards the Venture Capital sector can be effective only to the extent that favourable background conditions exist or are created.

2. Norway

Since 1968, the Industrial Development Corporation of Norway (SIVA) has been aiding the development of regional and local industry clusters. It has invested over NOK 300 million in 60 innovation centres and has leveraged co-investment from the private sector amounting to NOK 800 million. However, evaluations of the programme found that SIVA's investments tended to be less risky and oriented towards established companies.[216]

The Norwegian Industrial and Regional Development Fund (SND) established an equity division, SND Invest, in 1993 to provide equity to small firms experiencing lack of access to capital, with a maximum investment per firm limited to NOK 200 million for a maximum equity stake of 35%. Over its first ten years of operation, SND Invest has invested NOK 3.5 billion in more than 300 companies. Some of SND's regional offices provide start-up grants to potential entrepreneurs as well as loans to high-risk projects.

In 1997, two initiatives were launched to address the early-stage financing spectrum. The Start Fund (START-Fondet) aimed to provide investment and business advice to seed companies with international potential, mostly in biotechnology, ICT, and environment sectors. These companies receive around NOK 7.5 million for 2-7 years period. START-

[216] Arnold and Snowden (2000).

Fondet has been placed under private ownership and management, with the Government providing subordinated loans to bring its capital to NOK 320 million. The Government involvement is to be phased out after 15 years of operation.

The Seed Capital Scheme (Såkornkapitalordningen) was initiated in the same period and established five regional and one national fund that run parallel to the Start Fund. Through these funds, non-listed SMEs get access to equity capital – NOK 1 million on average – in early or expansion stages. They also benefit from the competence and networks of the fund managers. Although the funds are privately owned and managed, SND serves as coordinator and has contributed half of their capital through subordinated loans offered by its subsidiary, Venturefondet AS. The size of the funds is relatively small, with their total capital amounting to NOK 780 million (98.5 million Euros). Another four regional funds are to be established in the course of 2005, as are four technology-oriented funds targeting start-ups with high growth potential.

In 2001, a fund-of-funds, Argentum, was established with total capital of NOK 2.45 billion to improve the access to risk capital for innovative companies. Eligible funds should have a minimum of NOK 300 million in capital and focus on specific key sectors such as energy, marine/maritime, ICT, environment, and life sciences and biotechnology.

An incubator programme was launched in 2000 by SIVA to stimulate the establishment of new firms with growth potential by supporting their earliest, high-risk phases of development. Any innovation-oriented organization, such as science parks, private firms, and knowledge intensive public enterprises (i.e. hospitals), can be hosts for an incubator. To complement the support provided by the incubators, an Incubator Grant programme was established in 2001, offering grants to knowledge / technology intensive start-ups located in approved incubators.

SIVA established the Industry Incubators programme in 2004, in which incubators are linked to a well-established manufacturing company or a group of companies ("the mother company"). Based on its specific needs, the mother company offers physical premises and assistance to individuals willing to start up a relevant business. The main functions of the industry incubator are thus to identify and support new business opportunities as well as people who are interested in them and are capable of developing them. The industry incubators are organized as private limited companies owned by the mother companies, other local investors and SIVA. Four industry incubators were established in 2004, and another four are to be established in 2005. It is the ambition of SIVA to contribute to the establishment of a total of 50 incubators in the course of the next five years.

3. Switzerland

The VC industry in Switzerland has developed from virtually non-existence in the mid-1990s (less than 1 million Euros in early-stage investments in 1995) to mid-tier status in 2005. Two opposing conditions make Switzerland's case unique: Switzerland is a source of some of the world's most advanced technology, while it also has a very low rate of entrepreneurship, perhaps due to its culture of aversion to risk. In addition, Switzerland has a well-developed capital market and is one of the world's main financial centres. Tax and governance

regulations in Switzerland have impeded the establishment of domestic VC funds, with many of the active VC funds domiciled in offshore zones abroad.

In 2000, the Venture Capital Company (VCC) was introduced as a special vehicle for venture capital investments. It benefits from lower thresholds for exemption from capital gains tax at the federal level, as long as it meets certain conditions: (1) 50% of its capital is invested in Swiss companies less than five years old; (2) each investment represents at least five per cent of the company's capital and has a value of at least CHF 250,000. In addition, Swiss taxpayers who make subordinated loans to companies in which a VCC invests within one year of the loan, are able to deduct 50 percent of the loans from their taxable income (subject to a maximum lifetime deduction of CHF 500,000). If the loan is repaid, this deduction must be added back to taxable income. If the loan is not repaid, the investor may deduct further 50 per cent of the losses in excess of the amount originally deducted, up to a maximum of CHF 250,000. These VCC incentives have had little effect of VC investments.[217]

Venturelab is an initiative launched in 2004 to promote entrepreneurship in Switzerland. It is carried out in co-operation with the federal institutes of technology, universities and universities of applied sciences. Venturelab provides customised education tools to promote innovative young entrepreneurs and to inspire students for entrepreneurship. The initiative focuses on the best projects and accompanies them with professional consulting, paying more attention to practice rather than theoretical concepts. This initiative is organized at a regional level and should be addressed to approximately 1500 students. A further 500 entrepreneurs should be trained in management per year.

E. Eastern Europe, Caucasus and Central Asia

Recent policy initiatives in the provision of risk capital reflect in a desire to promote the diversification of the economy, away from an excessive specialization in the production of hydrocarbons in energy producing countries. There is also a widespread belief among public authorities throughout the sub-region that the potential for commercial innovation resulting from existing technological capabilities does not fully materialize because of various constraints, including the absence of appropriate financing, in a context in which overall financial development remains limited.

1. Belarus

Over recent years the number of small enterprises involved in production of innovative products or scientific research declined more than twofold – from 600 in 1997 to only 275 in 2006. Innovative enterprises account for mere 0.6% of the small enterprise employment.

The Belarusian Innovation Foundation, founded in 1998, aims to support small innovative enterprises by financing innovation projects on a repayable basis, co-investing with private investors and providing up to 50% of the required funds at subsidized interest rates for a period of up to four years. The foundation encourages greater use of the results of the scientific research and inventions that are of economic value in manufacturing. Additionally,

[217] AltAssets. http://www.altassets.com.

the foundation holds exhibitions, trade fairs of scientific and technical products, seminars and conferences. To date, the foundation has financed 35 projects, of which 20 are regional.

2. Kazakhstan

Kazakhstan has created a number of public financial institutions to implement its Innovative Industrial Development Strategy 2003-2015, which seeks to support business in creating a competitive domestic industry with a higher technological content. These institutions have been recently put under the common umbrella of the Fund of Stable Development "Kazyna". As part of this strategy, the National Innovation Fund was established in 2003, with a charter capital of $150 million. The NIF takes minority stakes in private venture funds, with an investment policy that is in line with overall state scientific and innovation priorities. Priority sectors include ICT, new construction materials and pharmaceutical products. Public participation in these hybrid funds involves an asymmetric sharing of risks with private partners in order to encourage the development of the venture capital industry.

The activities of the NIF have been instrumental in the creation of private local venture funds. It also collaborates with foreign institutions as a way to gain management and technological expertise. The NIF has driven the recent creation of the Kazakh Association of Venture Funds, which is expected to provide a focus for the articulation and defence of the interests of this emerging industry. The NIF also provides grants for R&D and contributes to financing technological incubators. Venture capital investments account for around half of total resources currently but it is projected that, as private venture initiatives take off, resources will be increasingly devoted to financing the innovation infrastructure.

3. Russian Federation

The Russian Federation has embraced an innovation strategy that aims to create better conditions for the modernization of the economy through the upgrading of the innovation infrastructure in the form of special economic zones and technoparks and improved access to finance for innovative companies.

Between 1993 and 1996 the EBRD facilitated the establishment of 11 Regional Venture Funds (RVFs) in Russia, which were set up between 1994 and 1997 with a total committed capital of approximately $312 million. The primary objective of the programme was to create the infrastructure for making private equity investments in medium sized private companies in the Russian regions with the ultimate aim of attracting further capital from private investors to demonstrate the viability of private equity in Russia. At the end of 2006, the total amount invested was $266 million in 105 portfolio companies.[218]

The Fund for Assistance to Small Innovative Enterprises (FASIE) supports innovation through a number of programmes, with a budget equivalent to 1.5% of the total federal expenditures for civilian science (around $45 million in 2006). The START programme, which is similar to the US Small Business Innovation Research Programme, accounts for the

[218] Source: EBRD.

bulk of resources.[219] It has contributed to the creation of around 1,500 enterprises since 2004. The continuation of public support in the second year requires matching financing from the private sector.

There is no special tax treatment for capital gains made by business angels or venture capitalists but some recent public initiatives have sought to promote in a more direct way the development of the venture capital industry. A specialized fund, focusing on information and communication technologies, with a charter capital of around $55 million was created in 2006. The extent of public support is limited in time, as this fund is planned to be completely privatized by 2010.

These programmes are rather modest in comparison with the latest initiative, the Russian Venture Company (RVC). RVC is a fund-of-funds with initial capital of $600 million (RUB 15 billion).[220] It intends to provide 49% of the capital of target funds, with the remaining 51% coming from private investors. The size of the target funds is to be between $40 million and $110 million. All the target funds' investments should be in high-technology sectors, and 80% of their funds should be allocated to early-stage companies. All returns on the government's stake in excess of five per cent go to the VC fund managers. The Russian Government hired Yigal Erlich, the former leader of Israel's Yozma programme, to serve on the board of RVC. Another prominent international board member is Esko Aho, former prime minister of Finland and current chief of EU innovations policy. In May 2007, the first three VC funds were selected, with a combined capital of almost $300 million. Of those funds, only one originated from Russia. Another selection round is planned for the autumn of 2007, looking to sanction 8-10 additional funds.

RUSSBA was created in 2006 as the national federation of business angel networks, under the umbrella of the Russian Venture Capital Association (RVCA).

F. Good Practices

Because the policy experience related to financing innovation is relatively limited as well as diverse, policymakers in individual countries face a particular challenge in designing national programmes and in learning from the experience of other countries. As countries vary in their economic and innovation history, in the conditions and institutions that support the cycle of innovation finance as well as in the nature and sequence of measures to address the deficiencies of that cycle, there is much causal ambiguity in making attributions to particular policy actions and drawing recommendations for further initiatives.

In view of this, evaluating or imitating the experience of individual countries requires sufficient understanding of the context in which it has been enacted, in particular the set of initiatives preceding it as well as the degree of development of each of the components of the equity financing cycle within the particular country. In addition, appreciating the development of a country's formal or informal VC industry at a particular point in time requires

[219] Desai and Goldberg (2007).
[220] Source: VentureBeat (http://venturebeat.com). Russia finally gets serious about venture capital, June 1, 2007.

understanding of its proper historical context in terms of economic development and set of enabling conditions.

The identification and understanding of good practices is hindered by the relative lack of monitoring and formal evaluations of implemented programmes. The impact of particular programmes is often estimated, at best, by the amount of capital allocated in support of particular enterprises or by the number of supported enterprises without sufficient regard for the development path and ultimate success of these enterprises. To the extent that programmes aim to facilitate not just the mere creation of enterprises but also the development of growing and successful enterprises, more elaborate programme monitoring and evaluation are crucial for providing learning opportunities for programme design and implementation.

1. Fundraising

There are several angles from which to discern good practices in spurring on the fundraising stage of the VC cycle: total availability of risk capital (through VC funds or business angels), engagement of private fund providers with VC firms, provision of incentives for VC managers to invest in early-stage, innovative firms, and provision of incentives for VC managers to identify and select commercially feasible, high-potential firms.

The provision of public funds for venture capital activities is perhaps the most widespread practice across countries. There are two main approaches to this, based on whether the funds are managed by public or private entities.

(a) Publicly managed funds

In several countries (Canada, Denmark, Finland, Norway, Portugal, Spain, Sweden) funds are placed in special agencies, typically affiliated with institutions promoting business or industrial development, with a mandate for direct investment in new, small or innovative enterprises. Many of these publicly managed funds emerged during periods when no private infrastructure existed for innovation finance. In this regard, publicly managed funds may serve as an important initial source of capital that allows for the accumulation of investment knowledge and expertise that can gradually flow into the private sector. Funds that have an explicit focus on early-stage, high-risk projects may be particularly relevant. Such an approach can be deemed valid in the absence of market mechanisms for investments in innovative companies. Yet, the drawbacks of publicly managed funds – lack of incentives, political interference that may shift the investment considerations away from commercial feasibility, or the ability to attract and deploy well qualified investment managers – should be kept in mind. Notably, evaluations of such public programmes in Finland, Norway, and Sweden have consistently pointed to the fact that investments made through these programmes tend to be less risky and oriented towards more established companies.

As market mechanisms begin to emerge or already exist in some form, public funds are best used to complement and support such mechanisms. In this regard, the programmes involving publicly managed funds have moved towards greater involvement of private investment

managers, either by shifting their focus to fund-of-funds allocations to privately managed funds (Canada, Denmark, Finland, Norway) or outright privatization (Sweden).

Notably, as privately managed funds take precedence and government venture capital activity is reduced, the Scandinavian countries have shifted their direct involvement towards nascent, seed-stage enterprises by establishing incubator programmes or seed funds. Such programmes can be seen as complementing the existing market mechanisms by increasing the deal flow of "investment-ready" firms.

(b) Privately managed funds

Another approach to the provision of public funds for venture capital investment activities has been through engaging private investment managers and leveraging additional private funds. In a typical scenario, the government or its agency acts as a cornerstone investor, providing a certain percentage of a fund's capital. This approach is now widely followed in a number of countries: Canada, Denmark, Finland, France, Germany, Ireland, Israel, UK, US, and, more recently, Kazakhstan, Latvia, and Russia, as well as by the European Investment Fund. The form of the government's investment includes both straight equity and subordinated loans. The main logic behind this approach is that professional VC managers have clear interests in identifying and backing commercially successful enterprises. In addition, where there is a careful selection of the funds to be supported (through competitive bidding or detailed evaluation of applications), the government's involvement plays an important legitimacy role for establishing relationships between VC firms and institutional investors.

(c) Fund incentive structure

In addition to simply making VC funds available for private managers to invest in promising enterprises, government programmes pay increasing attention to ensuring that the risk-return profile that VC managers face is appropriate for undertaking riskier, early-stage investments as well as to ensuring that the latter is done for reasons related to the explicit pursuit of the investments' upside (i.e. appreciation). It is notable here that providing downside protection – through outright guarantees or through refinancing investments with subordinate loans – has been counterproductive, as the experience of Germany, Israel and the Netherlands has shown. Nevertheless, this experience has been a valuable source of policy lessons in these countries.

The experience with the SBIC programme in the US exemplifies the importance of an incentive structure for promoting early-stage investments. In the early period of the programme, the need to service the loans provided by the SBA to the participating investment companies made it impractical for these companies to invest in enterprises without immediate cash-generation ability. The change from loans to participating preferred securities, deferring early interest payments in exchange for subsequent profit participation, created a significant shift towards seed-stage investments, with SBIC investments accounting for 65% of seed financing during the 1994-2002 period.

The Yozma programme in Israel provides another example of providing upside incentives to VC funds: each fund had the option to purchase the government's shares for up to five years from the inception of the fund. To a similar effect, recent programmes launched in the UK

(the Enterprise Capital Funds), Latvia (through the Latvian Guarantee Agency) and Russia (the Russian Venture Company) cap the returns accruing to the government's share (at 4.5%, 6%, and 5% respectively), with all excess returns going to the investment managers and limited partners. Such arrangements create an asymmetric allocation of the returns from the successful investments, thereby increasing the overall portfolio returns and making them more commensurate with the higher perceived risk of early-stage investments.

(d) Tax incentives

Several countries have been offering tax incentives for individuals who invest in private businesses. In the US (section 1244) the incentive allows individuals to write off losses on investments in small business corporations (i.e. those with paid-in capital of less than $1,000,000). It explicitly excludes businesses with more than 50% of their revenues derived from passive sources (royalty, rent, dividend, interest, etc.).

Schemes in the UK (Enterprise Investment Scheme) and Ireland (Business Expansion Scheme) offer tax rebates for investments made. The EIS scheme in the UK additionally offers income tax relief for failed investments as well as exemption or deferral of capital gains tax. The SUIR scheme in France offers income tax exemptions for a period of ten years.

Some schemes target pre-angel sources of finance, notably founders themselves or their friends or relatives. The Seed Capital Scheme in Ireland offers refunds from taxes paid in previous years to individuals starting a company with own funds. The "win-win" scheme in Belgium (Flanders) gives friends and relatives of entrepreneurs an opportunity to invest through a subordinated loan that gives an immediate tax reduction (2.5% of the loan) and future tax reduction (30% of the loan) in case the loan is not repaid.

Among schemes targeted larger, established companies, the Corporate Venturing Scheme in the UK offers income tax deduction (20% of amount invested); capital gains tax deferral as well as capital loss relief for investments in private companies.

Finally, some tax incentives schemes have been designed to encourage individuals to invest in venture capital funds. Examples of such schemes are the ARKimedes Fund (Belgium, Flanders), Labour Sponsored Venture Capital Company (Canada), Mutual Funds from Innovation (France), and Venture Capital Trusts (UK). Whereas the overall evaluation of the longest-running programme of this type, the LSVCC in Canada, has been negative, this has been attributed to the insufficient attention paid to and supervision of the management of the VC funds. In this regard, in the other programmes the funds are under private management (France, UK) or operated as fund-of-funds (Belgium). The CAPCO scheme in several states in the US is notable for offering insurance companies substantial tax credits (100-120% spread over ten years) for investments in qualified local VC companies (certified capital companies).

2. Investing

Good practices at the investing stage pertain to improving the country's entrepreneurial climate, increasing the supply of "investment ready" enterprises through support for

feasibility studies and product development, improving the information flow between potential entrepreneurs and potential investors, and offering guarantees to investors as a means to encourage them to invest in new or innovative enterprises.

(a) Improving entrepreneurial climate

Whereas the US programmes have capitalized on the country's strong entrepreneurial culture and a long tradition of striving to commercialize scientific knowledge generated in public research institutions, European countries have been facing the extra challenge of creating such fundamental background conditions. The EXIST programme in Germany has established 20 extensive regional networks of cooperation between educational, research, economic, and political institutions to motivate, develop, and support entrepreneurship. Similarly, the Science Enterprise Challenge programme in the UK has established 64 enterprise centres at UK universities in order to foster the commercialization of high quality research and new ideas, help stimulate a culture of scientific entrepreneurship within British universities, and incorporate entrepreneurship education across all curriculum areas. Another example of a programme aimed to create entrepreneurial awareness is the VentureLab initiative in Switzerland. It is organized at a regional level and provides customized education tools to promote innovative young entrepreneurs and inspire entrepreneurship among students in universities and institutes of technology.

(b) Increasing the supply of "investment ready" enterprises

Many programmes facilitate the investing process by promoting the creation of new enterprises, particularly based on the commercialization of scientific knowledge generated in public research institutions, and increasing the flow of "investment ready" enterprises to private investors and professional venture capital firms.

Perhaps the most prominent programmes have been the Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) programmes in the US, providing early-stage R&D grants to small technology companies or nascent technology entrepreneurs. The programmes provide crucial funding for feasibility studies (stage I) and prototype development (stage II), thereby "graduating" enterprises with a strong commercial potential that are able to attract private capital for their commercial efforts. In addition to the staged nature of the funding, the effectiveness of the programme stems from its decentralized decision structure, spread among 11 federal agencies and actively supported by technology-transfer offices in individual research universities. The latter not only make researchers aware of the existence of the R&D grants but also work with potential entrepreneurs to develop and appraise their ideas as well as to prepare their grant applications.

In Europe, several programmes have established (relatively) centralized provision of coaching and seed funding in the form of grants or loans to technology entrepreneurs, in order to make the recipient enterprises better prepared and more attractive to potential private investors. Examples of such programmes can be found in Austria (the Seed Funding and "LISA" programmes), Belgium (the Flemish Innovation Fund), Finland (TULI, TEKES, and Start Fund Vera programmes), Germany (High-Tech Start-Up Fund), Netherlands (the TechnoStarter programme), and Spain (New Technology Firms programme). The PreSeed

Finance Programme in Finland is particularly notable for operating an investor marketplace and expertise exchange in addition to providing pre-seed funding for the development of technology-oriented ideas. In the Netherlands, there is a pilot programme (Valorization Grants) currently running, which mirrors the SBIR programme in the US.

In contrast to this centralized approach to early-stage funding of innovative enterprises, regional or local incubators represent a more decentralized approach to fostering the creation of technology-based firms. Incubators are typically affiliated with universities or other public research institutions and aim to bring together researchers, entrepreneurs and finance providers to nurture a group of fledgling enterprises through the early stages of feasibility studies, product development, and market testing. Through formal programmes have been launched mostly since the late 1990s, such incubator structures have been established in Denmark, France, Ireland, Norway, Spain (Catalonia), and Sweden. Similar programmes are currently under way in Estonia, Hungary, and Slovenia.

(c) Improving the information flow between entrepreneurs and investors

In many countries, the creation of business angel networks (some of them with government assistance) has played an important role in bringing entrepreneurs and private investors closer. An example of a public programme that plays a similar role is the Canadian Community Investment Plan aimed at building investment development expertise in 22 communities. Its Internet-based component provides entrepreneurs with improved skills to structure and present their investment opportunities and to attempt to match qualified firms with local, regional or national sources of capital. Similarly, the marketplace (INTRO) operated as part of the PreSeed Finance programme in Finland facilitates presentation forums and investment negotiations for businesses in search for initial funding and private investors. Another example is the Center for Innovation and Business Development in Spain (Catalonia), which has played a similar coordination role for local start-ups and potential investors, functioning as a “one stop shop” for feasibility studies, funding, and project development.

(d) Investor guarantees

Providing guarantees to investors is one of the most popular types of programme. For the most part, guarantees are offered to SMEs and facilitate their access to bank lending. Under these conditions, new or innovative enterprises are undifferentiated guarantee recipients. One of the longest running programmes, the Small Business Loan Guarantee Scheme in the UK is notable for shifting its focus at the end of 2005 towards newer businesses.

Several guarantee schemes are notable for having an explicit focus on innovative enterprises and offering equity guarantees subject to certain limitations. Such programmes exist in Austria, Denmark (Equity Guarantee Programme, focusing on emerging growth companies), France (OSEO-Garantie), Italy (Guarantee Fund for Digital Technologies SMEs), and Portugal (New Technology Based Companies programme). In spirit, to the extent that they cover early-stage innovative companies, such programmes resemble feasibility grants with the added supervision by the private investors receiving the guarantees.

3. Value adding

Policymakers have paid no explicit attention to the value adding stage of the innovation financing process. Implicit in such a hands-off approach is the assumption that there exist proper market mechanisms for allocating and accessing the skills necessary for effective governance of early-stage innovative enterprises. Yet, some programme evaluations have pointed to the fallibility of this assumption. The early evaluation of the SBIC programme in the US pointed to the inability of the sponsored funds to attract high-calibre investment managers. Similarly, an evaluation of the LSVCC programme in Canada pointed to the inability of investment managers to devote time to their portfolio companies due to the high number of ventures under their supervision. Another aspect in which this assumption may turn out to be problematic is that in some countries, value adding skills may be in limited supply. In such cases, it is necessary to facilitate learning and knowledge transfer for the benefit of local investors.

The attraction and selection of skilled investment managers in some ways reflects the proper design and implementation of the funding of private venture capital funds. A bidding process allows for proper evaluation of the investor's expertise, whereas the preferential allocation of the returns accruing to the government's stake provides compensation incentives that may attract skilled managers. Programmes in Israel (Yozma), Russia (Russian Venture Company) and the UK (Enterprise Capital Funds) exemplify this approach.

While there have been no programmes aiming at facilitating the learning by local VC investors, the approaches by two countries, Israel and Russia, in the design of their fund of funds programmes is notable for their explicit goal of harnessing international venture capital expertise. In Israel, each Yozma fund had to engage one reputable international financial institution and one domestic institution. In Russia, the recently established Russian Venture Company has retained the services of expert policymakers from Israel and Finland. In addition, the funds supported under the programme have involved prominent US venture capital investors.

The ability of equity investors to motivate the venture managers to grow the venture and develop its full potential is also dependent on the availability of proper incentive compensation, tied to the ultimate success of the venture. In the US, stock options have been an important form of such compensation, aided by favourable tax treatment that defers the taxation of gains until the exercising of the option.

4. Exiting

Other than the regulation or deregulation of stock exchanges, few programmes exist with explicit focus on improving the exit stage of the innovation finance process.

The Capital Pool Company (CPC) programme in Canada brings together an experienced management team with small firms in need of capital and expertise, and as such offers an alternative to IPO. The programme enables people with extensive business and public market experience to form a "Capital Pool Company" with no assets other than a small amount of

seed capital and then list it on the TSX Venture Exchange to raise additional capital. The CPC then seeks an investment opportunity in a growing business and uses the raised funds to acquire the business in a "qualifying transaction". Following this, the shares of the CPC continue to trade as a regular listing on the Exchange.

G. Policy Implications

1. Government involvement in venture capital activities should be designed to complement and support rather than displace current market mechanisms for allocating capital to innovative enterprises.

2. Government initiatives to encourage venture capital investments need to pay close attention to providing proper incentives for private investment managers to select and develop high-growth, commercially viable enterprises.

a. Downside protection does not create such incentive.
b. Providing asymmetric allocation of the gains on successful investments – through options to buy the government's stake or capping the returns accruing to the government – provide such incentives by improving the risk-return profile of innovative enterprises.
c. A clear programme focus can be more easily translated into proper incentives.

3. Tax incentives are generally effective for encouraging individual investments in private enterprises. Their rules need to be unambiguous as to ensure that the recipient enterprises are indeed those for which the scheme is intended to benefit.

4. The supply of innovative enterprises depends first and foremost on their being a well established entrepreneurial culture and awareness, particularly in education and research institutions.

5. Grants represent an important and (potentially) effective source of financing for feasibility studies and product development. Staged distribution of grants represents an effective tool for dealing with the uncertainty inherent to the commercialization of scientific knowledge and for ensuring that more funds are allocated to projects with increasing commercial promise. Decentralization of grant giving and the active engagement of research institutions in the grant giving process can lead to higher programme awareness and more effective decision making.

6. There has been a limited focus on the availability of requisite investment skills among the local private investors. In this regard there is much room to encourage and facilitate skills development and knowledge transfer from regions with a more established infrastructure for early-stage innovation finance.

7. To the extent that early-stage investors in innovative enterprises are expected to provide more than money, availability and access to proper skills for the governance and development of such enterprises is an essential component of the financing infrastructure. Learning and

knowledge sharing are the primary mechanisms for countries/regions lacking in such expertise to acquire it.

8. Incentive stock option compensation is an important tool through which early-stage innovation enterprises attract and retain skilled managers and align their interests with those of the early-stage investors.

9. The provision of special stock market listing rules and regulations, tailored to the specific needs of small, growing companies represents an important lever for enhancing the access of such companies to growth capital and for improving the exit opportunities for the private investors backing these companies at their earlier development stages.

10. The degree to which existing or specially created stock markets can effectively serve to provide capital to small, growing companies depends on the availability of a support network of experts – investment banks, analysts, consultants, etc. – that understand and properly convey the risk-return profile of such companies to mainstream investors.

VI. POLICY RECOMMENDATIONS

A. Proper Policy Mindset

Any policy recommendations geared towards improving the environment for early-stage financing of innovative enterprises and, more specifically, the development of a local formal and informal VC industry should be made with consideration of the fundamental challenges associated with "engineering" markets for private financing as well as of the most apparent limitations or potential challenges to government involvement. The engineering challenge is best captured by the problem of simultaneity: "Three central inputs are necessary to the engineering process: capital, specialized financial intermediaries and entrepreneurs. The problem is that each of these inputs will emerge if the other two are present, but none will emerge in isolation of the others".[221]

The main implication of this challenge is that the specific recommendations outlined below should not be implemented blindly, without consideration for the complementary elements of the private financing cycle. In view of this, any policy initiatives should be prefaced by the development of a profound understanding of the country's potential venture capital landscape, highlighting both the conditions favourable to the emergence of a VC industry and the areas that need to be nurtured simultaneously.

Government programmes that involve financing of private businesses are naturally susceptible to political and bureaucratic influences that may interfere with the soundness of the business decisions. The dangers of political interference in response to specific interests are particularly high when the programme coordination and funding decisions are centralized[222]. Bureaucratic interference, on the other hand, occurs when programme managers are more concerned with reporting and claiming credit for positive programme results that may have occurred without the government's involvement (i.e. the government essentially crowds out private financing). An example of such a situation is supporting firms that do not need financing but are more likely to be successful, thereby ensuring that the programme will show positive results[223].

The recommendations presented below are organized along the four stages of the equity financing cycle, as discussed in detail in section 3 of this report.

B. Fundraising

As a basic condition, individual governments should ensure that the local regulations of the allocations that pension funds, insurance companies, and other institutional investors make to venture capital funds as well as the tax treatment of the investment vehicles are in line with those of countries with leading VC markets. Some of the regulations that may be reviewed include quantitative restrictions on allocations to "alternative" asset classes as well as "safe

[221] Gilson (2003 p. 1069).
[222] Lerner (2002).
[223] See Wallsten (2000) for a discussion of the SBIR programme in the US.

haven" and "prudent man" (as defined in Directive 2003/41/EC) rules that guide investment decisions.

As several countries have developed dedicated fund structures for raising venture capital, further efforts may be extended to ensure that these structures retain the most effective features, such as those of the Limited Liability Partnership – fixed life, flow-through distributions, deferral of tax liabilities until securities are sold, and lack of interference by limited partners.

The current fragmentation of the European VC market and divergent national approaches are hampering cross-border VC investments in Europe. To establish a more flexible framework for VC investments across countries, individual countries should play a crucial role in reviewing the existing and adopting any new regulations.

A reduction in capital gains taxes can serve as a major boost for the supply of capital to venture capital firms as well as increasing the incentives for VC firms to make risky investments.

Where the local pool of institutional capital is insufficient or inappropriate, proper conditions should be ensured to potentially attract capital from foreign institutional investors. Such conditions include aligning the local tax and regulatory framework with those available in countries competing for foreign institutional capital.

Even when the regulatory environment is favourable for the raising of VC funds, local institutional investors may stay at bay due to insufficient knowledge of the VC industry, the nature of VC investing, and the return profile of VC funds. Programmes to educate – for example, through information seminars – managers of institutional funds and build relationships with the local VC community would be appropriate to address such issues. In addition, promoting the establishment of gatekeepers or specialized investment advisors could give an additional boost to the consideration of venture capital as an institutional investment class.

When institutional investors are open to investing in VC funds but have concerns over the abilities and prospects of particular funds – such as when funds are newly established or led by relatively inexperienced managers – governments may use programmes to leverage institutional funds by acting as cornerstone investors and providing the necessary certification to fund managers. Such programmes should be of sufficient length to allow the supported VC funds to move through a few cycles and establish credible track records. Public-private-partnerships can also compensate for risk aversion and lack of private investors.

A complementary approach for EU countries, and one that does not involve funding, are programmes that seek to liaise local VC funds with the activities of the European Investment Fund related to its mandate given by the EC to expose them to additional sources of public financing and certification with institutional investors.

To smoothen interruptions to fledgling VC cycles, government fund-of-funds programmes may be introduced in periods in which VC fundraising slows down. This would ensure that

existing VC firms are able to raise additional funds to provide needed follow-on financing to their portfolio companies and thus bring them closer to successful exits. This will help them in building a track record that will be instrumental for the next wave of private fundraising.

C. Investing

Government initiatives that facilitate the investing stage of the VC cycle should aim to – in line with the discussion in Section 3 of this report – increase the availability of investment opportunities, ensure economies of scale through bigger funds while at the same time supporting cooperation with local actors, improve the investors' ability to source and select promising opportunities, and facilitate the structuring of investment agreements that provide incentives to both investors and entrepreneurs to increase the enterprises upside potential.

1. Promoting entrepreneurship

Education plays a major role in the promotion of entrepreneurship.[224] Universities worldwide include entrepreneurship courses in the curricula of their business, engineering, arts and science schools. Such courses expose students to the entrepreneurial process and equip them with basic skills in evaluating and shaping opportunities and preparing business plans. As the discussion of entrepreneurship as a career option permeates conversations at home, at work and at school, there will be a gradual change in attitude towards risk taking and job security. Beyond higher education institutions, the teaching of entrepreneurship can be introduced in secondary education as well as in institutions for post-educational qualifications.

In addition to motivating and preparing people to engage in entrepreneurship, educational programmes can address the specifics of the venture financing process and particularly the roles that business angels and VC investors play in that process. Increasing the awareness of potential entrepreneurs of the various financing options as well as their understanding of what private investors look for and how they make decisions will likely increase the demand for private capital.

Where the focus is on technology entrepreneurship – the commercialization of cutting edge scientific knowledge through the establishment of technology-based firms – governments can facilitate the establishment or strengthening of technology transfer offices or other agencies that bring together the scientific and business worlds. Such agencies can be located around major research institutions and should seek to educate faculty and researchers on possible entrepreneurial opportunities, the process involved in developing these opportunities, and the available resources for the pursuit of these opportunities.[225]

More generally, any facilitation of information exchange between scientists, engineers, managers, entrepreneurs, etc. through special forums, conferences, venture fairs or online discussion platforms will likely improve the flow of information to reveal potential innovative

[224] The priority actions outlined by the Spring 2006 European Council under the "Partnership for Growth and Jobs" strategy include expanding entrepreneurship education.
[225] The EC's Broad-based Innovation Strategy provides an extensive roadmap for making Europe a knowledge-based, innovation-friendly society (EC, 2006).

opportunities. Such efforts can be made in relation to the innovation and investment networks supported by the EC (e.g. Europe INNOVA, PRO INNO Europe, and EASY).

2. Public pre-VC capital

Incubator and seed capital programmes represent major sources of early-stage capital and viable avenues for making promising, high-potential firms ready to be taken on by professional investors such as VC firms. Where such programmes are lacking, governments should consider their introduction. Some of the issues related to the effective design of such programmes are outlined below.

Where governments seek to directly finance innovative firms with the hope of increasing the deal flow of VC firms, its key role is to provide certification for such firms in the eyes of potential VC investors who may normally avoid these firms because of problems of information asymmetry.[226] For some innovative firms – particularly those seeking to commercialize new technologies – much of the judgement associated with the potential value of the project is related to appraising the soundness of the underlying technology proposition. Government clerks can be reasonably accepted as more superior to private professionals in selecting investments only in cases when they have the proper technology expertise. This suggests that the selection of projects that receive government funding should be handled by agencies in which such expertise is readily present.

More generally, for the government's involvement to have any credibility in the eyes of private investors, public seed capital programmes should be infused with the elements that make the venture capital investment process effective: careful selection, incentives, monitoring, staged financing, strategic and management support. As a first step, before acting as venture capitalists, the government agents need to understand better and build strong relationships with the VC industry. In addition, government VC funds can be set up as public-private partnerships.

To ensure that they select and support high potential firms, government agents should employ professional selection criteria, in line with the role of private investors. Such an approach would help avoid selecting underachieving firms, which is the main potential drawback to government financing programmes. Considerations of the firm's track record, the experience of the management team, the existence of a clear product/market strategy are essential since these factors have historically been good predictors of the firm's commercial success. To better equip its decision officers for such appraisals, the government needs to provide them with continuous education and training and, possibly, to employ private sector expertise.

To allocate capital more efficiently, and continue to fund enterprises that show increasing promise, the funding provided by early-stage programmes should be staged. The initial stage should provide small grants for feasibility studies and market analysis. A second stage, for which enterprises apply upon successful completion of stage 1, provides larger funds for product development and initial marketing. Upon completion of that stage, an enterprise

[226] See Lerner (2002).

would be well geared for large-scale commercialization and should be able to attract private expansion capital.

Much attention needs to be paid to the oversight and support of the financing recipients. To this end, agents should not only have proper business expertise but also develop an attitude of strategic flexibility, ready to accommodate strategy or market changes that become necessary as the enterprise deals with its uncertain environment.

In its attempt to improve the deal flow of private VC firms, the government should be better attuned to the country's VC sector, following and considering their industry preferences.[227] Given the narrow industry focus of VC investments, governments can fund companies in sectors not currently popular with VC investors and provide follow-on funding to VC-backed companies or co-invest with private VC funds when VC fundraising is low.

3. Encouraging informal investors

Favourable tax treatment of private informal investments is perhaps the strongest lever that governments have to encourage informal investments in innovative enterprises. It appears that the countries with the most developed business angel markets are those that offer tax benefits to business angels and other private investors. Tax incentives may include the possibility to write off losses against tax liabilities as well as the provision of tax credits over a certain time period for a portion of the investments made. Such tax incentives can be developed not only to increase informal investment but also to encourage informal investors to take a long-term perspective.

Formal training of informal investors on the private financing process as well as current market and technology trends can increase the investors' market awareness and financing potential.

To deal with the inefficient flow of investment information in the business angel market the government should support – as many currently do – the establishment of business angel networks. Such networks not only pool the resources of individual angels and thus increase their funding potential, but also enable them to have a more visible market presence, making them easier to reach by potential entrepreneurs.

Setting up co-investment funds in the form of public-private partnerships can also be an excellent lever for attracting new investors into the remit of business angel networks and increasing their investment activity.

4. Deal sourcing and selection

To the extent that many VC managers come from a finance background (investment or commercial banking, accounting), they need to be educated on understanding technology-based businesses and dealing with the uncertainty surrounding innovative and early-stage

[227] See Lerner (2002).

enterprises. Governments can cooperate with educational institutions (e.g. business schools) on providing such training to new or potential VC managers.

Programmes can be established at business schools to develop venture capital managers that could be then hired by existing VC firms, proceed to establish new VC firms, or simply become business angels once they develop successful careers elsewhere. Over time, such programmes can be effective for the creation and dissemination of VC investment expertise and thus accelerate the learning curve of the local VC industry.

Another avenue for increasing industry learning involves formal and informal cooperation with more experienced foreign VC firms. Such cooperation can be made a pre-condition for government financing, as implemented in the Yozma programme in Israel. In addition, special efforts can be made to encourage foreign VC firms to operate in the domestic environment.

To further facilitate deal sourcing, relationships should be built between the technology and innovation community (including incubators and seed capital funds), business angels and the VC sector. Such relationships should focus on the exchange of relevant technology or market information, sharing of experience as well as referring promising investment deals.

5. Deal structuring

Incentive stock options have been a dominant form of compensation for entrepreneurs and managers in VC-backed firms. They provide strong incentives for the firm managers to grow the business and provide successful exit for the VC investors. In view of this, governments should review the local availability, usage and tax treatment of stock options and ensure its alignment with the practice in countries with well developed VC markets.

Another avenue for improving deal structure to better align the interests of entrepreneurs and VC managers involves the increased use of convertible preferred stock, by far the most used security in VC transactions in the US. Since the use and incentive power of convertible preferred stock is afforded by certain tax treatment,[228] local tax codes may be reviewed and modified accordingly.

Where the domestic use of convertible preferred stock is impractical,[229] other avenues – such as combining other financial instruments – can be explored for aligning the interests of entrepreneurs and VC managers and providing strong incentives for entrepreneurs to grow their companies and create exit opportunities.

D. Value Adding

Given the problems of uncertainty, information asymmetry, and agency costs the ability of VC firms to act as successful financial intermediaries depends on their solid contractual

[228] See Gilson and Schoar (2003).
[229] For instance, business angels in the UK have the obligation to take common shares in companies in order to benefit from the Enterprise Investment Scheme (EIS) relief.

arrangements (that create the right incentives for entrepreneurs to grow and steer the business towards successful exit), monitoring abilities and expertise.[230]

A strong service support network – lawyers, consultants, executive recruiters, marketing experts, etc. – attuned to the needs of young, innovative or technology-intensive businesses is essential for the value adding abilities of VC firms. While many of these emerge as the VC industry grows, access to such services in the early stages of the VC industry development may prove crucial for the success of the first VC funds.

The conditions at which a government invests in VC funds should be such that they provide incentives for the VC managers to pursue increased upside to their investments. To this end, loss guarantees have proven counter-productive. The experience in several countries shows that capping the return accruing to the government's share and allocating all the excess returns to the VC managers have a strong leveraging effect on the VC firms' returns and thus constitute an efficient mechanism for providing the "right" incentives to the VC managers.

When the government invests concurrently with private investors (e.g. VC firms) in entrepreneurial companies, another mechanism to provide upside incentives to the VC managers is to grant them the option to buy the government's share at predetermined rates and within a predetermined time period.

The VC funds' ability to provide follow-on finance to companies that successfully meet their development milestones and need capital for further development and expansion represents an important added value. From the VC fund's perspective, inability to participate in follow-on rounds leads to the dilution of its ownership stake when new investors join in and thus reduce return potential. In view of this, programmes focusing on financing small early-stage funds should be attuned to their needs for additional financing of the companies they back.

E. Exiting

In order to provide lucrative exit opportunities, stock markets should be sufficiently inviting of new listings of small, high-growth companies and provide sufficient trading liquidity in their secondary markets.

Existing stock markets, or specially created alternative investment markets, should be more accommodating of small, high-growth companies by lowering their listing and disclosure requirements, reducing the hold periods and escrow requirements for new listings as well as providing listing preparation services.

Trading liquidity can be enhanced through consolidation of regional exchanges and harmonization of regulations and trading systems. Such moves can increase the appeal of these exchanges to a wider set of institutional investors.

[230] Gilson (2003).

With the emergence of pan-European exchanges for offerings of small, high-growth companies, governments can facilitate the exchange of information as well as the pursuit of such exit routes among domestic VC investors and innovative enterprises.

Where IPOs do not represent viable exit options, due to under-developed local capital markets or lack of access to foreign markets, an improvement to the acquisition infrastructure – especially in regard to foreign buyers – is another avenue for boosting the exit opportunities for local equity investors. Such improvement may include tax incentives, streamlined regulations of domestic acquisitions or high-level networking and promotion activities for the leading domestic sectors.

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APPENDIX

Summary of Programmes Operated by Country

Type of measure	CA	US	EU	AT	BE	DK	FI	FR	DE	GR	IE	IT	NL	PT	ES	SE	UK	BG	CZ	EE	HU	LT	LV	PL	RO	SK	SI	IL	NO	CH	BL	KZ	RU
Direct funding																																	
Investments through government VC funds	√				√	√	√			√				√	√	√										√			√				
Investments through other government agencies																																	
Feasibility studies and other seed-stage activities		√		√	√		√		√	√			√	√	√	√	√			√	√												√
Innovative SMEs		√		√			√					√			√			√	√		√		√	√			√				√		
Co-investments with private investors in innovative SMEs		√					√	√	√					√			√											√			√		
Indirect funding																																	
Investments in privately managed VC funds	√	√	√			√	√	√	√	√	√				√		√						√	√				√	√			√	√
Financing of incubators and other early-stage intermediaries	√					√		√			√	√			√	√	√			√	√				√		√	√	√			√	
Guarantees and incentives																																	
Debt guarantees for investments in innovative SMEs			√	√				√					√	√			√	√	√				√										
Equity guarantees for investments in innovative SMEs				√		√		√				√	√	√																			
Tax incentives for financing innovative SMEs		√			√			√		√	√						√																
Tax incentives for investments in VC funds	√	√			√			√									√												√				

Financing Innovative Development

This publication is part of an ongoing series highlighting some of the results of the UNECE Sub-programme on Economic Cooperation and Integration. The objective of the Sub-programme is to promote a policy, financial and regulatory environment conducive to economic growth, knowledge-based development and higher competitiveness in the UNECE region. It covers different thematic areas related to this objective including innovation and competitiveness policies, entrepreneurship and enterprise development, financing innovative development, public-private partnerships for domestic and foreign investment, commercialization and protection of intellectual property rights.

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