

Venture Capital in Ireland in Comparative Perspective



FRANK BARRY,* CLARE O'MAHONY† AND BEATA SAX‡

ABSTRACT

This paper assembles the most comprehensive set of data available to offer a comparative perspective on venture capital in Ireland. The paper charts the emergence of the sector and the co-evolution of the demand and supply sides of the market. On the demand side, a flow of investment opportunities emerged – particularly from the indigenous software sector – for which venture capital represented an appropriate financing vehicle. Concurrently, on the supply side, public policy – including publicly provided funding – dramatically enhanced its availability. State support of the demand side has been a multiple of state support to the supply side of the market. Developing a self-sustaining VC sector, however, is found not to be a straightforward task.

Key Words: Venture capital; development finance; high-tech start-ups

INTRODUCTION

‘Venture capital’ refers to equity capital provided to early stage companies, where the venture capitalist also typically contributes management support to the enterprise. This type of capital is particularly appropriate to the needs of innovative start-up companies where informational asymmetries and the absence of collateral and reputation preclude access to more conventional forms of financing, and where the provision of equity relaxes the time constraints that enterprises would otherwise face.

Because of the link with innovative start-ups, the availability of an adequate supply of venture capital (VC) is usually seen as a necessary precondition for the emergence of innovative and dynamic regions. This draws on the model of Silicon Valley, which has been portrayed as an ecosystem consisting of two elements: (i) an economy of established firms, universities, research laboratories, etc., which produces output and innovations, and (ii) an

* School of Business, Trinity College Dublin

† College of Business, Dublin Institute of Technology

‡ Investors TFI Fund Management, Warsaw

2 *Venture Capital in Ireland in Comparative Perspective*

institutional infrastructure, with venture capital at its core, which enables the creation and growth of new start-up firms (Kenney, 2004).

Governments across the globe have responded by adopting policies aimed at ensuring the availability of venture capital at the regional level. Many such policies have ended in failure however. Avnimelech et al. (2005) suggest that part of the problem has been one of conceptualisation, where the absence of VC is seen as a purely supply-side deficiency. They point to necessary demand-side factors in sustaining a VC market, noting that 'a vibrant VC industry is dependent upon a flow of investment opportunities capable of growing in value quickly enough to provide capital gains justifying the investment risks' (Avnimelech et al., 2005: 199). An inappropriate focus solely on the supply side is one of the grounds on which Mason and Harrison (2003) critique the United Kingdom (UK) regional venture capital initiative.¹

The venture capital market expanded dramatically in Ireland in the early to mid-1990s, just as such a flow of investment opportunities emerged, primarily in the indigenous computer software sector, the most dynamic indigenous high-tech sector of the 'Celtic Tiger' era (Crone, 2004; Ó Riain, 2004).

This paper is structured as follows. The next section presents an overview of venture capital and private equity (PE) markets in the US, Europe and Ireland. The following section looks in more detail at the supply of VC and how it has been influenced by legislation and by the provision of public funds, with the latter ranging from unimportant in the case of the United States (US) to being of well above average European importance in the Irish case. This section also illustrates the very high degree of internationalisation of the Irish VC market and addresses the justification for state provision of VC funds under these conditions. The fourth section analyses the sectoral allocation of VC and the demand side of the market, investigating the role of Ireland's development agencies in directly supporting the types of firms for which VC finance is appropriate. The concluding comments focus on the co-evolution of the supply and demand sides of the VC market and seek to draw lessons of broader applicability from the Irish experience.

OVERVIEW OF VENTURE CAPITAL AND PRIVATE EQUITY MARKETS IN THE US, EUROPE AND IRELAND

Prior to 1980, venture capital financing in the US was regarded by many as a 'cottage industry'. Significant new legislation adopted around this time would influence its further development. This legislation included:

- The Revenue Act of 1978 and the Economic Recovery Tax Act of 1981, which reduced the capital gains tax rate and raised the incentives for long-term investments
- ERISA 1979 (the 'Prudent Man' Rule), which changed the investment rules for pension fund managers, allowing them to place funds in high-risk investments
- The Small Business Investment Incentive Act of 1980, which defined venture capital-type funds as companies that stimulated economic growth by encouraging entrepreneurship

- ERISA 1980 ('Safe Harbor'), which clearly distinguished between investment fund and pension fund managers. This made it possible for pension funds to be accepted as partners in venture capital funds, without the risk of incurring the same extent of liability as in the case of investment funds.

Implementation of this new legislation (amongst which the 'Prudent Man' Rule was seen by many as the most important) helped the market to develop in the 1980s. Venture capitalists of that time were instrumental in such success stories as Apple Computers, Cisco Systems, Genentech, Microsoft, Netscape, Sun Microsystems and Starbucks (Gompers, 2007). Growth was particularly dramatic in the 1990s: while the market reached a maximum of only \$5.5 billion in the 1980s, the number of venture capital funds increased from 43 to 629 between 1991 and 2000, by which time capital commitments had risen to well over \$100 billion. As Table 1 reveals, the US market has not yet returned to the levels prevailing before the collapse in 2000 of the dot-com bubble.

Table 1: The US Venture Capital Market (€ billions), Annual Averages

	1990–1997	1998–2000	2001–2003	2004–2006	2007–2010
<i>Funds raised</i>	6.4	63.9	23.6	21.7	15.4
<i>Funds invested</i>	4.8	57.3	26.8	18.8	17.6

Source: National Venture Capital Association (NVCA) Yearbooks. Data converted to Euros (European Currency Units (ECUs) prior to 1999) using Eurostat exchange rates

The equivalent data for Europe, which are available only for funds invested, are shown in Table 2.² European VC funding expanded over the 1990s as it did in the US but the bubble and subsequent downturn were far less dramatic than in the latter case. Ireland is seen to conform to the general European pattern.

Table 2: Venture Capital Funds Invested (€ billions), Annual Averages

Country	1990–1997	1998–2000	2001–2003	2004–2006	2007–2010
<i>Europe</i>	2.8	12.1	10.1	13.4	5.2
<i>UK</i>	0.7	3.4	2.6	6.1	1.3
<i>Germany</i>	0.5	2.6	1.6	1.1	0.8
<i>France</i>	0.5	1.8	1.3	1.6	1.0
<i>Ireland</i>	0.03	0.11	0.10	0.09	0.05

Source: Own calculations based on European Private Equity and Venture Capital Association (EVCA) Yearbooks data

Table 3 reveals that a turn-of-the-millennium bubble is much less in evidence in the aggregate private equity market. Funds raised and invested generally continued to grow until the onset of the global financial crisis, though Ireland stood somewhat apart from the general European trend.

4 Venture Capital in Ireland in Comparative Perspective

Table 3: Private Equity Funds Raised and Invested (€ billions), Annual Averages

Countries	1990–1997	1998–2000	2001–2003	2004–2006	2007–2010
FUNDS RAISED					
<i>Europe</i>	6.9	31.3	31.5	70.5	49.4
<i>UK</i>	3.4	12.2	16.6	43.6	26.7
<i>Germany</i>	0.7	3.9	2.2	2.6	2.4
<i>France</i>	1.0	5.2	4.1	8.2	5.5
<i>Ireland</i>	0.05	0.23	0.16	0.05	0.17
FUNDS INVESTED					
<i>Europe</i>	5.6	24.9	27.0	51.7	48.3
<i>UK</i>	2.4	10.6	10.3	27.9	21.3
<i>Germany</i>	0.7	3.3	3.1	3.3	5.6
<i>France</i>	1.0	3.3	4.5	7.5	7.5
<i>Ireland</i>	0.03	0.13	0.17	0.09	0.13

Source: Own calculations based on data from EVCA. Converted where necessary to Euros (ECUs prior to 1999) using Eurostat exchange rates

A large part of the European private equity industry constitutes buyout transactions, particularly for the UK (Figure 1).³ The Irish situation is quite different.

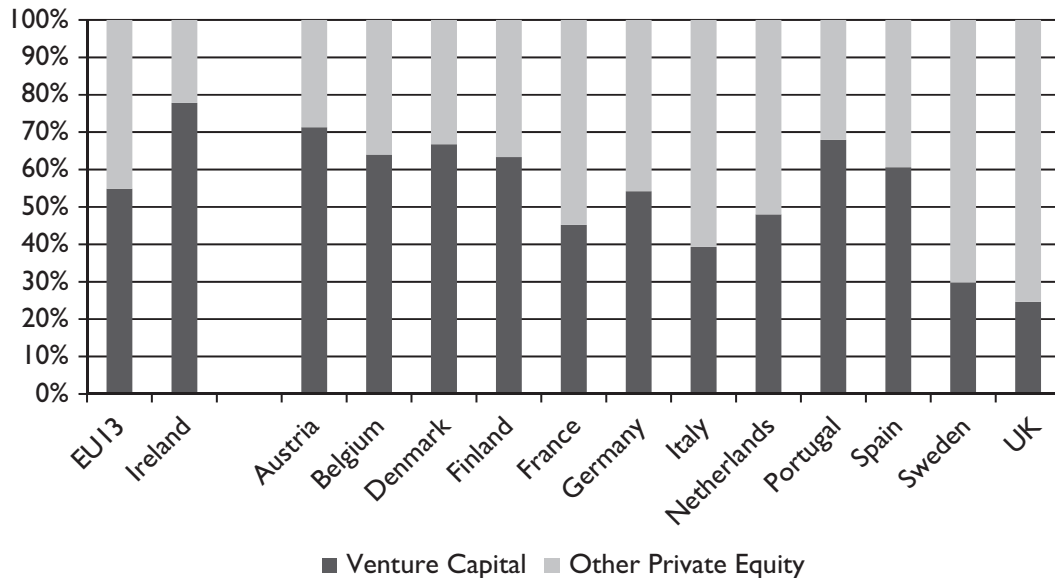
Buyout transactions constituted only a very small part of all private equity transactions in Ireland other than in 2003 and 2007 (Figure 2).

These two years, 2003 and 2007, represented the highest volumes of funds ever invested by Irish VC funds, with the vast bulk of the investments occurring in Ireland. Of the €255 million invested in 2003, for example, only €13 million went overseas, as will be shown later (Figure 9). The remainder included seven buyout transactions totalling €176 million.⁴

Figure 3 expresses venture capital investments as a share of national income. Even for the US at the height of the dot-com bubble, investments per annum came to less than 1 per cent of gross domestic product (GDP). Ireland until the second half of the 2000s recorded values close to the EU15 average, even though it is likely that Irish indigenous firms – which make up the demand side of the VC market – are less concentrated in high-tech sectors than would be the case for the EU15.⁵

Figure 4 provides data on the breakdown of VC finance between funds committed to the early seed and start-up phases and the expansion phases of enterprise development. The share of early stage financing in Ireland changed substantially over the years, with expansion phase projects predominant prior to 1998. Since then, Ireland has been far above both the European average and the US in terms of the proportion of VC finance going to early stage investments.

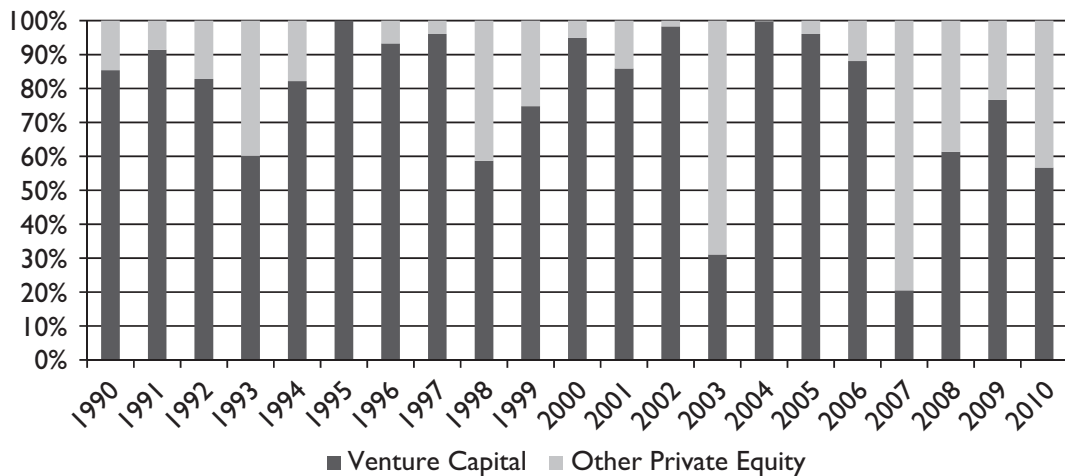
**Figure 1: Venture Capital Investments as a Share of all Private Equity Transactions
(Average Annual Percentage, 1990–2010)**



Note: 'EU13' refers to the EU member states shown here.

Source: Own calculations based on EVCA data

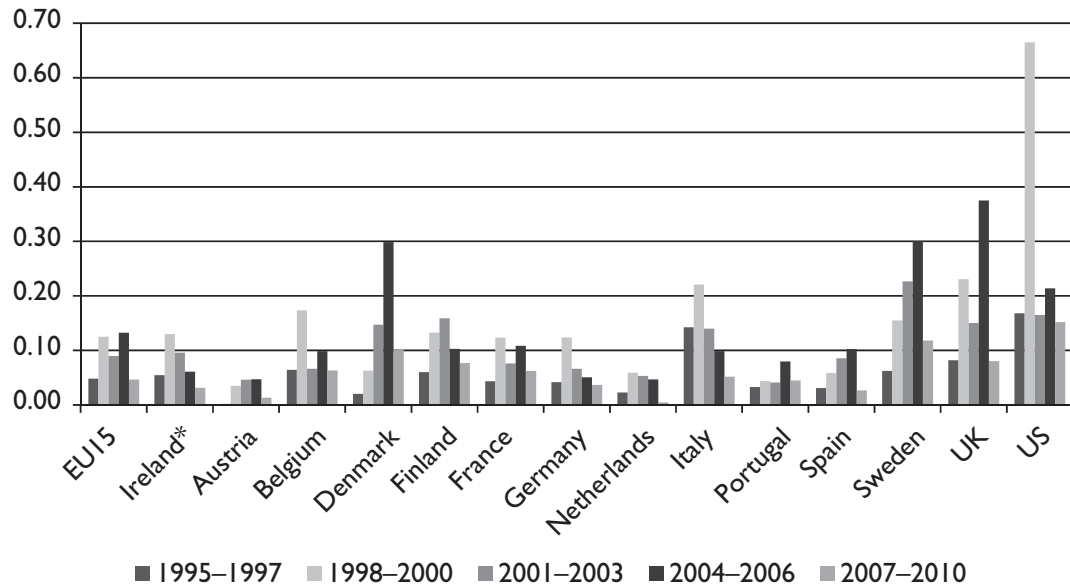
Figure 2: Venture Capital Investments as a Share of all Private Equity Transactions in Ireland (1990–2010)



Source: Own calculations based on EVCA data

6 Venture Capital in Ireland in Comparative Perspective

Figure 3: Venture Capital Investments as a Percentage of National Income (Average Annual Percentage)



Note: Gross national product for Ireland, except where included as part of EU15; gross domestic product for all other countries. Venture capital data for Luxembourg are only included from 2007

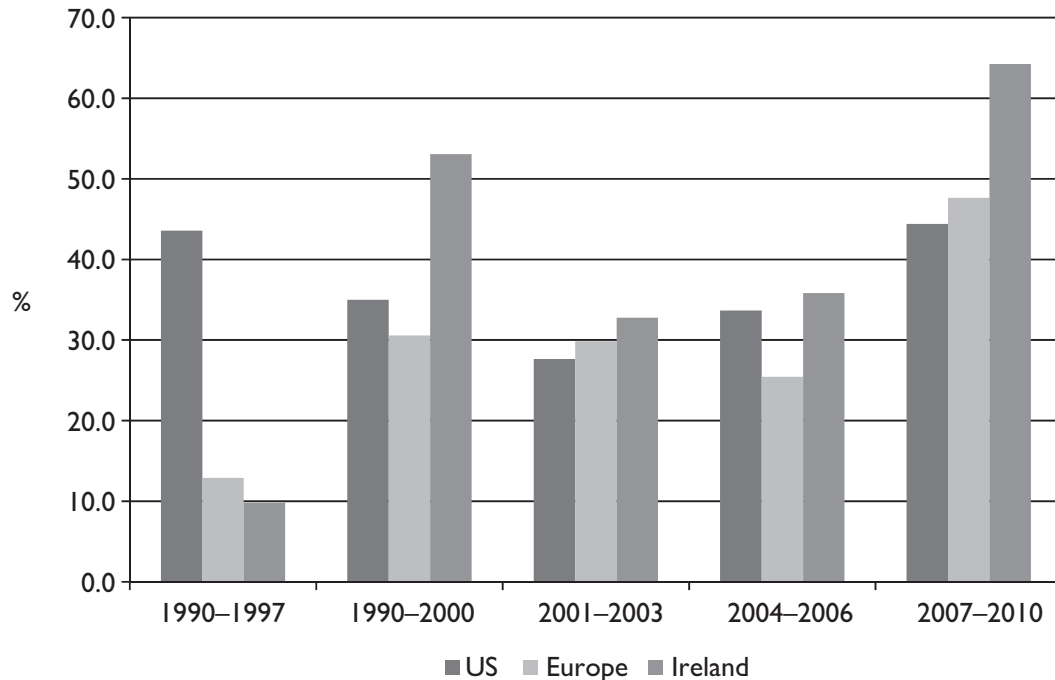
Source: Own calculations based on EVCA and NVCA data

Table 4: Mode of Exit (Average Annual Percentage)

	Ireland		Europe	
	1998-2003	2004-2010	1998-2003	2004-2010
Trade sales	46	42	35	26
Divestment by public offering	7	4	15	11
• Divestment on flotation (IPO)	1	0	6	5
• Sale of quoted equity	7	4	8	6
Write-offs	18	26	14	12
Repayment of principal loans	11	4	13	13
Sale to another private equity house	5	8	8	22
Sale to a financial institution	0	1	5	4
Other modes	12	14	10	13

Source: EVCA data

Figure 4: Early Stage (Seed and Start-Up) Investments as Share of Total Venture Capital Investments (Average Annual Percentage)



Source: Own calculations based on EVCA and NVCA data

By contrast, there is not much difference between Ireland and the rest of Europe in terms of mode of exit (Table 4). Trade sales have been predominant, representing a somewhat higher share for Ireland than for the rest of Europe. Write-offs were also higher for Ireland. The US data on mode of exit distinguish only between acquisitions and VC-backed initial public offerings (IPOs), with the ratio of the former to the latter running at around 3 to 1.

EXPANDING THE SUPPLY OF VENTURE CAPITAL IN IRELAND

Early developments in the Irish venture capital market included the establishment by the Industrial Development Authority (IDA) of its Enterprise Development Programme in 1978; the establishment of the National Enterprise Agency in 1981, its replacement by the National Development Corporation in 1986 and its amalgamation with the IDA in 1991; and the introduction of the Business Expansion Scheme in 1984 and the Seed Capital Scheme in 1993.

The Irish Venture Capital Association (IVCA) was founded in 1985 and had three members by the end of the 1980s. These were (i) Allied Combined Trust, established in 1972 with Allied Irish Investment Bank as a major shareholder; (ii) the Industrial Credit Company, established by the state in the 1930s to encourage investment in industry, and

(iii) the Dublin Business Innovation Centre, established in 1987 with private, public and European Union (EU) support.

A number of significant changes were introduced in 1994, which proved to be a crucial year in the development of the Irish VC market (Murphy, 2000; Jeng and Wells, 2000). One was the establishment in Irish law of 'the investment limited partnership', which had proved a suitable vehicle for venture capital activities in the US. It provides double taxation relief such that investments through qualifying venture capital funds are treated as though they are direct investments in the underlying companies.⁶

The same year also saw the publication of government guidelines advocating that pension funds 'support the venture capital industry by becoming a recognised form of finance for entrepreneurial companies' (Murphy, 2000: 46). The guidelines had their origins in a report commissioned by the Irish Association of Pension Funds, the Irish Insurance Federation and the Department of Finance, which found that pension-fund investments in Ireland were negligible in comparison to the situation in the US and the UK. The guidelines were issued as an alternative to legislation and advocated that pension funds should place 0.08 per cent of their assets annually into venture capital funds over the next five years. Since then, the proportion of new funds accounted for by the pension funds sector in Ireland has fluctuated around the European average level.

From 1994 the state's industrial development agencies also adopted new policies towards venture capital. One strand of the new approach saw them shift away from grant assistance towards equity participation in companies to which they advanced support. This had been advocated in the report of the Industrial Policy Review Group (the Culliton Report of 1992) 'to meet gaps in financial markets for venture capital and seed capital' (Industrial Policy Review Group, 1992: 12). The IDA, it was suggested, should become more of an 'aggressive venture capitalist' (Industrial Policy Review Group, 1992: 72) and should be prepared to take stakes of up to 50–60 per cent in the companies it supported. To fulfil these tasks adequately, the report advised that the IDA should be restructured into separate bodies, which eventually emerged as Forfás, with responsibility for research and policy; IDA Ireland, with responsibility for foreign direct investment; and Enterprise Ireland, with responsibility for indigenous industry. This equity participation approach will be discussed in a later section of the paper which focuses on the demand side of the VC market (since it directly supports the kinds of firms that are likely to seek or attract VC finance).

The other strand of the new approach was to expand the availability of venture capital by investing state capital, through Enterprise Ireland, in commercial VC funds.⁷ The Indigenous Industry Operational Programme for Industrial Development, a sub-section of the National Development Plan 1994–9, had identified as important the difficulties that small and medium enterprises (SMEs) faced in raising equity capital. This led to the establishment by Enterprise Ireland of the Seed and Venture Capital Measure 1994–9, which had the objectives of (i) making seed and equity capital available to SMEs, primarily in the knowledge economy; (ii) developing the seed and venture capital market in Ireland; (iii) encouraging private sector participation; and (iv) developing seed and VC management skills.

EU and national funding of the measure amounted to a total of €40 million and this was matched at the beginning by a further €40 million in private investments. The VC funds established were run on a purely commercial basis, with investment decisions taken solely by private sector VC fund managers. Returns were to be fed back into the funds and a ten-year lifecycle was envisaged, with a five-year investment period and five years in which to exit and realise returns.

In 2001, the Seed and Venture Capital Fund Scheme was recommenced under the National Development Plan 2001–6 with a commitment of national and EU funds amounting to €95 million. The objective of the programme was to leverage €400 million in private funding. This had already been achieved by 2002, and by 2004 the 15 funds established under the programme (with about €500 million in capital raised) had made investments in 75 companies totalling €133 million (Enterprise Ireland, 2005). By 2005 the state commitment to 30 VC funds had totalled €164 million (€66 million in total in the first programme and €98 million in the second), and about €30 million in returns had been received. The 2000–6 programme was followed by a further Seed and Venture Capital Programme set to run from 2007 to 2012, with an Enterprise Ireland commitment of €175 million.

In Europe as a whole, government provision of VC funds also grew over this period. It has typically contributed a smaller share than in Ireland since the initiatives of the mid-1990s, and the contrast has grown dramatically in recent years (Table 5). In the US, by contrast, the government plays no direct role in the provision of venture capital.

Table 5: Sources of New Funds – Europe, Ireland and the US (Average Annual Percentage by Type of Investor)

		1990– 1997	1998– 2000	2001– 2003	2004– 2006	2007– 2010
<i>Corporations</i>	<i>Europe</i>	8	11	6	5	3
	<i>Ireland</i>	5	5	2	0	1
	<i>US</i>	6	5	6	5	2
<i>Financial institutions</i>	<i>Europe</i>	51	40	36	29	19
	<i>Ireland</i>	46	28	18	22	16
	<i>US</i>	11	11	9	8	5
<i>Government</i>	<i>Europe</i>	5	5	8	8	6
	<i>Ireland</i>	9	9	18	10	34

Note: Figures do not sum to 100 because some categories of investor (particularly private investors and pension funds) are excluded

Source: Own calculations based on EVCA and NVCA data; exchange rates from Eurostat

Table 6 shows that of the European countries for which data are available, Portugal, Ireland, Austria and Finland record the highest shares for government as a source of new

funds. Portugal and Austria, as has been seen in Figure 3, have very small VC sectors relative to GDP, while Finland is at the opposite end of the spectrum.

Table 6: Sources of New Funds for European Economies (Average Annual Percentage by Type of Investor, 1994–2010)

Countries	Corporations	Private	Financial Institutions	Pension Funds	Government
<i>Austria</i>	4	5	51	3	17
<i>Belgium</i>	11	7	40	5	13
<i>Denmark</i>	7	7	28	27	9
<i>Finland</i>	7	2	28	23	15
<i>France</i>	8	8	47	11	3
<i>Germany</i>	8	8	49	6	11
<i>Ireland</i>	3	9	25	17	19
<i>Italy</i>	7	10	47	7	3
<i>Netherlands</i>	5	5	5	12	2
<i>Portugal</i>	3	1	54	4	31
<i>Spain</i>	9	6	42	7	12
<i>Sweden</i>	9	4	20	21	6
<i>UK</i>	6	5	26	32	5

Note: Country figures do not sum to 100 because some categories of investor are omitted

Source: Own calculations based on EVCA data

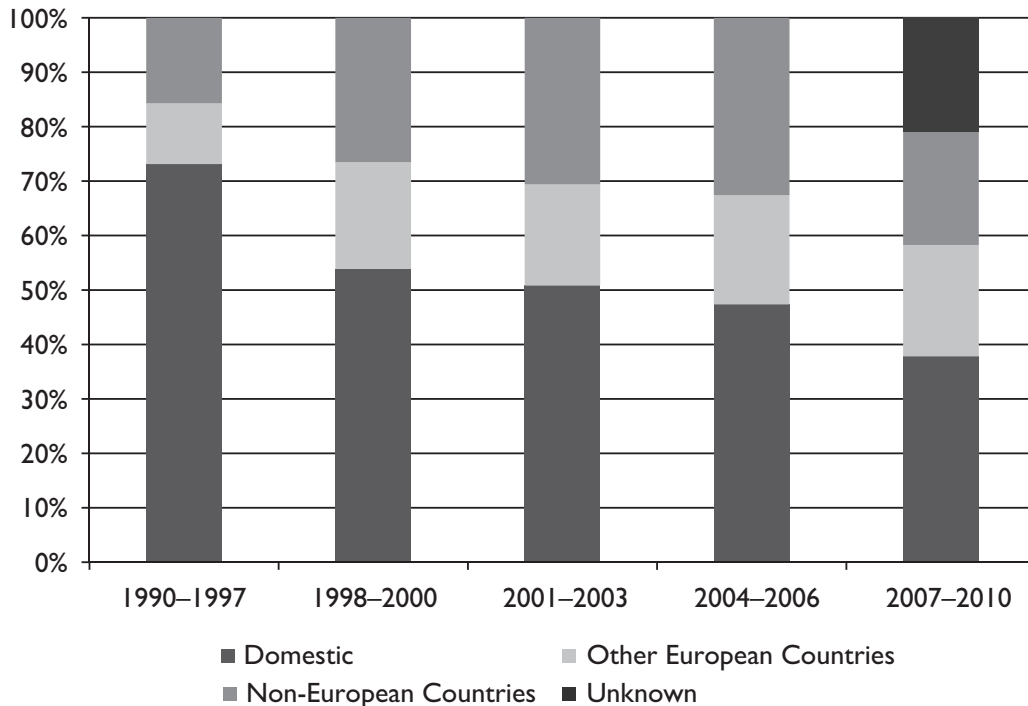
As noted earlier, the VC data are generally classified according to the ‘country of management’ approach, i.e. they refer to locally managed funds only. VC funds which are managed in a particular country can be raised from both domestic and non-domestic investors however. Funding sources in both Europe and Ireland have become increasingly internationalised over the period of analysis. Figure 5 shows that for European countries on average funds raised from non-domestic sources grew from less than one-third of the total in the early 1990s to over one-half of the total in more recent years.

Funds managed in Ireland displayed a much weaker degree of internationalisation (Figure 6), though the year 2002 stood out as exceptional, with more than 90 per cent of the capital raised that year coming from outside Ireland.

Figure 7 displays the propensity of European-managed funds to invest overseas while Figure 8 shows that Irish-managed VC funds have come to match this propensity to invest overseas over recent years.

We now depart briefly from the ‘country of management’ approach to explore how much funding is raised in Ireland and how much is invested in Ireland (in each case by European-managed funds only). These are described in the European Private Equity and

Figure 5: Geographical Sources of Funds Raised by the European Private Equity Industry (Average Annual Percentages, 1990–2010)



Source: Own calculations based on EVCA data

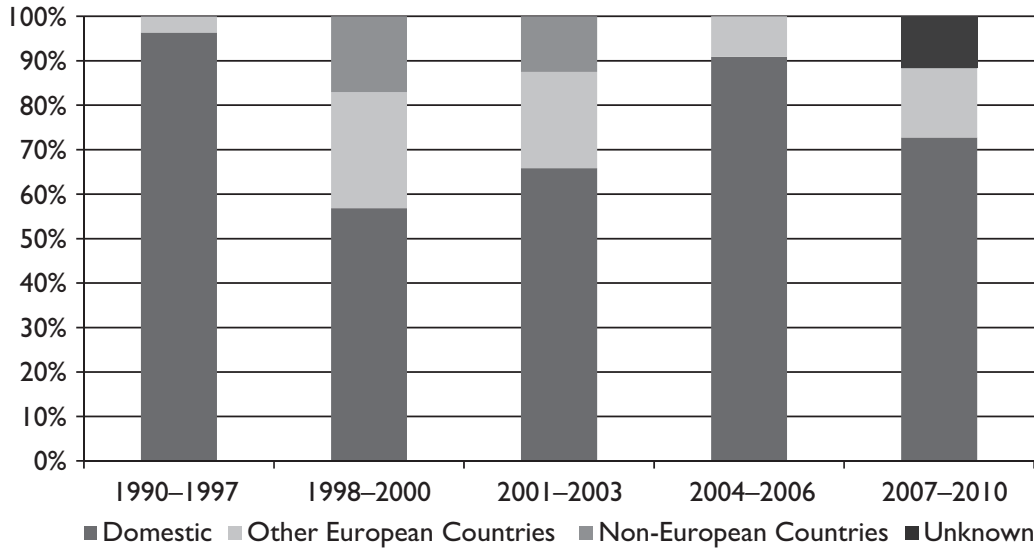
Venture Capital Association (EVCA) statistics as the 'country of origin' approach for funds raised, and the 'country of destination' approach for funds invested.⁸

Figure 9 presents data on funds raised and funds invested in Ireland for the period 1999–2003, comparing 'country of management' and 'country of origin' for funds raised, and 'country of management' and 'country of destination' for investments.

The major asymmetries on the 'funds raised' side arise in 1999 and 2002.⁹ In both of these years the amounts raised from foreign investors were larger than those raised from domestic investors. This indicates substantial net flows of funds raised. A similar situation can be observed on the investment side. In 1999, 2003, 2009 and 2010 much greater investments were made in domestic industry than came from domestically managed VC funds. The greatest asymmetry arose in 2010, when investments in Ireland ('country of destination') were €770 million, while funds invested by Irish-managed funds were only €48 million.

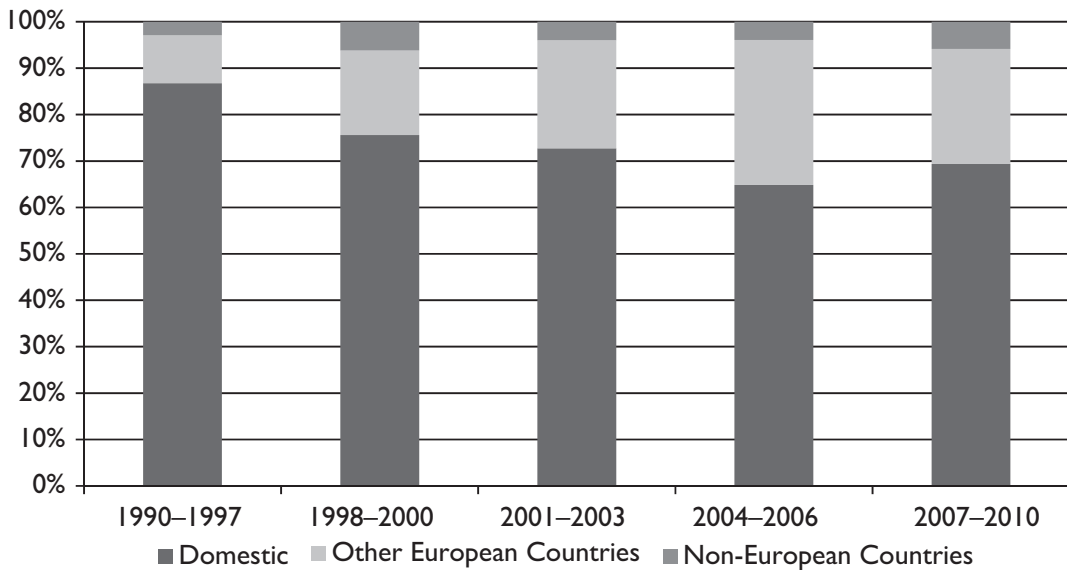
A comparison with other countries reveals how internationalised, or, more precisely, Europeanised, the Irish market is compared to other European countries.¹⁰ For the period 1999–2006 Ireland exhibited the greatest average net inflows for all European countries for funds invested and the second highest, after Sweden, for funds raised (see Figure 10).

Figure 6: Sources of Funds Raised by the Irish Private Equity Industry, Geographical Breakdown (Average Annual Percentages, 1990–2010)



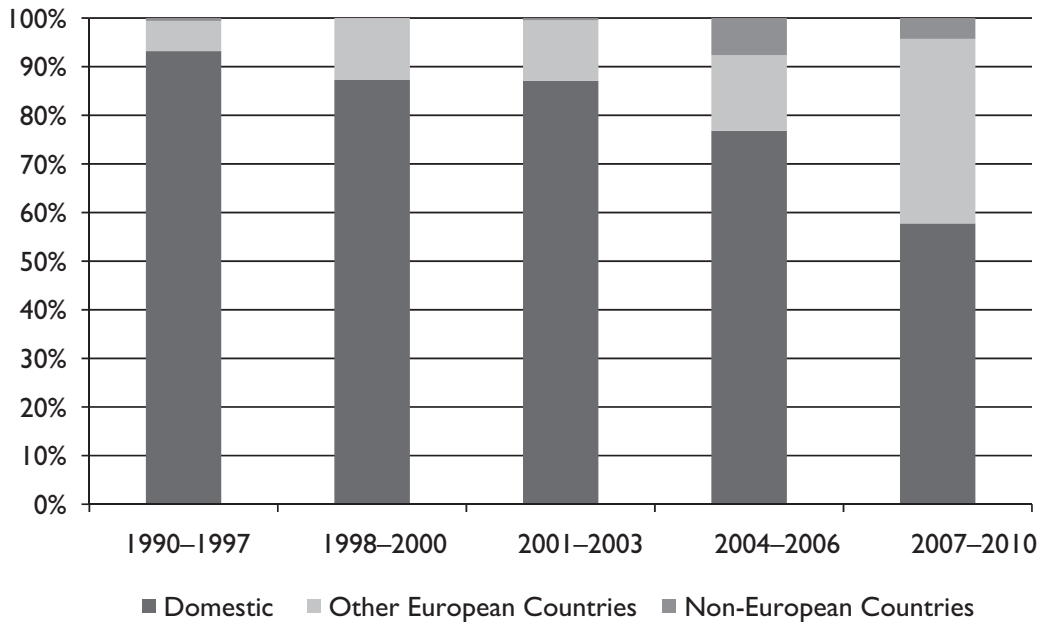
Source: Own calculations based on EVCA data

Figure 7: Geographical Destination of Funds Invested by the European Private Equity Industry (Average Annual Percentages, 1990–2010)



Source: Own calculations based on EVCA data

Figure 8: Geographical Destination of Funds Invested by the Irish Private Equity Industry (Average Annual Percentages, 1990–2010)



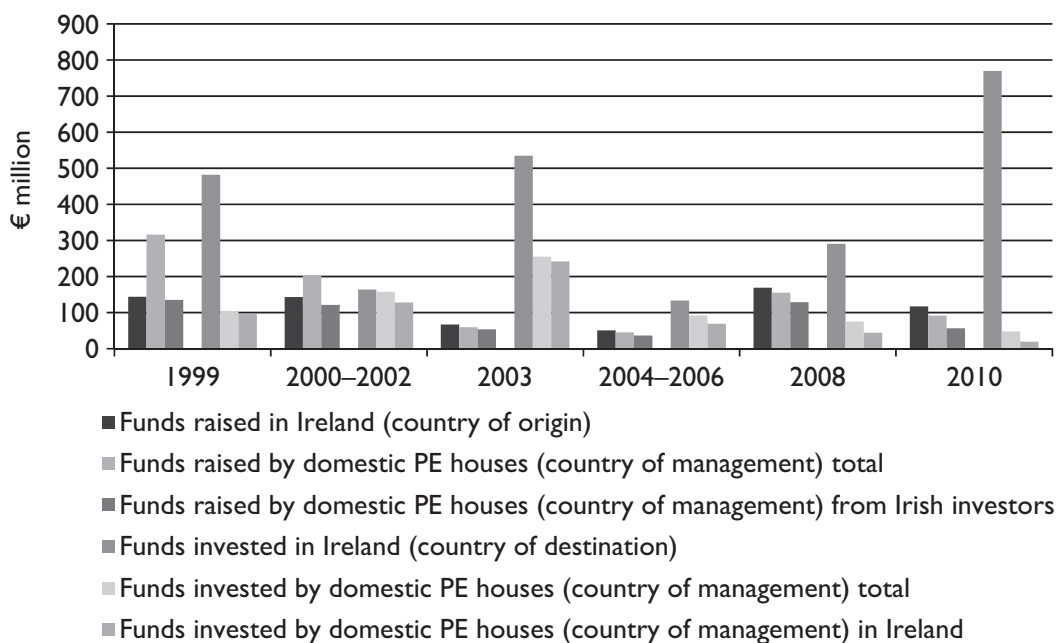
Source: Own calculations based on EVCA data

On average over the period, net inflows of investment into Ireland (i.e. the excess of foreign VC fund investments in Ireland over Irish VC fund investments overseas) came to almost 200 per cent of domestic investments by domestic VC funds. In terms of the countries charted, all were net recipients of investment other than Sweden and the UK.

For Ireland, net inflows of funds from abroad (i.e. the excess of overseas funds coming to domestic venture capital companies over funds raised in Ireland by foreign companies) represented, on average, 66 per cent of funds raised in Ireland by Irish venture capitalists. Net recipients of funds in this sense included Ireland, Italy, Portugal, Spain, Sweden, the UK and, to a lesser extent, France and Finland, whereas Belgium, Denmark, Germany, the Netherlands and, to a lesser extent, Austria, were net sources of funds.

The equivalent data for 2010 are as shown in Table 7. The percentage figure for net inflows of funds invested for Ireland is so large because funds invested in Ireland from abroad came to €751 million, funds invested abroad by Irish investors came to €27 million, and domestic investment by domestic VC funds was only €19 million (in rounded figures).

Given the internationalisation of the Irish VC market, the question arises as to why it is perceived as important for the government – acting through Enterprise Ireland – to create a local VC market, since there appears to be many more investment opportunities in Ireland

Figure 9: Comparison of 'Country of Management', 'Country of Origin' and 'Country of Destination' Figures (Ireland, Selected Years)

Note: Average annual values where years have been aggregated. Some of the data for 2007 and 2009 are unavailable

Source: Own calculations based on EVCA data

Table 7: Net Flows (%) Raised and Invested in Ireland and Other European Countries, 2010

Countries	Net Flows (Funds Invested)	Net Flows (Funds Raised)
Austria	700	-8
Belgium	192	-6
Denmark	-1	-4
Finland	55	-44
France	14	18
Germany	1	-20
Ireland	3,740	-44
Italy	53	-47
Netherlands	67	100

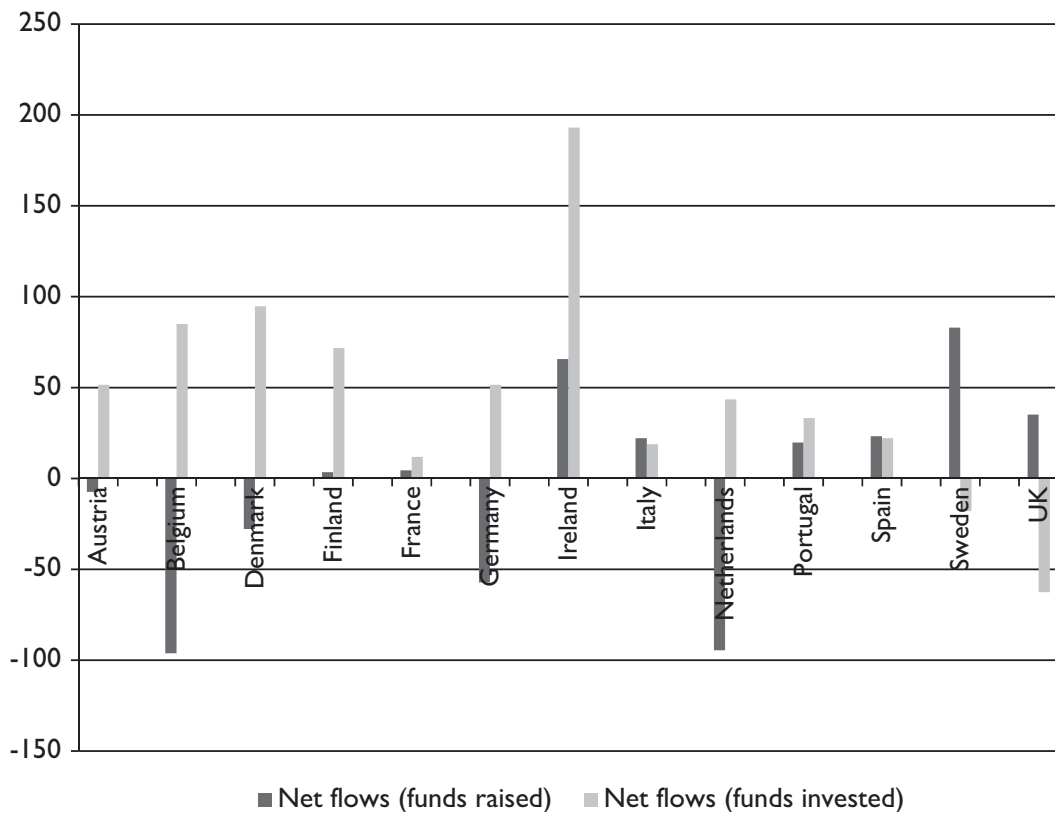
(Continued)

Table 7: (Continued)

Countries	Net Flows (Funds Invested)	Net Flows (Funds Raised)
Portugal	-1	56
Spain	19	2
Sweden	-17	68
UK	-37	46
Europe	4	0

Source: Own calculations based on EVCA data

Figure 10: Flows in Funds Raised and Invested in Ireland and Other European Countries (Average Annual Percentages, 1999–2006)



Source: Own calculations based on EVCA data; data for 2007 and 2009 unavailable

than Irish investors are able or willing to finance, and Irish companies themselves are not biased against foreign investors.¹¹

The answer is suggested by Florida and Kenney (1988) who, in discussing the localised nature of the VC process, point out that although long-distance investing occurs when deals are syndicated between several VC firms, the presence of a local venture capitalist to lead the deal is generally essential. Similarly, practitioners point out that when foreign venture capitalists invest in the Irish market, they usually do so by co-investing (syndication) with Irish venture capitalists.¹² If they invest directly, in turn, it tends to be in companies with some track record, financing later stage transactions (post first or even post second round financing) and frequently only when domestic VC is already in place.¹³ Unfortunately, data provided by the EVCA do not specify the stages of transactions in which non-domestic private equity houses are involved, making it difficult to ascertain whether the investments are in VC projects or in other private equity transactions.

THE SECTORAL LOCATION OF VC INVESTMENTS AND THE DEMAND SIDE OF THE MARKET

Although at the beginning of the 1990s Irish VC investment activity was directed towards more traditional consumer-related and other manufacturing sectors, towards the late 1990s it began to focus on 'new technology' – i.e. on communications and computer and consumer electronics – with life sciences becoming important over the new millennium (Table 8).

Table 8: Sectoral Distribution of Investments in Ireland
(Average Annual Percentages, 1990–2010)

Sectors	1990– 1997	1998– 2000	2001– 2003	2004– 2006	2007– 2010
<i>Communications</i>	7.8	15.9	14.3	16.2	21.9
<i>Computer and consumer electronics</i>	13.3	51.4	72.5	49.8	20.9
<i>Life sciences</i>	4.4	3.4	6.5	18.0	20.6
<i>Energy and environment</i>	0.6	0.2	0.4	0.0	4.2
<i>Consumer goods and retail</i>	36.5	3.4	1.0	10.5	4.4
<i>Consumer services</i>	n/a	n/a	n/a	n/a	3.7
<i>Business and industrial products</i>	15.5	15.4	3.0	2.2	4.4
<i>Business and industrial services</i>	5.4	5.5	1.9	0.7	1.3
<i>Chemicals and materials</i>	3.0	0.3	0.1	2.3	0.3
<i>Transportation</i>	4.8	0.0	0.2	0.0	7.8
<i>Financial services</i>	0.4	0.0	0.1	0.0	0.1
<i>Real estate</i>	n/a	n/a	n/a	n/a	0.0

(Continued)

Table 8: (Continued)

Sectors	1990–1997	1998–2000	2001–2003	2004–2006	2007–2010
<i>Agriculture</i>	1.3	1.1	0.0	0.0	0.2
<i>Construction</i>	5.2	1.6	0.0	0.0	3.0
<i>Unknown</i>	0.2	1.7	0.1	0.2	7.1
<i>Total investment</i>	100.0	100.0	100.0	100.0	100.0

Note: EVCA sectoral classifications changed in 2007; prior to this 'consumer services' and 'real estate' did not exist as separate categories

Source: Own calculations based on EVCA data

In Europe, on the other hand, although there was some shift towards communications over the new millennium, more traditional sectors (consumer goods, and business and industrial products) remained strong throughout the period of analysis (Table 9).

Table 9: Sectoral Distribution of Investments in Europe
(Average Annual Percentages, 1990–2010)

Sectors	1990–1997	1998–2000	2001–2003	2004–2006	2007–2010
<i>Communications</i>	3.3	11.3	13.3	14.2	12.4
<i>Computer and consumer electronics</i>	9.5	14.1	10.2	7.7	7.2
<i>Life sciences</i>	6.1	8.2	9.9	9.8	12.4
<i>Energy and environment</i>	1.5	1.0	1.7	2.0	5.9
<i>Consumer goods and retail</i>	21.2	17.4	18.9	22.0	14.8
<i>Consumer services</i>	n/a	n/a	n/a	n/a	8.2
<i>Business and industrial products</i>	24.3	19.0	18.7	15.6	12.1
<i>Business and industrial services</i>	10.6	7.9	8.0	11.5	9.3
<i>Chemicals and materials</i>	3.6	3.6	4.0	2.5	3.5
<i>Transportation</i>	5.4	5.5	3.4	2.5	3.8
<i>Financial services</i>	4.3	2.2	2.9	3.6	6.0
<i>Real estate</i>	n/a	n/a	n/a	n/a	0.3
<i>Agriculture</i>	1.5	0.9	0.5	0.3	0.6
<i>Construction</i>	4.1	2.2	3.8	2.5	2.9
<i>Unknown</i>	4.4	6.7	4.8	5.8	0.6
<i>Total investment</i>	100.0	100.0	100.0	100.0	100.0

Note: EVCA sectoral classifications changed in 2007; prior to this 'consumer services' and 'real estate' did not exist as separate categories

Source: Own calculations based on EVCA data

Across the Atlantic, VC investments also focus on new technology sectors, although they are more evenly distributed across these sectors, including in the biotech and medical and health-related areas (Table 10).

Table 10: Sectoral Distribution of Investments in the US (Average Annual Percentages, 1990–2010)

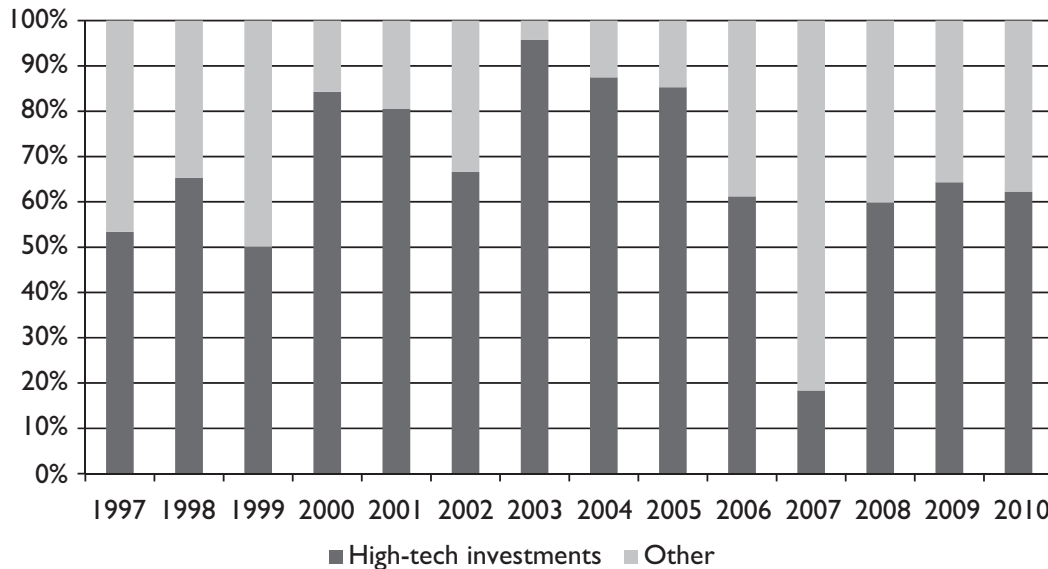
Sectors	1990–1997	1998–2000	2001–2003	2004–2006	2007–2010
<i>Biotechnology</i>	12.2	5.1	14.4	17.6	17.4
<i>Business products and services</i>	2.3	4.4	2.7	1.7	1.7
<i>Computers and peripherals</i>	5.2	1.7	1.9	2.3	2.0
<i>Consumer products and services</i>	4.8	3.6	1.1	1.4	1.8
<i>Electronics/instrumentation</i>	2.0	0.8	1.1	2.0	1.9
<i>Financial services</i>	2.6	3.9	2.3	2.6	2.1
<i>Healthcare services</i>	4.7	2.7	1.4	1.6	0.9
<i>Industrial/energy</i>	6.7	4.3	3.3	4.9	13.9
<i>Information technology services</i>	2.4	7.2	4.8	4.5	6.7
<i>Media and entertainment</i>	6.7	10.5	4.5	5.2	6.5
<i>Medical devices and equipment</i>	10.1	3.5	7.1	9.5	12.2
<i>Networking and equipment</i>	7.2	9.1	11.9	6.1	3.9
<i>Semiconductors</i>	3.7	3.0	7.5	8.7	5.2
<i>Software</i>	18.4	21.6	24.8	21.6	18.2
<i>Telecommunications</i>	8.2	14.7	10.5	9.2	4.7
<i>Undisclosed/other</i>	0.3	0.2	0.0	0.1	0.0
Total	100.0	100.0	100.0	100.0	100.0

Source: Own calculations based on NVCA data

Although investments in high-tech sectors frequently involve investments in high-tech projects, there is no necessary overlap between the two categories; account must be taken of the quality and type of the specific investments involved. The EVCA began to record investments in high-technology *projects* from 1997 and Figure 11 presents data on Irish VC investments in such projects for the period 1997–2003.

Figure 12 charts various national VC markets in terms of the share of VC investments in early stage and in high-technology projects. Of the European countries for which data are available, Ireland appears to be something of an outlier, with high proportions of both early stage investments and high-tech investments in the total.

Figure 11: Investments in High-Tech Projects in Ireland (Share of Total Amount of Private Equity Investments, 1997–2010)



Source: EVCA data

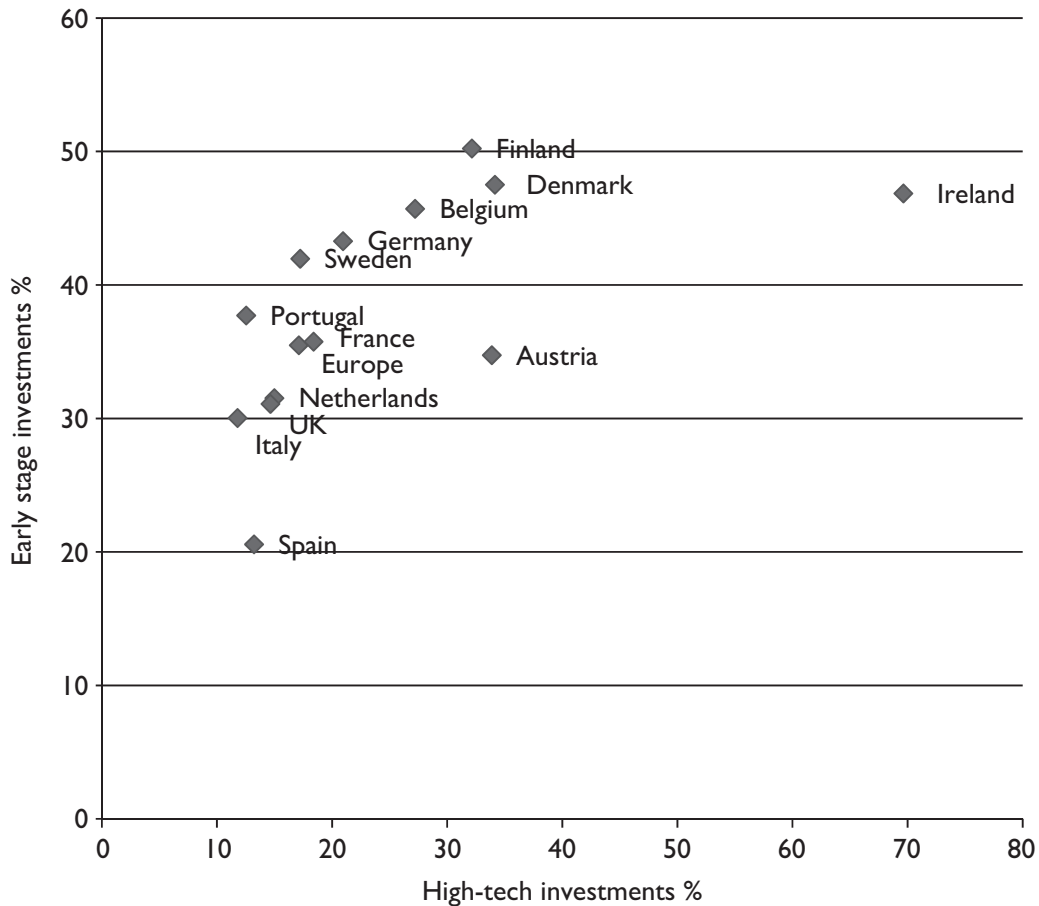
Besides seeding the emergence of venture capital, the Irish state also offers direct hands-on support to the types of firms for which venture capital is an appropriate financing vehicle. Indeed supports for the demand side are a multiple of the supports for the supply side of the VC market discussed heretofore. One form of such direct support is equity participation. Following the recommendation of the Industrial Policy Review Group (1992), equity participation – in the form of both ordinary shareholdings and preference shares – on the part of what would become Enterprise Ireland increased from 5 per cent of total financial supports in 1989 to 28 per cent in 1998 (Forfás, 2000, Table 5.2).¹⁴ Table 11 shows that Enterprise Ireland's direct equity participation in the companies it supports exceeds the sum total of funds provided by Enterprise Ireland to private sector VC managers to support companies of their own choosing.¹⁵

Table 11: Direct Enterprise Ireland Investments versus Enterprise Ireland Seed and Venture Capital Investments (€ millions) (Four-Year Totals, 1999–2010)

Investments	1999–2002	2003–2006	2007–2010
<i>Direct Enterprise Ireland investments</i>	83.90	95.00	172.84
<i>Enterprise Ireland Seed and Venture Capital investments</i>	91.62	46.68	51.65

Source: Enterprise Ireland Financial Statements 2000–2010

Figure 12: Early Stage and High-Tech Investments – Comparison of Ireland and Other European Countries (2000–2010 Average)



Note: Percentages of total amounts invested in each market. Early stage investments are presented as a share of venture capital investments. High-tech investments are presented as a share of private equity transactions

Source: Own calculations on the basis of EVCA data

This reflects the fact that Enterprise Ireland, as a development agency, has different motives from those of the VC companies, which seek only to maximise returns. The priority for the state agencies has been to develop knowledge-based industries in Ireland because of possible spill-over benefits and other market imperfections, rather than to achieve the best return on their investments.

Most Enterprise Ireland support is targeted towards the very small number of indigenous companies that it identifies as High-Potential Start-Ups (HPSUs). Of the hundreds of thousands of new business start-ups in the country over the period 1989–2006, only 637

were selected by Enterprise Ireland as HPSUs. Loosely, these are export-oriented firms with innovative products in dynamic market segments that are deemed capable of meeting rigorous growth targets.¹⁶

To be deemed eligible for support (though with no automatic entitlement), projects must first successfully pass a formal cost-benefit analysis, while qualitative and other factors that are difficult to quantify are then taken into account in a quality ranking matrix.¹⁷ Enterprise Ireland has in fact worked with the majority of these HPSUs from embryonic concept stage to the point where they were formally recognised as HPSUs. Supports available from the embryonic stage are dependent on agreement with the agency on an integrated development plan, and the agency then customises a support package that can include helping companies to monitor markets and exploit new market opportunities, encouraging process and operations improvement and the development of better products through access to appropriate research, and promoting increased management and employee training levels.

The agency works intensively with the HPSUs to ensure access to the best external management advice; it helps them to attract expertise to their boards – e.g. through the appointment of experienced non-executive directors – and to build an appropriate management team; it provides support for in-company training and for product and process development through direct support for in-company research and development (R&D) and through establishing technology innovation networks; and it helps them develop contacts with private sector financiers. It may also, where necessary, offer direct financial support (Forfás, 2000).

Ó Riain (2004: 98–105) suggests that the mentoring programmes that pair small companies with experienced industry figures and the Enterprise Development Programme, which provides one-on-one support and advice in terms of business plan development, have been of particular importance to indigenous software firms and, indeed, according to Walsh (1985), the latter had been instituted in 1978 partly in response to the lack of venture capital finance available at that time. The state has also extensively subsidised the R&D expenditures of indigenous software companies.

CONCLUSIONS

Drawing primarily on the Israeli experience, Avnimelech and Teubal (2008) present an innovation and technology policy cycle model of the emergence of innovation-intensive clusters in industrialising economies. The early phase identified in the model relates to the emergence of innovation capabilities and the diffusion of R&D across the economy. The background conditions were established in Israel in the wake of the Six Day War of 1967, which saw a sharp increase in military R&D spending, significant investments by foreign multinationals in R&D laboratories and a state-orchestrated process to expand innovation in the business sector.

The second phase of the model sees venture capital emerge, alongside an acceleration in the growth of high-tech start-ups, and IPO and mergers and acquisitions (M&A) activities. Avnimelech and Teubal (2008) describe how VC funding was purposefully developed by the Israeli state, after a number of false starts, through the enduring Yozma Program of

1993. This government-owned VC fund invested directly in early-stage activities as well as operating as a fund of funds invested through private VC companies.

More generally, Avnimelech et al. (2005) caution that the emergence of a dynamic regional or national VC market requires not just that supply-side shortages of funds be addressed but also that appropriate demand-side conditions prevail, notably 'a flow of investment opportunities capable of growing in value quickly enough to provide capital gains justifying the investment risks' (Avnimelech et al., 2005: 199).

The Irish experience corresponds in broad detail to that of Israel, though clearly without a parallel role for the security and defence industries. Table 12 shows that Irish gross expenditures on R&D have risen as a share of both EU and Organisation for Economic Co-Operation and Development (OECD) expenditures over the period under discussion, suggestive of the spread of innovation capabilities representing Phase 1 of the Avnimelech and Teubal (2008) model.

Table 12: Gross Domestic Expenditure on R&D in Ireland as a Percentage Share of EU27 and OECD, 1995–2009

	1995– 1997	1998– 2000	2001– 2003	2004– 2006	2007– 2009
<i>Ireland as share of EU27</i>	0.63	0.68	0.71	0.87	0.97
<i>Ireland as share of OECD</i>	0.19	0.20	0.22	0.26	0.29

Source: OECD, Main Science and Technology Indicators database

In Ireland, as in Israel, there was substantial government support of business sector R&D and innovative start-up companies. Table 13 provides a measure of the Irish state's increasing participation in the funding of R&D. While the share of R&D financed by government has declined in both the EU and the OECD over the period depicted, it has risen in Ireland.

Table 13: Percentage of Gross Expenditure on R&D Financed by Government – Ireland, EU27, OECD

	1995	2003	2004	2005	2006
<i>Ireland</i>	22.5	29.8	31.1	32	30.1
<i>EU27</i>	39.5	35.8	35.6	34.8	34.1
<i>OECD</i>	33.9	30.1	30.2	29.4	28.6

Note: missing observations confine our analysis to the years shown

Source: OECD, Main Science and Technology Indicators database

Again as in the Israeli case, government provision of direct support to the VC sector only came on stream once innovative start-up companies began to appear. Avnimelech and Teubal (2006) argue that the background conditions in Israel would have been unlikely to

trigger the necessary supply of VC without government involvement because of market or system failures. This proposition would seem to apply in the Irish case also.

It appears too early to be able to say in the Irish case however – as has been said of Israel – that the authorities can now take a back seat in the VC process.¹⁸ A background report undertaken by PricewaterhouseCoopers for the state agency Forfás in 2006 suggested not only that most Irish VC funds were below what would be regarded as a commercially viable size (of at least €40–€50 million) but also that the VC market in Ireland had not yet reached a point where it could be considered sustainable in its own right (Strategy Advisory Services, 2006). Three reasons were offered for this assessment. Firstly, it is difficult to assess performance in such a relatively young market. Secondly, the downturn in the technology sector represented a serious obstacle, and thirdly, it was thought that state withdrawal of funds at this time would send a negative signal both to local institutional investors and to overseas investors, who tend to look to the local market for evidence of support for VC.¹⁹ This is in spite of the fact that Ireland ranked second only to the UK in an evaluation by the EVCA (2003) of the favourability of the legal and tax aspects of the environment to venture capital investors and entrepreneurs.

The task of developing a self-sustaining VC sector is clearly not straightforward. Nor are the kinds of interventionist strategies followed in the Irish and Israeli cases necessarily appropriate to all emerging regions. The weaker the standards of public sector governance, the more the calculus shifts from correcting market failures to avoiding likely ‘government failures’.

ACKNOWLEDGEMENTS

We thank Garrett Murray of Enterprise Ireland for helpful discussions and suggestions, and Morris Teubal for stimulating our initial interest in the subject.

ENDNOTES

- 1 An alternative perspective is advanced by Gorodnichenko and Schnitzer (2010) however. They find that financial constraints restrain the ability of firms to both innovate and export, and cause export and innovation activities to become substitutes rather than complements.
- 2 Both the US and European data generally follow the *country of management* approach, meaning that they refer to the activities of locally managed funds only. Some insights to be gleaned from alternative approaches are offered later.
- 3 See, for example, the discussion of UK merchant capital in Sunley et al. (2005).
- 4 There was also an unprecedented increase in the activity of other European VC funds in 2003, which invested some €293 million in Irish companies, bringing the total invested in Ireland by domestic and other European VC funds to more than €535 million, as shown in Figure 9. We have been unable to discover any data on funds invested in Irish enterprises by non-European VC funds (see Organisation for Economic Co-Operation and Development, 2000). These are likely to be of some importance as Irish software companies in particular are known to seek financing from US VCs.
- 5 The Census of Industrial Production provides data on the sectoral location of Irish indigenous manufacturing firms, but data specifically for indigenous – as opposed to foreign multinational – firms are not generally available across the EU.
- 6 For more detailed information on the advantages of the investment limited partnership as a special vehicle for venture capitalists see Lyons (2004).
- 7 See Sterne (2004: 247–51, 284) on the history of commercial VC firms in Ireland.
- 8 These statistics do not record funds raised or invested by VC funds managed outside Europe.
- 9 Not all years are shown separately in the figure.

24 *Venture Capital in Ireland in Comparative Perspective*

- 10 As the data for comparing the country of management, country of origin and country of destination approaches are limited in regard to non-European countries, only flows to and from European countries can be taken into consideration in the analysis.
- 11 'Overseas founders are often considered attractive to Irish companies due to their established far reaching networks and international presence which bring added value with their investments' (FitzGerald, 2002).
- 12 See for example FitzGerald (2002) and Berkery (2001).
- 13 Berkery (2001).
- 14 Preference shares with a low coupon rate are used to provide a form of long-term finance at low cost to SMEs that are unable to raise development finance from the market on similar terms.
- 15 The Enterprise Ireland Seed and Venture Capital Investments reported in Table 11 amount to €131.17 million for the period 2000–6. This exceeds the €98 million reported by the 2006 Seed and Venture Capital Programme Report as Enterprise Ireland funds committed for the period. The latter appears to refer to new funds earmarked from the Enterprise Ireland budget while the former includes profits, possibly from previous programmes, ploughed back into the current programme.
- 16 Companies in software and information and communications technology comprised almost half of these HPSUs, particularly since 1994, while in more recent years there has been a growth in the share represented by the pharmaceuticals and medical devices sectors (O'Brien, 2008).
- 17 The focus of the development agencies on export development has been criticised in some quarters as being overly mercantilist. It has been pointed out in defence however that non-traded-sector firms are likely to be competing largely with each other, which would put the state in a vulnerable position were it to support some and not others. In the case of software, the strong focus of the relevant agency has always been on software product firms, which tend to be much more export-oriented than software services.
- 18 Nor are the internal rates of return (IRR) data unambiguous. For the period 1994–2005 the EVCA has reported the average European IRR as 9.4 per cent, while the only available evidence for Ireland suggests an Irish IRR of 15.7 per cent (Donnelly, 2007). It transpires however that this figure is based on the performance of only three particular funds and cannot be taken as representative.
- 19 The downturn in the dynamism of the indigenous high-tech sector has been ascribed by Ó Riain (2010) to a shift in Ireland from decentralised networks of state supports to what he terms 'market managerialism'.

REFERENCES

- Avnimelech, G., Kenney, M. and Teubal, M. (2005) 'The Life Cycle Model for the Creation of National Venture Capital Industries: The US and Israeli Experiences', in E. Giuliani, R. Rabellotti and M.P. van Dijk (eds.), *Clusters Facing Competition: The Importance of External Linkages*, Aldershot: Ashgate.
- Avnimelech, G. and Teubal, M. (2006) 'Creating Venture Capital Industries that Co-Evolve with High-Tech: Insight from an Extended Industry Life Cycle Perspective on the Israeli Experience', *Research Policy*, 35, pp. 1477–98.
- Avnimelech, G. and Teubal, M. (2008) 'From Direct Support of Business Sector R&D/Innovation to Targeting Venture Capital/Private Equity: A Catching-Up Innovation and Technology Policy Life Cycle Perspective', *Economics of Innovation and New Technology*, 17, pp. 153–72.
- Berkery, D. (2001) *Technology in Ireland*, Dublin: Delta Partners.
- Crone, M. (2004) 'Celtic Tiger Cubs: Ireland's VC-Funded Software Start-Ups', paper presented at Institute of Small Business Affairs National Entrepreneurship and SME Development Conference, 2–4 November, Newcastle-Gateshead.

- Donnelly, M. (2007) 'Funding to Reach €3 Billion in Ireland in 2008', *Finance Magazine*, December, available from: <http://www.finance-magazine.com/display_article.php?i=8025&pi=280>, accessed 13 July 2012.
- Enterprise Ireland (2005), *Seed and Venture Capital Programme 2000–2006*, Dublin: Enterprise Ireland.
- European Private Equity and Venture Capital Association (2003) *Benchmarking European Tax and Legal Environments: Indicators of Tax and Legal Environment Favouring the Development of Private Equity and Venture Capital in European Union Member States*, Brussels: European Private Equity and Venture Capital Association.
- FitzGerald, E. (2002) *Venture Capital Opportunities in the Irish Market*, Dublin: A&L Goodbody.
- Florida, R. and Kenney, M. (1988) 'Venture Capital, High Technology and Regional Development', *Regional Studies*, 22, pp. 33–48.
- Forfás (2000) *Enterprise 2010: New Strategy for the Promotion of Enterprise in Ireland in the 21st Century*, Dublin: Forfás.
- Gompers, P.A. (2007) 'Venture Capital', in B.E. Eckbo (ed.), *Handbook of Corporate Finance: Empirical Corporate Finance*, 1, Amsterdam: Elsevier/North-Holland.
- Gorodnichenko, Y. and Schnitzer, M. (2010) 'Financial Constraints and Innovation: Why Poor Countries Don't Catch Up', National Bureau of Economic Research working paper no. 15792.
- Industrial Policy Review Group (1992) *A Time for Change: Industrial Policy for the 1990s* (the Culliton Report), Dublin: Stationery Office.
- Jeng, L.A. and Wells, P.C. (2000) 'The Determinants of Venture Capital Funding: Evidence across Countries', *Journal of Corporate Finance*, 6, pp. 241–89.
- Kenney, M. (2004) 'Supportive Economic Institutions: Silicon Valley's Lessons for Developing Countries', in A. Bartzokas and S. Mani (eds.), *Financial Systems, Corporate Investments in Innovation, and Venture Capital*, Cheltenham: Edward Elgar.
- Lyons, S. (2004) *Limited Partnership: Restriction on Size of Partnerships now Relaxed*, Dublin: L.K. Shields Solicitors.
- Mason, C. and Harrison, R. (2003) 'Closing the Regional Equity Gap? A Critique of the Department of Trade and Industry's Regional Venture Capital Funds Initiative', *Regional Studies*, 37, pp. 855–68.
- Murphy, M. (2000) 'Ireland: Venturing Far and Near', *European Venture Capital Journal*, September, pp. 46–50.
- O'Brien, G. (2008) 'Irish Policy for Selecting and Supporting High Potential Start-Up Companies', M.Sc. in Economic Policy Studies dissertation, Trinity College Dublin.
- Ó Riain, S. (2004) *The Politics of High-Tech Growth: Developmental Network States in the Global Economy*, Cambridge: Cambridge University Press.
- Ó Riain, S. (2010) 'From Developmental Network State to Market Managerialism in Ireland', in F. Block and M.R. Keller (eds.), *State of Innovation: The U.S. Government's Role in Technology Development*, Boulder, CO: Paradigm Publishers.

- Organisation for Economic Co-Operation and Development (2000) 'The Internationalisation of Venture Capital Activity in OECD Countries: Implications for Measurement and Policy', STI working paper 2000/7, Directorate for Science, Technology and Industry.
- Sterne, J. (2004) *Adventures in Code: The Story of the Irish Software Industry*, Dublin: Liffey Press.
- Strategy Advisory Services (2006) *Enterprise Ireland Seed and Venture Capital Funds Programme: Final Report*, Dublin: PricewaterhouseCoopers.
- Sunley, P., Klagge, B., Berndt, C. and Martin, R. (2005) 'Venture Capital Programmes in the UK and Germany: In What Sense Regional Policies?', *Regional Studies*, 39, pp. 255–73.
- Walsh, M. (1985) 'Venture Capital in Ireland', *Irish Business and Administrative Research*, 7(1), pp. 33–45.

Copyright of Irish Journal of Management is the property of Irish Journal of Management and its content may not be copied or emailed to multiple sites or posted to a listserv without the copyright holder's express written permission. However, users may print, download, or email articles for individual use.