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NESTA Making Innovation Flourish

Atlantic Drift

Venture capital performance in the UK and the US

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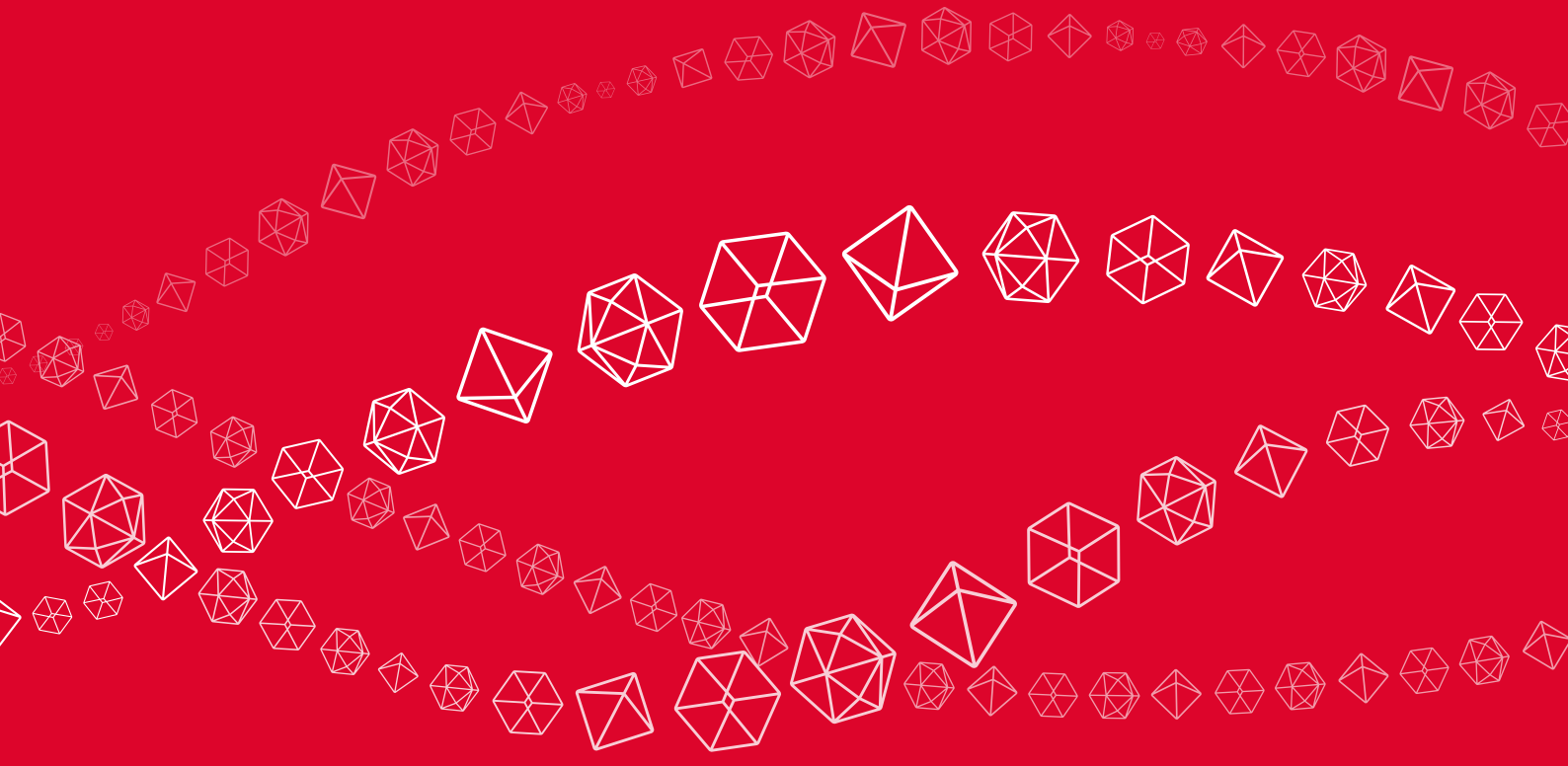

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Executive summary

The importance of a vibrant venture capital industry in supporting growth is widely recognised, and consequently governments across the world have sought to promote the industry. But the development of the VC industry in the UK (and in many other countries) has been hampered by the low returns it delivers to its investors. Understanding how the UK venture capital market compares with other ones, particularly the US market, is the first step towards improving the performance of the UK VC industry.

This report sheds further light on the magnitude of the performance gap between US and UK venture capital funds, its evolution over time, and what the likely drivers of the performance differences are. It uses a novel database that combines data on VC fund performance and their investments in the US and UK for 791 funds raised between 1990-2005. Therefore, it not only reports differences in aggregate performance across countries, but in addition it compares like-for-like funds, with the same focus, vintage year and experience, but located on opposite shores of the Atlantic.

The key contribution of this study to the debate on venture capital fund performance in the UK is thus twofold: first, it aims to identify key factors that are associated with VC fund performance, and second, to examine if any of these factors may explain the performance difference between UK and US-based funds.

The report thus provides useful insights to investors determining their asset class allocation and selecting which VC funds to invest in, VC fund managers choosing their investment strategy and fund structure and, finally, policymakers aiming to support the development of the VC industry.

Key findings

1. The returns performance of UK and US VC funds in recent years has been very similar. UK funds have historically underperformed US funds, but this gap has significantly narrowed. The gap in fund returns (net IRR) between the average US and UK fund has fallen from over 20 percentage points before the dotcom bubble (funds raised in 1990-1997) to one percentage point afterwards (funds raised in 1998-2005). However, this convergence has been driven by declining returns in the US after the burst of the dotcom bubble, rather than by increasing returns in the UK. Average returns for funds raised after the bubble in both the UK and the US have been relatively poor, but VC performance is likely to move upwards as VC funds start to cash out their investments in social media companies (particularly in the US).

2. The wider environment in which UK funds and the companies they finance operate was a major contributor to the historical gap in VC returns. While there are some large differences in the observable characteristics of VC funds between both countries, they cannot account for the historical returns gap.

3. Average returns obscure the large variability in returns within countries. The dispersion in returns across funds was highest during the pre-bubble years, and has fallen significantly since then. But in both periods the gap in returns between good and bad performing funds within a country was much larger than the gap in the average returns across countries. Thirteen per cent of UK funds established

since 1990, would have got into the top quartile of US funds by returns (this is 22 per cent for funds established in the post bubble period), while 45 per cent of UK funds outperformed the median US fund. Selecting the right fund manager is thus more important than choosing a particular country.

4. The strongest quantifiable predictors of VC returns performance are (a) whether the fund managers' prior funds had outperformed the market benchmark; (b) whether the fund invests in early rounds; (c) whether the fund managers have relatively more prior experience; and (d) whether the fund is optimally sized (neither too big nor too small). Moreover, historical performance has been higher for funds located in one of the four largest investor hubs (Silicon Valley, New York, Massachusetts and London) and for investments in information and communication technology.

5. UK government-backed funds have historically underperformed their private counterparts, but the gap between public and private returns has narrowed in recent periods. This suggests that in later years governments have become savvier when designing new VC schemes.

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Part I: Introduction

Venture capital has been the driving force behind some of the most vibrant sectors of the US economy.[1] It is an important source of funding, expertise and networks for innovative companies (see Section 1.1). Because of this, a well-developed venture capital industry is crucial for entrepreneurs, financiers and policymakers alike. But the development of the venture capital industry around the world has been slow and uneven.

The first venture capital (VC) fund was created in the US back in 1946, but the growth of the US VC industry only accelerated in the late 1970s. Across the Atlantic, the UK venture capital market only began to take off in the 1980s, though 3i was also founded in 1946. And it was not until the late 1990s that venture capital started to take hold in the rest of Europe. Today the US continues to be home to the largest venture capital industry in the world, investing $20 billion in 2010 (Figure 1). In contrast, VC investments made by European-based funds totalled only $5 billion in 2010, a quarter of the US level. Within Europe, the UK has one of the most active VC market, with UK funds investing $1 billion in 2010. Still, this only represents 0.05 per cent of UK GDP, which compares unfavourably to 0.14 per cent in the US.[2]

The development of the VC industry over time has not been smooth either. Venture capital activity peaked in 2000, fuelled by an internet bubble that was followed by millions of dollars lost, hundreds of bust companies and a massive fall in VC activity. As the industry began to pick up pace again the financial crisis struck to reverse these gains, however Figure 1 reveals that in 2010 VC investments were growing again.

While venture capital continues to spread globally, expanding in China and other emerging markets in recent years, questions are being asked about the industry's ability to deliver acceptable returns in more mature markets. Average VC returns over the last decade have been low, not having recovered from the dotcom crash (Figure 2). Some observers argue this is a permanent shift towards lower returns, raising doubts about the sustainability of the VC model. However, VC returns have not been much different relative to the overall stock market since 2002, so recent returns may reflect the natural evolution of a competitive market.[3] As VC funds start to cash out their investments in social networks, returns are likely to move upwards once again.

Whether European VC funds will benefit from this recovery is a different question. Trade associations and VC professionals have long asserted that realised returns of venture investments in Europe have historically been lower than in the US, and pointed to this underperformance as the main obstacle to the development of a strong VC industry in the UK and continental Europe.[4] The few empirical studies that provide a comparison between US and Europe (and the even fewer that consider US and UK differences) appear to support these claims: in all such studies the UK and the European venture capital industry more generally are perceived to be the poor cousins of the US industry, consistently delivering lower returns to their investors.[5]

However, most of these studies only compare aggregate performance across countries, without considering how the characteristics of each individual fund and its investments can help explain the performance gap across countries.

1. See for instance Lerner J. (2009) 'Boulevard of Broken Dreams: Why Public Efforts to Boost Entrepreneurship and Venture Capital Have Failed – and What to Do About It.' Princeton: Princeton University Press, p.248.
2. US based VC funds invested $20 billion and UK based funds £1 billion according to EVCA in 2010. In the same year, US GDP was $14,658 trillion and the UK GDP was $2,247 trillion (nominal, IMF data).
3. For a detailed discussion see Kedrosky, P. (2009) 'Right-Sizing the U.S. Venture Capital Industry.' Kansas City: Kauffman Foundation; and Kaplan, N. and Lerner, J. (2010) It Ain't Broke: The Past, Present, and the Future of Venture Capital. 'Journal of Applied Corporate Finance.' Vol.22, No.2, pp.36-47.
4. Hege, U., Palomino, F. and Schwienbacher, A. (2009) Venture Capital Performance: The Disparity Between Europe and the United States. 'Revue de l'association française de finance.' Vol.30, No. 1/2009, p.7-50.
5. See Box 1 for a literature review of empirical studies on venture capital performance.

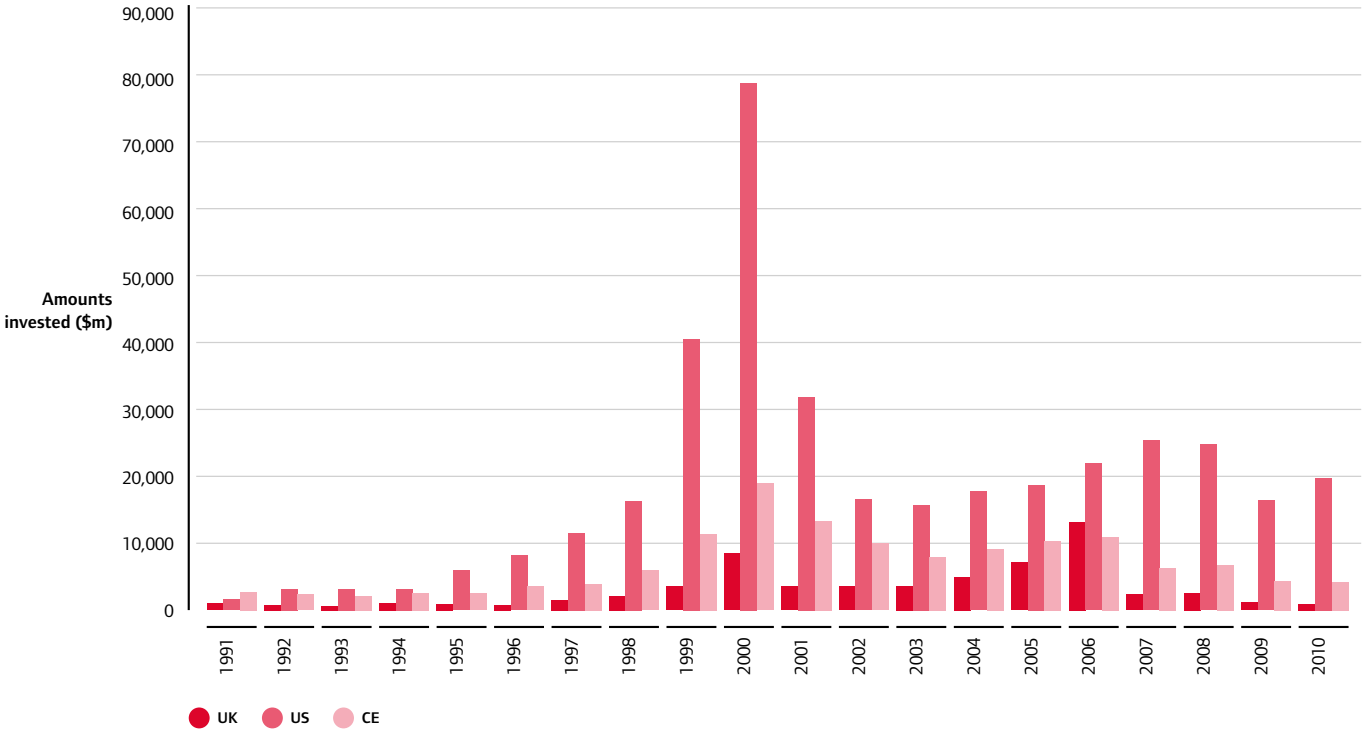
This report aims to fill this gap, focusing on the performance difference between UK and US funds and its evolution over time. Specifically, we compare the returns in the US and the UK of like-for-like funds, with the same focus, vintage year and experience, among other factors, and explore whether some of these factors may explain the UK's underperformance. To do so, we build a new database that matches fund level performance records with individual investments made by these funds, covering 791 funds raised in the UK and the US between 1990-2005 (See Box 2 for a description of the database and the sources used to build it).

The second aim of this report is to identify which factors are associated with better VC fund performance in the UK. Most of the literature that has explored the drivers of VC returns has only used data for US funds.[6] We examine whether the same factors explain performance on both shores of the Atlantic, and how the impact of these factors has evolved over time.

Finally, the success of venture capital and the potential benefits that it can bring into an economy have not been left unnoticed by policymakers, and thus several governments around the world have attempted to stimulate VC activity. Therefore we also consider the relative performance of publicly backed venture capital funds in an attempt to assess the role of government in this area.

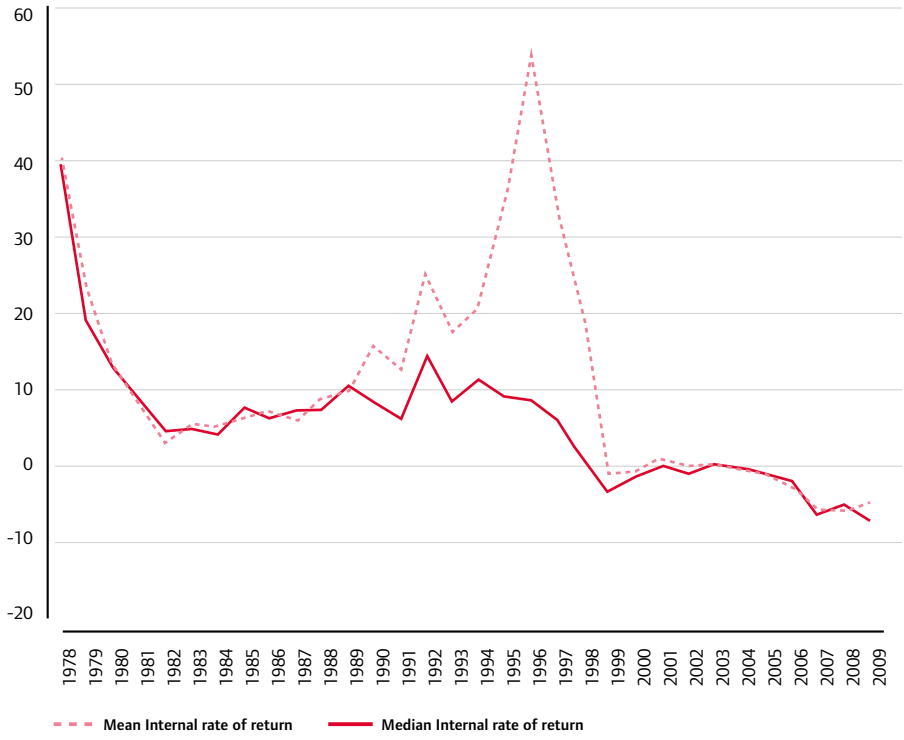
6. See Box 1.

Figure 1: Venture capital investment by US, UK and continental European funds by year



Note: Only VC investments included (Seed, Early-Stage, Expansion, Later-Stage). Source: Thomson One for US and EVCA for Continental Europe and the UK.

Figure 2: Venture capital industry performance by vintage year (US, UK and continental Europe)



Source: Thomson One.

7. CBR (2008) 'Financing UK Small and Medium sized Enterprises: the 2007 Survey.' Cambridge: CBR.
8. Gorman M. and Sahlman, W. (1989) What do venture capitalists do? 'Journal of Business Venturing.' Volume 4, Issue 4, July 1989, pp.231-248.
9. Kaplan, S.N. and Stromberg, P. (20010 Venture capitalists as principals: contracting, screening, and monitoring. 'American Economic Review.' (Papers and Proceedings) 91, pp.426-430.
10. Gompers, P. and Lerner, J. (2001) The Venture Capital Revolution. 'Journal of Economic Perspectives.' Volume 15, Number 2, Spring 2001, pp.145-168.
11. Chemmanur, T. and Loutskina, E. (2006) 'The Role of Venture Capital Backing in Initial Public Offerings: Certification, Screening, or Market Power?' EFA 2005 Moscow Meetings Paper. Available at SSRN: http://ssrn.com/abstract=604882.
12. Sorenson, O. and Stuart, T. (2001) Syndication Networks and the Spatial Distribution of Venture Capital Investments. 'American Journal of Sociology.' 106, pp.1546-86.
13. Lerner, J. and Schoar,A. (2005) Does Legal Enforcement Affect Financial Transactions? The Contractual Channel in Private Equity. 'The Quarterly Journal of Economics.' 120 (1), pp.223-246.

1.1 The contribution of venture capital to innovation and economic growth

The provision of suitable finance to high-growth companies requires the presence of effective financial systems that support innovation and growth. Bank finance is by far the main source of finance for most businesses in developed economies.[7] The majority of firms accessing finance rely on small-scale debt finance: credit cards, overdrafts, and commercial loans. Only a small proportion of UK businesses seeking external finance receives venture capital (3 per cent). A natural question is why venture capital is important if only such a small proportion of firms use it. Empirical evidence on the significance of venture capital for innovation and growth is available at the following three levels.

Venture capital and firms

Venture capitalists provide several critical services in addition to providing finance, such as helping the company to raise more finance, reviewing and helping to formulate business strategy, filling in the management team and introducing them to potential customers and suppliers.[8] Venture capitalists carefully screen firms and structure contracts to strengthen incentives and monitor firms,[9] promote their professionalisation and induce them to behave more aggressively. Gompers and Lerner (2001) write that venture capital helps entrepreneurial firms to invest more than they would otherwise, to grow more quickly, and sustain performance in the long term – even after going public.[10]

Chemmanur and Loutskina (2005) found that venture capitalists attract a greater number and higher quality of market participants such as underwriters, institutional investors, and analysts to an IPO, thus obtaining a higher valuation for the IPOs of firms backed by them. They also found some evidence that suggests that venture capitalists are able to either select better quality firms to back (screening), or help

create such higher quality firms by adding value to them (monitoring) in the pre-IPO stage.[11]

Knowledge regarding the target company's industry allows the venture capitalist to oversee investments more efficiently and more effectively, in part because industry experience enhances the venture capitalist's ability to recognise signs of trouble at an early stage.[12] As a consequence, venture capital has become an important source of funding for a significant number of innovative companies, not only in the United States, but also increasingly around the world.[13]

Venture capital and innovation

The role of venture capital in economic development is increasingly recognised as central to the development of an entrepreneurial economy.[14] There is an emerging consensus that venture capital is a key component of the innovation process[15] and that it plays a crucial role in 'new economy innovation systems' formed by highly dynamic sets of interrelationships between VCs, market conditions and new firm incubators.[16]

On the basis of his study of the Internet industry in the US, Zook (2005) concludes that: *"financial institutions of innovation are probably more important for economic growth in this knowledge economy than the location of research universities"*.[17] Kenney and Florida (1988) argue that VCs play a key role within regional innovation networks and act as catalysts or 'technological gatekeepers' who facilitate and direct innovations within localised clusters[18] making it the *''most important institution supporting technology entrepreneurship''*.[19]

A variety of studies suggest that venture-backed firms are responsible for a disproportionate number of patents and new technologies,[20] and they bring more radical innovations to market faster than lower-growth businesses that rely on other types of finance.[21] In fact, venture capital has played a unique role in the information and commercialisation of entire new industries.[22] In the case of biotechnology for example, *"it is safe to say that without venture capital and regional agglomeration, the industry would not exist in the form that it does today"*.[23]

Venture capital and employment growth

The evidence from the US, where venture activity has a longer pedigree, is compelling. A study undertaken by Puri and Zarutskie (2008) found that despite the extremely small proportion of VC-backed firms (0.1 per cent of all new firms created between 1981 and 2001) they accounted for nearly 10 per cent of employment in the US in the late 1990s and early 2000s. Chemmanur, Krishnan and Nandy (2009) also show that VC-backed firms have higher levels of productivity compared to non VC-backed firms. Hence, VC is widely perceived to be an engine of growth for the economy. The question that arises is why other sources of business finance cannot borrow or duplicate such features and processes of the venture capital industry. Hall and Lerner (2010) summarise these reasons as follows:

> *"Economists have suggested several explanations for the apparent superiority of venture funds in this regard. First, because regulations limit banks' ability to hold shares, at least in the US, they cannot freely use equity. Second, banks may not have the necessary skills to evaluate projects with few collateralizable assets and significant uncertainty. Finally, venture funds' high-powered compensation schemes give venture capitalists incentives to monitor firms closely. Banks sponsoring venture funds without high-powered incentives have found it difficult to retain personnel"*.[24]

14. Mason C. and Harrison, R. (2002) The geography of venture capital investments in the UK.' 'Transactions of the Institute of British Geographers.' Vol.27, Issue 4, pp.427-451.
15. Powell, W., Koput, K., Bowie, J. and Smith-Doerr, L. (2002) The Spatial Clustering of Science and Capital: Accounting for Biotech Firm-Venture Capital Relationships. 'Regional Studies.' Vol.36.3, pp.291-305.
16. Cooke, P. (2001) 'Knowledge Economies: Clusters, learning and cooperative advantage.' London, New York: Routledge.
17. Zook, M.A. (2005) 'The Geography of the Internet Industry: Venture Capital, Dot-coms and Local Knowledge.' Oxford: Blackwell Publishers, p.6.
18. Florida, R.L. and Kenney, M. (1988) Venture capital-financed innovation and technological change in the USA. 'Research Policy.' 17, pp.119-137.
19. See Saxenian, A. and Sabel, C. (2008) Roepke Lecture in Economic Geography – Venture Capital in the 'Periphery': The New Argonauts, Global Search, and Local Institution Building. 'Economic Geography.' Vol.84, Issue 4, pp.379-394.
20. Kortum, S. and Lerner, J. (2000) Assessing the contribution of venture capital to innovation. 'RAND Journal of Economics.' Vol.31, No.4, pp.674-692; also Mann, J.R. and Sager, W.T. (2007) Patents, venture capital, and software start-ups. 'Research Policy.' 36, pp.193-208.
21. See Hellmann, T. and Puri, M. (2000) The interaction between product market and financing strategy: the role of Venture Capital. 'Review of Financial Studies.' 13, pp.959-984; also Gompers, P. and Lerner, J. (2001) The Venture Capital Revolution. 'Journal of Economic Perspectives.' Volume 15, Number 2, Spring 2001, pp.145-168.
22. Bygrave, W.B. and Timmons, J.A. (1992) 'Venture Capital at the Crossroads.' Cambridge, MA: Harvard Business School Press.
23. Powell, W., Koput, K., Bowie, J. and Smith-Doerr, L. (2002) The Spatial Clustering of Science and Capital: Accounting for Biotech Firm-Venture Capital Relationships. 'Regional Studies.' Vol.36.3, pp.291-305, p.304.
24. Hall, B. and Lerner, J. (2010) 'The financing of R&D and innovation.' United Nations University, UNU Merit, Working Paper Series 2010-012. Maastricht: UNU. p.34.

Box 1: Related literature

As more data has become available in recent years, more studies have, in various ways, analysed both the gross performance at the deal level for venture capital investments or the net performance at the fund level. Several studies are concerned with data selection bias correction methodologies and they use individual funding rounds to compute the performance of private equity investments relative to the equity markets (Peng, 2001;[25] Woodward and Hall, 2004;[26] Cochrane, 2005;[27] Gottschalg and Phalippou, 2009[28]).

A few empirical studies have looked not only at the performance of venture capital funds but also tried to understand what factors may affect such performance. Gompers and Lerner (1998)[29] used data on IPO exits to demonstrate that fund performance is driven by factors such as scale, geography, fund management skills, persistence of performance (i.e. certain funds consistently outperform the market) and specialisation of funds. Kaplan and Schoar (2005)[30] used a data set of individual fund performance collected by Venture Economics (now Thomson One) and fund characteristics, and found that returns persist strongly across subsequent funds of a partnership and better performing partnerships are more likely to raise follow-on funds and larger funds.

Other academic studies added an additional dimension to the literature by examining fund performance differences across countries, mostly comparing Europe to the US. Gottschalg *et al.* (2004)[31] considered fund-level performance measures for private equity funds in the US and Europe and found that funds in Europe underperform their US peers. Hege *et al.* (2003)[32] showed that US VC firms as a rule reach significantly higher performance on average in terms of IRR than their European counterparts. Hege *et al.* (2009)[33] also used Venture Economics to compare the success of venture capital investment in the US and in Europe between 1997-2003 by analysing individual venture-backed companies and the value generated within the financing process. Their research identified a gap between the value generated by US venture capital investments and European investments that is statistically highly significant and very large in economic terms. Finally, reports from the British Venture Capital Association (BVCA) and the European Venture Capital Association (EVCA) also confirm the European underperformance relative to the US.[34,35]

The findings of this report are generally consistent with these studies. However, our study differs from previous work in several counts. First, several of these studies examine the private equity industry as a whole while we focus solely on the VC industry (only carefully selected VC funds have been included). Second, most of these studies have overwhelmingly US-based samples and when they include a cross country performance comparison they normally focus on the US and Europe. In contrast, our main focus is the UK and a cross country comparison between the UK and the US. Third, most studies look either at investments at the portfolio-company level or at returns at the fund level. We use fund level performance records and individual investments made by these funds to guide our empirical investigation. Finally, most of the previous studies only compare aggregate performance across countries, without considering how the characteristics of each individual fund and its investments can help explain the performance gap across countries.

25. Peng, L. (2001) 'Building a Venture Capital Index.' Yale ICF Working Paper No. 00-51. New Haven, CT: Yale ICF.
26. Woodward, S.E. and Hall, R.E. (2004) Benchmarking the Returns to Venture.' NBER Working Paper No. 10202. Cambridge, MA: NBER.
27. Cochrane J. (2009) The risk and return of venture capital. 'Journal of Financial Economics.' 75 (2005), pp.3-52.
28. Phalippou, L. and Gottschalg, O. (2009) The Performance of Private Equity Funds. 'The Review of Financial Studies.' 22(4), pp.1747-1776.
29. Gompers, P. and Lerner, J. (1998) 'What Drives Venture Capital Fundraising?' Brookings Papers on Economic Activity, July 1998, pp.149-192. Washington, DC: The Brookings Institution.
30. Kaplan, S.N. and Schoar, A. (2005) Private Equity Performance: Returns, Persistence and Capital Flows. 'Journal of Finance.' 60, pp.1791-1823.
31. Gottschalg, O., Phalippou, L. and Zollo, M. (2004) 'Performance of Private Equity Funds: Another Puzzle?' Working Paper. Fontainbleau: INSEAD.
32. Hege, U., Palomino, F. And Schwienbacher, A. (2003) 'Determinants of Venture Capital Performance: Europe and the United States.' RICAFE-LSE Working Paper No 001. London: RICAFE-LSE.
33. Hege, U., Palomino, F. and Schwienbacher, A. (2009) Venture Capital Performance: The Disparity Between Europe and the United States. 'Revue de l'association française de finance.' Vol.30, No. 1/2009, p.7-50.
34. EVCA (2009) 'Final Figures – 2009 Performance Survey.' Brussels: EVCA.
35. BVCA (2010) 'Private Equity and Venture Capital Performance Measurement Survey 2009.' London: BVCA.

Box 2: Data sources and sample construction

The main challenge when undertaking research on venture capital is the availability of suitable data, especially fund performance data, since partners are typically not subject to public disclosure requirements.[36] To overcome this challenge, several data sources have been used for this study. The result is a novel database that combines data on US and UK VC fund[37] performance and their investments anywhere in the world. The data collection required considerable time and effort, but resulted in a dataset that is significantly larger and more comprehensive than other fund-level performance datasets on venture capital in the UK.

	Thomson One	Preqin	Dow Jones	EurekaHedge	Pitchbooks	Desk research	EVCA	Magdalen centre	Pratt's Guide	Galante's	SBA
Fund characteristics	☑	☑					☑				
Investment deal details	☑		☑								
Portfolio companies characteristics	☑		☑								
Fund performance records											
Net IRRs		☑	☑	☑	☑	☑					
Multiples		☑									
Share IPOs	☑										
Partners							☑	☑	☑	☑	
Offices							☑	☑	☑	☑	
Public Investments		☑				☑					☑
Hub Variables	☑					☑					

This combination of data from a variety of sources created a database of 5,850 VC funds established between 1990 and 2009, and details of around 133,000 individual investments made to over 33,000 companies based around the world. We restrict the analysis of VC returns to funds with vintage year between 1990 and 2005. Funds raised post 2005 were dropped as they are unlikely to have had time to exit their investments yet, resulting in fund returns data that is either missing or based on very early estimates. We also collect data for funds in continental Europe, although they are not included in our analysis on VC performance as the proportionally small sample of funds reporting net IRR and multiples was unlikely to be representative of the market. We do however include continental European funds when looking at funds' characteristics and their ability to bring companies to a successful exit, as the number of funds reporting this information is much larger. Finally, our database also includes hand-collected data on the number of partners and offices that each fund had when it was raised, extracted from industry directories. Further information on the database is included in the appendix of the report.

36. Hellman, T. and Puri, M. (2002) Venture Capital and the Professionalization of Start-ups: Empirical Evidence. 'Journal of Finance.' 57, pp.169-197; also McKenzie, M.D. and Janeway, W.H. (2008) 'Venture capital fund performance and the IPO market.' CFAP Working Papers, No.30. Cambridge: Centre for Financial Analysis & Policy.
37. The nationality of the fund is defined as the country where the fund manager is based. Note that throughout the report 'fund manager' is used to refer to the venture capital firm that manages the fund, also known as the GP or general partner.

A natural question is whether the sample of funds with performance data is representative of the wider population of funds, given that we only have performance data for 791 funds. We follow a number of steps to mitigate these concerns. First, we compare our performance metrics to the returns provided by Thomson One, the most comprehensive source of aggregate returns for the VC industry (even if also incomplete; for a critique see Maats, *et al.* (2011)[38]). As seen in Figure A2 in the appendix, the IRRs in the UK and the US follow similar patterns over time regardless of the source used. Second, we compare the characteristics of funds for which we have performance data to the funds for which this is not available. We identify several differences between both samples, reported in Table A3 in the appendix. For instance, funds reporting performance data tend to be larger, from more established GPs, from earlier vintage years and invest larger amounts in more companies. However, these differences appear both in the US and the UK samples, so they are unlikely to bias the estimates for the returns gap. Moreover, the econometric analysis controls for these factors as well. There is only one difference worth discussing in more detail. As seen in Table A3, it appears that our performance sample oversamples funds with a higher share of IPO exits in the UK while it undersamples them in the US, which suggests that we may be underestimating the magnitude of the returns gap. The share of IPO exits is an imperfect proxy of performance, but we try different methods to exploit this information to correct our estimates (i.e., weighting and imputing) and find similar patterns under these corrections.

38. Maats, F., Metrick, A., Yasuda, A., Hinkes, B. and Vershouski, S. (2011) 'On the consistency and Reliability of Venture Capital Databases.' Working Paper. New Haven, CT: Yale School of Management.

Part 2: The venture capital industry in Europe and the US

The US VC industry continues to be more developed than the European VC industry, even though both venture capital industries follow similar cycles. In this section we ask whether differences go beyond the aggregate size of the market, examining fund characteristics in the UK, the US and continental Europe. We focus the discussion on a few selected factors, but include more detailed information on several other characteristics in the appendix.[39]

2.1 There are some large differences in fund characteristics across countries, and they are robust over time

US funds are larger than European funds, and the gap has not narrowed much over time. Funds raised between 2006 and 2009, the most recent year for which we have data, are larger in real terms than funds raised during 1990-2005, the main study period. But convergence between countries in fund size has been limited. Average fund size in the US was twice as much as in continental Europe in 1990-2005, and continues to be 90 per cent higher in the most recent period.

Their larger size allows US funds to make twice as many investments as European funds, and invest larger amounts to each portfolio company on average, particularly relative to continental Europe. US funds invest in a larger number of companies, but also undertake a larger number of investments in each of the companies that they fund. Over 1990-2005, US funds invested in follow-up rounds in roughly 40 per cent of their portfolio companies, which compares to only about 20 per cent in the UK and continental Europe. There are also differences in their syndication practices. US funds tend to invest with a larger number of co-investors than UK and continental European funds (Table 1).

2.2 US funds are more specialised, concentrating investment in fewer sectors

Figure 3 shows the proportion of capital invested by all funds in our sample across nine broad industries.[40, 41] The left panel presents the allocation of capital for funds established in the 1990-2005 period and the right panel focuses on the most recent funds, established in 2006-2009. In the earlier period the industry defined as internet/computers received the highest share of investment in all three examined geographical regions. Biotech/healthcare and communications/electronics were the next most preferred industries. The remaining industries received considerably smaller proportions of investments. If we look at funds raised in the most recent period (2006-2009), there has been a shift of investment away from internet/computers, even if this industry continues to top the ranking.

US funds had, and continue to have, a much larger focus on internet/computers and communications/electronics when compared with European funds, which instead invest relatively larger proportions in other sectors such as business/industrial and consumer. European funds also invest more on energy, a sector that has tripled its share of investment in recent years.

There are also differences in the degree of sectorial specialisation across countries. Using a measure of the concentration of investment

39. See Tables A2, A3 and A4.
40. Note that figures on amounts invested by industry differ from those reported in the summary statistics tables in the appendix. The values discussed here refer to proportion of the aggregate amount of VC investment allocated to each industry, while the summary statistics report the average across the sample of the proportion that each fund allocated to each industry. In other words, the former corresponds to the weighted average by size and the latter reports an unweighted average.
41. The original sample of investments was classified into 69 separate industry segments as defined by Thomson One. We follow Gompers *et al.* (2008) approach and we assign all investments into nine broad industry classes: Internet and Computers; Communications and Electronics; Business and Industrial; Consumer; Energy; Biotech and Healthcare; Financial Services; Business Services; and all other (see Gompers P., Kovner A., Lerner J. and Scharfstein, D. (2008) Venture Capital Investment Cycles: The Impact of Public Markets. 'Journal of Financial Economics.' 87 (2008), pp.1-23 for further information).

Table 1: Key Summary Statistics

	Fund Vintage Year 1990-2005						Fund Vintage Year 2006-2009					
	Mean			Median			Mean			Median		
	US	UK	CE	US	UK	CE	US	UK	CE	US	UK	CE
Fund Size (USD millions)	163.26	142.20	78.19	67.51	46.92	38.47	171.14	148.37	93.41	76.50	57.24	43.70
Number of investments made	31.87	16.95	14.82	18	8	9	15.38	8.66	9.15	8	4	5
Average investment size (USD millions)	2.98	3.78	2.22	1.81	1.90	1.60	3.76	4.93	3.29	2.02	2.26	1.95
Number of companies invested in	15.88	11.48	10.48	11	7	7	8.48	5.94	6.74	5	4	4
Average amount invested in each company	4.71	4.60	2.86	3.03	2.38	2.09	5.18	5.93	3.98	3.08	3.00	2.30
Proportion of companies receiving multiple investments	0.38	0.18	0.22	0.38	0.12	0.17	0.34	0.21	0.17	0.33	0.04	0
Average number of investors involved in a deal	4.14	2.92	3.05	4.06	2.74	2.72	3.53	2.93	2.04	3.39	3	1.45
Specialisation index	0.55	0.47	0.50	0.5	0.38	0.44	0.65	0.58	0.56	0.57	0.5	0.5

in an industry or a group of industries,[42] we find that US funds are more specialised than both UK and continental European funds. Specialisation may be a more difficult strategy in Europe given the higher fragmentation of the European VC market, although in the most recent years (2006-2009) we observe a trend towards higher specialisation in all three markets (Table 1).

2.3 European funds are more internationalised than US funds

Most US funds have traditionally only invested locally, with less than a third of US funds raised between 1990 and 2005 having invested in one or more companies outside the US (Figure 4a).[43] In contrast, the majority of European funds have invested outside of their home market.[44] This reflects the smaller size of home markets across Europe and, encouragingly, the ability of European funds to overcome, at least partially, this constraint and invest across borders.

Figure 4b reports the location of investments broken up by the fund's nationality. Less than 20 per cent of US funds raised between 1990 and 2005 made an investment in a European company, while about 40 per cent of European funds (both in the UK and the continent) have invested in the US.

The strong geographical preference of US funds for investing in the US becomes even clearer when we consider the amounts invested in each market (Figure 4c).[45] Ninety-one per cent of all US VC capital raised between 1990 and 2005 stayed in the US, while less than 5 per cent went to Europe. In contrast, only 47 per cent of all capital invested by the UK funds went to UK companies, while as much as 20 per cent went to the US and another 20 per cent was invested in continental Europe. Finally, continental European funds invested a large proportion of their funds in the US (17 per cent), but only 5 per cent in the UK.

The situation has changed somewhat in recent times. A higher proportion of European funds raised in 2006-2009 have chosen to invest locally while US-based funds are becoming more global. As a result, the proportion of European VC capital being invested in the US has halved, falling to 10 per cent, and a slightly larger share of US VC capital is coming to Europe.

Overall, this analysis suggests that Europe did not offer an attractive proposition to US VC funds. Europe has a less developed VC market than the US, so attracting US funds (their

42. Specifically, specialisation is measured as a Herfindahl index constructed using the number of investments made into each industry. The higher the index, the more specialised a fund is. Intuitively, the Herfindahl index measures the probability that, if you were to take two investments from a VC portfolio at random, they would be in the same industry.
43. Differences in the coverage of investment activity across countries in the earlier years could potentially impact some of the comparisons on investment flows across countries, but the fact that differences remain in the later years despite improved coverage supports the findings on internationalisation.
44. Note that the results for continental Europe need to be interpreted with care, since the codification does not consider funds that only invest within continental Europe as internationalised, even if they invest in multiple countries within the continent.
45. Note that figures on amounts invested by region differ from those reported in the summary statistics tables in the appendix. The values discussed here refer to proportion of the aggregate amount of VC investment allocated to each region, while the summary statistics report the average across the sample of the proportion that each fund allocated to each region. In other words, the former corresponds to the weighted average by size and the latter reports an unweighted average.

Figure 3: Venture capital investment by industry and vintage year (UK, US and continental Europe)

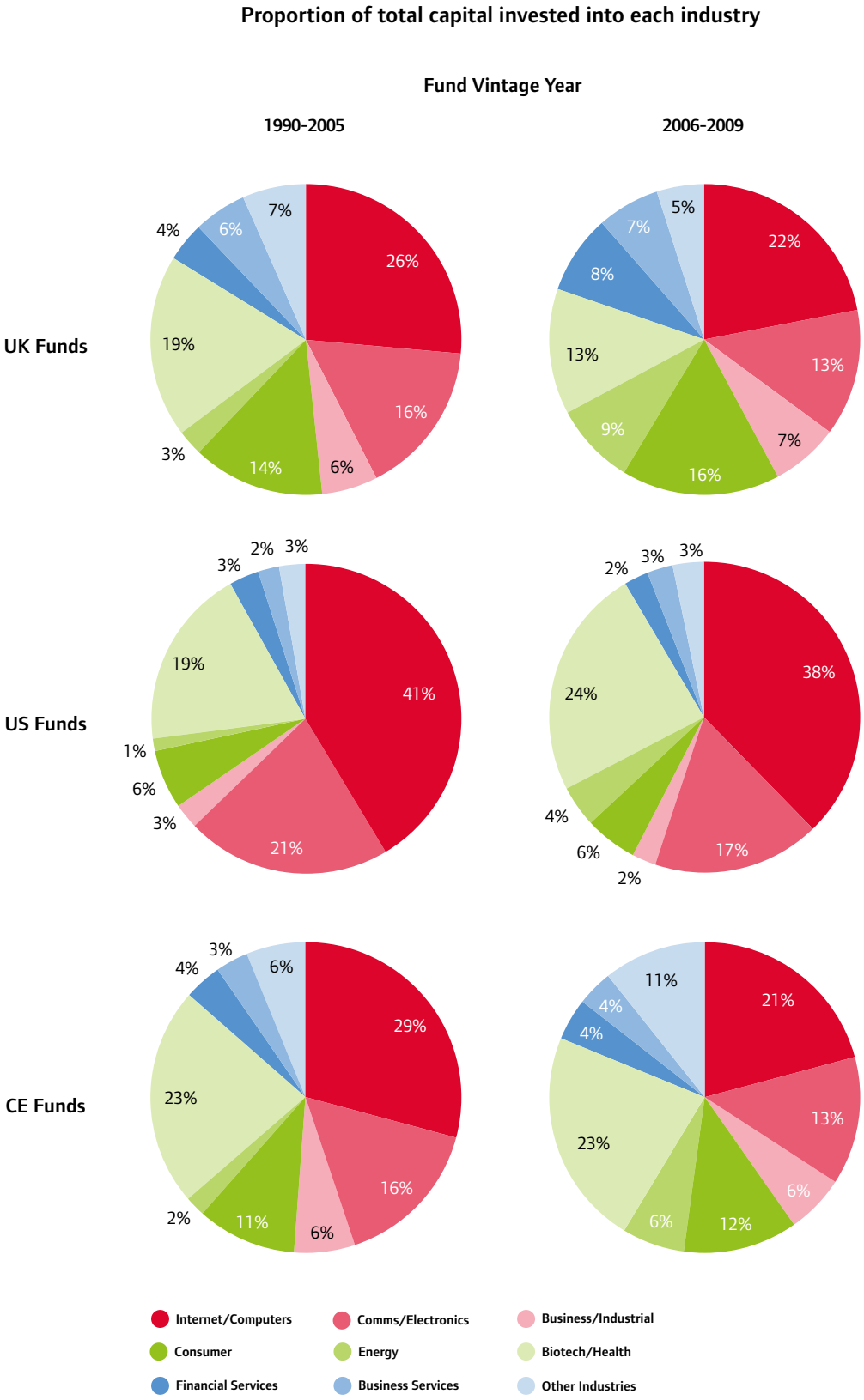


Figure 4: The geography of investments by region of the fund (UK, US and continental Europe)

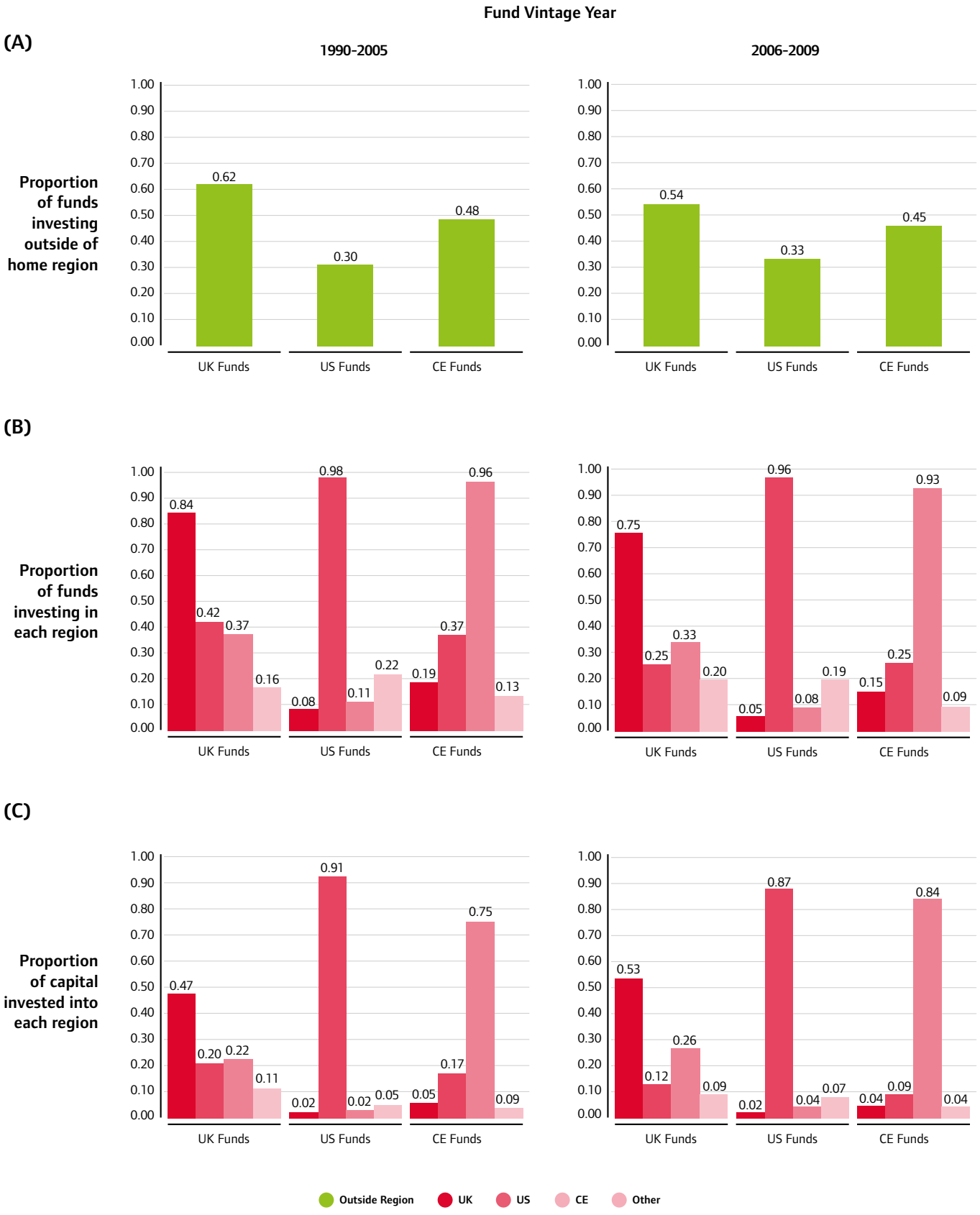
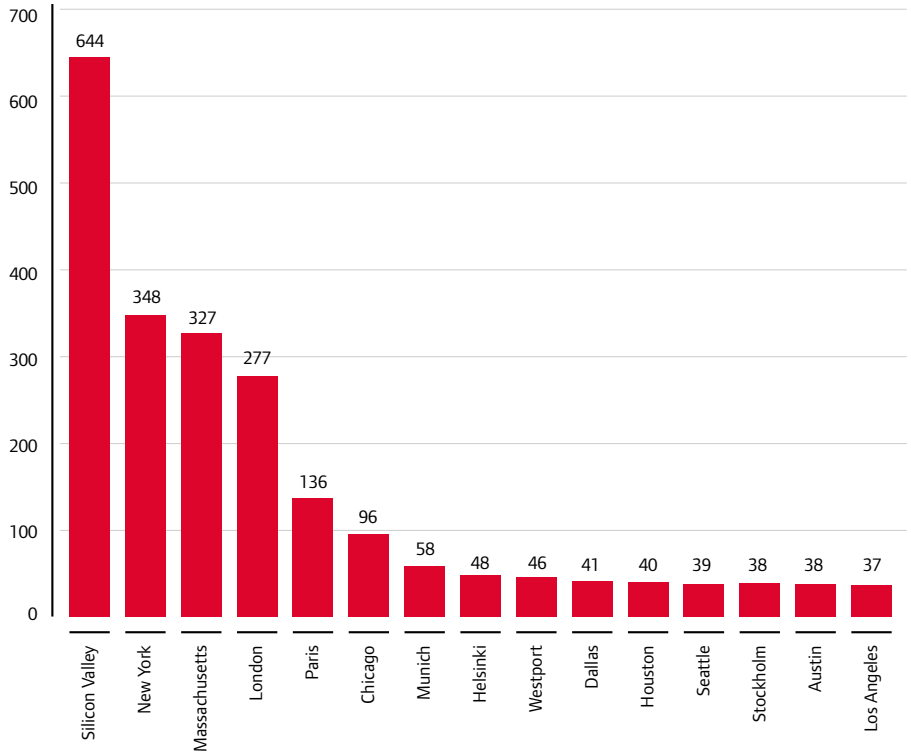


Figure 5: Venture capital funds raised in 1990-2005 by city-region



46. Sorenson, O. and Stuart, T. (2001) Syndication Networks and the Spatial Distribution of Venture Capital Investments. 'American Journal of Sociology.' 106, pp.1546-86.

money but also, crucially, their expertise) ought to benefit European economies. Instead, the opposite is happening. A much larger share of European VC funds invest in the US than the other way around. While Europe is likely to benefit from its funds investing in the US (for the returns it provides, the network it builds and the experience it generates), the small flow in the opposite direction is a cause for concern.

The analysis also shows that the UK has become an attractive destination to domicile venture capital funds, building on its strong financial industry. This has made it easier for London to become a global hub for venture capital funds.

2.4 The global venture capital industry is concentrated in very few hubs

Information about potential investment opportunities generally circulates within geographic and industry spaces.[46] This makes it advantageous for fund managers to locate near each other and close to agglomerations of high potential entrepreneurs. As a result, four geographical areas, Silicon Valley, New York, Massachusetts and London, hosted 40 per cent of all VC funds launched in the US and Europe between 1990 and 2005 (Figure 5). This is discussed further in Section 4.4.

Part 3: The performance of venture capital funds

Observers have argued that the low returns delivered by European VC funds to their investors are a major factor hampering the development of the VC industry in the UK and continental Europe. This section aims to understand the magnitude of this performance gap, its evolution over time, and what potential factors may explain it.

3.1 UK funds have historically underperformed US funds, but the gap has narrowed

We consider two different metrics of VC fund performance, fund multiples and the internal rate of return. The fund multiple corresponds to the amount that investors receive from the fund relative to the amount that they had originally contributed.[47] However, multiples do not take into account the time value of money: a fund which pays back investors after 12 years has the same multiple as one which does so after two years, even though investors would much prefer the latter. Therefore we also use the internal rate of return (IRR), which takes account of this and is thus our preferred metric.[48] Performance data is only available for a subset of funds, so we restrict the analysis in this section to the UK and the US, since the data on these regions is the most complete.[49]

Figure 6 reports the average performance of funds raised in the UK and the US between 1990 and 2005, broken in two periods. Whether we look at IRRs or multiples a clear UK-US gap arises for funds raised before the dotcom bubble. The average IRR for funds with vintage year 1990-1997 is 33 per cent in the US and 13 per cent in the UK. That is, returns for pre-bubble funds in the UK were 20 percentage points lower than in the US. Multiples display the same patterns. US VC funds raised in 1990-1997 returned to their investors 181 per cent more than their original investment on average, compared to UK funds which only managed to return an additional 66 per cent to their investors (2.81 vs. 1.66).

But this gap in returns has narrowed significantly since the bubble burst. Funds with vintage year 1998-2005 in the US reported IRRs of -0.21 per cent on average, compared to -1.21 per cent in the UK, a difference of 1 percentage point. Multiples have also converged (1.05 vs. 1).

The volatility of fund returns becomes even clearer when looking at Figure 7, which illustrates the performance of VC funds by vintage year and location. Funds raised in the years before the dotcom crash performed well, while returns for funds that followed have been close to zero. This dynamic is quite typical of the venture capital industry, which is very sensitive to business cycles and public market dynamics, and tends to display a large cyclicality in returns.[50]

VC returns have followed a similar pattern in the UK and the US over the sample period, although there are two significant but related differences. First, returns in the UK did not grow as fast as they did in the US in the run-up to the dotcom bubble, and as a result the UK was proportionally less affected by the dotcom crash that followed. Second, the magnitude of the UK-US returns gap has changed over time, and the gap appears to have almost closed for funds raised after 1997. However, the convergence of returns has not been driven by UK funds becoming better, but by the worsening performance of US funds.

47. Specifically, 'multiple' is defined as the ratio between the total value that the LP has derived from its interest in the partnership, i.e. distributed cash and securities plus the value of the LP's remaining interest in the partnership, and its total cash investment in the partnership, expressed as a multiple. It is important to note that this measure does not reflect the time value of money, and therefore will not show whether one partnership has returned value to LPs more quickly or more slowly than another. However, it is one measure of 'profit' or 'loss' for the LP.
48. Specifically, we use net IRR, which corresponds to the discount rate where the present value of future cash flows of an investment is equal to the cost of the investment after management fees and carried interest have been accounted.
49. See Box 2 for further discussion. Performance data as per last quarter 2009.
50. See for instance Gottschalg, O., Phalippou, L. and Zollo, M. (2004) 'Performance of Private Equity Funds: Another Puzzle?' Working Paper. Fontainbleau: INSEAD; also Gompers P., Kovner A., Lerner J. and Scharfstein, D. (2008) Venture Capital Investment Cycles: The Impact of Public Markets. 'Journal of Financial Economics.' 87 (2008), pp.1-23.

Figure 6: Average performance of UK and US venture capital funds

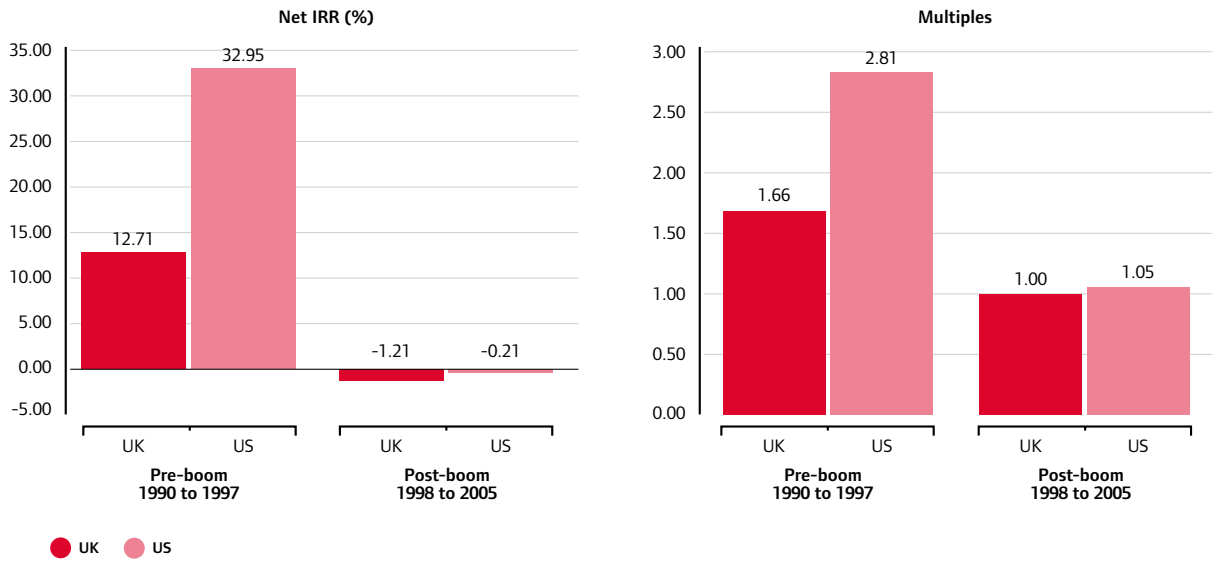
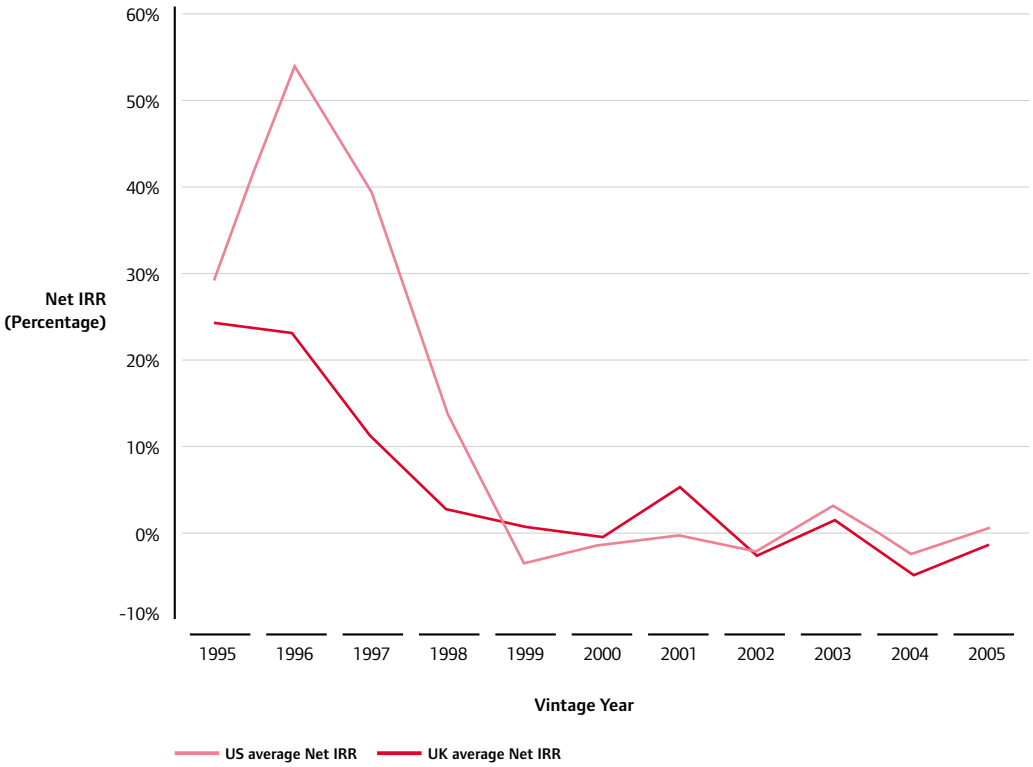


Figure 7: Performance of UK and US venture capital funds by vintage year



3.2 The historical UK-US returns gap cannot be explained by observable fund characteristics

As seen in Section 2, there are some important differences in the characteristics of venture capital funds in the US and the UK. We next ask whether these differences can help explain the UK-US performance gap. In other words, we examine whether the UK-US gap in average returns is explained by (a) differences in the characteristics of the VC industry between countries (e.g., the US having larger funds) or (b) differences in the returns that funds with exactly the same characteristics achieve in each country (e.g., large UK funds doing worse than large US funds).

We use regression analysis to examine how the UK-US returns gap changes when we control for factors related to the characteristics of the fund, its managers and its investments, and test how statistically significant any remaining differences are. We split the sample into four periods (1990-93, 1994-97, 1998-2001, and 2002-2005) to examine how the returns gap has evolved over time. This also has the advantage of smoothing some of the year-on-year fluctuations in returns typical of the venture capital industry. Table A5 in the appendix presents the results of this analysis, which is summarised in Figure 8.[51]

Each bar represents the magnitude of the UK-US returns gap in each period when a set of controls has been included in the regression. As in Figure 7, we also observe a narrowing of the gap between UK and US funds returns over time. While before the dotcom bubble, the UK-US gap in annual returns averaged between 15 and 20 percentage points, this gap fell to negligible levels after the dotcom crash, and it is no longer statistically significant. Figure 8 also provides evidence on what factors may explain both the existence of the UK-US gap in returns and its convergence in most recent periods. We discuss them one-by-one next.

The first bar in Figure 8 reports the gap in performance for UK and US funds with the same vintage year.[52] It shows that UK funds underperformed US funds, even after controlling for the year in which the fund was established. Therefore the time of fundraising does not explain the historical gap in returns. The second bar controls in addition for the size of the fund and its investment stage focus, but the magnitude of the gap remains basically unchanged.[53]

We next consider whether these performance differences are driven by the industries in which funds from the two countries chose to invest.[54] We find that two funds with exactly the same industry exposure would still have performed differently across both shores of the Atlantic. Therefore, the UK VC funds historical underperformance is not due to poor industry selection, but to their choice of companies within industries or the underperformance of some industries in the UK.

We continue this exercise including a set of extended controls associated with the fund manager itself, such as its prior experience relative to the other managers in the market, and its strategic choices, such as the number of companies they invest in, the average round in which they first invest in a company, the amount they commit, the number of co-investors in the round (i.e. the extent of syndication), and an index that measures how industrially specialised the fund is.[55] In a nutshell, the inclusion of these controls does not narrow the gap either.[56] Overall, the gap in the earlier periods remains when like-for-like funds are compared.

Finally, we ask whether the historical returns gap is the result of a lack of exits in the UK, or instead less profitable exits. As shown in the last bar in Figure 8, the gap narrows when we control for the shares of IPO exits and M&A exits,[57] but it still continues to be large and significant.[58] Thus, both the smaller number of exits and the lower returns from these exits explain the historical low returns generated by UK VC funds.

3.3 The convergence in returns is not the result of changes in the characteristics of UK funds

Figure 8 also provides additional evidence on what factors explain the convergence of returns in the UK and US or, more precisely, which don't. The collapse in the returns gap over time is of the same order of magnitude regardless of whether controls are included or not. Therefore, this suggests that convergence in returns has not been driven by changes in the observable characteristics of VC funds in the UK and the US, such as size, experience or investment strategy. Instead, it is most likely the result of changes in the wider economic environment (or alternatively in some unmeasured VC funds characteristics).

51. Unless otherwise stated, the regression models discussed in this report have been estimated with ordinary least squares (OLS). The regression tables in the appendix report standard errors in parentheses clustered at the fund manager level. *, **, *** indicate statistical significance at the 10 per cent, 5 per cent and 1 per cent level respectively.
52. See Table A5 columns 1-3.
53. See Table A5 column 5.
54. See Table A5 column 6.
55. See Table A5 column 8.
56. We have explored a much larger set of potential controls, such as the whether the fund is located in a hub (Table A5 column 9), the average number of rounds per company, the average investment per round, the overall number of investments, different proxies for experience (such as fund sequence number or age) etc., but the conclusion does not change. In short, they fail to explain the UK-US returns gap.
57. Share of IPO exits refers to the proportion of companies in which the fund has invested that went on to exit through an initial public offering. Share of M&A exits is similarly constructed as the share of companies that went on to exit through an acquisition or merger.
58. See Table A5 column 10.

Figure 8: UK-US performance gap by vintage period (gap relative to the US in percentage points)

The question that remains is whether this convergence is permanent or will prove to be just transitory. One hypothesis states that the UK VC industry has matured, becoming more connected with the US and hence more exposed to the US market functionalities. Some evidence appears to support this hypothesis, since younger European and US VC firms are less different from each other than their older counterparts, in terms of fund characteristics, investments strategies and contract and monitoring behaviour.[59,60]

In contrast, the alternative hypothesis suggests that performance differences are just not evident yet; but that they will be once the likes of Facebook and Twitter go public (after taking account of the impact of the recent exits of LinkedIn and Skype). The public markets for entrepreneurial companies have been difficult in recent years, so many of the most promising venture-backed firms in the US have chosen to remain privately held. Accounting conventions in the industry often lead to conservative valuations of private firms. Therefore, their eventual IPO may trigger large gains in the US funds which hold these investments, improving as a result the aggregate performance of US funds in most recent periods.

While only time will tell which of the two hypotheses dominates, examining what explains the historical gap may shed some light on what is likely to happen in the future. We turn to this next.

3.4 The wider UK environment was a major contributor to the historical gap in VC returns

The large difference in the returns enjoyed by investors in the US and the UK in the decade prior to the dotcom crash cannot be explained by a large set of controls capturing several characteristics of the funds, their managers and their strategies. In other words, a large UK-US returns gap remains in that period, even if we compare like-for-like funds. Therefore, the UK historical underperformance can only be the result of some unmeasured fund characteristics or the environment in which funds operated (for example, the number of opportunities available and the barriers to their development, the ambition and ability of entrepreneurs, the background of investors, other cultural issues, etc.).

59. See right panel in Table A2 in the appendix.
60. Schwienbacher, A. (2008) Venture capital investment practices in Europe and the United States. 'Financial Markets and Portfolio Management.' Vol.22, pp.195-217 (data on pp.203, 207).

Examining the performance of funds when they invest in other countries can shed some light on whether performance differences are due to different fund manager characteristics or to the investment opportunities that they face.

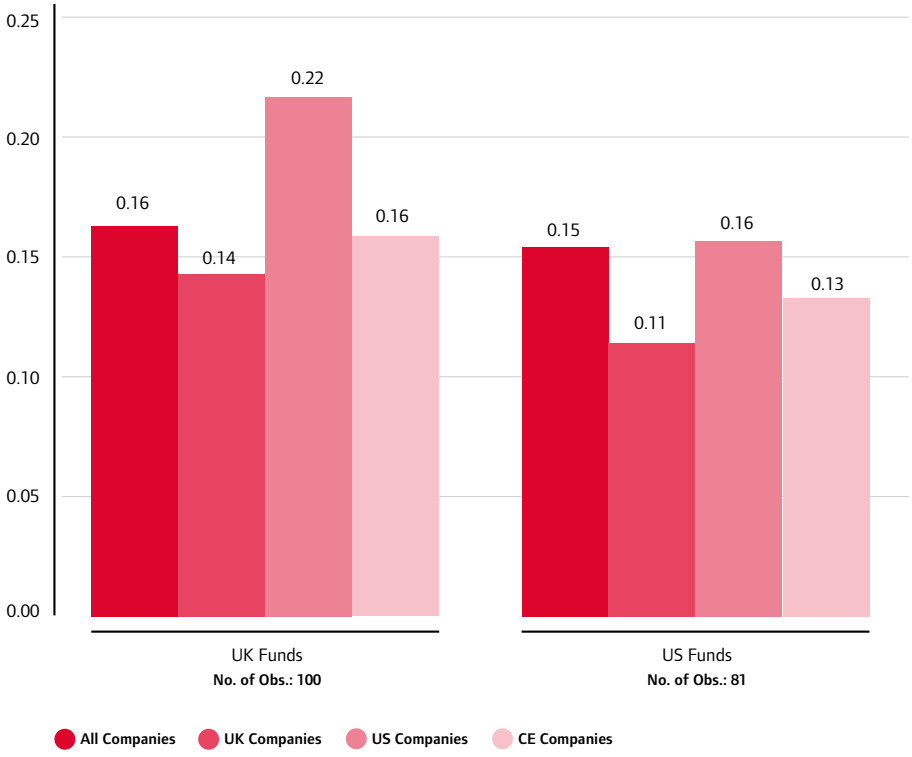
We first examine how investing more capital into one country as opposed to another is associated with fund performance. We find evidence that the more capital US-based funds committed to UK-based companies as opposed to the US-based companies, the worse the IRR and multiples they achieved.[61] However, we only find this relationship for funds raised before the dotcom bubble, and not afterwards. In most recent years US funds investing a larger amount of capital in European markets have instead displayed higher returns.[62]

A caveat to this analysis is that we cannot directly attribute portions of the fund performance to investments in any particular country. In other words, we do not know whether the negative performance of a US fund investing in the UK was due to its investments in the UK or those made anywhere else. To overcome this problem we analyse the success that funds that invest in all three markets had at bringing companies to an IPO exit in each region (UK, US and continental Europe). IPOs are by far the most important (and profitable) means for venture capitalists to exit an investment, and have been used as performance measurements in various studies.[63] The share of portfolio companies that exited through an IPO thus allows us to measure a given fund's performance in one region and compare it with its performance in other regions.

Figure 9 illustrates that both US and UK funds enjoyed the lowest share of IPO exits when investing in UK companies, while they achieved the highest share of IPOs in their US investments. The share of IPOs for UK portfolio companies were also somewhat lower than for continental Europe, despite having a less developed IPO market than the UK.[64] Similarly, UK funds performed well when investing in the US, while US funds' performance worsened when investing in Europe.[65]

61. Specifically, the coefficient in the regression (-24.542) implies that a US fund with 100 per cent of its investments in the UK would have had a 25 percentage points lower net IRR than a fund with the same vintage year, size, stage and industry focus but fully invested in the US (Table A6 column 1).
62. See Table A6 column 3.
63. See Gompers P., Kovner A., Lerner J. and Scharfstein, D. (2008) Venture Capital Investment Cycles: The Impact of Public Markets. 'Journal of Financial Economics.' 87 (2008), pp.1-23; also Sorensen, M. (2007) How smart is smart money? A two-sided matching model of venture capital. 'Journal of Finance.' 62(6), pp.2725-2762; also Bottazzi, L., Da Rin, M. and Hellmann, T. (2007) 'The Role of Trust for Investment: Evidence from Venture Capital.' ECGI Finance Working Paper 187. Brussels: ECGI.
64. We also considered the evolution over time, but the number of observations in some cells when we split the sample of funds investing in all three regions by period is too low to provide meaningful conclusions.
65. This last finding is noteworthy, since Chen *et al.* (2009) finds that investments outside the fund managers' home city or state (but within the US) achieve better success rates than local investments, as it would be expected to compensate for the higher costs and effort involved in investing outside the fund's local market (see Chen, H., Gompers, P., Kovner, A. and Lerner, J. (2009) 'Buy Local? The Geography of Successful and Unsuccessful Venture Capital Expansion.' HBS Working Paper 09-143. Cambridge, MA: Harvard Business School.

Figure 9: Share of IPO exits for UK and US funds investing in all three regions (1990-2005)



This suggests that the wider UK environment was a major contributor to the UK's low historical returns. It may also help to explain two facts documented in Section 2, namely the limited appetite of US funds to invest in Europe,and the large share of European VC capital invested in the US. And, finally, it raises the difficult yet important question of what are the factors that influence the environment in which young innovative companies operate.

3.5 Differences in returns within countries are larger than between countries

Average returns do not capture the large variability in returns within countries. Figure 10 illustrates the spread of performance records in the UK and the US over time.[66] The gap in returns between good and bad performing funds within a country is much larger than the gap in the average returns across countries. This suggests that investors can find good performing funds everywhere, so that selecting the right fund manager may be more important than choosing a particular country.

Looking at the distribution of returns within countries also allows us to examine the historical UK-US returns gap from a different angle. Was the UK's underperformance driven by the extremely good performance of a small number of US-based funds, which experienced exceptionally high returns during the dotcom era? Or was it instead the majority of US funds that performed better than their UK counterparts, and not just a small proportion of them?

The median performance of UK funds was 0.8 per cent while for US funds it was 2 per cent (in others words, 50 per cent of UK funds had returns above 0.8 percent). Thirteen per cent of UK funds would have got into the top quartile in the US, 24 per cent of UK funds outperformed the average US fund and 45 per cent outperformed the median US fund.

Figure 10(b) reveals that the dispersion of returns has been volatile over time. The range of returns for US funds raised between 1994 and 1997 was large, with the vast majority of such funds performing well. More particularly, 75 per cent of all US funds received positive returns, and more than a quarter reached returns above 55 per cent. In contrast the range of returns for UK funds was mostly concentrated below 10 per cent. The dispersion of returns for funds established between 1998 and 2005 has been much lower, concentrated around zero on both sides of the Atlantic. Few funds appear to have done very well or very badly. The fall in the dispersion of returns over time is also clear if we examine the evolution of the interquartile range. The difference in net IRR between top and bottom quartile funds in the US was 40 percentage points pre-bubble and only 14 after. For the UK it was 22 and 13 percentage points respectively.

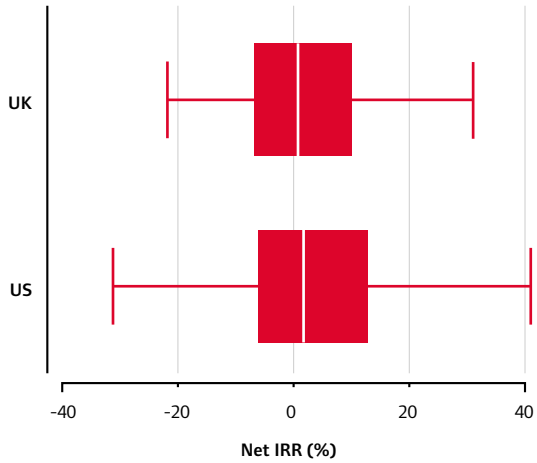
These comparisons do not take in account the different characteristics of UK and US funds. Since we are interested in estimating the magnitude of the gap at different percentiles of the returns distribution (instead of just the average) we use a quantile regression to compare the returns of like-for-like funds in the UK and the US. We find that in the years prior to the dotcom boom, the very best US funds indeed outperformed their UK equivalents by a whopping 89 percentage points.[67] But the returns for the median US fund were also 13 percentage points higher than in the UK (adding additional controls leads to the similar conclusions). Therefore, while the outstanding returns of top US funds account for some of the performance gap in early periods, they do not on their own fully explain the UK's underperformance in that period.

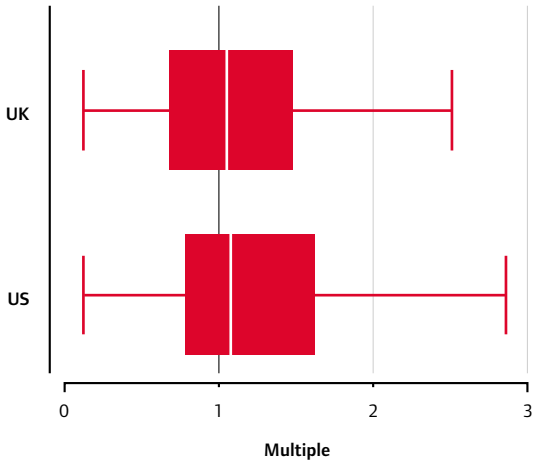
66. Note that outliers are excluded from this graph. The central line in the box represents the median and the extremes of the box correspond to the percentile 25th and 75th of the returns distribution. The length of the box thus corresponds to the interquartile range.

67. This corresponds to difference in returns between the UK and the US at the 95th percentile of the returns distribution for funds raised in the 1994-1997 period estimated using a quantile regression. See Table A7, which uses a quantile regression to estimate the UK-US returns gap at different percentiles of the returns distribution. Similar results arise regardless of whether only vintage year or also an extended set of controls are included in the regression.

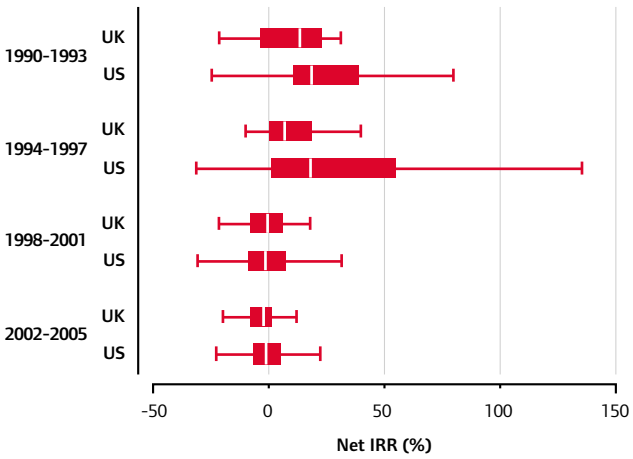
Figure 10: Dispersion of returns within countries over time

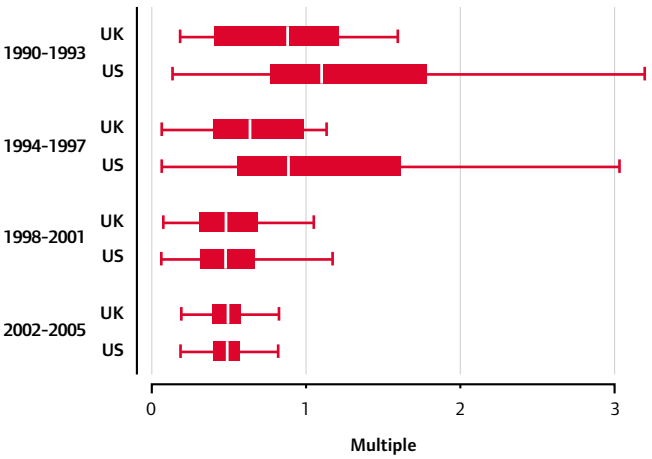
(A) 1990-2005





(B) By period





Part 4: Identifying the best-performing funds

The last section shows that, while there are large differences in the average VC returns between the UK and the US, investors can find good performing funds in both countries. The question is how to identify them. Thus in this section we go beyond examining cross-country differences in returns and aim to explore which factors can help predict VC returns once cross-country differences have been accounted for. We consider several potential drivers of returns and use a regression model to examine how their role varies across countries and over time.

Specifically, we investigate the importance of the following variables: the size of the fund; the experience of the fund manager; the fund's industry specialisation; its propensity to syndicate; its past performance; its location in an investor hub; some other characteristics of its investment strategy; and finally, the fund manager's structure (i.e., its number of partners and offices).

We estimate the effect that each of these variables has on the two measures of fund performance (net IRR and multiples), controlling in all regressions for the nationality of the fund manager, the funds' vintage year and its industry and stage focus. We identify a few of these variables which are associated with better performance, whether considered separately or simultaneously with other factors: size, experience, past performance, hubs and earlier rounds. However, we find differences on their impact over time, with some of them having become weaker predictors in recent years.[68] We next discuss the main findings in detail, and present the full results of the regression analysis in the appendix.[69]

4.1 Small funds underperform medium-sized funds, but larger is not always better

The average IRR for the bottom quartile of funds by size (those with assets under management below $84 million) are about 7 percentage points lower than those achieved by larger funds.[70] Economies of scale in VC investing are, however, limited. Above this threshold, increasing the size of the fund is not associated with better performance, and in some circumstances it can even be counterproductive.

A larger scale allows funds to cast a wider net, follow-up their most successful investments and spread the costs more widely. But the size of the fund is positively related to the experience of the fund manager itself. Successful fund managers are able to raise larger funds, so it could be experience and not size that is driving returns. In order to test this, we control for the experience of the fund manager and we find that medium-sized funds ($84-$365 million)[71] continue to have a superior performance in comparison to small funds. However, we also find that larger funds (those above $365 million, the top quartile) no longer achieve better returns than small funds.[72] Beyond a certain size diseconomies of scale arise, damaging performance. Therefore, while experienced fund managers may be able to raise very large funds, the analysis suggests that their fund returns would have been higher on average if they had kept their funds smaller. Or, in other words, it is medium-sized funds that perform better.[73]

68. Note that some of the funds raised in the latest period (2002-05) have not yet exited their investments and returned the capital to their investors. This implies that fund returns data for the latest period is more likely to be unavailable or based on preliminary estimates of company valuations. Therefore, the weakening of some of the effects in the later period may be in part the result of using more noisy data, and not just of a shift in the market (this is the reason why funds raised after 2005 have been excluded from the performance analysis, since this issue would become more severe).
69. Table A5 examines the effect of these different variables on fund performance, while Table A8 and A9 explore how the effect of the most significant ones (experience, round of investment, persistence and location in a hub) changes over time and across countries.
70. See Table A5 columns 4-6. Note that all fund size measures discussed throughout the report are in 2010 US dollars, and thus adjusted for inflation.
71. This corresponds to the second and third quartile of funds by size.
72. Excluding sectorial specialisation from the regression does not change the results.
73. This is consistent with Lerner, J., Leamon, A. and Hardymon, F. (2011) 'Private Equity, Venture Capital, and the Financing of Entrepreneurship: The Power of Active Investing.' New York: Wiley.

4.2 More experienced fund managers achieved higher returns

There are several reasons why more experienced venture capitalists could be able to deliver better returns. First, experience in screening potential deals helps fund managers select better companies to invest. Second, venture capitalists with more experience may be able to add more value to the firms they fund, for instance due to improved monitoring skills or by helping new ventures set business strategy and attract critical resources.[74,75] Finally, more experienced fund managers also have stronger and wider networks. These can be a source of comparative advantage when sourcing deals and looking for co-investors, but also when working with clients and suppliers or when engaging with potential acquirers or underwriters at the time to exit an investment. In fact, a large proportion of the benefits accrued from greater experience can be explained by the better networks more experience fund managers have access to.[76]

We examine the importance of experience and find that more experienced fund managers deliver higher returns to their investors.[77,78] We measure the experience of a fund manager by the number of prior investments it has made relative to the average for all the other funds with the same vintage year.[79] However, using other measures of experience, such as the number of previous funds raised by that fund manager (sequence number) or the number of years it has been investing also leads to the same conclusion.[80] Similarly, experience predicts returns regardless of the controls that we include in the regression.[81]

We also test whether experience is equally important for both US and UK funds, and find this to be case.[82] However, when we break down the effect of experience by period,[83] we find that the benefits of experience appear to have faded over time, perhaps reflecting the fact that information on potential deals is becoming easier to access. Alternatively, this could potentially reflect the greater importance of experience in booming periods when opportunities abound, relative to more normal times when the differences between the best and the worst performing funds are much smaller.

4.3 Past performance predicts future performance

We capture the performance of the preceding fund raised by each fund manager and find strong evidence of persistence in returns over time.[84] A fund raised by a fund manager whose previous fund performed well is more likely to exhibit superior performance too.[85,86] This sets venture capital apart from some other asset classes, such as mutual funds, where often the returns are more the result of luck than skill, and so display very limited persistence.[87]

When comparing the persistence of returns in the UK and US, we find a significant relationship between past and present returns in the US, but not for the UK. This however could be driven by the relatively small number of UK fund managers for which we have performance data for multiple funds. Finally, we observe a varying degree of persistence across different periods. It was highest during the earliest period (1990-93) and lowest for funds raised during the dotcom bubble (1998-2001), although it increased again in the latest period.[88]

4.4 Funds in investor hubs had better returns

Fund managers located in one of the four largest investor hubs (Silicon Valley, New York, Massachusetts and London) achieved on average 7.4 percentage points higher IRRs than those based elsewhere.[89] This may be explained by the fact that these regions concentrate a large share of the world's venture capital activity, so funds can benefit from agglomeration economies, both directly (since proximity to portfolio companies and other investors helps minimising information asymmetries) and indirectly (since portfolio companies can have access to better networks and a more developed supporting infrastructure among others).[90]

However, performance varies across hubs and over time. Figure 11 displays the average IRR for funds based in each region relative to the average IRR achieved by US funds located outside the major hubs mentioned.[91] Funds in Silicon Valley or Massachusetts have significantly outperformed all other US funds. Instead, London's performance has lagged behind that of all US hubs, on par with US funds outside hubs, but still better than for UK funds outside London.

74. For instance, Gompers *et al.* (2005) provide evidence that prior deal flow experience helps venture capital managers to take advantage of deal opportunities by ramping-up investments when opportunities improve, and that ramp-up often leads to better exit performance (see Gompers, P., Kovner, A., Lerner, J. and Scharfstein, D. (2005) 'Venture Capital investment cycles: the role of experience and specialization,' NBER Working Paper. Cambridge, MA: NBER.
75. Gompers, P., Lerner, J., Scharfstein, D. and Kovner, A. (2010) Performance Persistence in Entrepreneurship and Venture Capital. 'Journal of Financial Economics.' 96 (1), pp.18-32.
76. Hochberg, Y., Ljungqvist, A. and Lu, Y. (2007) Whom you know matters: venture capital networks and investment performance. 'Journal of Finance.' 62, pp.251-301.
77. See Table A5 column 4-7.
78. Note that throughout the report 'fund manager' is used to refer to the venture capital firm that manages the fund, also known as the GP or general partner.
79. Specifically, following Gompers *et al.* (2008) relative experience corresponds to the log of the number of investments made by the venture capital firm prior to the year the fund was raised and the average of the number of investments made prior to that year by all other venture capital firms raising funds in that year. Note that the negative value for average relative experience reported in the summary statistics tables is the result of the logarithmic transformation used when constructing the variable. See Gompers P., Kovner A., Lerner J., and Scharfstein, D. (2008) Venture Capital Investment Cycles: The Impact of Public Markets. 'Journal of Financial Economics.' 87 (2008) 1–23.
80. Unreported regressions.
81. See Table A5 columns 7-11.
82. See Table A8 column 1.
83. See Table A8 column 2.
84. Note that information on past returns is only available for 259 funds.
85. See Table A5 column 11.
86. See Kaplan, S.N. and Schoar, A. (2005) Private Equity Performance: Returns, Persistence and Capital Flows. 'Journal of Finance.' 60, pp.1791-1823.

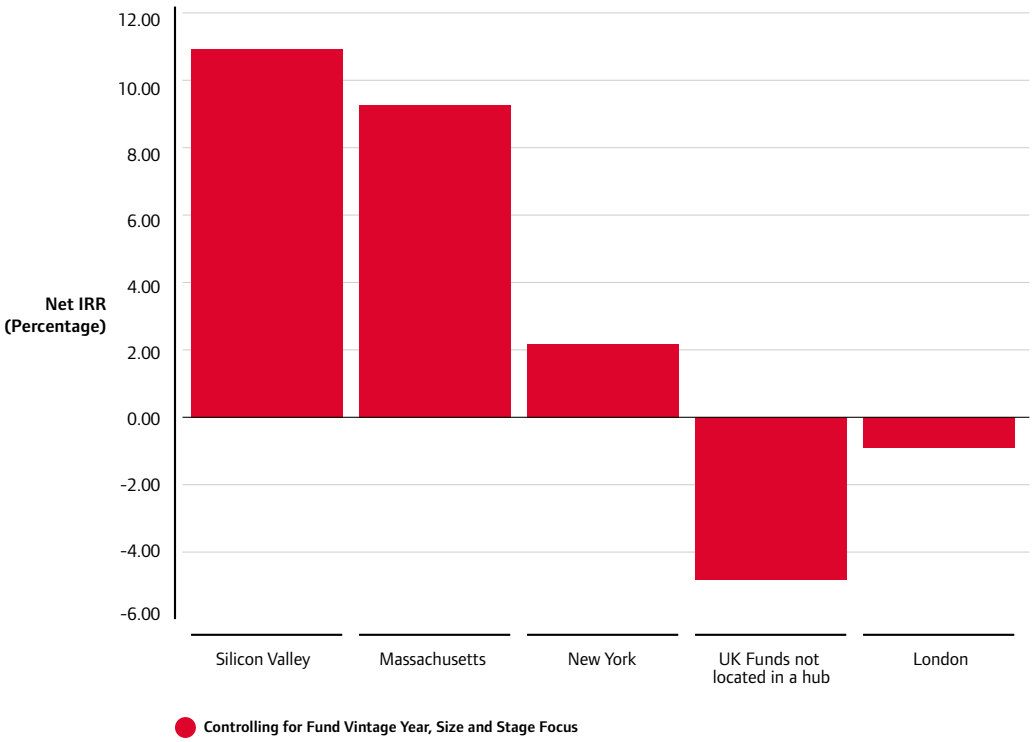
The superior performance of funds based in hubs has faded over time though. It was mostly driven by funds raised in 1994-1997, which were able to benefit from the dotcom bubble, but it has almost disappeared since then. The falling trend is common for all hubs except New York, which on the contrary has seen improving relative performance for funds based there over the last two decades. In 1990-93 New York underperformed the rest of the US while in 2002-05 it outperformed the rest of the US, including all the other hubs. In contrast, in the most recent period the advantage from being located in Silicon Valley, Massachusetts and London is no longer significant.

4.5 Investing in earlier rounds leads to better performance

Fund managers face several strategic choices that may impact fund performance, such as the number of companies to fund, the round at which to invest, the amount of initial funding to commit or whether to syndicate with other venture capitalists. We find that only one of these choices is significantly correlated with performance: funds investing in earlier rounds, admittedly a more risky strategy, performed better than those investing in later rounds.[92,93] This is true both in the UK and the US. This relationship is also quite robust over time (albeit weaker in the earliest period). On average, making the first investments one round earlier is associated with 2.4 percentage points higher returns.[94]

Which industries to target is an important investment strategy decision too. Funds can follow a narrow strategy, concentrating on a few sectors, or a wide strategy, spreading their investments across many sectors. We test the impact of specialisation with an index that measures how concentrated the funds' portfolio is on a few sectors,[95] but we do not find a robust relationship between specialisation and fund performance.[96] This is not to say that all sectors perform equally. There are large differences in the historical returns generated by different sectors. Specifically, funds with a larger share invested in internet and computers, communications and electronics, and biotechnology and healthcare delivered the highest returns over the study period.[97] But the extent to which concentration of the portfolio matters seems ambiguous.

Figure 11: Performance of funds based in investor hubs (relative to US funds outside hubs, 1990-2005)



87. See for instance Cahart, M. M. (1997) On Persistence in Mutual Fund Performance. 'The Journal of Finance.' 52, 57-82; or Berk, J. and Green, R. (2002) 'Mutual Fund Flows and Performance in Rational Markets.', WorkingPaper No. 9275, National Bureau of Economic Research.
88. The coefficient for previous returns falls however short from significance for the latest period (2002-05), even if its magnitude is not far from that for funds raised in the period just before the bubble (1994-97). See table A8 column 6.
89. See Table A5 column 9.
90. Hochberg, Y., Ljungqvist, A. and Lu, Y. (2007) Whom you know matters: venture capital networks and investment performance. 'Journal of Finance.' 62, pp.251-301.
91. This corresponds to the coefficients in Table A9 column 2.
92. We find this result regardless of whether stage focus dummies are included or not in the regression. Note that this is not to say that 'early-stage' funds outperform 'later-stage' funds, but simply that getting into the venture at an earlier round pays off.
93. The coefficients for the other three variables (number of companies invested by the fund, average size of investment at first investment and average number of co-investors) are not statistically different from zero, although in some unreported regressions we find that syndicating with more partners is weakly associated with better performance.
94. Table A5 column 8.
95. See footnote 42 in Section 2 for further discussion on the Herfindahl index used to measure industry specialisation.
96. In unreported regressions, we find some evidence on industry specialisation being associated with better performance for US based funds in the earlier periods, but not in more recent periods or in the UK.
97. Industry controls in the regressions, which measure the share of the fund invested in a sector, provide an estimate of the returns generated by each sector relative to the returns generated by financial services. The coefficients for each industry are: Internet and computers 39.28; communications and electronics 34.51; business/industrial 23.59; consumer 20.06; energy 23.07; biotech/healthcare 30.48; business services 33.18; other industries 39.76.

4.6 A larger number of partners was associated with higher returns

We also investigate the relationship between performance and the number of partners and offices that the fund has. Venture capital organisations have on average five general partners and two offices, but there is a wide variation among them.[98] Most venture capital general partners have a decade or more of experience.[99] However, any given partner can only monitor a certain number of deals and effectively serve on only a limited number of boards, so a larger number of partners may be an advantage.

We find that funds with more partners outperform, even after controlling for fund size and experience among others.[100] However, the positive effect associated with a higher number of partners has been eroded over time. A larger number of offices are also correlated with better performance, but very weakly and only in the earliest period.[101] Altogether, it appears that having more resources, whether partners or offices, may help the fund manager take advantage of more opportunities during boom periods (as prior to the dotcom bust), but it does not make a difference in non-boom times.

4.7 Much of the variability in returns is not explained by these factors

A note of caution to conclude this section, the model that we have estimated is successful at identifying several factors that help to explain performance. But differences across funds regarding these factors can only account for about 30-40 per cent of the variation in returns.[102] In other words, much of the variability of returns continues to be unexplained. This is most likely accounted for by a combination of unmeasured (or unmeasurable) factors and serendipity. After all, investing in new ventures is, and will continue to be, an uncertain business.

98. See Table A3. Both the number of partners and offices range from 1 to c. 20. UK and US funds have the same number of partners on average. However, the data on partners and offices for the UK is extremely limited and self-selected, so the results for the UK need to be interpreted with great care. The data for the US has wider coverage, but the overall sample for the partners (offices) analysis is still reduced to 520 (426) funds.
99. Gompers, P. (1998) Venture capital growing pains: Should the market diet? 'Journal of Banking and Finance.' 22, pp.1089-1104.
100. See Table A10 columns 1-2.
101. See Table A10 column 7-8.
102. If persistence is included, the sample becomes smaller and the R-squared get close to 0.6.

Part 5: Public interventions to support VC funds

Governments around the world have taken a strong interest in facilitating access to finance for innovative high-growth companies, and the UK has been no exception. Several schemes in support of the venture capital industry have been set up in response to the belief that there are significant funding gaps not being addressed by the market, particularly for small high-technology start-ups or in particular regions.[103] The attempts to stimulate the supply of new sources of finance have followed different approaches, from ensuring that each region has access to regional-based VC funds to trying to demonstrate that investors in early-stage funds can make robust returns, thereby promoting the private sector venture capital industry.[104] Many past UK interventions have fallen foul of a few common problems: trying to achieve too many goals; being sub-scale; limiting the pool of potential investments; and having unrealistic time horizons.[105] However, recent government schemes (i.e. ECFs) have avoided many of these pitfalls and are aiming to make use of the best of private sector experience and establish a credible policy in the area.

Despite their growing importance in the market,[106] the evidence on the performance of UK government VC schemes is limited. A recent evaluation by the National Audit Office (NAO)[107] concluded that the financial performance of public funds had been very poor (although not untypical when compared with private VC returns over the same period), and pointed to poor design and geographical restrictions on the funds' investment activity as factors to address. But while the financial performance of the UK public funds has not been good, their impact on supply of finance may have been significant, since many recipients of public funding claimed that in the absence of the schemes they would have not undertaken their investments.[108] International studies also provide a mixed picture. For instance, a recent report by the World Economic Forum found that companies with moderate government VC support outperform (in terms of value and patent creation) both companies with only private venture capital support and those with extensive public support. This effect was however stronger for programs associated with national governments (and international organisations) rather than sub-national entities (e.g. state and provincial governments).[109]

5.1 Publicly backed funds have delivered lower returns than private funds, but the gap has narrowed

In this section, we assess the financial performance of publicly backed venture capital funds.[110] Public schemes are generally set up to support investment in the least profitable segments of the market, where private VC investors will not go. In addition, they are often motivated by spillover effects and other non-commercially driven outputs. Therefore, the financial returns generated by publicly supported funds are a useful but incomplete metric to assess the success of these interventions. Also, when evaluating their returns, they need to be benchmarked with private funds operating in the same space, since otherwise there is the risk of underestimating their performance.

We analyse performance records of 93 (50 UK and 43 US) publicly backed funds[111] raised between 1990 and 2005, which have made over 3,100 investments. Our coverage

103. See Sunley, O., Klagge, B., Berndt, C. and Martin, R. (2005) Venture capital programmes in the UK and Germany: in what sense regional policies? 'Regional Studies.' 39 (2), pp.255-273; also Mason, .C and Harrison, R. (2003b) Closing the Regional Equity Gap? A Critique of the Department of Trade and Industry's Regional Venture Capital Funds Initiative. 'Regional Studies.' Vol.37, 8, pp.855-868.
104. Ibid.
105. NESTA (2009) 'Reshaping the UK Economy.' London: NESTA.
106. Publicly backed UK VC funds have become increasingly important over the past decade: they participated in 42 per cent of all venture capital deals in 2009. Since 2005, there has been a broadly stable representation of the public sector in the venture capital market, after a significant increase in the portion of deals that are publicly backed following the dotcom crash. In 2002, over 20 per cent of all deals involved a publicly backed fund, and this share doubled to over 40 per cent by 2009. This has been driven both by falls in private sector funding and increases in government funding (see: (2008) 'Shifting Sands: The changing nature of the early-stage venture capital market in the UK.' London:NESTA).
107. National Audit Office (2009) 'Venture capital support to small businesses.' London: NAO.
108. The authors of the report also surveyed business groups, businesses and fund managers that were involved in the schemes. Thirty-two per cent of businesses reported they would have been unable to obtain any finance without support from the funds. Around 23 per cent reported that they would not have gone ahead with their planned activity in the absence of finance from the Department's funds.
109. Brander J., Du, Q. and Hellmann, T. (2010) 'The Effects of Government-Sponsored Venture Capital: International Evidence.' NBER Working Paper No. 16521. Cambridge, MA: NBER.
110. In this section we use the term public funds as a short hand for publicly backed funds, and so it includes funds set up directly by the public sector and private funds that have benefited from different forms of government support (tax credits, subsidies, co-funding, etc.).

of public funds is limited, but we do have access to very detailed information about their investment activities, and thus we can compare their performance with that of solely private funds with the same characteristics. This is particularly useful because the average public and private fund are different in several dimensions. As reported in Table A4 in the appendix, public funds tend to be smaller, undertake fewer investments in fewer companies, and invest smaller amounts. They also have fewer exits and achieve markedly lower returns, about 10 percentage points lower IRR than the average private fund in the UK and 6 percentage points lower in the US.[112]

We next use the same regression approach as in previous sections to examine what factors may account for this public-private gap, as well as to estimate the real magnitude of the gap when like-for-like funds with the same characteristics are compared. Table A11 reports the full results of this analysis, summarised in Figure 12.

In line with previous studies we find that publicly backed funds historically underperformed private funds, particularly in the UK.[113] However, the public-private returns gap shrinks when we control for vintage year,[114] which indicates that many public funds were established in years preceding poor market performance. Still, large differences in returns remain for some periods even after we control for vintage year.

Publicly backed funds in the pre-bottom bubble period heavily underperformed private funds, with average returns for public funds being up to 20 percentage points lower in the UK. The results suggest that in later years governments have become savvier when designing new schemes.[115] Based on the regression analysis, there may still be some margin for improvement as in the latest period there continues to be a gap in the returns between public and private funds, even if it is small and only statistically significant for the US.

5.2 The public-private gap in returns is not fully explained by observed fund characteristics

Observers have often pointed to the small size of many public funds as a culprit for their underperformance. But it is not just fund size that explains the difference in returns. In the earliest period the public-private gap decreases slightly after we control for size, but it continues to be large and significant.[116] Controlling for stage, another factor commonly cited given publicly backed funds' usual focus on early-stage, does not alter the results either. Similarly, not much changes when we add industry controls.[117] It is not the industries that public funds choose to target, but their selection of companies within industries (and what they do with them) that leads to underperformance. Adding additional controls, such as experience of the fund manager, industry specialisation and other measures of investment strategy reduces the historical public-private gap for the US, but not for the UK.[118]

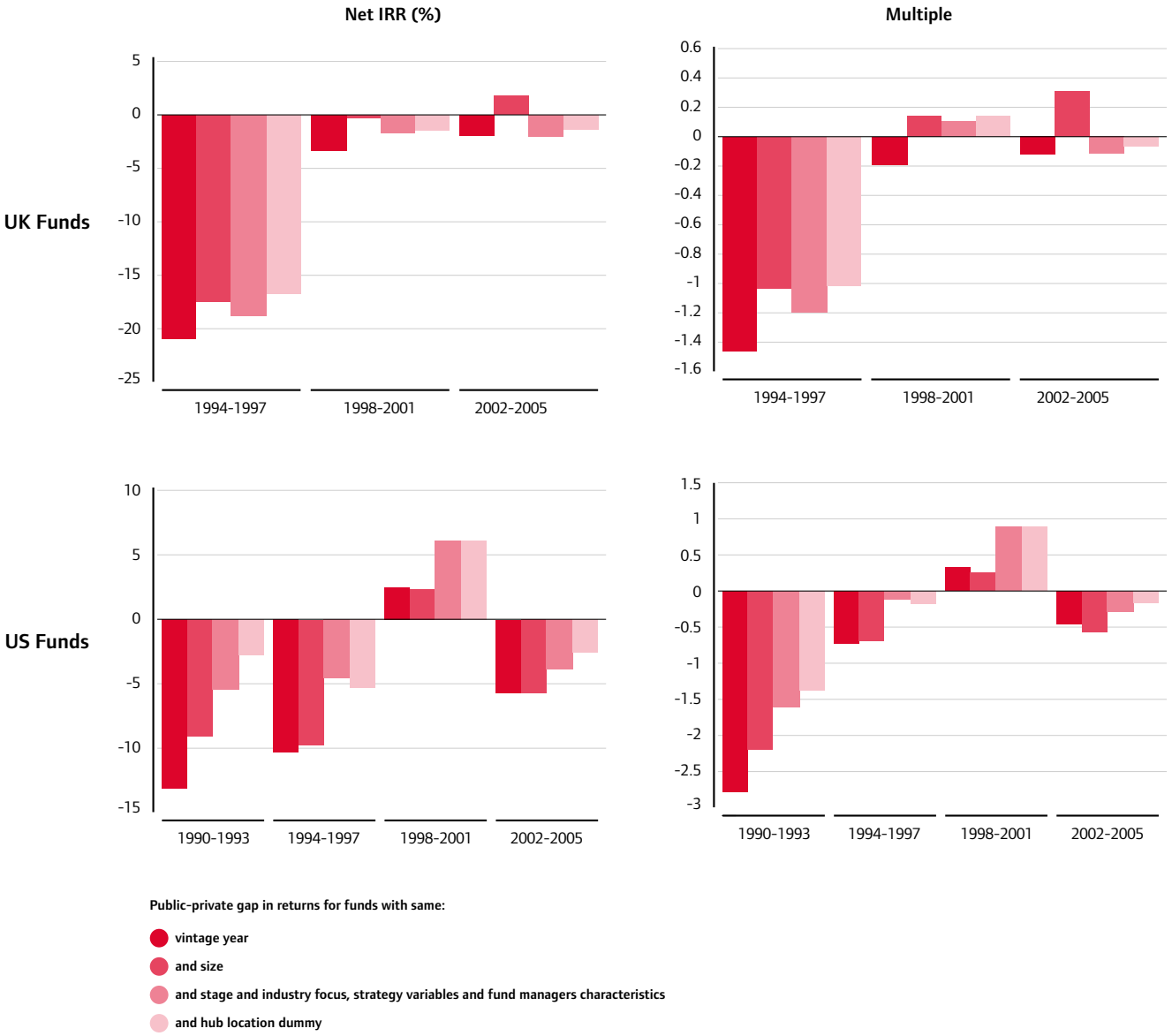
Many publicly backed funds had a regional focus that may have prevented them from locating in hubs and taking advantage of the benefits associated with them, but controlling for investor hubs does not eliminate the gap. Controlling for the proportion of companies that a given fund successfully exits also does not explain the public underperformance.

If the historical public-private returns gap is not accounted for by these factors, what does explain it? One hypothesis is that the restrictions that publicly backed schemes impose on fund managers may hinder their performance. An alternative hypothesis is that governments may fund less capable fund managers, either because they are unable to distinguish good from bad fund managers or, alternatively, because only managers that cannot raise funding in the market seek support from government schemes.[119] Whatever the answer, the narrowing of the public-private performance gap in most recent years suggests that this may have become less of an issue.

A question that remains is what has been the role of public funds in explaining the historical UK-US returns gap. While the US has more government schemes to encourage VC than many realise, the UK has been particularly active in using public funding to support the VC industry. The design of the schemes has also been different. We find that the underperformance of publicly backed government funds is one of the factors that contribute to the aggregate UK-US returns gap.[120] However, the US continues to experience higher historical returns than the UK when we exclude public funds from the sample.

111. This includes 50 UK-based funds that received support under the government schemes (RVCFs, UCFs and VCTs) or the EIF and 43 US-based funds that made use of the SBIC programme. VCTs are codified as publicly backed funds due to the tax benefits they receive and the strings that come attached with them, but public funds continue to underperform private funds if VCTs are excluded (although in that case we do not observe convergence in public-private returns in the UK). We are able to identify publicly supported funds in our UK sample with high reliability. Instead, in the US we only codify as public funds those participating in one programme (SBIC), and so many other publicly supported funds in the US for which we do not have data (e.g., state government programmes etc.) are likely to be coded as private funds.
112. Note that some publicly backed funds in the US may be coded as private (see note above), so this difference may underestimate the gap between public and private funds in the US.
113. See Table A11 column 1.
114. See Table A11 column 2.
115. See Table A11 column 3.
116. See Table A11 column 4.
117. Specifically, a small change in standard errors and coefficients for the US makes the estimates of the public-private gap to fall short from significance when before they were weakly significant.
118. Measures of investment strategy refer to the number of companies the fund invests in, the average amount invested by the fund in their first investment into a company, the average round of the first investment into a company and the average number of syndication partners involved in the deals they participated in. See Table A11 column 8.
119. We explored this question looking at the performance of the private funds of those fund managers that had also received public backing at some point, but did not find any conclusive evidence to discriminate between the two hypotheses.
120. See Table A11 (compared with Table A5).

Figure 12: Public-private returns gap by country (public returns gap relative to private funds)[121]



121. Note that there is no available performance data for UK public funds in 1990-1993.

Part 6: Policy implications

This report examines the performance differences between UK and US venture capital funds. UK funds have historically underperformed US funds but this gap has narrowed to one percentage point (net IRR) for funds raised in the post bubble period. The historical performance gap is robust to different measures of venture capital activity, fund characteristics or investments strategies, suggesting that the UK environment was a major contributor to this gap.

The evidence shows the progress that the UK has made over the last two decades, but it also highlights the important challenges that lie ahead. Whether the UK venture capital industry will be able to match (or, why not, surpass) the performance of the US venture capital industry in the next decade will depend on the decisions taken by investors, fund managers and policymakers among others. The findings in this report can help inform investors' and fund managers' decisions, but they have particularly important implications for UK policymakers:

- *Remember venture capital activity does not exist in a vacuum.* Venture capitalists are tremendously dependent on their partners. Without entrepreneurs who conceptualise visionary businesses, experienced lawyers able to negotiate agreements, skilled marketing gurus and engineers, and customers who are willing to take a chance on a young firm, success is unlikely. The evidence shows that the environment that UK start-ups faced was a major contributor to the UK historical gap in VC returns. While there are encouraging signs that the UK is becoming a better place for entrepreneurial ventures, this cannot be taken for granted. Efforts to improve the conditions faced by those young innovative companies that could become the giants of tomorrow should be stepped up.

- *Resist the temptation to overengineer public support schemes.* In many instances, government requirements that limit the flexibility of entrepreneurs and venture investors have been detrimental. It is tempting to add restrictions on several dimensions: for instance, the locations in which the firms can operate, the type of securities venture investors can use, and the evolution of the firms (e.g. restrictions on acquisitions or secondary sales of stock). These types of restrictions have been present in a number of past UK public programs, and probably can help explain their large historical underperformance. More recent programs appear to have mostly overcome the temptation to micromanage the entrepreneurial and venture capital process, but pressures to do so in the future should be resisted.

- *Avoid initiatives that are too small.* Policymakers must be sure that their venture initiatives have critical mass. Too small a program will do little to improve the environment for pioneering entrepreneurs and venture funds. It is also likely to lead to poor financial returns (i.e. small funds tend to underperform), which may create a backlash that impedes future efforts. Too often, UK efforts have led to the creation of undercapitalised funds which do not have the staying power to back their companies through development.

Over the coming months NESTA will continue its work to develop further evidence on what measures policy makers can take to improve the environment for UK high-growth companies.

Appendix 1: Data sources and definitions

Table A1: Data sources and definitions

Variable	Details	Source	*Additional Info
Fund size	The inflation-adjusted size of the fund in 2010 USD (millions).	NESTA calculation using Thomson, Preqin and desk research*	See data notes
Size quartiles	The size quartiles are dummy variables equal to one if the size of the fund lies within a given quartile in the distribution. The smallest quartile is omitted as a reference in the regression and the others are interpreted relative to this one.	NESTA calculation using Thomson, Preqin and desk research*	See data notes
Number of investments made by the fund	The number of investments made by the fund during its lifetime.	NESTA calculation using Thomson data	
Number of companies invested in by the fund	The number of companies receiving investment from the fund.	NESTA calculation using Thomson data	
Number of rounds per company	The average number of investments made by a fund into its portfolio companies.	NESTA calculation using Thomson data	
Share of companies receiving multiple investments	The number of portfolio companies of a fund that receive more than one investment as a proportion of all portfolio companies.	NESTA calculation using Thomson data	
First investment round number	The average round at which a fund makes its first investment into a portfolio company.	NESTA calculation using Thomson data	
Average size of investment per round	The average amount invested by the fund in the portfolio company on a given round in 2010 USD (millions).	NESTA calculation using Thomson data	
Average size of investment at first investment	The average amount invested by the fund in their first investment into a portfolio company in 2010 USD (millions).	NESTA calculation using Thomson data	
Average size of investment per company	The average amount invested in each portfolio company. in 2010 USD (millions).	NESTA calculation using Thomson data	
Net IRR	The net IRR earned by an LP to date after fees and carry. The internal rate of return is based upon the realized cash flows and the valuation of the remaining interest in the partnership. IRR is an estimated figure, given that it relies upon not only cash flows but also the valuation of unrealized assets.	Preqin*	Additional Net IRR data is derived from imputation primarily based on the Multiple value the fund reported
Multiples	The ratio between the total value that the LP has derived from its cash and securities plus the value of the LP's remaining interest in the partnership – and its total cash interest in the partnership – i.e. distributed investment in the partnership, expressed as a multiple.	Preqin*	Additional Net IRR data is derived from imputation primarily based on the Net IRR value the fund reported
Share of IPO exits	The number of companies that received investment from a given fund and exited through an IPO as a fraction of all companies receiving investment from the fund.	NESTA calculation using Thomson data	
Share of M&A exits	The number of companies that received investment from a given fund and exited through a merger of acquisition as a fraction of all companies receiving investment from the fund.	NESTA calculation using Thomson data	
Average number of syndication partners	The average number of funds that invest in a deal that the fund is involved in.	Thomson	

Variable	Details	Source	*Additional Info
Experience of GP relative to the market at fund vintage	The difference between the log of the number of investments made by a fund manager prior to the fund vintage year and the average of the number of investments made by all organisations prior to that year.	NESTA calculation using Thomson data	
Sequence number of the fund	The sequence number of a fund within the fund manager.	NESTA calculation using Thomson data	
Industry specialisation index	Index created by calculating the sum of the squared proportions of the number of investments made by a fund into each of the nine industry groupings.	NESTA calculation using Thomson data	
Hub Dummy	Dummy variable equal to one if the fund is located in a hub (Silicon Valley, New York, Massachusetts, London).	NESTA calculation using Thomson data	
Year FE	Dummy variable equal to one if the fund's vintage year was the year in question.	Thomson, Preqin and desk research*	See data notes
Number of partners of GP at fund vintage year	The number of partners reported by the GP in the year the fund was raised (or the previous or subsequent year).	EVCA, VCR, Pratt's guide and Galante.	
Number of offices of GP at fund vintage year	The number of offices reported by the GP in the year the fund was raised (or the previous or subsequent year).	EVCA, VCR, Pratt's guide and Galante.	
Proportion of capital invested into each region	The proportion of capital invested by the fund that went to companies located in a given region.	NESTA calculation using Thomson data	
Stage Controls	Dummy variables equal to 1 if the fund's investment focus is in the particular stage.	Preqin, Thomson, EVCA and desk research*	See data notes
Proportion of capital invested into each industry	The proportion of capital invested by the fund that went to companies operating in a given industry.	NESTA calculation using Thomson data	
UK-Based Fund	Dummy variable equal to 1 if the fund's GP is located in the UK.	Preqin and Thomson*	Preqin for the fund's reporting performance data, Thomson for the others

Fund characteristics: Preqin provides information on fund characteristics such as fund size, type, location and focus. In order to provide more accurate information on fund characteristics (including management characteristics) we captured individual investment deals made by each fund. We used three different databases to do so. Thomson One Reuters was our primary source of individual investment deals data. Thomson One captures investments deals for over 14,000 US, UK or European private equity funds. Investments deals for the funds we have performance records for were captured using the Thomson One database. This was supplemented with data acquired from VentureSource Dow Jones (when funds were not included in Thomson One database). These two databases (fund returns and fund individual investment outcomes) were merged and any discrepancies between the two were reconciled. These related to a minority of cases where the sources reported a different vintage year, size or stage focus for a fund. To find the true values we consulted other sources or contacted the fund managers themselves.

Fund type: Our study sample contains funds that are classified by Preqin as seed-stage, early-stage, early-stage: seed, early-stage: start-up, venture (general), expansion, development, later-stage, balanced and mezzanine.[122] We aggregate these into five new categories: i) 'early-stage' which includes all seed-stage, early-stage, early-stage: seed and early-stage: start-up funds; ii) 'generalist' which includes all venture (general); iii) 'expansion' which includes all expansion, development and later-stage funds; iv) 'balanced' funds; and v) 'mezzanine' funds. Again with this variable, some discrepancies appeared between what our two main sources were reporting. We again endeavoured to attain more information on what the correct stage focus for each fund is by checking other external sources such as industry experts, as well as contacting the funds themselves through phone calls or emails. Using the combination of the information received from these sources and our knowledge of what investments the fund made, we are confident we have a variable that accurately reflects the investment focus of the funds in the sample.

Fund size and vintage year: Two main sources were used to locate data on the size of (amount of capital raised by) the VC funds. These sources were Thomson Reuters and Preqin. Discrepancies occasionally appeared between the sizes reported by the two sources so the following actions were taken to reconcile the figures.

- If the difference between the fund sizes was less than 5 per cent of the larger estimate, using the home currency the amount was reported in from Preqin, we use the value in US dollars from Thomson.

- If the difference between the fund sizes was greater than 5 per cent using the same criteria, we search for a third source, e.g. VentureSource, fund website, to confirm the value given by one of the main sources. The criteria for confirming a fund size using a third source is, again, a difference of less than 5 per cent of the larger estimate in the reported currency.

- On the rare occasion where two or more sources confirm a size not within 5 per cent of the size reported in Thomson or Preqin, this confirmed size is used.

- Where the size in the reported currency being used comes from a source other than Thomson, the Thomson exchange rate corresponding to that fund is used to convert the size into US dollars. This is only necessary when the reported currency isn't already US dollars and is due to the investment sizes corresponding to these funds coming from Thomson and using the same rates. If the Thomson exchange rate for the fund is unavailable, the Preqin rate is used.

- In instances where the fund size is reported by only one of Preqin and Thomson, this size is used.

- All amounts are converted to 2010 US dollars (and so they are adjusted for inflation).

- Funds with assets under management less than $1 million have been excluded from the analysis (due to inconsistencies in the data).

Similarly discrepancies were found relating to the vintage years reported by the two main sources. These were reconciled as follows:

- If a difference of only one year was found between the sources, the year from Thomson is used. If a difference of more than one year is found, a third source is found to confirm either of the vintage years reported by Thomson or Preqin.

Partners and office data: We use information from three directories: Pratt's guide to Private

122. Preqin defines investments stages as follows:
    - *Balanced*. Private equity funds that invest in companies at all stages of development from early-stage to buy-out.
    - *Early Stage*. Type of venture fund that invests only in the early stage of a company life. There are two main categories of early-stage funds: start-up and seed investments
    - *Expansion*. (Also known as 'development' or 'growth capital') Funds aiming to grow and expand an established company. For example: to finance increased production capacity, product development, marketing and to provide additional working capital.
    - *Mezzanine*. Mezzanine debts are debts that incorporate equity-based options, such as warrants, with a lower-priority debt. Mezzanine is often used to finance acquisitions and buyouts.
    - *Venture (General)*. Venture capital is a type of private equity investment that provides capital to new or growing businesses. Venture funds invest in start-up firms and small businesses with perceived, long-term growth potential

Equity and Venture Capital sources, Galante's Venture Capital & Private Equity Directory and information from the Magdalen Centre at the Oxford Science Park, and from the European Venture Capital Association, in order to collect data on GP partners and offices. Our intention was to analyse the effect of partners/offices for the period in which the fund was active. The difficulty this presented was obtaining historic data on the number of partners and offices the GP had on the fund's vintage year (since accessing not current data was not enough).

Performance data: The two most commonly used performance metrics are fund multiple, which measures the total distribution relative to the total takedown, and the internal rate of return (IRR), which takes into account the time value of money (McKenzie and Janeway 2008,[123] for a critique see Phalippou 2009[124]). The most commonly used source of VC fund performance data in the literature is Reuters Thomson One. The principal shortcomings of these two databases have been outlined by Ljungqvist and Richardson (2003):[125] (i) the performance data is largely provided by VC firms on a voluntary basis and thus potentially subject to selection biases; and, (ii) the data is based on unrealised as well as realised investments, which introduces noise and potentially biases due to subjective accounting treatment.

The multiple reports the return received by the fund's LPs compared to the amount of capital they committed to the fund. A weakness of this measure is that it does not take account of the time value of money, i.e. it does not account for the length of time it took for the fund to deliver the return to the LPs. Net IRR overcomes this by using discounted cash flow data to take account of both the return the LP receives and how long it took to be realised therefore making it a more accurate measure. Net IRRs are reported net of fees and carried interest and include returns from dividends.

The analysis of performance records represented an empirical challenge. Several funds report either Net IRR or Multiples (but not both) and in order to conduct a meaningful analysis the missing value (Net IRR or Multiple) was imputed using a regression analysis with the reported value (Net IRR or Multiple) and controls for industry, country and vintage year. The resulting measures of returns are winsorized at the 1 per cent level to reduce the impact of outliers on the estimation.

The primary source of VC fund performance data was the Private Equity Intelligence database (Preqin). Preqin contains performance data for over 4,000 private equity funds based in the US, UK or continental Europe, from which over 1,000 are operating in the VC market. Their performance records are attained either directly from the LP and/or GP of the fund or calculated internally by Preqin based upon cash flows and valuations, provided for individual partnerships. We supplemented this with performance records from other commercial databases such as LP Source Dow Jones, EurekaHedge, Pitchbooks and desk research.

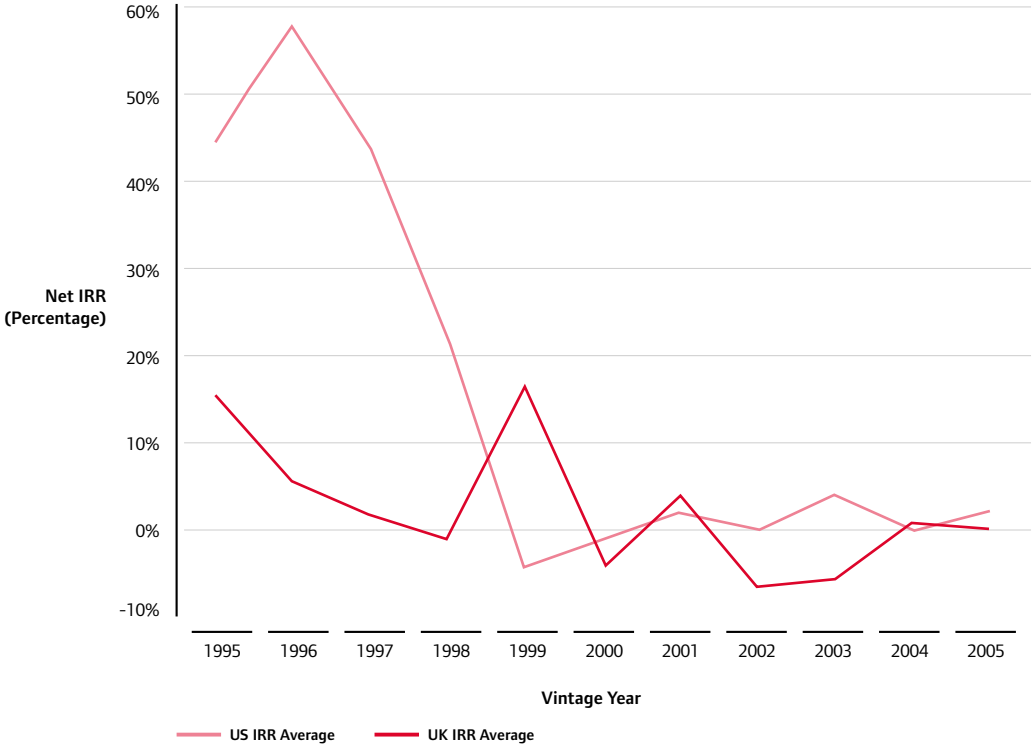
LP Source is a newly established (by Dow Jones) research tool that provides data on active fund managers, their investments strategies and preferred industries. Although the dataset is mainly focused on the US market, a tailored dataset with performance data for UK funds was made available to the researchers. EurekaHedge provides information on the global alternative fund industry and contains over 20,000 funds across all assets class. Its European Private Equity Database provided us with a number of VC fund performance records that were not available in the other databases used.

Performance records for quoted funds (i.e. VCTs) were acquired by the Tax Shelter report published by the Allenbridge Group plc, an independent UK tax efficient investment consultancy.[126] Venture Capital Trusts (VCTs) are companies listed on the London Stock Exchange, and are similar to investment trusts. They are run by fund managers who are usually members of larger investment groups. They invest in a range of small higher-risk companies whose shares and securities are not listed on a recognised stock exchange, by investing through VCTs. However, companies whose shares etc. are dealt in solely on the Alternative Investment Market (AIM) of the London Stock Exchange or on two of the Plus Markets are regarded as unquoted companies.[127]

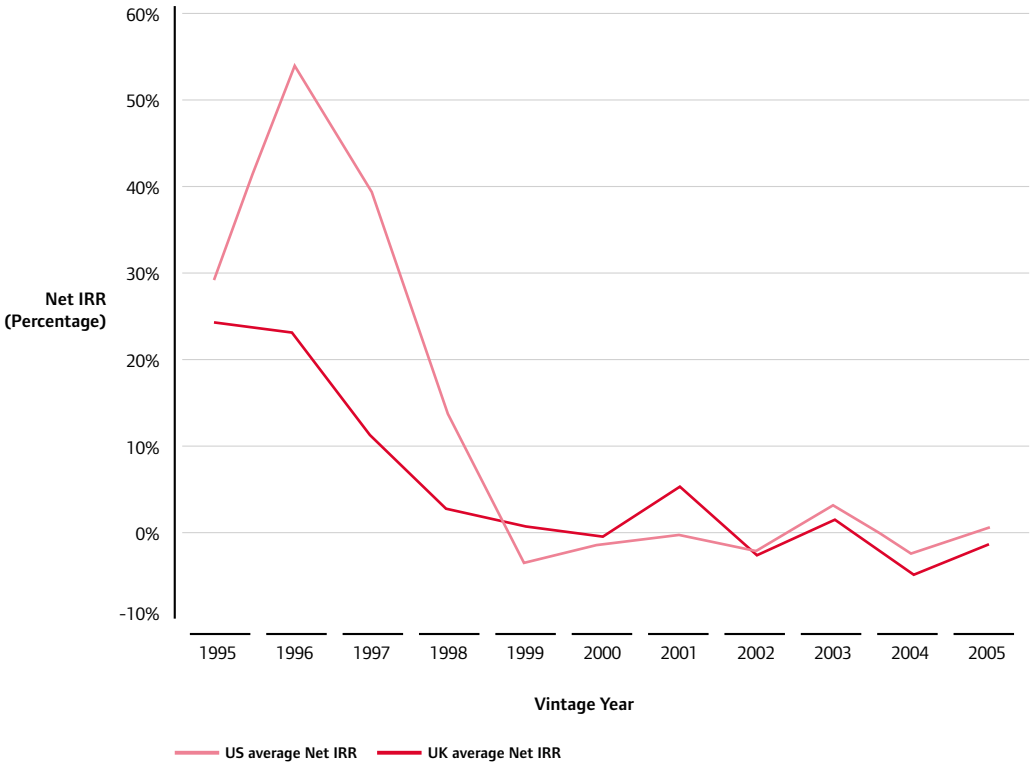
123. McKenzie, M., Janeway, W. (2008) 'Venture Capital Fund Performance and the IPO Market.' CFAP Working Paper No.30.
124. Phalippou, L. (2009), The Hazards of Using IRR to Measure Performance: The Case of Private Equity. 'CFA Digest.' May 2009, Vol. 39, No. 2.
125. Ljungqvist, A., Richardson, M., and Wolfenzon, D, (2005) 'The investment behaviour of private equity fund managers.' Working paper, New York University.
126. Allenbridge Group plc, http://www.taxshelterreport.co.uk/vct_performance.htm, accessed on XX/06/2010
127. HM Revenue & Customs: http://www.hmrc.gov.uk/guidance/vct.htm , accessed on 20/08/2010

Figure A1: Venture capital returns over time by data source in the UK and the US

(A) Thomson



(B) NESTA database



Appendix 2: Tables

Table A2: Summary statistics – All funds (UK, US and continental Europe)

	1990-2005						2006-2009						1990-2005			2006-2009		
	UK		US		CE		UK		US		CE		Test of means			Test of means		
	n	mean	n	mean	n	mean	n	mean	n	mean	n	mean	UK-US	UK-CE	CE-US	UK-US	UK-CE	CE-U
Fund size	401	142.2	2835	163.3	825	78.2	138	148.4	1156	171.1	402	93.4		+++	---		+++	---
Number of investments made by the fund	401	16.99	2835	31.87	825	14.8	138	8.66	1156	15.38	402	9.2	---		---	---		---
Number of companies invested in by the fund	401	11.50	2835	15.88	825	10.48	138	5.94	1156	8.48	402	6.74	---		---	---		---
Average number of rounds per company	401	1.28	2835	1.75	825	1.31	138	1.30	1156	1.60	402	1.25	---		---	---		---
Share of companies receiving multiple investments	401	0.18	2835	0.38	825	0.22	138	0.21	1156	0.34	402	0.17	---	---	---	---		---
First investment round number	401	1.70	2835	2.57	825	1.74	138	1.78	1156	2.61	402	2.03	---		---	---	-	---
Average size of investment per round	401	3.79	2835	2.98	825	2.22	138	4.93	1156	3.76	402	3.29	++	+++	---		+	
Average size of investment at first investment	401	3.91	2835	3.36	825	2.31	138	5.03	1156	4.00	402	3.35	+	+++	---		+	
Average size of investment per company	401	4.61	2835	4.71	825	2.86	138	5.93	1156	5.18	402	3.98		+++	---		++	--
Share of IPO exits	401	0.10	2835	0.15	825	0.10	138	0.04	1156	0.05	402	0.05	---		---			
Share of M&A exits	401	0.23	2835	0.35	825	0.18	138	0.07	1156	0.14	402	0.08	---	+++	---	---		---
Average number of syndication partners	119	2.92	672	4.14	98	3.05	17	2.93	158	3.53	36	2.04	---		---		+	---
Experience of GP relative to the market at fund vintage	401	-2.24	2835	-1.51	825	-2.62	138	-2.24	1156	-1.37	402	-1.97	---	+++	---	---		---
Sequence number of fund	401	3.07	2835	2.13	825	1.02	138	2.91	1156	3.08	402	2.66	+++	+++	---			-
Industry specialisation index	401	0.47	2835	0.55	825	0.50	138	0.58	1156	0.65	402	0.56	---	--	---	---		---
Hubs (1 if fund located in a hub)	401	0.68	2835	0.46	825	0.00	138	0.63	1156	0.48	402	0.00	+++	+++	---	+++	+++	---
Vintage year	401	2000	2835	1999	825	2001	138	2007	1156	2008	402	2007	+++	---	+++			
Number of partners of GP at fund vintage	30	4.93	350	5.13	43	4.51	8	4.25	98	5.61	25	4.76			-	-		
Number of offices of GP at fund vintage	11	10.00	415	1.81	9	2.00	8	2.00	139	2.42	11	3.00	+++	+++			-	
Proportion of capital invested into:																		
UK companies	401	0.63	2834	0.01	824	0.04	138	0.60	1156	0.01	402	0.03	+++	+++	+++	+++	+++	+++
US companies	401	0.16	2834	0.93	824	0.11	138	0.12	1156	0.91	402	0.09	---	++	---	---		---
CE companies	401	0.14	2834	0.02	824	0.82	138	0.15	1156	0.02	402	0.84	+++	---	+++	+++	---	+++
Other companies	401	0.08	2834	0.04	824	0.03	138	0.13	1156	0.06	402	0.04	+++	+++	-	++	+++	--
Fund Stage focus:																		
Early-stage	401	0.43	2835	0.43	825	0.53	138	0.41	1156	0.52	402	0.53		---	+++	--	--	
Expansion	401	0.15	2835	0.16	825	0.13	138	0.09	1156	0.10	402	0.11			--			
Mezzanine	401	0.02	2835	0.05	825	0.02	138	0.05	1156	0.05	402	0.01	---		---		+	---
Generalist	401	0.17	2835	0.14	825	0.09	138	0.09	1156	0.10	402	0.09		+++	---			
Balanced	401	0.22	2835	0.22	825	0.22	138	0.36	1156	0.23	402	0.26				+++	++	
Proportion of capital invested in:																		
Internet and computer	401	0.30	2834	0.41	824	0.34	138	0.27	1156	0.37	402	0.26	---	-	---	---		---
Communications and electronics	401	0.16	2834	0.20	824	0.17	138	0.13	1156	0.16	402	0.16	---		---			
Business/Industrial	401	0.06	2834	0.03	824	0.07	138	0.05	1156	0.03	402	0.06	+++		+++	++		+++
Consumer	401	0.10	2834	0.07	824	0.09	138	0.09	1156	0.05	402	0.08	+++		++	++		++
Energy	401	0.03	2834	0.02	824	0.03	138	0.11	1156	0.04	402	0.06	+		++	+++	++	
Biotech/Healthcare	401	0.19	2834	0.20	824	0.19	138	0.21	1156	0.27	402	0.27				-		
Financial services	401	0.03	2834	0.02	824	0.03	138	0.04	1156	0.02	402	0.03						
Business services	401	0.05	2834	0.02	824	0.03	138	0.03	1156	0.02	402	0.03	+++	++	+++			
Other industries	401	0.06	2834	0.03	824	0.06	138	0.06	1156	0.03	402	0.06	+++		+++			+++

Note: The last six columns report whether there are significant statistical differences in the means across countries (positive or negative). +,++,+++ (-,--,---) indicate significance at the 10 per cent, 5 per cent and 1 per cent level respectively.

Table A3: Summary statistics – Performance funds 1990-2005 (UK and US)

	UK						US						Test of means	Test: Perf vs. Non-Perf	
	n	mean	sd	min	median	max	n	mean	sd	min	median	max	UK-US	UK	US
Fund size	119	246.1	590.6	3.9	75.4	4769	672	309.2	332.1	5.6	204.3	2946		+++	+++
Number of investments made by the fund	119	25.13	28.01	1.0	16.00	140.0	672	52.4	45.14	1.00	41.00	295.0	---	+++	+++
Number of companies invested in by the fund	119	15.59	13.46	1.00	13.00	68.0	672	22.41	15.68	1.00	19.50	123.0	---	+++	+++
Average number of rounds per company	119	1.40	0.62	1.00	1.20	6.36	672	2.14	0.76	1.00	2.05	5.26	---	+++	+++
Share of companies receiving multiple investments	119	0.23	0.21	0.00	0.19	0.91	672	0.52	0.24	0.00	0.55	1.00	---	+++	+++
First investment round number	119	1.72	0.75	1.00	1.46	5.00	672	2.40	0.97	1.00	2.27	12.50	---		---
Average size of investment per round	119	4.58	5.78	0.23	2.31	32.14	672	3.91	5.13	0.13	2.79	84.27		+	+++
Average size of investment at first investment	119	4.88	6.06	0.22	2.31	32.14	672	4.76	5.93	0.16	3.39	84.27		++	+++
Average size of investment per company	119	5.90	6.53	0.29	3.17	32.14	672	7.38	6.98	0.18	5.72	84.27	--	++	+++
Net IRR	119	3.23	16.01	-21.80	0.80	76.00	672	9.91	31.85	-31.10	2.00	165.00	---	.	.
Multiples	119	1.21	0.81	0.12	1.05	5.35	672	1.59	1.70	0.12	1.08	9.84	---	.	.
Share of IPO exits	119	0.12	0.14	0.00	0.07	0.67	672	0.12	0.13	0.00	0.09	1.00			---
Share of M&A exits	119	0.23	0.20	0.00	0.23	1.00	672	0.32	0.18	0.00	0.32	1.00	---		---
Average number of syndication partners	119	2.92	1.37	1.00	2.75	6.68	672	4.14	1.53	1.00	4.06	12.63	---	.	.
Experience of GP relative to the market at fund vintage	119	-2.09	2.25	-4.63	-2.55	2.87	672	-1.18	2.28	-4.83	-0.80	3.52	---		+++
Sequence number of fund	119	4.15	7.53	0.00	1.00	37.00	672	2.90	3.39	0.00	2.00	25.00	+	++	+++
Industry specialisation index	119	0.41	0.26	0.08	0.33	1.00	672	0.51	0.24	0.09	0.45	1.00	---	---	---
Hubs (1 if fund located in a hub)	119	0.72	0.45	0.00	1.00	1.00	672	0.52	0.50	0.00	1.00	1.00	+++		+++
Vintage year	119	1999	3.65	1990	1999	2005	672	1999	3.78	1990	1999	2005		---	---
Number of partners of GP at fund vintage	30	4.93	1.39	2.00	5.50	6.00	350	5.13	3.17	1.00	4.00	20.00		.	.
Number of offices of GP at fund vintage	11	10.00	5.67	1.00	11.00	15.00	415	1.81	1.76	1.00	1.00	22.00	+++	.	.
Proportion of capital invested into:															
UK companies	119	0.66	0.38	0.00	0.84	1.00	672	0.01	0.04	0.00	0.00	0.49	+++		
US companies	119	0.11	0.22	0.00	0.00	1.00	672	0.94	0.16	0.00	1.00	1.00	---	--	
CE companies	119	0.15	0.27	0.00	0.00	1.00	672	0.02	0.09	0.00	0.00	1.00	+++		
Other companies	119	0.07	0.23	0.00	0.00	1.00	672	0.03	0.12	0.00	0.00	1.00			-
Fund Stage focus:															
Early-stage	119	0.32	0.47	0.00	0.00	1.00	672	0.27	0.44	0.00	0.00	1.00		---	---
Expansion	119	0.15	0.36	0.00	0.00	1.00	672	0.09	0.29	0.00	0.00	1.00	+		---
Mezzanine	119	0.03	0.16	0.00	0.00	1.00	672	0.08	0.27	0.00	0.00	1.00	---		+++
Generalist	119	0.35	0.48	0.00	0.00	1.00	672	0.52	0.50	0.00	1.00	1.00	---	+++	+++
Balanced	119	0.15	0.36	0.00	0.00	1.00	672	0.04	0.19	0.00	0.00	1.00	+++	--	---
Proportion of capital invested in:															
Internet and computer	119	0.26	0.27	0.00	0.21	1.00	672	0.39	0.28	0.00	0.38	1.00	---	-	---
Communications and electronics	119	0.17	0.21	0.00	0.09	1.00	672	0.19	0.18	0.00	0.15	1.00			--
Business/Industrial	119	0.07	0.13	0.00	0.00	0.57	672	0.03	0.10	0.00	0.00	1.00	+++		
Consumer	119	0.12	0.18	0.00	0.01	0.88	672	0.07	0.16	0.00	0.00	1.00	+++		
Energy	119	0.04	0.13	0.00	0.00	1.00	672	0.02	0.08	0.00	0.00	1.00			
Biotech/Healthcare	119	0.20	0.27	0.00	0.11	1.00	672	0.24	0.32	0.00	0.09	1.00			+++
Financial services	119	0.02	0.06	0.00	0.00	0.44	672	0.02	0.06	0.00	0.00	0.51		-	
Business services	119	0.07	0.14	0.00	0.00	1.00	672	0.02	0.07	0.00	0.00	1.00	+++		
Other industries	119	0.05	0.12	0.00	0.00	0.62	672	0.02	0.07	0.00	0.00	0.57	+++		

Note: The last three columns report whether there are significant statistical differences in the means across countries and samples (positive or negative). +,++,+++ (-,--,---) indicate significance at the 10 per cent, 5 per cent and 1 per cent level respectively. Perf and Non-Perf refer to the sample of firms for which performance data is available and unavailable respectively. A dot indicates missing data in the non-performance sample.

Table A4: Summary statistics – Public vs. Private funds (Performance funds 1990-2005 in the UK and US)

	UK				US				Test of means			
	Public		Private		Public		Private		UK-US		Public-Private	
	n	mean	n	mean	n	mean	n	mean	Public	Private	UK	US
Fund size	50	64.81	69	377.4	42	182.0	630	317.6	---		---	---
Number of investments made by the fund	50	23.04	69	26.64	42	47.0	630	52.74	---	---		
Number of companies invested in by the fund	50	16.12	69	15.20	42	19.90	630	22.58		---		
Average number of rounds per company	50	1.33	69	1.45	42	2.14	630	2.14	---	---		
Share of companies receiving multiple investments	50	0.21	69	0.24	42	0.50	630	0.52	---	---		
First investment round number	50	1.59	69	1.81	42	2.37	630	2.40	---	---		
Average size of investment per round	50	1.61	69	6.73	42	2.53	630	4.00	--	+++	---	---
Average size of investment at first investment	50	1.68	69	7.20	42	3.09	630	4.88	---	+++	---	---
Average size of investment per company	50	2.16	69	8.60	42	4.81	630	7.55	---		---	---
Net IRR	50	-2.02	69	7.04	42	4.13	630	10.29	-		---	-
Multiples	50	0.99	69	1.37	42	1.29	630	1.61	-	-	---	-
Share of IPO exits	50	0.10	69	0.13	42	0.06	630	0.13	+			---
Share of M&A exits	50	0.18	69	0.27	42	0.26	630	0.32	--	-	--	-
Average number of syndication partners	50	2.80	69	3.01	42	3.55	630	4.18	--	---		--
Experience of GP relative to the market at fund vintage	50	-2.51	69	-1.78	42	-2.47	630	-1.09		--	-	---
Sequence number of fund	50	1.90	69	5.78	42	1.12	630	3.02	+	++	---	---
Industry specialisation index	50	0.37	69	0.44	42	0.47	630	0.51	--	--		
Hubs (1 if fund located in a hub)	50	0.54	69	0.86	42	0.31	630	0.53	++	+++	---	---
Vintage year	50	2000	69	1997	42	2000	630	1999		---	+++	+++
Number of partners of GP at fund vintage	6	5.67	24	4.75	12	3.50	338	5.19	++		++	-
Number of offices of GP at fund vintage	2	1.00	9	12.00	23	1.35	392	1.84	--	+++	---	--
Proportion of capital invested into:												
UK companies	50	0.91	69	0.48	42	0.00	630	0.01	+++	+++	+++	---
US companies	50	0.05	69	0.16	42	0.99	630	0.94	---	---	---	+++
CE companies	50	0.03	69	0.24	42	0.01	630	0.02	+	+++	---	--
Other companies	50	0.00	69	0.11	42	0.00	630	0.04		++	---	---
Fund Stage focus:												
Early-stage	50	0.44	69	0.23	42	0.19	630	0.27	+++		++	
Expansion	50	0.26	69	0.07	42	0.07	630	0.09	++		+++	
Mezzanine	50	0.00	69	0.04	42	0.17	630	0.07	---		-	
Generalist	50	0.16	69	0.49	42	0.55	630	0.52	---		---	
Balanced	50	0.14	69	0.16	42	0.02	630	0.04	++	+++		
Proportion of capital invested in:												
Internet and computer	50	0.27	69	0.25	42	0.36	630	0.39		---		
Communications and electronics	50	0.15	69	0.19	42	0.16	630	0.19				
Business/Industrial	50	0.06	69	0.09	42	0.09	630	0.03		+++		++
Consumer	50	0.11	69	0.12	42	0.06	630	0.07		++		
Energy	50	0.06	69	0.02	42	0.01	630	0.02	++			--
Biotech/Healthcare	50	0.22	69	0.18	42	0.23	630	0.24				
Financial services	50	0.01	69	0.03	42	0.03	630	0.02	--		-	
Business services	50	0.07	69	0.06	42	0.04	630	0.02		++		
Other industries	50	0.05	69	0.06	42	0.03	630	0.02		++		

Note: The last four columns report whether there are significant statistical differences in the means between public and private funds in the UK and the US (positive or negative). +,++,+++ (-,--,---) indicate significance at the 10 per cent, 5 per cent and 1 per cent level respectively.

Table A5: UK-US performance gap over time (with and without controls)

	Net IRR											Multiple										
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
UK-based fund	-6.676**	-7.439***										-0.371**	-0.399***									
	(3.120)	(2.743)										(0.147)	(0.132)									
UK-based fund raised 1990-1993			-17.543***	-15.886***	-16.851***	-15.846**	-14.334**	-15.618**	-19.326***	-11.161**	-24.299**			-1.214***	-1.106***	-1.159***	-1.051**	-0.980**	-1.067**	-1.220***	-0.842**	-1.912*
			(6.417)	(5.833)	(5.783)	(6.846)	(6.600)	(6.839)	(6.564)	(5.246)	(11.755)			(0.420)	(0.379)	(0.378)	(0.416)	(0.400)	(0.418)	(0.412)	(0.338)	(1.034)
UK-based fund raised 1994-1997			-24.685***	-23.096***	-23.481***	-21.419***	-21.344***	-20.770***	-23.220***	-16.845**	-14.878			-1.210***	-1.111***	-1.144***	-1.076***	-1.075***	-1.043***	-1.143***	-0.843***	-0.443
			(8.505)	(8.170)	(8.066)	(8.125)	(7.589)	(7.527)	(7.547)	(6.868)	(11.629)			(0.391)	(0.372)	(0.371)	(0.362)	(0.339)	(0.338)	(0.343)	(0.306)	(0.664)
UK-based fund raised 1998-2001			-0.085	2.330	2.670	3.597	4.561*	4.753*	1.995	1.901	10.166*			-0.037	0.095	0.108	0.134	0.197	0.210	0.096	0.059	0.442
			(2.032)	(2.194)	(2.265)	(2.514)	(2.413)	(2.700)	(2.765)	(2.820)	(5.297)			(0.093)	(0.104)	(0.113)	(0.130)	(0.132)	(0.149)	(0.153)	(0.155)	(0.303)
UK-based fund raised 2002-2005			-2.329	-0.137	0.094	2.269	0.886	1.945	-0.961	-0.964	5.663			-0.022	0.108	0.096	0.189	0.119	0.180	0.061	0.028	0.326
			(1.897)	(2.280)	(2.472)	(2.745)	(2.885)	(3.271)	(3.563)	(3.778)	(5.453)			(0.068)	(0.098)	(0.108)	(0.130)	(0.142)	(0.160)	(0.174)	(0.179)	(0.295)
Fund size $85m-$191m				6.220**	6.507**	6.276**	4.501	3.858	2.417	1.970	2.632				0.453***	0.486***	0.468***	0.377**	0.351**	0.291*	0.256	0.435
				(3.008)	(3.092)	(3.091)	(3.042)	(2.916)	(2.879)	(2.889)	(5.879)				(0.171)	(0.177)	(0.175)	(0.168)	(0.164)	(0.161)	(0.160)	(0.350)
Fund size $191m-$365m				7.642**	7.990**	7.587**	3.716	2.974	0.402	1.012	0.931				0.478***	0.524***	0.500***	0.303*	0.287*	0.181	0.189	0.189
				(3.405)	(3.467)	(3.396)	(2.968)	(3.065)	(3.113)	(3.039)	(6.392)				(0.184)	(0.191)	(0.187)	(0.161)	(0.165)	(0.164)	(0.161)	(0.338)
Fund size >$365m				6.362**	6.940**	6.529**	0.485	-0.812	-4.198	-2.052	-2.051				0.289**	0.364***	0.323**	0.013	-0.010	-0.149	-0.072	-0.088
				(2.701)	(2.878)	(2.938)	(2.746)	(2.975)	(3.241)	(3.004)	(5.510)				(0.124)	(0.139)	(0.142)	(0.139)	(0.142)	(0.149)	(0.143)	(0.283)
Industry specialisation index							4.897	5.046	3.861	4.850	8.471							0.355	0.325	0.276	0.316	0.546
							(5.021)	(4.905)	(4.735)	(4.928)	(10.188)							(0.270)	(0.257)	(0.247)	(0.259)	(0.547)
Experience of GP relative to the market at fund vintage							2.078***	1.964***	1.940***	1.454**	4.347***							0.110***	0.106***	0.105***	0.079**	0.180***
							(0.591)	(0.622)	(0.601)	(0.592)	(1.206)							(0.032)	(0.034)	(0.033)	(0.032)	(0.066)
Number of companies invested in								0.042	0.058	0.036	0.008								-0.000	0.001	-0.000	0.006
								(0.094)	(0.093)	(0.089)	(0.131)								(0.005)	(0.005)	(0.005)	(0.007)
Average amount of first investment made								0.030	0.009	-0.163	0.171								0.001	-0.000	-0.009	0.020
								(0.119)	(0.122)	(0.145)	(0.278)								(0.005)	(0.005)	(0.006)	(0.012)
Average round of first investment into a company								-2.407**	-2.401**	-3.308***	-0.100								-0.128**	-0.127**	-0.171***	0.028
								(1.117)	(1.071)	(1.168)	(1.894)								(0.057)	(0.055)	(0.055)	(0.096)
Average number of syndication partners								1.592	1.321	1.084	2.200								0.092*	0.081*	0.067	0.106
								(0.992)	(0.955)	(0.985)	(1.781)								(0.050)	(0.048)	(0.050)	(0.093)
Hub dummy									7.435***											0.306***		
									(2.214)											(0.117)		
Share of IPO exits										58.226***											3.033***	
										(10.197)											(0.602)	
Share of M&A exits										11.180*											0.480	
										(6.314)											(0.294)	
Excess Net IRR of last fund of GP											0.265**											
											(0.108)											
Excess Multiple of last fund of GP																						0.315**
																						(0.124)
Year FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stage Controls	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Controls	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	791	791	791	791	791	791	791	791	791	791	259	791	791	791	791	791	791	791	791	791	791	264
R-Squared	0.006	0.244	0.259	0.267	0.270	0.286	0.303	0.310	0.322	0.350	0.504	0.007	0.228	0.242	0.255	0.262	0.279	0.296	0.303	0.311	0.342	0.539

Note: Columns 1 and 2 look at how controlling for fund vintage year affects the historic underperformance of UK funds. From column 3 onwards we analyse how the performance changed over time, which allows us to observe the convergence in performance. We then add additional controls to examine how they affect our convergence findings. Size variables refer to quartiles of the size distribution with the bottom quartile omitted as a reference quartile. The regression models in this table have been estimated with ordinary least squares (OLS). The table reports standard errors in parentheses clustered at the fund manager level. *, **, *** indicate statistical significance at the 10 per cent, 5 per cent and 1 per cent level respectively. The right panel reproduces the same regressions but considering multiples instead of net IRR as dependent variable.

Table A6: Investments location and fund performance

	Net IRR				Multiple			
	US Funds 1	UK Funds 2	US Funds 3	UK Funds 4	US Funds 5	UK Funds 6	US Funds 7	UK Funds 8
Fund size $85m-$191m	6.415*	-3.667	6.890*	2.540	0.497**	-0.075	0.544***	0.222
	(3.635)	(4.392)	(3.615)	(3.389)	(0.205)	(0.241)	(0.203)	(0.189)
Fund size $191m-$365m	7.145*	2.248	7.845**	4.398	0.509**	0.124	0.558***	0.190
	(3.839)	(6.174)	(3.762)	(5.295)	(0.212)	(0.313)	(0.209)	(0.291)
Fund size >$365m	5.956*	4.867	6.695**	14.247***	0.320*	0.159	0.377**	0.595***
	(3.418)	(8.240)	(3.373)	(5.323)	(0.167)	(0.365)	(0.164)	(0.203)
Proportion of investments made to UK companies	-24.542**	4.408			-1.627**	0.262		
	(12.409)	(8.231)			(0.704)	(0.394)		
Proportion of investments made to CE companies	2.339	13.104			0.525	0.695*		
	(6.338)	(10.774)			(0.414)	(0.367)		
Proportion of investments made to companies in other regions	11.593	9.707			0.561	0.556		
	(12.057)	(12.372)			(0.676)	(0.549)		
Proportion of investments made to UK companies 90-93			-107.189***	-27.796**			-8.216***	-1.846**
			(35.247)	(11.344)			(3.144)	(0.888)
Proportion of investments made to UK companies 94-97			-288.534***	2.339			-11.758**	0.408
			(110.825)	(22.628)			(4.700)	(1.128)
Proportion of investments made to UK companies 98-01			-17.237	10.381**			-1.062	0.592**
			(13.133)	(4.624)			(0.707)	(0.247)
Proportion of investments made to UK companies 02-05			15.263	8.190			0.911	0.107
			(24.539)	(15.705)			(1.246)	(0.732)
Proportion of investments made to CE companies 90-93			-12.481	-17.269			1.261	-1.398
			(8.993)	(17.310)			(1.966)	(1.233)
Proportion of investments made to CE companies 94-97			-153.849**	54.936			-5.249**	2.952***
			(64.715)	(33.505)			(2.552)	(0.743)
Proportion of investments made to CE companies 98-01			3.619	10.662*			0.152	0.589**
			(8.100)	(6.022)			(0.453)	(0.285)
Proportion of investments made to CE companies 02-05			16.283***	0.109			0.825***	-0.364
			(5.771)	(20.891)			(0.270)	(0.897)
Proportion of investments made to other regions companies 90-93			84.056	-519.444			5.619	11.002
			(76.628)	(472.082)			(8.236)	(27.233)
Proportion of investments made to other regions companies 94-97			-42.088***	94.937***			-2.250***	4.466***
			(11.614)	(23.733)			(0.604)	(0.839)
Proportion of investments made to other regions companies 98-01			26.443**	-1.986			1.498**	0.062
			(11.241)	(6.535)			(0.649)	(0.316)
Proportion of investments made to other regions companies 02-05			15.852**	-12.807			0.453	-0.614
			(7.631)	(14.489)			(0.422)	(0.697)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stage Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	672	119	672	119	672	119	672	119
R-Squared	0.293	0.463	0.312	0.690	0.287	0.457	0.303	0.639

Note: Columns 1 and 2 examine how investing in different regions as opposed to the US affected the performance of both US and UK funds. Columns 3 and 4 look at how this evolved over time. Size variables refer to quartiles of the size distribution with the bottom quartile omitted as a reference quartile. The regression models in this table have been estimated with OLS. The table reports standard errors in parentheses clustered at the fund manager level. *, **, *** indicate statistical significance at the 10 per cent, 5 per cent and 1 per cent level respectively. The right panel reproduces the same regressions but considering multiples instead of net IRR as dependent variable.

Table A7: Distribution of returns (Quantile regression)

	Net IRR					Multiple					Net IRR					Multiple				
	1 95	2 75	3 50	4 25	5 5	6 95	7 75	8 50	9 25	10 5	11 95	12 75	13 50	14 25	15 5	16 95	17 75	18 50	19 25	20 5
UK-based fund raised 1990-1993	-43.300***	-15.100**	-10.100*	-19.500***	-8.554*	-4.820***	-1.250***	-0.509**	-0.910***	-0.200**	-29.737***	-18.413***	-5.808	-15.670**	-0.730	-4.040***	-1.267***	-0.387*	-0.729***	-0.056
	(4.870)	(6.585)	(5.203)	(5.345)	(4.510)	(0.230)	(0.296)	(0.217)	(0.115)	(0.086)	(11.399)	(5.159)	(4.363)	(7.794)	(6.015)	(0.301)	(0.332)	(0.226)	(0.234)	(0.161)
UK-based fund raised 1994-1997	-89.000***	-36.200***	-12.960***	-2.400	9.800	-4.937***	-1.420***	-0.330**	-0.360***	-0.090	-76.951***	-32.907***	-11.581***	-1.457	14.120*	-4.154***	-1.422***	-0.378**	-0.290*	0.224
	(2.995)	(5.806)	(3.746)	(4.030)	(8.319)	(0.596)	(0.225)	(0.161)	(0.101)	(0.085)	(10.455)	(3.828)	(3.105)	(4.823)	(7.711)	(0.324)	(0.250)	(0.175)	(0.155)	(0.218)
UK-based fund raised 1998-2001	-4.100	-0.500	1.330	1.100	5.700	-0.170	0.070	0.059	0.050	0.060	-0.636	-1.112	2.141	3.549	8.510	-0.042	0.008	0.042	0.155	0.066
	(6.249)	(3.689)	(2.516)	(2.636)	(5.868)	(0.384)	(0.149)	(0.109)	(0.064)	(0.111)	(16.169)	(2.651)	(2.271)	(3.793)	(6.960)	(0.335)	(0.177)	(0.117)	(0.119)	(0.178)
UK-based fund raised 2002-2005	-10.000	-4.200	-1.740	-1.553	2.500	-0.110	0.030	-0.030	-0.010	0.120	-4.641	-3.676	0.668	-0.403	-4.890	-0.167	0.024	0.073	0.043	0.095
	(9.142)	(5.854)	(3.844)	(4.176)	(5.024)	(0.273)	(0.221)	(0.167)	(0.096)	(0.196)	(24.605)	(4.125)	(3.260)	(5.364)	(4.408)	(0.303)	(0.244)	(0.172)	(0.157)	(0.255)
Fund size $85m-$191m											5.381	3.037	1.855	2.112	1.488	0.494**	0.086	0.075	0.151**	0.040
											(8.119)	(1.848)	(1.519)	(2.506)	(3.377)	(0.244)	(0.120)	(0.080)	(0.076)	(0.108)
Fund size $191m-$365m											2.123	3.368*	-0.289	0.006	0.832	0.325	0.145	0.017	0.048	0.067
											(8.963)	(2.042)	(1.726)	(2.812)	(4.117)	(0.247)	(0.132)	(0.090)	(0.086)	(0.111)
Fund size >$365m											-3.412	0.305	0.019	2.118	0.829	-0.287	0.021	-0.004	0.107	0.078
											(11.193)	(2.558)	(2.142)	(3.443)	(4.421)	(0.271)	(0.165)	(0.111)	(0.107)	(0.133)
Industry specialisation index											14.329	5.519*	1.114	-2.719	6.464	0.728*	0.147	0.052	-0.048	0.057
											(14.290)	(3.332)	(2.866)	(4.729)	(6.184)	(0.422)	(0.221)	(0.149)	(0.144)	(0.153)
Experience of GP relative to the market at fund vintage											1.286	1.127***	0.675**	0.275	1.519***	0.120**	0.026	0.021	0.006	0.006
											(1.720)	(0.337)	(0.276)	(0.429)	(0.540)	(0.051)	(0.021)	(0.014)	(0.013)	(0.016)
Number of companies invested in											-0.043	-0.080	0.043	0.076	0.191*	-0.004	-0.004	0.000	0.003	0.005*
											(0.294)	(0.056)	(0.045)	(0.076)	(0.102)	(0.007)	(0.004)	(0.002)	(0.002)	(0.003)
Average amount of first investment made											-0.134	0.064	0.075	0.170	0.217	-0.003	0.001	0.002	0.006	-0.001
											(0.362)	(0.101)	(0.083)	(0.111)	(0.134)	(0.010)	(0.006)	(0.004)	(0.004)	(0.006)
Average round of first investment into a company											-1.839	-2.191***	-0.395	0.127	-0.994	-0.142	-0.101**	-0.022	0.001	0.003
											(3.833)	(0.751)	(0.636)	(0.950)	(1.232)	(0.093)	(0.048)	(0.033)	(0.028)	(0.041)
Average number of syndication partners											0.562	-0.145	0.091	0.213	-0.228	0.046	0.016	-0.002	-0.002	-0.002
											(2.901)	(0.543)	(0.428)	(0.698)	(1.129)	(0.076)	(0.035)	(0.022)	(0.021)	(0.035)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stage Controls	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Controls	No	No	No	No	No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791

Note: The regression models discussed in this table have been estimated using quantile regression at different percentiles of the performance distribution (from those funds at the 95th percentile to those at the bottom 5 per cent percentile). The first 5 columns look at these regressions controlling only for the vintage year of the fund, the following 5 columns look at them when controls are added. Size variables refer to quartiles of the size distribution with the bottom quartile omitted as a reference quartile. The table reports standard errors in parentheses clustered at the fund manager level. *, **, *** indicate statistical significance at the 10 per cent, 5 per cent and 1 per cent level respectively. The right panel reproduces the same regressions but considering multiples instead of net IRR as dependent variable.

Table A8: Fund performance drivers across countries and over time

	Net IRR						Multiple					
	1	2	3	4	5	6	7	8	9	10	11	12
Experience of GP relative to the market at fund vintage UK	2.240*		1.839		2.564*		0.078		0.051		0.067	
	(1.177)		(1.166)		(1.370)		(0.058)		(0.053)		(0.106)	
Experience of GP relative to the market at fund vintage US	1.945***		1.377**		4.860***		0.110***		0.082**		0.196**	
	(0.672)		(0.638)		(1.483)		(0.037)		(0.034)		(0.082)	
Average round of first investment into a company UK	-5.883**		-4.146		-0.430		-0.179		-0.110		0.126	
	(2.614)		(2.589)		(3.687)		(0.167)		(0.147)		(0.226)	
Average round of first investment into a company US	-2.109*		-3.449***		0.019		-0.122**		-0.182***		0.031	
	(1.154)		(1.238)		(1.992)		(0.058)		(0.058)		(0.102)	
Experience of GP relative to the market at fund vintage 90-93		4.463***		3.765***		4.595		0.371***		0.320***		0.434*
		(1.107)		(1.099)		(2.987)		(0.087)		(0.087)		(0.241)
Experience of GP relative to the market at fund vintage 94-97		5.651***		3.556**		13.226***		0.272***		0.171**		0.539***
		(1.633)		(1.604)		(2.876)		(0.081)		(0.076)		(0.151)
Experience of GP relative to the market at fund vintage 98-01		-0.143		-0.020		0.211		-0.023		-0.015		-0.027
		(0.539)		(0.502)		(1.215)		(0.030)		(0.028)		(0.066)
Experience of GP relative to the market at fund vintage 02-05		0.193		0.304		0.067		0.003		0.008		-0.054
		(0.538)		(0.542)		(1.294)		(0.021)		(0.021)		(0.076)
Average round of first investment into a company 90-93		-0.654		-2.165		4.764		-0.069		-0.166		0.512
		(1.719)		(1.710)		(5.051)		(0.116)		(0.117)		(0.391)
Average round of first investment into a company 94-97		-2.337		-6.759		-5.404		-0.068		-0.265		-0.085
		(5.141)		(5.169)		(7.213)		(0.238)		(0.233)		(0.351)
Average round of first investment into a company 98-01		-2.706**		-2.184**		-1.038		-0.136**		-0.093*		-0.052
		(1.257)		(1.026)		(2.077)		(0.059)		(0.050)		(0.105)
Average round of first investment into a company 02-05		-1.834*		-1.192		1.151		-0.070		-0.039		0.134
		(1.036)		(1.005)		(1.638)		(0.048)		(0.045)		(0.090)
Share of IPO exits for UK funds			21.255**						1.537**			
			(10.580)						(0.647)			
Share of IPO exits for US funds			68.873***						3.508***			
			(12.095)						(0.728)			
Share of M&A exits for UK funds			-4.200						-0.007			
			(9.693)						(0.517)			
Share of M&A exits for US funds			16.801**						0.641*			
			(7.374)						(0.345)			
Share of IPO exits for funds raised:1990-1993				46.632***						3.027**		
				(17.180)						(1.268)		
Share of IPO exits for funds raised:1994-1997				119.806***						6.056***		
				(25.382)						(1.248)		
Share of IPO exits for funds raised:1998-2001				30.428***						1.266**		
				(8.821)						(0.502)		
Share of IPO exits for funds raised:2002-2005				21.429**						0.973**		
				(10.591)						(0.455)		
Share of M&A exits for funds raised:1990-1993				27.136*						1.668		
				(14.801)						(1.063)		

	Net IRR						Multiple					
	1	2	3	4	5	6	7	8	9	10	11	12
Share of M&A exits for funds raised:1994-1997				62.538***						2.699***		
				(21.278)						(0.984)		
Share of M&A exits for funds raised:1998-2001				-11.038*						-0.735**		
				(6.585)						(0.309)		
Share of M&A exits for funds raised:2002-2005				-12.330						-0.462		
				(8.454)						(0.332)		
Excess Performance of last fund of GP UK					0.195						-0.000	
					(0.172)						(0.163)	
Excess Performance of last fund of GP US					0.262**						0.319**	
					(0.114)						(0.129)	
Excess Performance of last fund of GP 90-93						1.327***						0.615*
						(0.493)						(0.347)
Excess Performance of last fund of GP 94-97						0.463**						0.339*
						(0.179)						(0.195)
Excess Performance of last fund of GP 98-01						0.132						0.202
						(0.100)						(0.160)
Excess Performance of last fund of GP 02-05						0.338						-0.022
						(0.207)						(0.206)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stage Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional Controls^	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	791	791	791	791	259	259	791	791	791	791	264	264
R-Squared	0.311	0.343	0.356	0.412	0.506	0.600	0.304	0.347	0.346	0.408	0.542	0.591

^ Additional controls refer to controls for industry specialisation, number of companies invested in, the average amount of the first investment made and the average number of syndication partners invested alongside.

Note: Columns 1-2 investigate the influence of GP experience and investing early across countries and over time. Columns 3-6 look at exit rates and persistence(excess performance refers to performance in excess of the market benchmark) over time and across countries in the presence of controls for GP experience and the round of investment. Size variables refer to quartiles of the size distribution with the bottom quartile omitted as a reference quartile. The regression models in this table have been estimated with OLS. The table reports standard errors in parentheses clustered at the fund manager level. *, **, *** indicate statistical significance at the 10 per cent, 5 per cent and 1 per cent level respectively. The right panel reproduces the same regressions but considering multiples instead of net IRR as dependent variable.

Table A9: Investor hubs and fund performance

	Net IRR			Multiple		
	1	2	3	4	5	6
Hub dummy for funds raised 1990-1993	9.019			0.359		
	(5.638)			(0.488)		
Hub dummy for funds raised 1994-1997	25.864***			1.225***		
	(7.462)			(0.363)		
Hub dummy for funds raised 1998-2001	1.774			0.052		
	(2.143)			(0.110)		
Hub dummy for funds raised 2002-2005	1.013			-0.060		
	(2.203)			(0.096)		
London funds (relative to rest of UK)		5.731*			0.174	
		(3.327)			(0.174)	
Silicon Valley funds		9.363***			0.409**	
		(3.479)			(0.190)	
New York funds		4.027			0.148	
		(3.142)			(0.147)	
Massachusetts funds		7.540*			0.314	
		(4.142)			(0.221)	
London funds raised 1990-1993			18.509			0.651
			(12.997)			(0.808)
London funds raised 1994-1997			10.647			0.403
			(7.077)			(0.389)
London funds raised 1998-2001			1.935			0.028
			(3.618)			(0.206)
London funds raised 2002-2005			0.990			-0.136
			(4.490)			(0.181)
Silicon Valley funds raised 1990-1993			11.689			0.463
			(10.017)			(0.943)
Silicon Valley funds raised 1994-1997			43.576***			1.994***
			(11.707)			(0.585)
Silicon Valley funds raised 1998-2001			0.622			0.006
			(2.651)			(0.144)
Silicon Valley funds raised 2002-2005			-1.344			-0.129
			(2.465)			(0.104)
New York funds 1990-1993			-15.825*			-1.419**
			(8.726)			(0.599)
New York funds 1994-1997			-3.664			-0.067
			(7.097)			(0.307)
New York funds 1998-2001			4.896*			0.223
			(2.819)			(0.142)
New York funds 2002-2005			11.680***			0.390***
			(4.438)			(0.136)
Massachusetts funds 1990-1993			6.929			0.023
			(6.743)			(0.550)
Massachusetts funds 1994-1997			21.956*			1.138*
			(11.660)			(0.634)
Massachusetts funds 1998-2001			3.957			0.213
			(4.285)			(0.213)
Massachusetts funds 2002-2005			2.223			-0.003
			(2.369)			(0.095)
Base contols included	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Stage Controls	Yes	Yes	Yes	Yes	Yes	Yes
Industry Controls	Yes	Yes	Yes	Yes	Yes	Yes
No. of Observations	791	791	791	791	791	791
R-Squared	0.346	0.325	0.412	0.331	0.312	0.399

^ Additional controls refer to controls for industry specialisation, number of companies invested in, the average amount of the first investment made and the average number of syndication partners invested alongside.

Note: Column 1 looks at the performance over time of funds located in four largest investor hubs (Silicon Valley, New York, Massachusetts and London). Column 2 examines the performance of different individual hubs, the US hub performance relative to US non-hub funds and London relative to UK non-hub funds. Column 3 looks at the performance of the individual hubs over time. Size variables refer to quartiles of the size distribution with the bottom quartile omitted as a reference quartile. The regression models discussed in this table have been estimated with OLS. The table reports standard errors in parentheses clustered at the fund manager level. *, **, *** indicate statistical significance at the 10 per cent, 5 per cent and 1 per cent level respectively. The right panel reproduces the same regressions but considering multiples instead of net IRR as dependent variable.

Table A10: Number of partners/offices and fund performance

	Net IRR								Multiple							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
UK-based fund raised 1994-1997	-1.900	2.678			-0.802	-0.302			-1.900	2.678			-0.802	-0.302		
	(12.639)	(12.477)			(1.693)	(1.605)			(12.639)	(12.477)			(1.693)	(1.605)		
UK-based fund raised 1998-2001	-1.675	3.515	-18.131	-12.689	-0.268	0.071	-0.672	0.598	-1.675	3.515	-18.131	-12.689	-0.268	0.071	-0.672	0.598
	(6.209)	(6.372)	(22.958)	(22.797)	(0.689)	(0.699)	(1.328)	(1.358)	(6.209)	(6.372)	(22.958)	(22.797)	(0.689)	(0.699)	(1.328)	(1.358)
UK-based fund raised 2002-2005	4.344	6.941	11.177	20.689	0.010	1.007		1.053	4.344	6.941	11.177	20.689	0.010	1.007		1.053
	(13.885)	(13.949)	(33.118)	(33.777)	(1.650)	(1.577)		(1.575)	(13.885)	(13.949)	(33.118)	(33.777)	(1.650)	(1.577)		(1.575)
Fund size $85m-$191m		5.841		4.650		0.540*		0.532*		5.841		4.650		0.540*		0.532*
		(4.055)		(3.860)		(0.275)		(0.275)		(4.055)		(3.860)		(0.275)		(0.275)
Fund size $191m-$365m		5.670		3.869		0.523*		0.481		5.670		3.869		0.523*		0.481
		(4.228)		(4.075)		(0.294)		(0.295)		(4.228)		(4.075)		(0.294)		(0.295)
Fund size >$365m		1.500		3.110		0.233		0.269		1.500		3.110		0.233		0.269
		(5.126)		(4.898)		(0.358)		(0.358)		(5.126)		(4.898)		(0.358)		(0.358)
Industry specialisation index		13.867*		12.819*		0.603		0.552		13.867*		12.819*		0.603		0.552
		(7.426)		(7.097)		(0.502)		(0.503)		(7.426)		(7.097)		(0.502)		(0.503)
Experience of GP relative to the market at fund vintage		2.660***		1.873***		0.158***		0.161***		2.660***		1.873***		0.158***		0.161***
		(0.724)		(0.702)		(0.048)		(0.048)		(0.724)		(0.702)		(0.048)		(0.048)
Number of companies invested in		-0.039		-0.016		-0.007		-0.010		-0.039		-0.016		-0.007		-0.010
		(0.105)		(0.100)		(0.007)		(0.007)		(0.105)		(0.100)		(0.007)		(0.007)
Average amount of first investment made		0.057		-0.076		0.002		0.000		0.057		-0.076		0.002		0.000
		(0.212)		(0.202)		(0.018)		(0.018)		(0.212)		(0.202)		(0.018)		(0.018)
Average round of first investment into a company		-2.808**		-2.031		-0.170*		-0.191**		-2.808**		-2.031		-0.170*		-0.191**
		(1.411)		(1.345)		(0.089)		(0.089)		(1.411)		(1.345)		(0.089)		(0.089)
Average number of syndication partners		2.823***		3.125***		0.224***		0.227***		2.823***		3.125***		0.224***		0.227***
		(1.004)		(0.956)		(0.067)		(0.067)		(1.004)		(0.956)		(0.067)		(0.067)
GP number of partners at fund vintage	1.409***	0.699*							1.409***	0.699*						
	(0.349)	(0.397)							(0.349)	(0.397)						
GP number of partners at fund vintage for UK funds 94-97^			5.758***	5.575***							5.758***	5.575***				
			(2.063)	(2.091)							(2.063)	(2.091)				
GP number of partners at fund vintage for UK funds 98-01			3.890	3.155							3.890	3.155				
			(4.478)	(4.471)							(4.478)	(4.471)				
GP number of partners at fund vintage for UK funds 02-05			-1.988	-3.861							-1.988	-3.861				
			(8.620)	(8.671)							(8.620)	(8.671)				
GP number of partners at fund vintage for US funds 90-93			3.595***	2.689**							3.595***	2.689**				
			(1.227)	(1.235)							(1.227)	(1.235)				
GP number of partners at fund vintage for US funds 94-97			8.901***	7.692***							8.901***	7.692***				
			(0.979)	(1.031)							(0.979)	(1.031)				
GP number of partners at fund vintage for US funds 98-01			0.229	-0.429							0.229	-0.429				
			(0.469)	(0.516)							(0.469)	(0.516)				
GP number of partners at fund vintage for US funds 02-05			0.096	-0.244							0.096	-0.244				
			(0.576)	(0.590)							(0.576)	(0.590)				
GP number of offices at fund vintage year					0.033	0.034							0.033	0.034		
					(0.042)	(0.044)							(0.042)	(0.044)		

	Net IRR								Multiple							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
GP number of offices at fund vintage year UK 94-97^							-0.065	-0.041							-0.065	-0.041
							(0.170)	(0.162)							(0.170)	(0.162)
GP number of offices at fund vintage year UK 98-01							0.062	-0.024							0.062	-0.024
							(0.107)	(0.109)							(0.107)	(0.109)
GP number of offices at fund vintage year UK 02-05							-0.035								-0.035	
							(1.646)								(1.646)	
GP number of offices at fund vintage year US 90-93							0.545***	0.462**							0.545***	0.462**
							(0.188)	(0.192)							(0.188)	(0.192)
GP number of offices at fund vintage year US 94-97							-0.082	-0.227							-0.082	-0.227
							(0.278)	(0.269)							(0.278)	(0.269)
GP number of offices at fund vintage year US 98-01							-0.017	-0.026							-0.017	-0.026
							(0.108)	(0.108)							(0.108)	(0.108)
GP number of offices at fund vintage year US 02-05							0.002	0.041							0.002	0.041
							(0.054)	(0.054)							(0.054)	(0.054)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stage Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
Industry Controls	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes
No. of Observations	520	520	520	520	426	426	426	426	520	520	520	520	426	426	426	426
R-Squared	0.316	0.390	0.405	0.457	0.290	0.409	0.304	0.419	0.316	0.390	0.405	0.457	0.290	0.409	0.304	0.419

^ No data on the number of partners and offices were available for the fund managers of the UK-based funds raised in the 1990-1993 period.

Note: Columns 1-2 examine the effect of GP partners with and without controls, while columns 3-4 look at the effect of partners over time on funds in the US and the UK. Columns 5-8 repeat the analysis looking at the number of offices of the GP. Size variables refer to quartiles of the size distribution with the bottom quartile omitted as a reference quartile. The regression models in this table have been estimated with OLS. The table reports standard errors in parentheses clustered at the fund manager level. *, **, *** indicate statistical significance at the 10 per cent, 5 per cent and 1 per cent level respectively. The right panel reproduces the same regressions but considering multiples instead of net IRR as dependent variable.

Table A11: Public-private performance gap

	Net IRR										Multiple									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
UK based fund	-4.031	-6.286**									-0.248*	-0.377***								
	(3.257)	(2.996)									(0.148)	(0.143)								
UK-based fund raised 1990-1993			-17.626***	-16.031***	-16.943***	-15.941**	-14.284**	-15.491**	-19.101***	-11.114**			-1.223***	-1.114***	-1.167***	-1.057**	-0.981**	-1.069**	-1.218***	-0.847**
			(6.470)	(5.886)	(5.859)	(6.956)	(6.679)	(6.941)	(6.678)	(5.309)			(0.424)	(0.383)	(0.383)	(0.422)	(0.406)	(0.425)	(0.419)	(0.343)
UK-based fund raised 1994-1997			-17.943*	-17.629*	-18.072*	-15.945*	-15.655*	-14.317*	-17.512**	-10.299			-0.972**	-0.951**	-0.969**	-0.891**	-0.894**	-0.828**	-0.960**	-0.622*
			(9.966)	(9.681)	(9.525)	(9.555)	(8.765)	(8.546)	(8.725)	(7.703)			(0.462)	(0.452)	(0.444)	(0.421)	(0.390)	(0.385)	(0.395)	(0.346)
UK-based fund raised 1998-2001			1.537	2.376	2.720	3.992	4.897*	5.665*	2.890	3.857			0.013	0.067	0.078	0.116	0.174	0.210	0.096	0.114
			(2.834)	(2.724)	(2.768)	(2.948)	(2.695)	(2.967)	(3.029)	(3.225)			(0.116)	(0.119)	(0.132)	(0.145)	(0.144)	(0.160)	(0.167)	(0.171)
UK-based fund raised 2002-2005			-1.438	-2.007	-1.502	1.245	0.879	2.651	-0.442	-2.586			-0.002	-0.030	0.021	0.134	0.111	0.198	0.070	-0.072
			(3.788)	(4.269)	(4.667)	(4.321)	(4.920)	(5.610)	(5.991)	(6.755)			(0.143)	(0.192)	(0.214)	(0.207)	(0.242)	(0.264)	(0.283)	(0.291)
Fund size $85m-$191m				6.010*	6.268**	5.942*	4.101	3.295	1.945	1.392				0.450**	0.476***	0.455**	0.363**	0.329*	0.273*	0.232
				(3.116)	(3.175)	(3.172)	(3.151)	(3.011)	(2.967)	(2.973)				(0.178)	(0.182)	(0.180)	(0.173)	(0.169)	(0.166)	(0.165)
Fund size $191m-$365m				7.054**	7.479**	7.023**	3.158	2.257	-0.105	0.208				0.462**	0.511***	0.487**	0.293*	0.273	0.175	0.170
				(3.467)	(3.545)	(3.474)	(3.108)	(3.219)	(3.242)	(3.164)				(0.190)	(0.197)	(0.193)	(0.169)	(0.174)	(0.172)	(0.168)
Fund size >$365m				5.851**	6.553**	6.096**	0.034	-1.444	-4.559	-2.773				0.279**	0.359**	0.319**	0.012	-0.013	-0.142	-0.081
				(2.830)	(3.034)	(3.091)	(2.917)	(3.173)	(3.379)	(3.136)				(0.133)	(0.148)	(0.150)	(0.146)	(0.152)	(0.156)	(0.151)
Industry specialisation index							4.116	4.206	3.193	3.974							0.354	0.316	0.274	0.305
							(5.100)	(4.918)	(4.758)	(4.887)							(0.273)	(0.257)	(0.248)	(0.257)
Experience of GP relative to the market at fund vintage							2.079***	1.961***	1.936***	1.460**							0.111***	0.107***	0.106***	0.081**
							(0.587)	(0.623)	(0.603)	(0.594)							(0.032)	(0.034)	(0.033)	(0.032)
Number of companies invested in								0.048	0.062	0.042								-0.000	0.000	-0.001
								(0.095)	(0.094)	(0.090)								(0.005)	(0.005)	(0.005)
Average amount of first investment made								0.020	0.002	-0.172								0.001	0.000	-0.009
								(0.120)	(0.122)	(0.147)								(0.005)	(0.005)	(0.006)
Average round of first investment into a company								-2.407**	-2.397**	-3.321***								-0.127**	-0.127**	-0.171***
								(1.119)	(1.071)	(1.178)								(0.057)	(0.056)	(0.055)
Average number of syndication partners								1.661	1.396	1.182								0.096*	0.085*	0.072
								(1.008)	(0.972)	(1.006)								(0.051)	(0.049)	(0.051)
Hub dummy									7.226***										0.298**	
									(2.247)										(0.119)	
Share of IPO exits										58.543***										3.054***
										(10.166)										(0.604)
Share of M&A exits										10.549										0.460
										(6.447)										(0.300)
Public hub	-7.397***	-3.216									-0.346***	-0.062								
	(2.739)	(2.443)									(0.127)	(0.117)								
Public fund UK 94-97^			-20.826**	-17.412**	-17.154**	-17.421**	-17.200**	-18.812**	-16.635*	-18.441**			-0.736	-0.519	-0.564	-0.587	-0.538	-0.600	-0.510	-0.586
			(9.224)	(8.802)	(8.711)	(8.808)	(8.178)	(8.138)	(8.532)	(7.369)			(0.451)	(0.440)	(0.434)	(0.422)	(0.393)	(0.399)	(0.414)	(0.358)
Public fund UK 98-01			-3.374	-0.194	-0.096	-0.744	-0.611	-1.827	-1.462	-4.417			-0.093	0.071	0.091	0.072	0.099	0.056	0.071	-0.078
			(3.031)	(3.173)	(3.414)	(3.698)	(3.522)	(3.556)	(3.620)	(4.102)			(0.141)	(0.167)	(0.184)	(0.200)	(0.200)	(0.203)	(0.204)	(0.236)
Public fund UK 02-05			-2.239	1.712	1.266	0.437	-1.186	-2.078	-1.394	1.519			-0.066	0.160	0.070	0.043	-0.028	-0.057	-0.029	0.123
			(3.885)	(4.788)	(5.228)	(4.873)	(5.346)	(5.784)	(6.149)	(7.149)			(0.139)	(0.210)	(0.237)	(0.226)	(0.259)	(0.270)	(0.290)	(0.319)
Public fund US 90-93			-13.184**	-9.028	-9.670*	-9.260	-5.236	-5.386	-2.737	-7.504			-1.386***	-1.091**	-1.104***	-0.966**	-0.775*	-0.798*	-0.688	-0.895**
			(5.706)	(5.766)	(5.788)	(5.970)	(5.970)	(6.028)	(6.310)	(6.358)			(0.447)	(0.427)	(0.425)	(0.437)	(0.430)	(0.427)	(0.442)	(0.442)
Public fund US 94-97			-10.235	-9.737	-9.527	-10.122	-6.021	-4.553	-5.252	-0.347			-0.364	-0.345	-0.351	-0.365	-0.147	-0.056	-0.085	0.159
			(15.870)	(15.249)	(15.016)	(15.001)	(15.399)	(14.240)	(14.093)	(13.673)			(0.776)	(0.739)	(0.729)	(0.696)	(0.704)	(0.647)	(0.645)	(0.629)

	Net IRR										Multiple									
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Public fund US 98-01			2.459	2.512	3.732	3.990	5.844	6.221	6.215	6.309			0.167	0.128	0.261	0.284	0.395*	0.442*	0.441*	0.450*
			(3.114)	(3.414)	(3.807)	(3.953)	(4.183)	(4.332)	(4.594)	(4.144)			(0.179)	(0.190)	(0.215)	(0.219)	(0.235)	(0.242)	(0.253)	(0.232)
Public fund US 02-05			-5.678**	-5.714**	-5.229*	-4.432	-4.718	-3.924	-2.485	-3.383			-0.222***	-0.279**	-0.219*	-0.185	-0.193	-0.142	-0.083	-0.119
			(2.473)	(2.796)	(2.826)	(2.996)	(2.985)	(3.012)	(2.949)	(2.868)			(0.076)	(0.113)	(0.118)	(0.143)	(0.138)	(0.134)	(0.135)	(0.131)
Year FE	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Stage Controls	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
Industry Controls	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
No. of Observations	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791	791
R-Squared	0.012	0.245	0.264	0.271	0.274	0.290	0.306	0.314	0.325	0.354	0.011	0.228	0.246	0.257	0.265	0.282	0.299	0.306	0.313	0.345

^ No data performance data was available for UK-based funds with public backing raised in the 1990-1993 period

Note: Columns 1 and 2 examine the underperformance of publicly backed funds with and without controlling for the fund vintage year. Columns 3-10 look at the relative performance of public funds in the UK and US over time as different controls are introduced. Size variables refer to quartiles of the size distribution with the bottom quartile omitted as a reference quartile. The regression models in this table have been estimated with OLS. The table reports standard errors in parentheses clustered at the fund manager level. *, **, *** indicate statistical significance at the 10 per cent, 5 per cent and 1 per cent level respectively. The right panel reproduces the same regressions but considering multiples instead of net IRR as dependent variable.

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