

# Value Creation in Venture Capital



A Comparison of Exit Values across  
Canadian Provinces and US States



October 2005

Thomas F. Hellmann  
Edward J. Egan  
James A. Brander

**Value creation in venture capital:  
A comparison of exit values  
across Canadian provinces and US states**

Thomas F. Hellmann  
Edward J. Egan  
James A. Brander

**About the Authors:** This study has been conducted by a research team based at the Sauder School of Business, University of British Columbia. The project leader was Thomas Hellmann. The other primary investigators are Edward Egan and James Brander. Thomas Hellmann and James Brander are professors in the Strategy and Business Economics Division of the Sauder School of Business. Both have backgrounds in finance and economics, and have previously published on venture capital. Edward Egan is an M.Sc. student, specializing in management information systems. He has an extensive consulting background related to venture capital finance.

**Date:** October 2005

**Acknowledgements:** This study has been commissioned by Leading Edge BC, with cooperation from the Sauder School of Business at the University of British Columbia. We are grateful for help and support from Todd Tessier of Leading Edge BC and the Ministry of Small Business and Economic Development, and from Daniel Muzyka, Dean of the Sauder School of Business. Several researchers and programmers performed above and beyond the call of duty, including Anna Krasnoperova, Chris Port, Ben Heller, Jeff Muhr, Alex Shyr and Igor Ostrovsky. We also thank Brent Holliday and Greenstone Venture Partners for the many ways in which they supported this research. None of the people or organizations acknowledged here are responsible for any errors or shortcomings of the report.

**Corresponding Author:**

Professor Thomas Hellmann  
Sauder School of Business  
University of British Columbia  
Vancouver, B.C. V6T 1Z2  
hellmann@sauder.ubc.ca

## **Executive Summary**

The primary objective of this study is to calculate the amount of value that is created by venture-capital backed companies, and to compare these valuations across jurisdictions. Our measure of value creation is the value of companies at the time of an initial public offering, or at the time of an acquisition. Since venture capitalists and other early investors have an opportunity to liquidate their investments at this time, this is commonly referred to as the “exit value.”

By focusing on exit values we are looking at “output” measures of venture capital performance rather than “input” measures, like total investment. Exit values are a fundamental measure of venture capital activity. They quantify what is arguably the most important outcome of venture capital investments, namely the value of the companies they finance. As such, exit values allow us to compare the performance of venture capital markets across different jurisdictions (i.e. Canadian provinces and US states).

The principal finding of this study is that Canada in general and British Columbia in particular perform surprisingly well (compared to U.S. jurisdictions) using exit values as a performance measure once differences on aggregate size or in inputs are accounted for. Specifically, Canada has higher exit values per dollar of GDP, per dollar of R&D spending, and per dollar of venture capital investment. Within Canada, British Columbia and Alberta are the strongest performers on these measures. Canada does have smaller average exit values (i.e. successful ventures tend to be smaller at exit than in the United States), which might be viewed as a negative point. However, on the positive side, Canada also has relatively more exits and a shorter average time to exit than the United States.

This study focuses on the period 1997 to 2004. 509 exits of Canadian venture capital backed companies generated a total exit value of US\$30 billion, compared to 3047 companies generating US\$381 billion in the US. The exit value of a typical Canadian

company was lower, with an average (median) of US\$59 million (US\$20 million), compared to US\$192 million (US\$92 million) in the US. However, exits occurred faster in Canada, with the average (median) time from founding to exit being 76 (50) months, compared to 85 (61) months in the US.

So far, these results confirm the common notion that, in absolute terms, the Canadian market is much smaller than the US. However, the main finding of this study is that once we account for apparent differences between these two economies, the Canadian market performs surprisingly well. If we compare total exit values against GDP, we find that Canada outperforms the US by 3%. When compared against the amount of venture capital investment, Canada outperforms the US by 15%. Comparing the performance of the two countries' venture capital markets against the amount of R&D spending, Canada generates more exit value for every dollar spent on R&D. Canada generates 79% more exit value per dollar spent on R&D. This figure increases to 125% for private sector R&D.

The two countries experienced a similar boom and bust cycle over the period 1997-2004, with clear signs of recovery in 2004. One important difference between the two countries is that information and communication technology account for almost three quarters of all the exit value created in the US, compared to about half in Canada. Canada generated relatively more exit value in sectors such as energy and sustainable technology.

This study also compares the performance of the individual Canadian provinces against US states. California generates the highest total exit value, reflecting both its size and venture capital intensity, followed by Massachusetts, Texas and New York. Possibly a surprising result is that Ontario ranks fifth, with a total exit value of US\$14 billion. Within Canada the order of exit values reflects the relative size of the provinces. After Ontario, Quebec has next largest venture capital exit value with US\$5 billion, followed surprisingly closely by British Columbia with US\$4.2 billion, and Alberta with US\$3.7 billion. Ontario has the highest average and median exit value. The western provinces of

Alberta and British Columbia have the fastest times to exit, not only in Canada, but also when compared to the US states.

If we compare each jurisdiction's performance relative to its GDP, we find that California and Massachusetts continue to have the highest exit value creation rates. Measured against R&D spending they continue to do well. However, if compared against the amount of venture capital investment, their performance is markedly weaker.

British Columbia and Alberta are the two most profitable jurisdictions across all of Canada and the US, when evaluated against R&D spending. They also continue to perform very well when compared against the level of venture capital investments. These findings reinforce our central theme that smaller venture capital market may sometimes be the most efficient ones.

We also examine the generation of exit values across different sectors. Information and communication technology dominates most US states. In Canada this is also true for British Columbia, and to a lesser extent for Ontario. In Alberta, energy is the dominant sector. Quebec has a more varied structure, where information and communication technology, life sciences, and other sectors (such as manufacturing) all make significant contributions to the total exit value.

We believe that this study is the first to provide a systematic comparison of exit values across Canadian and US jurisdictions. One important innovation is our data collection method, which allows us to obtain acquisition values. A second innovation is our emphasis on exit values in the first place. Most prior studies that compare venture capital markets focus on the inputs in this market, namely the amount of investments made. This study argues that exit values are the key to evaluating the relative performance of venture capital markets.

## **Table of Contents**

|   |           |
|---|-----------|
| <b>1. Background and objectives</b>   | <b>1</b>  |
| <b>2. Methodology</b>   | <b>3</b>  |
| 2.1. Existing studies of returns in venture capital                           | 3         |
| 2.2. Methodological preliminaries   | 4         |
| 2.3. Data definitions   | 6         |
| 2.4. Construction of benchmarks   | 10        |
| 2.5. Data sources   | 12        |
| 2.6. Industry Classification  | 16        |
| <b>3. Analysis of exit values: Canada versus the US</b>                       | <b>18</b> |
| <b>4. Analysis of exit values: Comparing Canadian Provinces and US states</b> | <b>21</b> |
| 4.1 Basic exit statistics   | 21        |
| 4.2 Benchmarked exit values   | 35        |
| 4.3. Sector comparisons   | 48        |
| 4.4. Time trends  | 52        |
| <b>5. Conclusions</b>   | <b>57</b> |
| <b>References</b>   | <b>58</b> |
| <b>Appendix I: Industry Classifications</b>                                   | <b>59</b> |
| <b>Appendix II: Extensive data tabulation</b>                                 | <b>65</b> |

## **1. Background and objectives**

Venture capital is widely considered to be an important contributing force to economic growth. Venture capitalists finance entrepreneurial companies that commercialize innovations, and that play a crucial role in promoting competition and economic renewal. The value created by venture capital backed companies benefits investors, entrepreneurs, employees, customers, and the economy at large, including by providing tax revenues for governments. The most direct measure for this value creation process is the value of the entrepreneurial companies themselves. This value is naturally measured at the time that venture capitalists exit their investments. Successful exits normally occur either at or shortly after an initial public offering (IPO), or at the time that an entrepreneurial company is acquired by another firm. In this study we set out to examine the value created by venture capital backed companies, measured at the time of exit.

Our primary objective is to compare exit values of venture capital backed companies across different Canadian provinces and US states. Exit values play a fundamental role for the venture capital market. Put simply, exit values measure how much money is created in the venture capital process. Formally, exit values measure the total amount of value that is created for the shareholders of venture capital backed companies. This includes not only the value harvested by venture capitalists themselves, but also the value gained by all other shareholders, such as the entrepreneurs, employees with stock options, and other equity investors (e.g., angel investors).

A comparison of exit values can reveal important economic patterns concerning how the various provinces compare with each other in terms of their entrepreneurial economic activity. More exits and higher values are indicators of a more active entrepreneurial environment. Looking at total exit value incorporates both the number of exits and the size of exits. Naturally, different jurisdictions can have different exit values because of differences in their relative size. We therefore consider a number of benchmarks against which we can compare the exit values of the different provinces and states.

The calculations of total exit values are of economic interest by themselves. But in addition, our analysis compares the relative importance of IPOs versus acquisitions as exit channels for venture capital backed enterprises, and examines how exit values vary by year and across industries.

A systematic compilation of exit values is a breakthrough in the literature on venture capital activity. We are not aware of any prior systematic study that attempts to measure and compare exit values across provinces and states. Our study also makes several important contributions to the measurement methodology of exit values. In particular, we use a number of new data collection methods to provide more comprehensive coverage of acquisition events than has previously been achieved.



## 2. Methodology

### 2.1. Existing studies of returns in venture capital

In the US, the National Venture Capital Association (NVCA, [www.nvca.org](http://www.nvca.org)) regularly publishes rates of returns for the US venture capitalists. Many industry observers consider these returns unreliable, since they are based on a relatively small sample of venture capital firms, and are self-reported. There appears to be systematic under-reporting of underperforming investments, as well as by underperforming venture capital funds. Recently, Sand Hill Econometrics ([www.sandhillecon.com](http://www.sandhillecon.com)) tried to address these problems by constructing an index for the venture capital industry that successfully corrects for some of these biases.

A small academic literature attempts to provide estimates of the returns in venture capital. Kaplan and Schoar (2005) use US data from a sample, collected by Venture Economics, for the period 1980 to 2001. Based on the cash flows of the venture capital firms, they calculate a mean return of 17% (median of 11%). Jones and Rhodes-Kropf (2002) use US data from a sample collected by Venture Economics, for the period 1980 to 1999, and find a mean return of 19.25% (median of 9.13%). Ljungqvist and Richardson (2003) use proprietary US data from an anonymous large limited partner, covering the period 1981-1993, and find a mean return of 19.81 % (median of 18.66%). Gompers and Lerner (1997), using proprietary US data from Warburg Pincus, find a return of 30.5%, and provide various estimates of excess returns. Brander, Amit and Antweiler (2002) use a sample of Canadian venture capital investments, collected by Macdonald & Associates, for the period 1992 to 1997. They find an average return of 24.5%, and an investment-weighted return of 16.3%. All of these studies estimate the return to the venture capital investor and are therefore "gross" returns rather than "net" returns.<sup>1</sup>

---

<sup>1</sup> These studies typically calculate the gross returns to the venture capital firm. These gross returns should not be compared directly with standard financial returns to passive instruments (such as bonds) as various costs would need to be deducted first. To identify returns to limited partners or net returns it would be necessary, in particular, to take out carried interest and management fees but this information is rarely disclosed.

Several studies also consider the returns to venture-capital backed companies. Cochrane (2003) uses US data from a sample collected by VentureOne for the period 1987 to 2000. He constructs maximum likelihood estimates for an asset return model that accounts for selection bias from un-exited companies. He estimates a 15% return, and after accounting for market return and risk, he finds an excess return of -7%. Cumming and MacIntosh (2003) use a survey-based sample, collected by Venture Economics for the US and the Canadian Venture Capital Association for Canada, covering the period 1992-1995. They estimate a 5.6% return for the US and a -3.2% return for Canada.

While this literature has made several important contributions, for our purposes it also has several shortcomings. First, these studies are based on incomplete and often rather small samples rather than on data sets that capture something close to the entire population of venture capital investments. This raises a significant possibility of "selection bias" in the sense that the included observations might differ from the rest of the population. In particular, as data reporting is voluntary it is likely to be biased towards underreporting of poor returns. Second, none of these studies focuses on inter-provincial/state differences of venture capital performance.<sup>2</sup>

## **2.2. Methodological preliminaries**

For this study we had no access to any proprietary returns data from venture capitalists, firms receiving venture capital, or related organizations. Moreover, there is no source of reliable and complete data on the amount of investments obtained by the entire population of all venture capital backed companies in Canada and the US. We therefore refrain from attempting to calculate rates of return, which would be based on incomplete and potentially biased self-reported data. Instead, we focus solely on an estimation of the value of realized exit events. While this constitutes a compromise, our approach has several important advantages. It does not require data on the amount and timing of

---

<sup>2</sup> The only prior study that focuses on inter-provincial comparison was undertaken by Greenstone Venture Partners, with the participation of Ed Egan. This was essentially a sample-based pilot study, the results of which prompted this much more extensive population-level study.

investments. (Return calculations require timing information both from venture capitalists and possibly from other investors.) It is less affected by the reporting bias that affects prior studies of venture capital activity as we use publicly available data to identify exits. And it allows us to consider a much larger set of companies. Indeed, we believe that we come close to having complete coverage of the population of exit events, and are certain that we have more comprehensive coverage than any previous study on either Canadian or US venture capital exits.

Any study of venture capital exits faces two types of data availability problems. First, there is a *disclosure problem*. This is not a problem for IPOs, since all IPOs are publicly disclosed. For an exit value we use a company's market capitalization, valued at the IPO offer price. Acquired private companies, however, are under no legal obligation to disclose acquisition values. The acquiring firm may or may not be required to disclose the transaction. If the acquiring firm is private, it has no legal obligation to disclose. If the acquiring firm is public (i.e., listed on a stock market), security laws prescribe that acquisitions must be disclosed, unless they are below certain thresholds (that may vary across countries and that typically depend on the acquirers' own asset values and the transaction size). Apart from legal disclosure, there is also voluntary disclosure. Indeed, many public companies report all of their acquisitions, even if they fall below the legal thresholds. Likewise, some private acquirers make voluntary disclosures. Most venture capital investors are under no legal obligation to disclose exit data, and they typically choose not to voluntarily disclose such data either. The one notable exception is Canadian labor-sponsored venture capital funds that fall under a unique legal requirement to disclose their investment and exit data.

Second, there is the *data collection problem*. This may seem surprising, but many of the commercial data sets fail to collect a significant amount of publicly disclosed data. Moreover, different commercial datasets have different data omissions, even if provided by the same data provider. We suspect that the main reason for these omissions are that companies do not need to report their publicly disclosed data directly to the data

providers, and that data providers have insufficient interest in gathering all of this data by themselves at their own expense.

For this study we do not make use of any data that is not publicly disclosed by companies. However, we develop a variety of new techniques for gathering data that is publicly disclosed, even if not collected by the commercial data providers. The use of some proprietary web-crawling algorithms is an important component of this data gathering technique. Moreover, we combine data from several commercial databases, to provide cross-validation and ensure a more comprehensive collection of exit values. Our study focuses on the time period 1997 to 2004. For this period, publicly disclosed data is readily available on the Internet.

### **2.3. Data definitions**

Exit values matter because they measure the amount of value created by venture capital backed companies. It is natural to measure exit values at the time that venture capitalists are able to liquidate their investments. Unfortunately, there is no systematic data on exactly when venture capitalists exit their investments. We therefore use the following approach. We consider IPOs and acquisitions by public acquirers as our two exit events.<sup>3</sup> Acquisitions by a private acquirer may or may not represent an exit event for venture capitalists. If the acquisition is paid for in cash, we consider it an exit event. However, if the acquisition is paid for in stock, then the venture capitalist trades one illiquid stock for another, and we do not consider this a liquidity event.

If a company fails, it may be liquidated. It is possible that a small amount of money is reported as an exit value, such as through a sale of assets. Since these amounts are very small, and since venture capitalists rarely obtain any of these proceeds – they typically are used to pay off more senior claim holders, such as bank debt – we exclude them from

---

<sup>3</sup> Strictly speaking, venture capitalists can not exit at the time of the IPO, and typically must continue to hold their stock at least through the so-called ‘lock-up period’ and possibly beyond. Since we do not have any data on when venture capitalists exit, we focus on the IPO.

our exit value calculation. This means that our exit values pertain to successful venture-capital backed companies. We also do not consider as exit events company buybacks or secondary sales of venture capital shares, since these exit methods are also normally only associated with unsuccessful companies. Note that including unsuccessful companies would hardly affect our estimates of total exit values, although it would significantly reduce average exit values.

In the US, an IPO always represents a meaningful liquidity event. For Canadian companies, the measurement of exit value presents one additional challenge. In Canada, there have been a number of junior stock exchanges, which were eventually amalgamated into the TSX Venture Exchange. The TSX-VN (or its predecessor exchanges) gives companies an opportunity to go public at a much earlier stage than any US stock exchange. However, an IPO on the TSX-VN does not necessarily represent a meaningful liquidity event for venture capitalists. This is in part because the exchange has very low liquidity, thus depriving venture capitalists of any real opportunity to sell much of their stock. We therefore adopt the following approach for recognizing a Canadian IPO. A listing on the TSX-VN alone is not treated as an IPO. Instead, to recognize a Canadian IPO, one of three possible conditions must be met.<sup>4</sup> First, if the company upgrades to a major exchange (TSX, NASDAQ, NYSE, etc....), we count the subsequent offering as the exit event. Second, if there is direct evidence that venture capitalists were able to exit their investments through the TSX-VN listing, we count this as an exit event. This requires an explicit mention of a liquidity event in press reports, public statements of the company, or public statements of the venture capital firm. Third, if the offering size exceeds \$1 million, we treat this as an exit event.<sup>5</sup> This threshold eliminates the small offerings that are typical of illiquid junior market stocks. Companies that are able to raise more than \$1 million typically have significantly more liquidity than firms that fall below that threshold.

---

<sup>4</sup> If more than one of the above three criteria are satisfied, we count the first exit event as the relevant one.

<sup>5</sup> The offering can be a primary offering on the TSX-VN, or any secondary offering, if all previous offerings were below the \$1 million threshold. Using \$1 million as a threshold value is somewhat arbitrary, but not important to our findings. In unreported calculations we also considered using different thresholds, but found that this did not materially affect our main findings.

A common occurrence in Canada is that companies first list on the TSX-VN and subsequently get acquired. The acquisition typically represents the real liquidity event for venture capitalists. Our methodology allows us to recognize this, since it does not record the listing on the TSX-VN, unless it satisfies the above-mentioned criteria.

The Canadian market has a few additional peculiarities that are worth mentioning. A common method for going public is by a so-called “reverse takeover.” This means that a private company acquires a company that is listed already on the stock market, but effectively is only an empty shell company. The shell company typically has no assets and earnings, and may even have been de-listed by the exchange. By acquiring the shell company, the private company buys itself a public listing. Reverse takeovers are common practice in Canada, and are publicly described as such. We can therefore readily identify these transactions as reverse takeovers, and treat them as IPOs. At first, this transaction might appear as an acquisition, since there is a public company that acquires a private company. However, this is a regulatory artifact, since the public company has no operational entity. We therefore treat reverse takeovers as public listings. Whether we then count the IPO as an exit event depends on the same criteria as above. Specifically, we consider it an exit event, unless it occurs on a junior exchange, and the company raises less than CAN\$1 million.

A related Canadian peculiarity concerns “capital pool companies.” These are specially regulated companies that can make a small initial public offering (less than \$500,000) to set up a publicly-traded company. By regulation, this entity cannot have any operational assets at the time of the IPO. The capital pool company can then acquire operational assets, and become a regular publicly traded operational company. This transaction is thus a reverse takeover, and we treat it accordingly.

Finally, another unique feature of the Canadian market is income trusts. A company can issue an instrument that resembles preferred equity on the stock exchange. This promises a fixed dividend to income trust holders. However, these preferred shares are fundamentally different from common shares and, unlike in a typical venture capital

setting, they are not convertible. Moreover, if a company issues an income trust, this does not provide any liquidity to the common shareholders. For this reason we do not count the issuance of an income trust as an exit event.

For the comparisons across jurisdictions we use the location of the company. This means that we focus on the value created by venture capital companies. Our analysis does not make a distinction between local investors and investors that come from different jurisdictions.

All of our measurements are in US dollars. Canadian dollars are converted into US dollars using Bank of Canada published monthly exchange rates.

We consider a company venture capital backed if we can identify at least one venture capital investment in the company. In addition, we require that the venture capital investment occurred prior to the exit event. This implies that we exclude all private investments into public companies (PIPEs). Estimating the exit value of PIPEs seems inappropriate, since by definition these are already liquid investments. For Canadian companies, our definition of PIPEs is based on the same three criteria for recognizing IPOS as exit events. This means that if a company lists on the TSX Venture Exchange, but does not satisfy any of our three criteria for a liquid exit it remains a candidate for venture capital investments. If a venture capitalist invests after the initial TSX Venture listing, but before any of the three criteria are satisfied, we do not treat that venture capital investment as a PIPE deal.

We exclude all private equity deals that are either explicitly mezzanine financing or leverage buyout financing (LBOs), or deals that come from funds that explicitly claim only to invest in mezzanine or buyout deals. If a corporation has an organized venture capital fund, we recognize this as venture capital. However, if a corporation makes private equity investments on an ad-hoc basis, we do not consider it a venture capital investment. These criteria provide a conservative perspective on exit values. In Canada, we exclude some well-known large exits, such as 360 Networks and Yellow Pages

(which we classify as mezzanine financing) and Le Groupe Videotron (which we classify as corporate investment).

#### **2.4. Construction of benchmarks**

To compare exit values across jurisdictions, we naturally want to account for the different sizes of the local economies. We use a variety of benchmark measures that capture their relative sizes. Our first benchmark considers aggregate economic activity, as captured by Gross Domestic Product (GDP) as measured at the state or provincial level. Our second benchmark is based on the R&D investments across jurisdictions and we consider both the total level of R&D, as well as the level of private R&D. We can measure both of these benchmarks at the level of the individual jurisdictions. The economic significance of these two benchmarks is very intuitive. We want to measure the value creation of venture capital relative to some standard measures of the size of the local economy. The GDP measure is a broad standard measure, whereas our two measures of R&D provide a more focused benchmark that is relevant for venture capital activity and for innovation more broadly.

Our third benchmark uses published data on the size of the local venture capital markets. Unfortunately, our data sources do not allow us to obtain the total amount of investment that individual companies receive. Nonetheless we have access to aggregate information about the level of venture capital investment in each jurisdiction. At this point, it should also be noted that venture capital backed companies obtain funding not only from venture capitalists, but also from other sources, such as angels and corporations. Comparing the total exit value to the amount of reported venture capital in each jurisdiction, however, provides an approximate idea of how much value is generated by venture capital backed companies, relative to the amount of money that is invested. Specifically we compare our exit values against the benchmark of the total venture capital investments made within the province/state. For this we use a moving 5-year average.<sup>6</sup> Comparing exit values to

---

<sup>6</sup> A 5-year horizon approximates the relevant investment period for the majority of our companies.



investment levels is important, because, in an indirect manner, it accomplishes similar goals to rate of return calculations. In particular, at the aggregate level of each jurisdiction, it allows us to compare the total returns (total exit value) against some measure of investments (namely the total venture capital invested). Naturally, this benchmark is not a precise measure of rates of return, since it cannot take account of the timing of individual investments, nor can it match investments and exits at the level of individual companies. Still, at an aggregate level it provides a useful approximation that allows us to present some new and meaningful comparison of jurisdictions.

Our fourth benchmark compares exit values against overall stock market performance. Our data covers the highly volatile period commonly referred to as the “dotcom boom and bust.” During this period, investor returns from investing in the stock market varied dramatically, as reflected in the wide swings of the NASDAQ index. Moreover, while some of the exit values, especially in 2000, were remarkably high, many of their prices subsequently fell, often by a large amount. Our exit values are thus affected by this boom and bust cycle. We control for this in two related manners. First, we divide exit values by the index value of the NASDAQ at the time of the exit event. This naturally deflates the high returns of the dotcom boom. The thought experiment is essentially that we compare exit values against some measure of alternative returns available to investors at the time of exit. Using the NASDAQ index implicitly assumes that all investors consider the NASDAQ as their alternative investment opportunity.

Recent research in finance has demonstrated an important “home bias,” where investors allocate significantly larger amounts of investment to their home market. It may therefore be more appropriate to use different benchmarks for US and Canadian investors, to recognize differences in their perceived alternative investments. Our second approach is to divide all US exit values by the NASDAQ index, and all Canadian exit values by the TSX index (which is widely recognized to be the main index for Canadian stock market investors). To make the US and Canadian exit values comparable, we start the two indices simultaneously at 1, at the beginning of our sample period.

## 2.5. Data sources

Our data comes from multiple sources, and involves a significant amount of integration and cross-validation. In this section we describe our data sources and briefly outline some of our integration methods.

The data for US venture capital backed companies comes from Thomson Financial's ([www.thomson.com/financial](http://www.thomson.com/financial)) Venture Economics database (VE henceforth). This is a commercially sold database that has a broad coverage of US venture capital investments. Lerner (1995) and Kaplan, Sensoy and Strömberg (2003) discuss the strengths and weaknesses of this dataset.

The data for US IPOs comes from two main sources: VE and Thomson Financial's Global New Issues database (GNI henceforth). GNI is the leading US database on IPOs, and has been widely used for academic research. Even though VE and GNI are offered by the same company (Thomson Financial), there is a considerable amount of non-overlapping information in these two databases. We compile information from both databases. In the few instances where we find contradictory information across the two databases, we use the information from GNI, which is widely considered to be the most reliable database for US IPOs.

The data for US acquisitions comes from VE, as well as from Thomson Financial's Mergers and Acquisitions database (TFMA henceforth). TFMA contains information on all disclosed mergers and acquisitions, where either the acquiring or the target company is listed on a US exchange. It has been widely used for academic research. Again, we find that even though these two databases are offered by the same company, there is a considerable amount of non-overlapping information in these two databases, so that we compile information from both databases. In case of contradictions, we use the information from TFMA.

All our data for Canadian companies is obtained from publicly available data. To identify Canadian venture capital backed companies we compiled lists of Canadian venture capital firms and their funds from published sources. These include the Canadian Venture Capital Association (CVCA) ([www.cvca.ca](http://www.cvca.ca)), Réseau Capital ([www.reseaucapital.com](http://www.reseaucapital.com)), Pratt's Guide, and a large number of associations, forums, networks and websites. Based on these lists of venture capitalists, we obtain the names of venture capital backed companies in a variety of ways. We use both current and past websites of those venture capital firms. Historic websites can be accessed through the so-called "Way-back machine," which contains an archive of web pages ([www.archive.org](http://www.archive.org)). In addition to this, we use some proprietary web-crawling algorithms to extract other publicly available data about venture capital backed companies, such as from press reports and other public disclosures. As venture capitalists often invest in syndicates, and as an investment announcement will usually mention all syndicate members, we can be relatively certain that we have a near-comprehensive coverage of Canadian venture capital funds.

The data for IPOs of Canadian venture capital backed companies comes from several sources. We extract all available information from the System for Electronic Document Analysis and Retrieval (SEDAR) for Canadian listings ([www.sedar.com](http://www.sedar.com)) and the U.S. Securities and Exchange Commission (SEC) for Canadian companies listing in the US ([www.sec.gov](http://www.sec.gov)). We focus on filings of IPO prospectuses, and identify all completed IPOs. We also cross-check our data with information from GNI (for US-listed Canadian companies) and FP Advisor ([www.fpinfomart.ca](http://www.fpinfomart.ca)). In addition we use some proprietary web-crawling algorithms to extract other publicly available data on IPOs, such as press reports and other public disclosures.

The data for Canadian acquisitions comes from several sources. We obtain all relevant information available in SEDAR and SEC. We focus on the annual reports, which contain information on M&A activities of publicly-listed firms. We also use the TFMA database, mostly to confirm acquisitions of Canadian targets by US buyers. Again, we use our proprietary web-crawling algorithms to extract further publicly available data on mergers and acquisitions, from press reports and other public disclosures. The importance

of these events to industry participants means that news is often available from multiple independent sources. Another important source of legal filings is the Strategis database (<http://strategis.ic.gc.ca>), which is maintained by Industry Canada. We extract information from the “Certificates of Amalgamation,” which contains information for all mergers and acquisitions where at least one of the two parties is federally incorporated. We extract information from the “Certificates of Discontinuance,” which contains information for all mergers and acquisitions where the acquired party is federally incorporated, and discontinuing its registration of incorporation. This allows us to identify acquisitions where the buyer is taking the target company outside of Canada. Finally, we use the “Certificates of Amendments” to trace name changes that either signal an acquisition itself, or allow us to trace subsequent acquisitions, including reverse takeovers.

We obtain data on GDP and R&D from the OECD, using SourceOECD ([www.titania.sourceoecd.org](http://www.titania.sourceoecd.org)), as well as from their original sources at the US Bureau of Economic Analysis, the National Science Foundation, and Statistics Canada.

We obtain data about US aggregate venture capital investments from a NVCA approved data source, namely the Price Waterhouse Moneytree survey ([www.pwcmoneytree.com](http://www.pwcmoneytree.com)). For Canada, we use the data published by the CVCA.<sup>7</sup> For the US, the aggregate investment data can be considered reasonably accurate. However, a question remains concerning the validity of the aggregate investment data on Canadian venture capital. Our understanding from talking to industry sources is that there is a concern that the available data not only underestimate the total amount of venture capital investments, but that there is also unequal coverage across provinces, with greater underreporting for the western provinces. For the purpose of this analysis, we made a determination that the aggregate statistics for Alberta cannot be considered sufficiently reliable to warrant their inclusion. We also caution that the estimates for British Columbia appear somewhat low, and that the coverage for some of the smaller provinces also appears incomplete.

---

<sup>7</sup> For the initial three years of the sample we do not have a full preceding five year history of venture investment for the Canadian provinces, so we use the appropriate shorter moving average.

Our method of matching data across datasets is based on name-matching. This involves both computer-based matched algorithms, as well as a considerable amount of human-based verification and cross-checking. We are also careful to track company name changes. This information is available in VE for US venture capital backed companies and in Strategis for federally incorporated Canadian venture capital backed companies.

Overall, we believe that we have virtually complete coverage of all exits by IPO. As far as acquisitions are concerned we believe that this study contains the most comprehensive coverage of exits by acquisitions available to date. In particular, we believe that our coverage of acquisitions by publicly-listed buyers is close to complete. The percentage of such deals where the acquisition value remains undisclosed is also fairly low.<sup>8</sup> The area where our coverage is likely to remain somewhat incomplete is acquisitions by privately-held buyers. Such acquisitions remain difficult to trace, especially since they frequently involve no disclosure of the acquisition value. However, since most of these transactions are widely believed to be relatively small, and only rarely include acquisitions for cash, it is reasonable to believe that this omission is unlikely to significantly affect our measurement of exit values.

We also make an attempt to determine the speed with which exits occur. Our data does not allow us to always determine the exact timing of when the first venture-capital investment was made. We therefore focus on the time between the founding of the company and the exit as a more dependable measure of the speed with which companies exit. For the US, we obtain this data from VE. For Canada, we can only obtain this data for federally incorporated companies, which amount to 140 out of our 509 exits. As a

---

<sup>8</sup> Out of 370 Canadian M&As, we found 273 exit values, yielding a disclosure rate of 73.8%. Of the remaining 97 companies, 8 companies were acquired by foreign public companies which did not file to either SEDAR or the SEC. 32 companies were acquired by public companies that did file either with SEDAR or the SEC, but that did not disclose their acquisition value, presumably because it fell below the legal disclosure threshold. Finally, 57 companies were acquired by private companies, and no additional information was undisclosed. In this case we are also unable to ascertain whether the transaction used stock or cash. If some of the transactions used stock, then they would not qualify as an exit event under our exit criteria. Including all 57 companies therefore overstates the amount of non-disclosure. Indeed, if we take out the 57 acquisitions by private acquirers, then the disclosure rate for public acquirers is 273 out of 313, or 87.2%.

consequence, our data on the time between founding and exit requires two caveats. First, our estimates are based on limited data. Second, our measure is not a precise measure of the investment duration for the venture capitalists. In general, the founding data does not correspond to the investment date. Moreover, venture capitalists may hold on to their investments beyond the first liquidity opportunity, which is our measure of exit.

## **2.6. Industry Classification**

Classifying industries is an inherently difficult task, and different data sources use different classification systems. For the purpose of this study we use a number of classification methods that, albeit imperfect, still provide a coherent picture of how exit values vary by industry.

We focus on three sectors that are of particular importance to the venture capital industry: Information and Communication Technology (ICT henceforth), Life Sciences (LS henceforth), and Energy and Sustainable Technology (EST henceforth). No precise consensus definition exists for any of these sectors.

For US companies, VE uses several proprietary industry classification systems. We use their so-called “Industry Sub Group 2” data. This industry classification system is geared towards venture capital investments. We are therefore able to provide a simple mapping from this classification system to our four industry classes (ICT, LS, EST and “Other”). Appendix I provides an explanation for this mapping.

For Canadian companies, our data collection method requires that we categorize companies manually. As a conceptual basis for this manual classification system, we assign each company a North American Industry Classification (NAIC) code. NAIC codes actually provide a much more detailed industry classification than necessary for this study. The appendix provides a definition of how we allocate NAIC codes to our four industry categories. Our definition of ICT is very similar to that used by the British Columbia Technology Industries Association (BCTIA), and is also fairly similar to the

definition proposed by the American Engineering Association (AEA). The AEA's classification is slightly narrower, and indeed the AEA acknowledges that its definition may be too narrow. For example, it excludes semiconductor machinery. Our definition is slightly more inclusive, incorporating closely related industries, including semiconductor machinery. A well known problem is that NAIC codes are not well suited for tracking biotechnology companies. We include the usual categories that are used by biotechnology companies, and also try to be reasonably broad, such as by including health sciences. We are not aware of a precise definition for the EST sector. We therefore use a pragmatic approach of including all energy companies, as well as utilities and waste processing. This means that our data includes both sustainable and non-sustainable technologies. However, there is no credible classification mapping that separates sustainable from non-sustainable production methods for these technology sectors.

### **3. Analysis of exit values: Canada versus the US**

We begin our analysis with a comparison of the aggregate statistics of Canada versus the US. Table 1 summarizes the main results. All values are expressed in US dollars.

The total exit value for the period 1997 to 2004 was just under \$30 billion for Canada, compared with \$381 billion in the US. This suggests that the in value terms, the Canadian market is approximately 8% relative to the US. As Canadian GDP was approximately 8% of U.S. GDP over this period (using market exchange rates), we can see that venture-backed exit values are of comparable overall importance in the two countries. However, the actual number of exits is relatively higher in Canada, as the Canadian to U.S. ratio is fully 17% when comparing the total number of exits in Canada and the US. The difference between these two is readily explained by the different sizes of typical exits. The average value of a Canadian exit amounts to \$59 million, compared with \$192 million in the US, showing that US exits are more than three times as large as in Canada. The distribution of venture capital returns is right skewed, so that the median exit value is lower than the average exit value. Table 1 shows that the median exit value in the US is more than four times as large as in Canada.

One may ask to what extent these differences are driven by stronger IPO or stronger acquisition markets. Table 1 shows that the US dominates total, average and median values not only for IPOs, but also for M&As. The differences between the US and Canada are slightly less pronounced for M&As than for IPOs, but the gap between the two markets remains large.

So far, our results are consistent with the common perception that Canada slightly lags the US in terms of the strengths of its venture capital market, at least as far as median and average values are concerned. Some of the other results in Table 1, however, shed some additional light on this comparison. For instance, exits tend to occur faster in Canada relative to the US. Our estimated average (median) time between founding and exit is 76 (50) months for Canada, compared with 85 (61) in the US.



**Table 1: Comparing Exit Values: Canada versus US**

|   | <b>Canada</b> | <b>USA</b> | <b>Canada<br/>/ US</b> |
|---|---------------|------------|------------------------|
| <b>All Exits</b>                            |               |            |                        |
| Total Value of Exits (US\$b)                | 29.7          | 381.4      | 8%                     |
| Number of Exits                             | 509           | 3,047      | 17%                    |
| Average Value of Exits (US\$m)              | 58.9          | 191.6      | 31%                    |
| Median Value of Exits (US\$m)               | 20.5          | 92.4       | 22%                    |
| Average Time Founding to Exit (Months)      | 76            | 85         | 90%                    |
| Median Time Founding to Exit (Months)       | 50            | 61         | 82%                    |
| <b>IPO</b>                                  |               |            |                        |
| Total Value of Exits (US\$b)                | 15.2          | 35.9       | 6%                     |
| Number of Exits                             | 139           | 746        | 19%                    |
| Average Value of Exits (US\$m)              | 111.9         | 333.2      | 34%                    |
| Median Value of Exits (US\$m)               | 49.9          | 224.9      | 22%                    |
| Average Time Founding to Exit (Months)      | 80            | 85         | 93%                    |
| Median Time Founding to Exit (Months)       | 67            | 62         | 107%                   |
| <b>M&amp;A</b>                              |               |            |                        |
| Total Value of Exits (US\$b)                | 14.51         | 145.45     | 10%                    |
| Number of Exits                             | 370           | 2301       | 16%                    |
| Average Value of Exits (US\$m)              | 39.3          | 113.5      | 35%                    |
| Median Value of Exits (US\$m)               | 15.2          | 46.7       | 32%                    |
| Average Time Founding to Exit (Months)      | 74            | 85         | 87%                    |
| Median Time Founding to Exit (Months)       | 48            | 61         | 79%                    |
| <b>Benchmarks</b>                           |               |            |                        |
| Total Value per \$1000 GDP                  | 4.99          | 4.83       | 103%                   |
| Total Value per \$1000 GERD                 | 333.04        | 186.4      | 179%                   |
| Total Value per \$1000 BERD                 | 579.89        | 257.53     | 225%                   |
| Total Value per \$1 VC Invested (5 yr avg.) | 2.07          | 1.8        | 115%                   |
| Total Value (NASDAQ Normalized)             | 15.1          | 193.3      | 8%                     |
| Total Value (Domestic Index Normalized)     | 20.0          | 193.3      | 10%                    |
| <b>Sector Breakdown</b>                     |               |            |                        |
| EST / Total Value of Exits                  | 15%           | 2%         | N/A                    |
| ICT / Total Value of Exits                  | 50%           | 74%        | N/A                    |
| Life Sciences / Total Value of Exits        | 8%            | 13%        | N/A                    |
| Other / Total Value of Exits                | 27%           | 11%        | N/A                    |

The most important insight from Table 1 is that the differences between the US and Canada disappear or are reversed once we benchmark exit values against measures of the relative size of the two economies. If we compare the total exit values relative to the sizes of the two economies, as measured by GDP, we find that Canada's exit values are very similar to those of the US. Our estimates suggest that relative to its GDP, Canada actually generates slightly (3%) more exit value than the US. If we compare total exit values against the amount of R&D spending (as measured by GERD) we find an even stronger result. For every R&D dollar spent, Canada generates 79% more exit value than the US. One might suspect that this result could be driven by large public R&D spending in the US. However, if we compare Canada with the US using private sector R&D (as measured by BERD), we find that Canada outperforms the US by even more, generating more than twice as much exit value for every private dollar spent on R&D.

If we compare the total exit values against the amount of investment in the venture capital industry, we note that Canada continues to outperform, although by the smaller margin of 15%. Because the Canadian data is likely to underestimate the total amount of venture capital investment, it is possible that the total exit values across the two countries are in fact even more similar than suggested by the estimates of Table 1. If we normalize exit values against the NASDAQ index, the comparison of exit values between Canada and the US is essentially unaffected, with Canadian exit values at 8% relative to the US. If we normalize exit values against the domestic stock market index (NASDAQ for the US and TSX for Canada), the Canadian market performs slightly better, about 10% of the US value.

Finally, it is interesting to note that Canadian and US venture capitalists invest in slightly different sectors. It is true that information and communication technology is the leading sector in both countries, but in the US they account for almost three quarters of the total exit value, compared with about half the exit value in Canada. The life sciences sector is relatively more important in the US, while energy and sustainable technology is of greater importance in Canada. Finally "Other" sectors (mainly manufacturing and services) are much more important in Canada than in the US.

## **4. Analysis of exit values: Comparing Canadian Provinces and US states**

Our data allows us to compare the total exit values of Canadian provinces and US states. In the appendix we provide a comprehensive listing of this comparison. Table A1 reports total exit values for the period 1997 - 2004. Table A2 provides data on a large number of exit value statistics. This table contains all of the Canadian provinces, and the US states that had a total exit value exceeding US\$1 billion.

Before we begin with the analysis of comparing exit performance across jurisdictions, we present some data on the most successful companies in our data set. Specifically, Table 2 presents a list of the five largest exits for the four leading Canadian provinces, as well as California and Massachusetts.

### **4.1 Basic exit statistics**

Chart 1A shows the top ten jurisdictions ranked by total exit value. Several points are worth noting. First the chart clearly demonstrates that California is an outlier in terms of exit values. Indeed, California accounts for approximately 44% of the total exit value in the United States. Massachusetts, Texas and New York are the next largest states in exit value. This conforms to the received wisdom about relative rankings in the venture capital industry. The fact that Ontario is fifth, however, might be considered a surprise. Indeed it suggests that the strength of the Canadian venture capital industry is frequently underestimated.

Chart 1B compares the exit values of the four leading Canadian provinces, namely (in alphabetical order) Alberta, British Columbia, Ontario, and Quebec. With almost US\$14 billion, Ontario clearly has the largest total exit value, followed by Quebec with US\$5 billion. British Columbia is third with US\$4.2 billion, followed by Alberta with US\$3.7 billion.

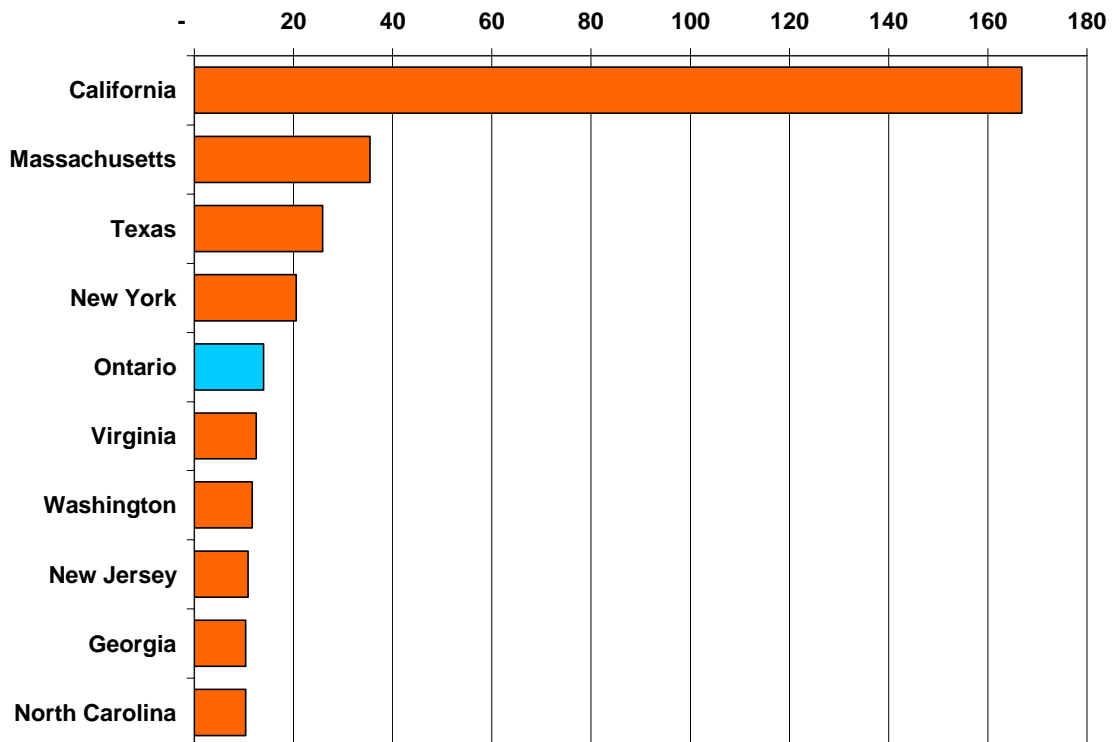
**Table 2: Top five exits for selected provinces and states**

| Company Name                  | Year | Exit Value<br>(US\$m) | Exit Type   | Sector*      |
|-------------------------------|------|-----------------------|-------------|--------------|
| <b>British Columbia</b>       |      |                       |             |              |
| Abatis Systems                | 2000 | 656                   | Acquisition | ICT          |
| Creo Inc.                     | 1999 | 488                   | IPO         | ICT          |
| Xantrex Technology Inc.       | 2004 | 375                   | IPO         | EST          |
| ALI Technologies Inc.         | 2002 | 347                   | Acquisition | ICT          |
| MacDonald Dettwiler & Assoc.  | 2000 | 327                   | IPO         | ICT          |
| <b>Ontario</b>                |      |                       |             |              |
| Electrovaya Inc.              | 2000 | 1,110                 | IPO         | Other        |
| Solect Technology Group Inc.  | 2000 | 1,088                 | Acquisition | ICT          |
| 724 Solutions Inc.            | 2000 | 912                   | IPO         | ICT          |
| Balisoft Technologies         | 2000 | 656                   | Acquisition | ICT          |
| Delano Technology Corporation | 2000 | 603                   | IPO         | ICT          |
| <b>Quebec</b>                 |      |                       |             |              |
| Sabex                         | 2004 | 565                   | Acquisition | Life Science |
| Saputo Group Inc.             | 1997 | 469                   | IPO         | Other        |
| Rona Inc.                     | 2002 | 412                   | IPO         | Other        |
| Mega Bloks Inc.               | 2002 | 251                   | IPO         | Other        |
| Adaltis Inc.                  | 2004 | 224                   | IPO         | Life Science |
| <b>Alberta</b>                |      |                       |             |              |
| OPTI Canada Inc.              | 2004 | 1,238                 | IPO         | EST          |
| Fairborne Energy Limited      | 2004 | 431                   | RTO         | EST          |
| Western Oil Sands             | 2000 | 374                   | IPO         | EST          |
| A-Channel Inc.                | 2004 | 218                   | Acquisition | Other        |
| 180 Connect Inc.              | 2004 | 189                   | IPO         | ICT          |
| <b>California</b>             |      |                       |             |              |
| eToys                         | 1999 | 2,068                 | IPO         | ICT          |
| SiByte, Inc.                  | 2000 | 2,068                 | Acquisition | ICT          |
| Bookham Technology            | 2000 | 1,803                 | IPO         | ICT          |
| Turnstone Systems Inc.        | 2000 | 1,749                 | IPO         | ICT          |
| Inktomi Corporation           | 1998 | 1,684                 | IPO         | ICT          |
| <b>Massachusetts</b>          |      |                       |             |              |
| CoreTek Inc.                  | 2000 | 1,915                 | Acquisition | ICT          |
| Spring Tide Networks Inc.     | 2000 | 1,347                 | Acquisition | ICT          |
| Viant Corporation             | 1999 | 984                   | IPO         | ICT          |
| MatrixOne Inc.                | 2000 | 955                   | IPO         | ICT          |
| Nexabit Networks Inc          | 1999 | 896                   | Acquisition | ICT          |

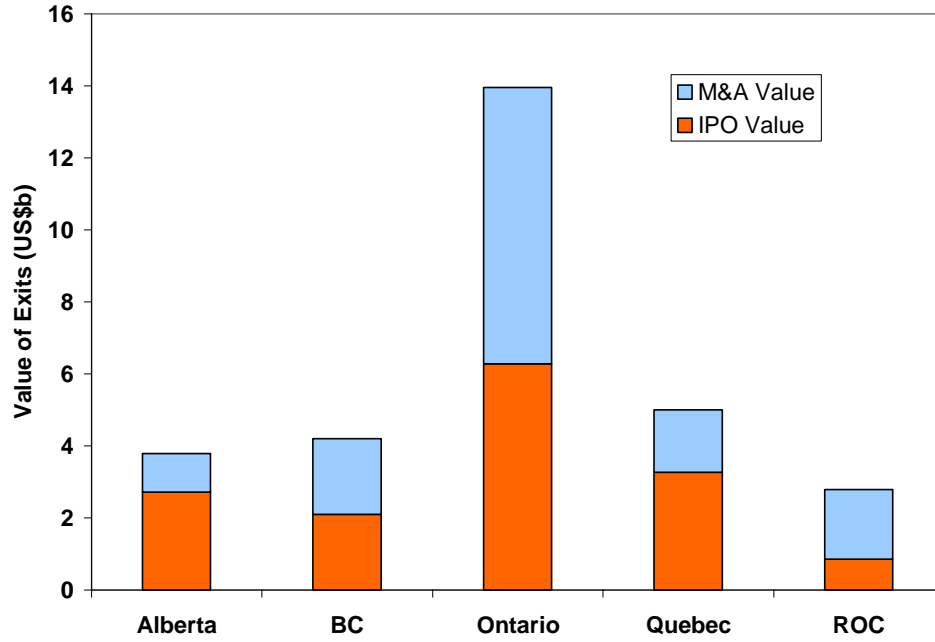
The chart also shows the values for the rest of Canada (ROC), which amounts to another US\$2.8 billion, and breaks down the relative contribution of IPOs and acquisitions. In Ontario and Quebec acquisitions account for more than half, in Alberta they account for less than half, and in British Columbia they account for almost exactly half of the exit value.

Chart 1C considers five selected US states that are of particular relevance to British Columbia, and Canada at large. Each of these states was chosen for a specific reason. Connecticut is the state that is most similar to British Columbia, in terms of its total exit value. Washington State and Oregon are the two states that are geographically closest to British Columbia in the Pacific Northwest. Texas is widely recognized as a leading cluster for information and communication technology. North Carolina, and especially its research triangle, is widely thought to be a leading biotechnology cluster. Chart 1C shows wide disparities in the total exit values, with Texas being the largest of our comparison states, and Oregon being the smallest.

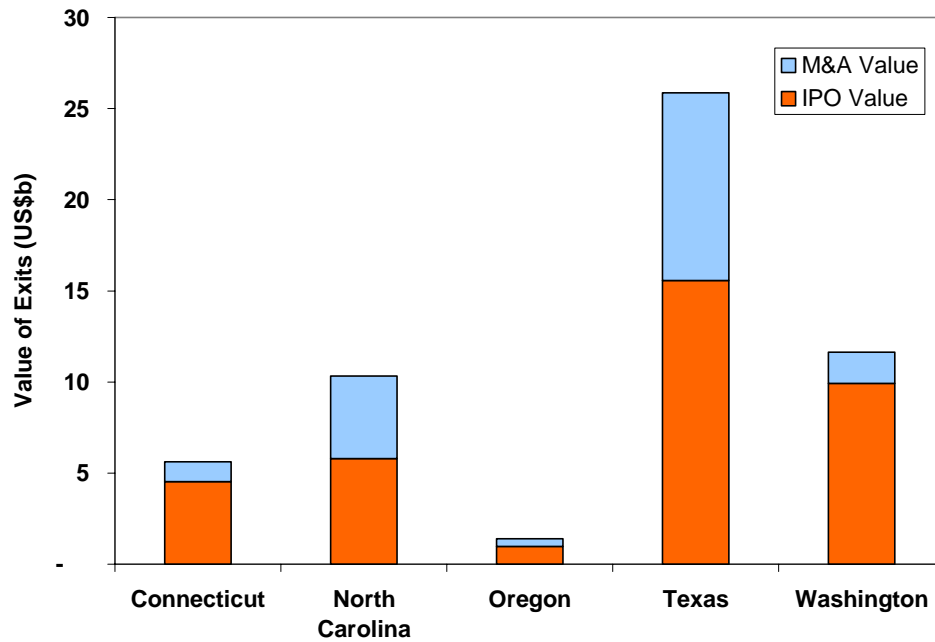
**Chart 1A: Total Value of Exits – Top 10 Jurisdictions**



**Chart 1B: Total Value of Exits – Canadian Provinces**

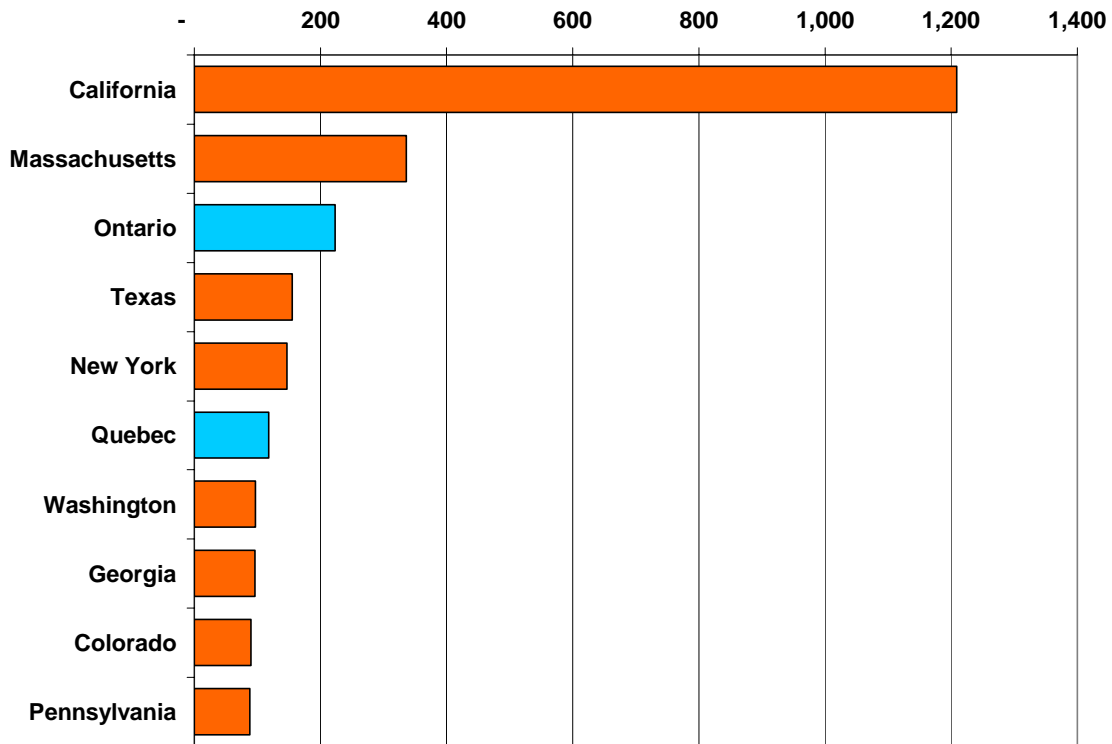


**Chart 1C: Total Value of Exits – US Comparison States**

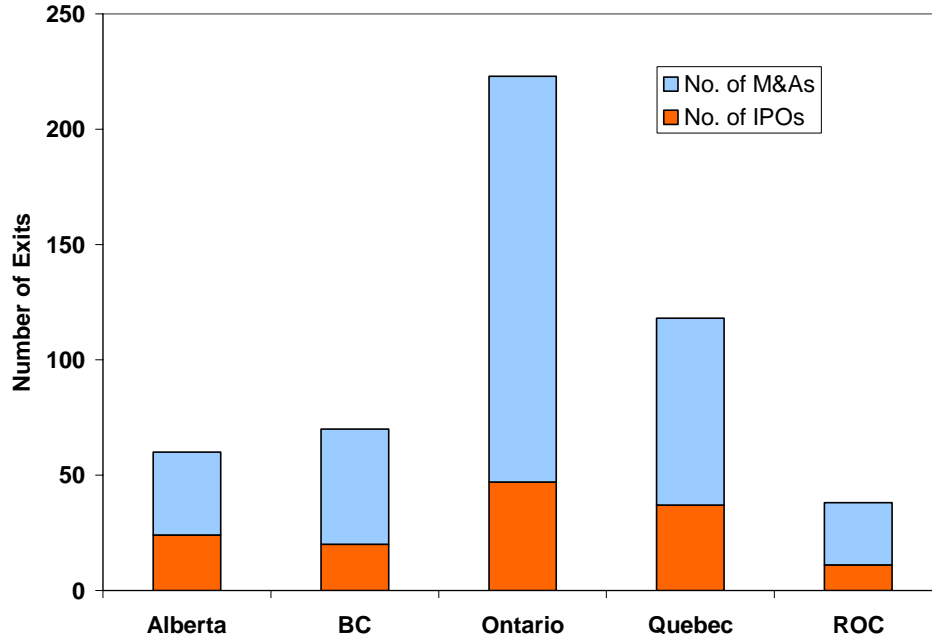


Charts 2A, B and C perform a similar analysis for the total number of exits. Chart 2A shows that California is an extreme outlier, with over 1200 exits over the sample. The relative ranking of other US states is approximately similar than in chart 1A. Ontario is ranked third, with 223 exits, and Quebec sixth with 118 exits. Chart 2B shows that the relative ranking among Canadian provinces is the same as in Chart 1B. Chart 2C shows that the relative ranking is also preserved for our US comparison states.

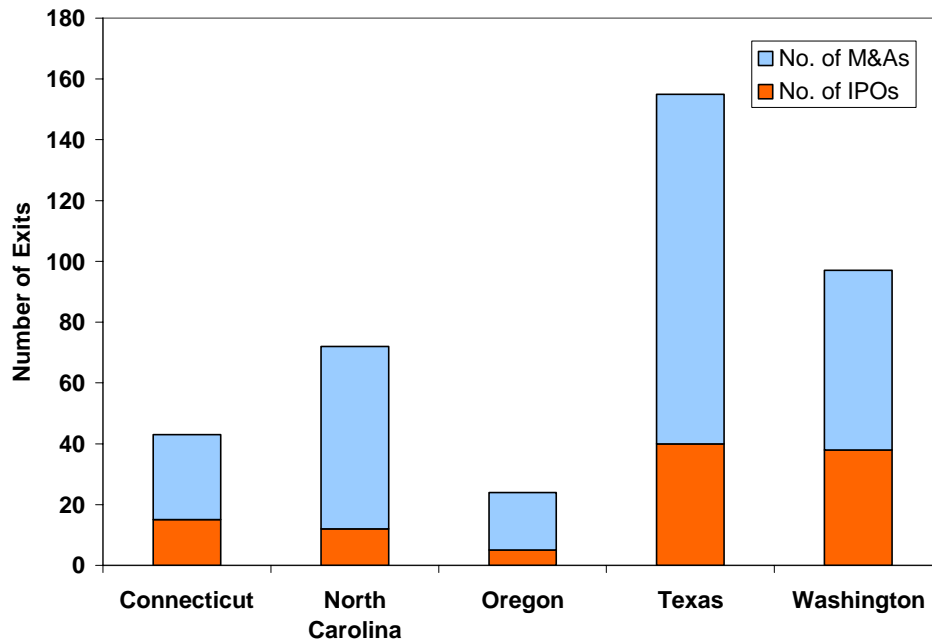
**Chart 2A: Number of Exits – Top 10 Jurisdictions**



**Chart 2B: Number of Exits – Canadian Provinces**



**Chart 2C: Number of Exits – US Comparison States**





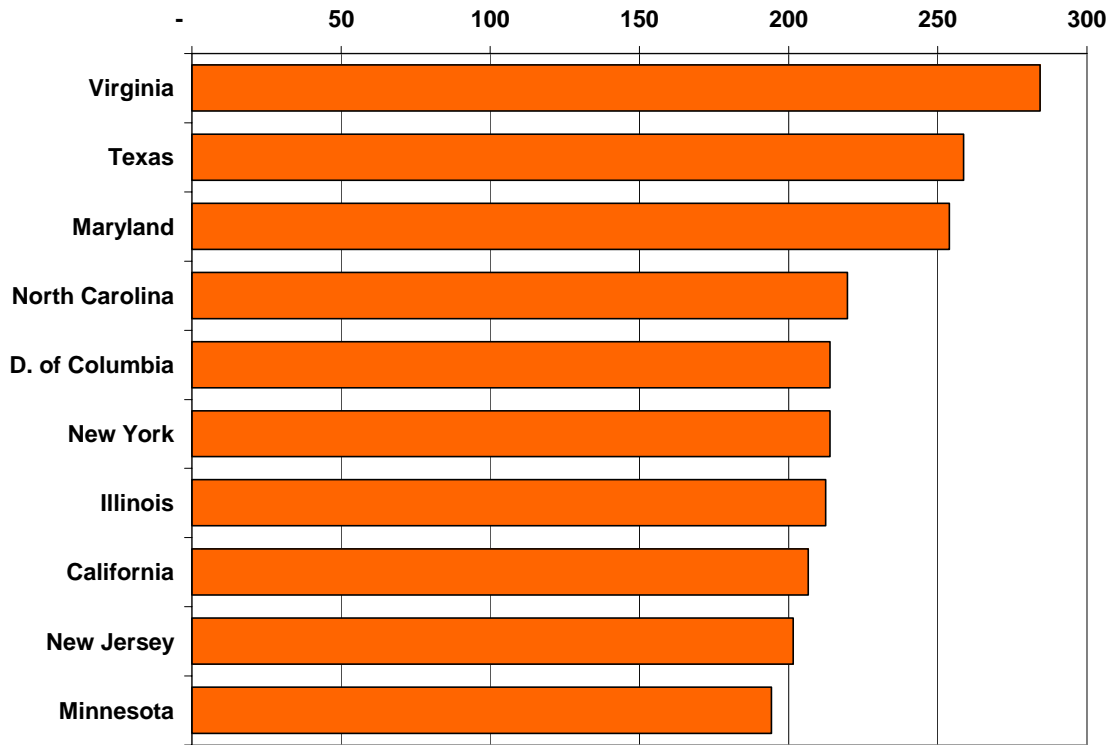
Charts 3A, B and C focus on the average exit value. This provides a measure of how large or successful a typical venture-capital backed company is. An important methodological point to note is that, beginning with Chart 3A, all of our top ten rankings focus exclusively on those jurisdictions that had a total exit value exceeding US\$1 billion. Excluding the smaller jurisdictions seems appropriate, since they are somewhat less important to an understanding of the main value drivers of the US and Canadian venture capital industry.

Possibly the most surprising result in Chart 3A is that California no longer ranks first. This may be considered particularly surprising given that California has an unusually large number of companies with more than US\$1 billion of exit value (see Table 2). The result in Chart 3A suggests that in addition to these very large exits, California also has a large number of companies with only moderately successful exit values. Another interesting finding in Chart 3A is that Virginia, Maryland and the District of Columbia all rank in the top five. These three jurisdictions host many of the defense related start-ups, companies that often generate large exit values.

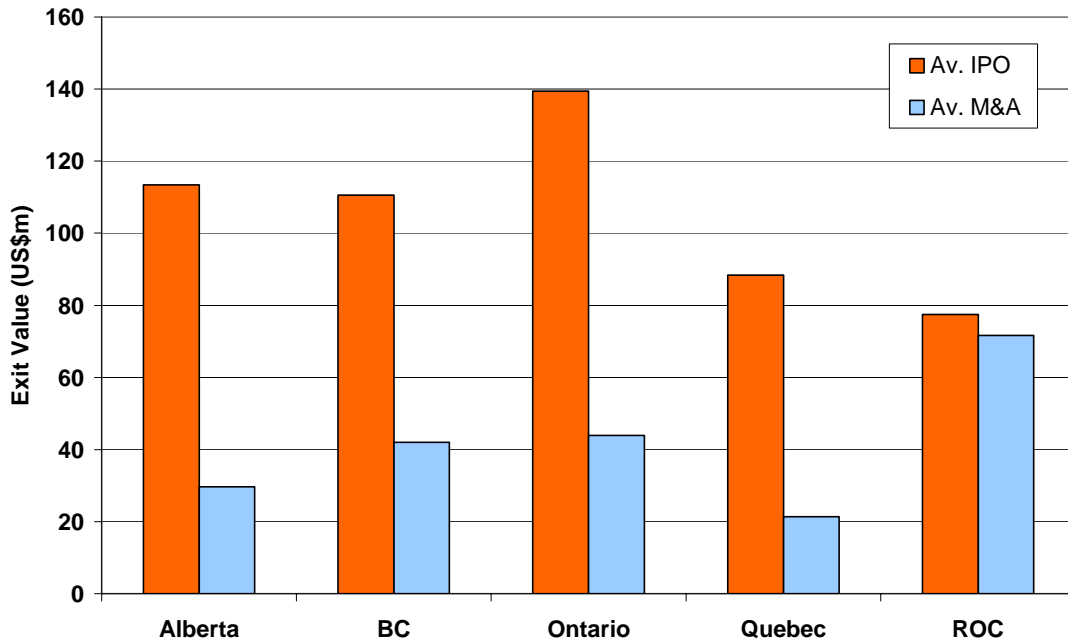
An important result in Chart 3A is that none of the Canadian provinces makes the top ten ranking. Indeed, Chart 3B shows that the average value in the Canadian provinces is significantly smaller than in the US. This result appears to be true across all jurisdictions, and continues to apply both for IPOs and acquisitions. This confirms that, relative to Canada, venture-capital backed companies in the US generate larger exit values. Chart 3B also suggests that the average exit value is fairly similar across Canadian provinces. In Ontario, IPOs are slightly larger. In Quebec, IPOs and acquisitions are slightly smaller.

Chart 3C shows that there are considerable differences in the average exit values across our comparison US states. In particular, we note that the cluster-focused states of Texas and North Carolina have higher average exit values, both in terms of IPOs and acquisitions. Oregon has the lowest average exit values of the comparison states.

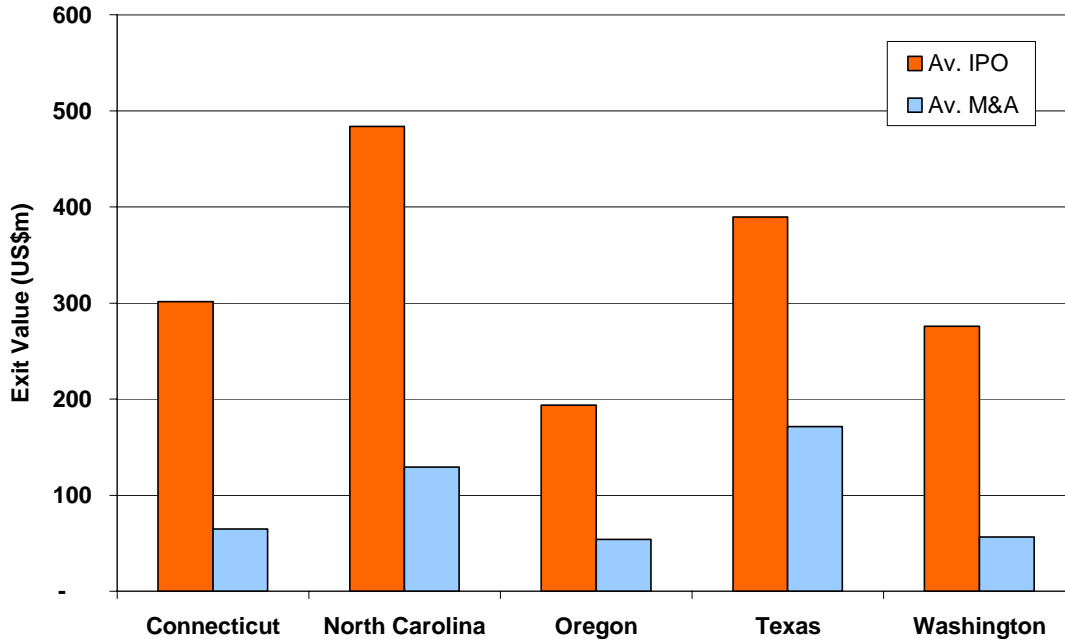
**Chart 3A: Average Value of Exits – Top 10 Jurisdictions**



**Chart 3B: Average Value of Exits – Canadian Provinces**

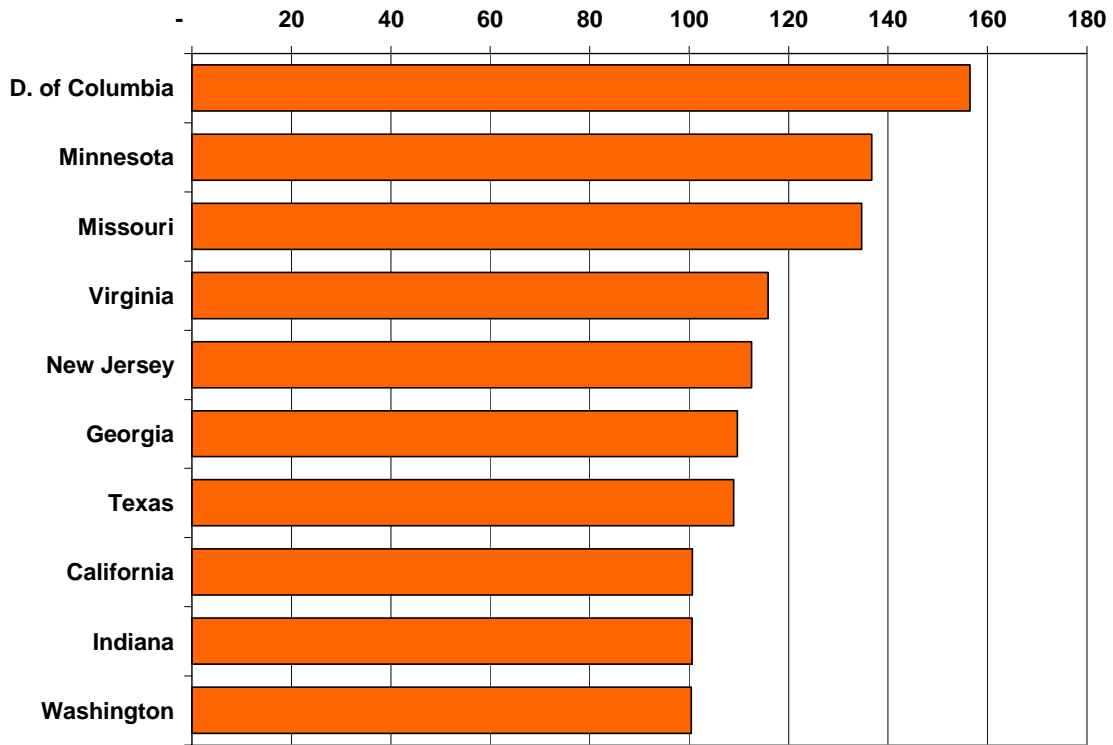


**Chart 3C: Average Value of Exits – US Comparison States**

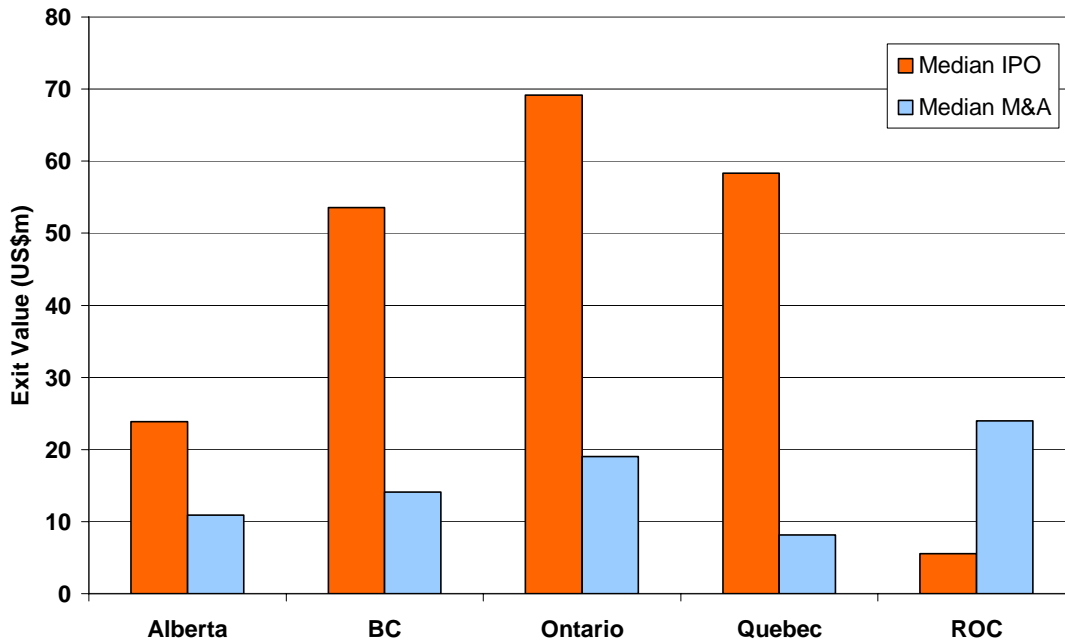


Charts 4A, B and C perform a similar analysis than 3A, B and C, using the median exit value. The qualitative results are very similar, although some of the details differ. The relative ranking of some of the states changes in Chart 4A. Chart 4B shows that Alberta has a significantly lower median IPO value than the other large Canadian provinces. Chart 4C shows some minor differences in the relative ranking of the comparisons states.

**Chart 4A: Median Value of Exits – Top 10 Jurisdictions**



**Chart 4B: Median Value of Exits – Canadian Provinces**



**Chart 4C: Median Value of Exits – US Comparison States**

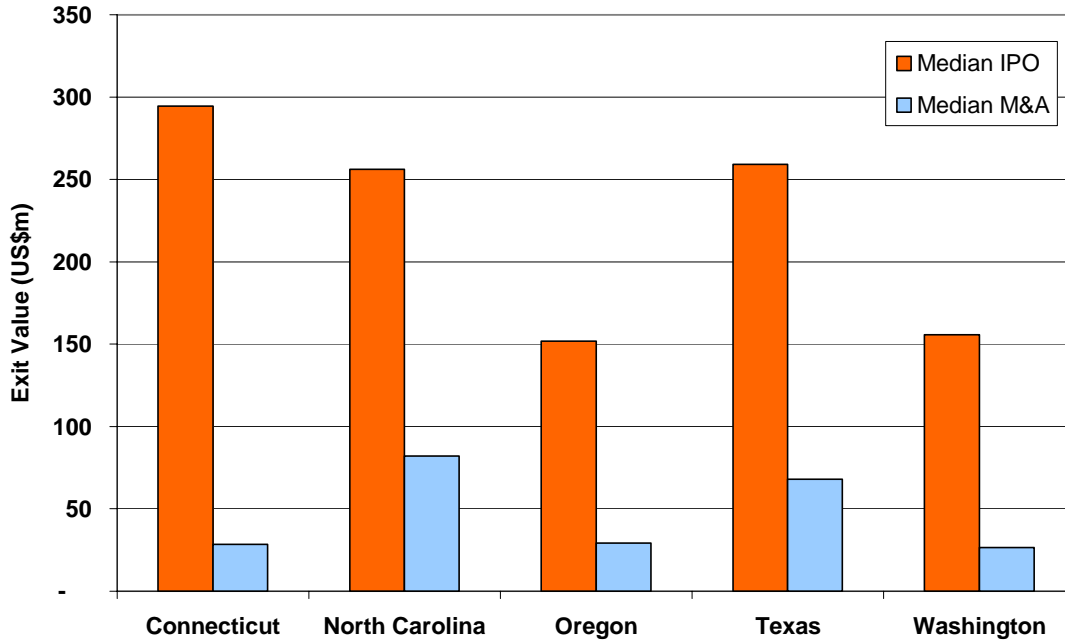
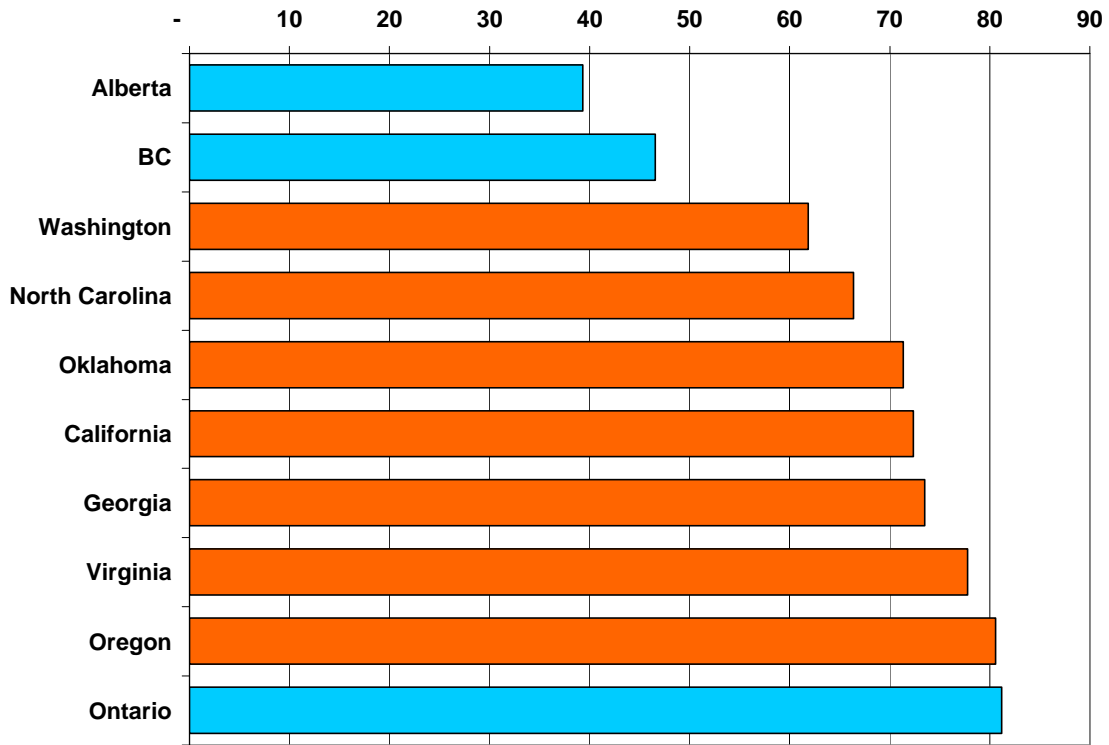
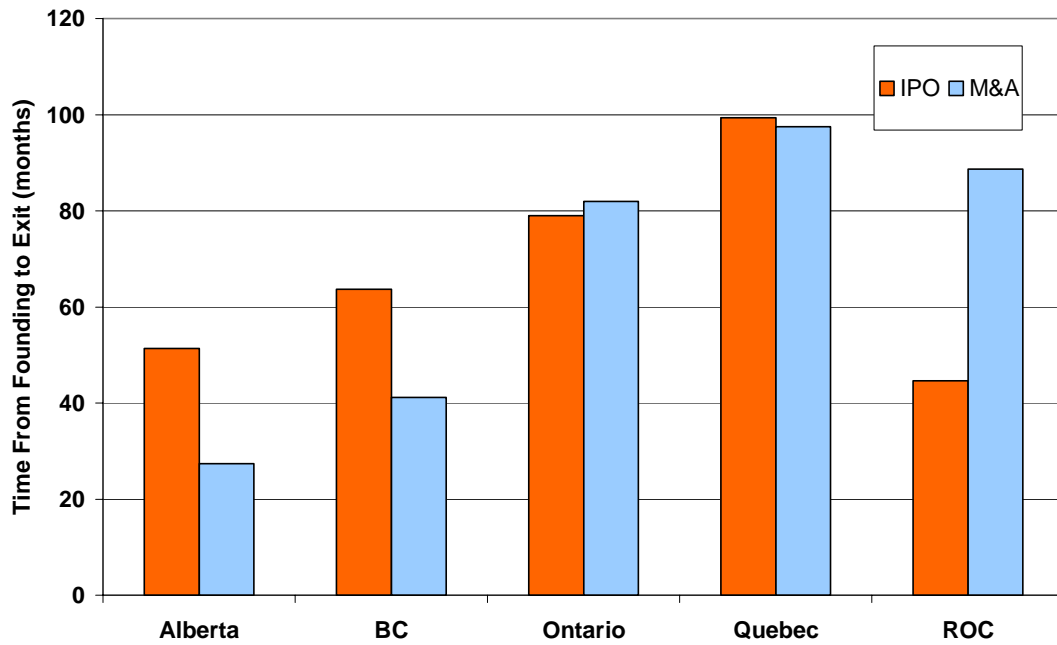


Chart 5A, B and C document the average time from founding to exit. They show that Alberta and British Columbia have the lowest average time between founding and exit. Since venture capitalists care a lot about a rapid path to liquidity, this is an important result. One conjecture for this may be that venture capitalists in the western provinces make more extensive use of junior stock markets. Still, these liquidity events can be considered economically meaningful events, since our exit criterion recognizes junior market listing only if they satisfy some minimal size threshold (namely that the company raises more than CAN\$1 million). Moreover, it is worthwhile noting that the faster path to liquidity applies not only to IPOs, but also to acquisitions, suggesting that junior markets are only part of the reason why Alberta and British Columbia have the fastest exits.

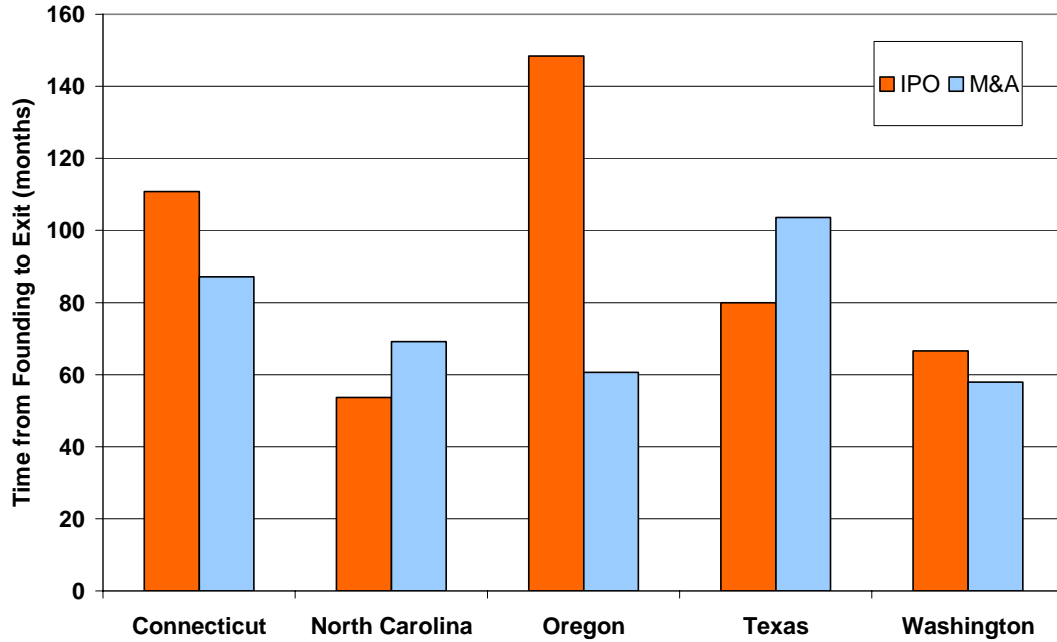
**Chart 5A: Average Time Founding to Exit – Top 10 Jurisdictions**



**Chart 5B: Average Time Founding to Exit – Canadian Provinces**

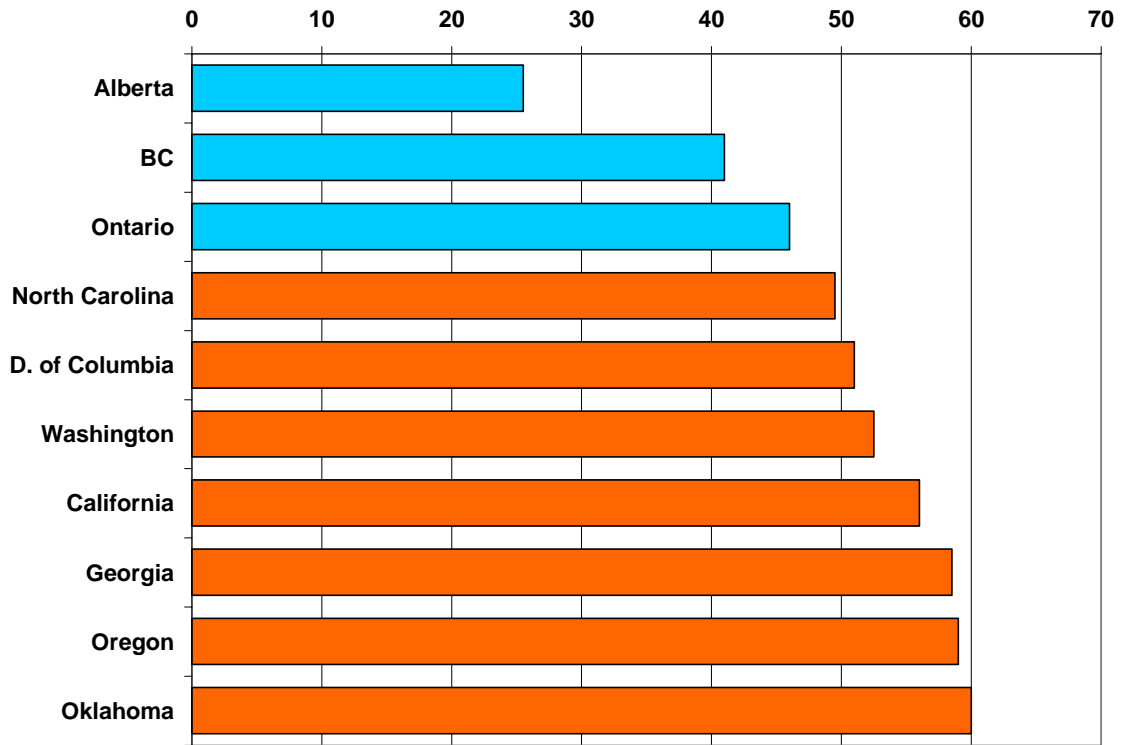


**Chart 5C: Average Time Founding to Exit – US Comparison States**

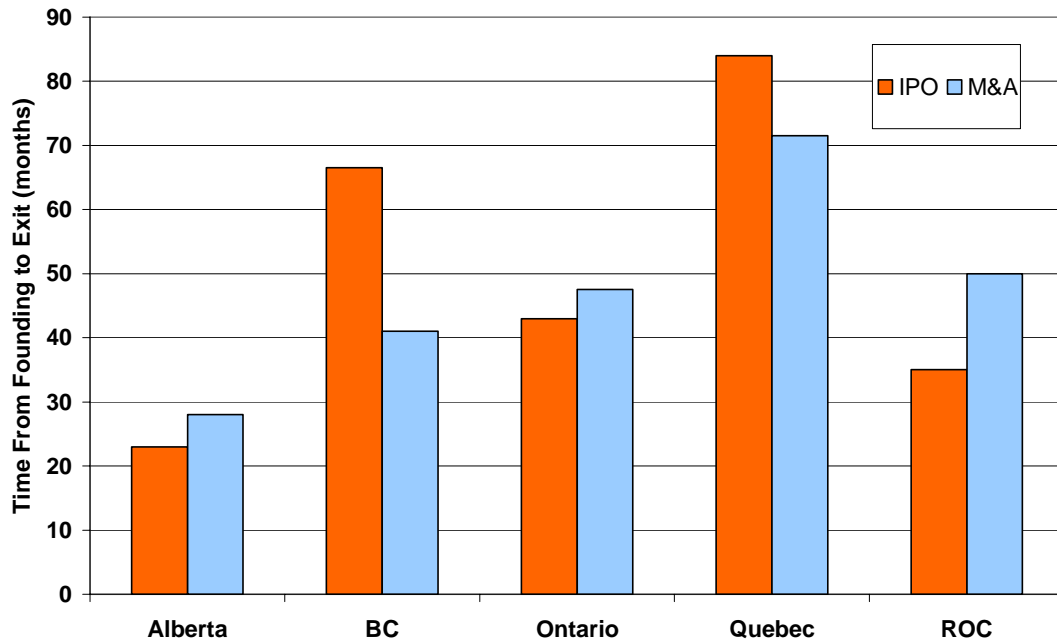


Charts 6A, B and C perform a similar analysis for the median time to exit. Because the distribution of exit times is right-skewed, the medians are lower than the averages. Overall, the median time to exit has a similar pattern than the average time to exit. The most notable difference is that Ontario rises to the third place, ahead of all US states.

**Chart 6A: Median Time Founding to Exit – Top 10 Jurisdictions**

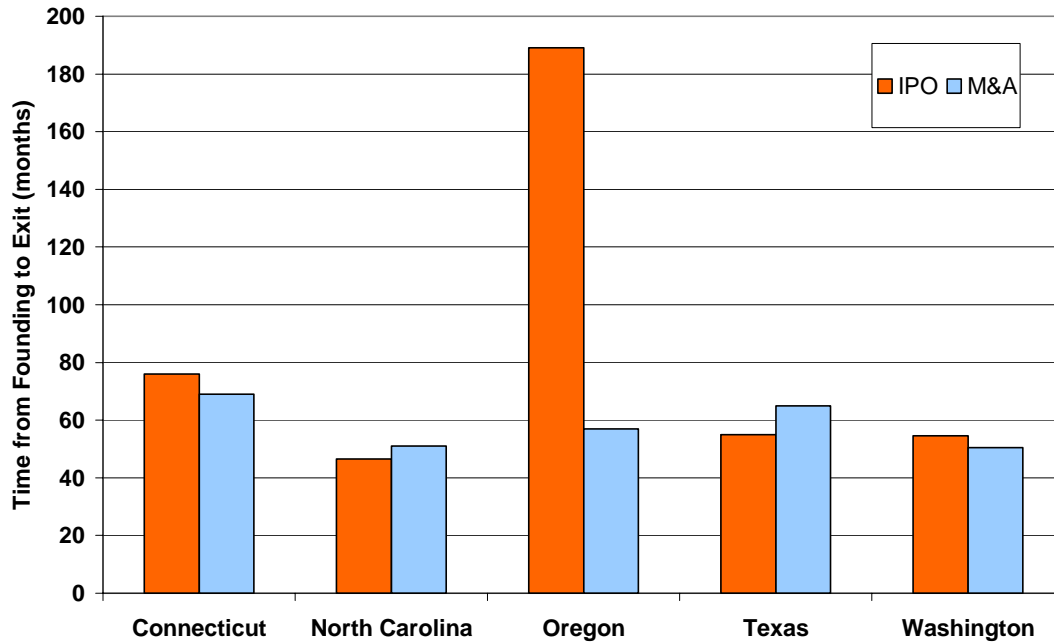


**Chart 6B: Median Time Founding to Exit – Canadian Provinces**





**Chart 6C: Median Time Founding to Exit – US Comparison States**



#### **4.2 Benchmarked exit values**

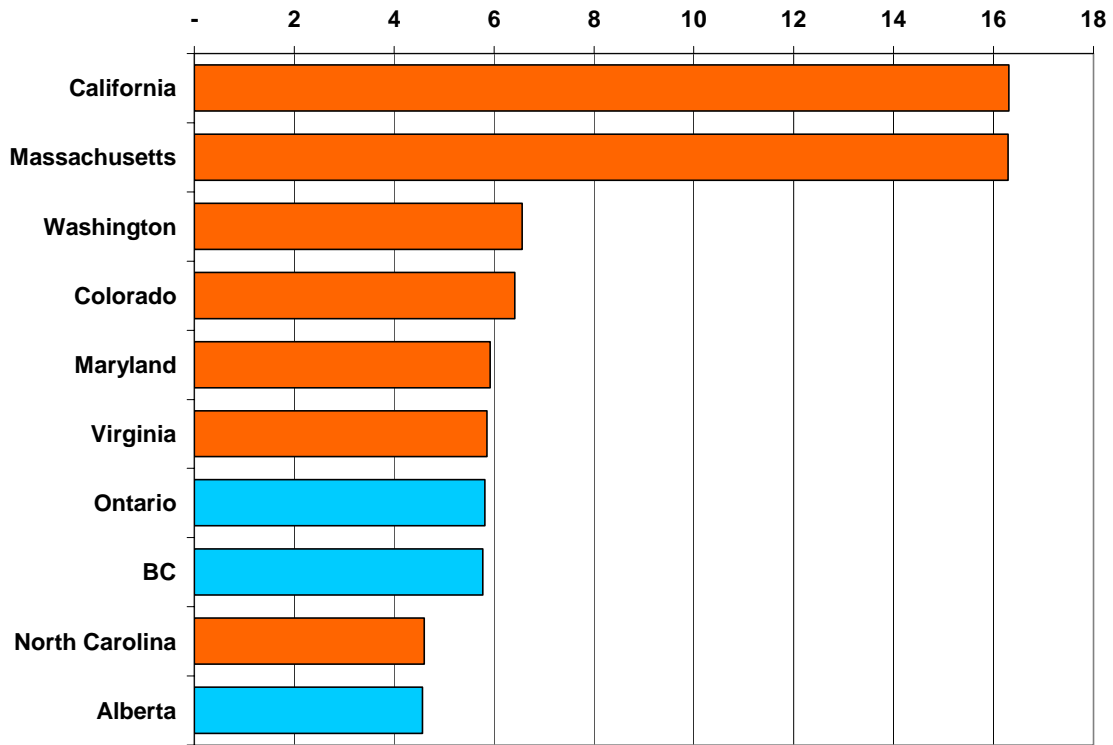
We now turn to the analysis of benchmarked exit values, to recognize the fact that different jurisdictions have different sizes and different economic structures. To account for the various ways in which jurisdictions differ from each other, we propose a variety of benchmarks for comparing exit performance.

Our first benchmark is to normalize exit values by a broad measure of the size of each jurisdiction. For this we use a measure of the gross domestic product (GDP) of each province and state. This is sometimes also called the gross state product (GSP). With this, we can calculate total exit values per \$1000 GDP.

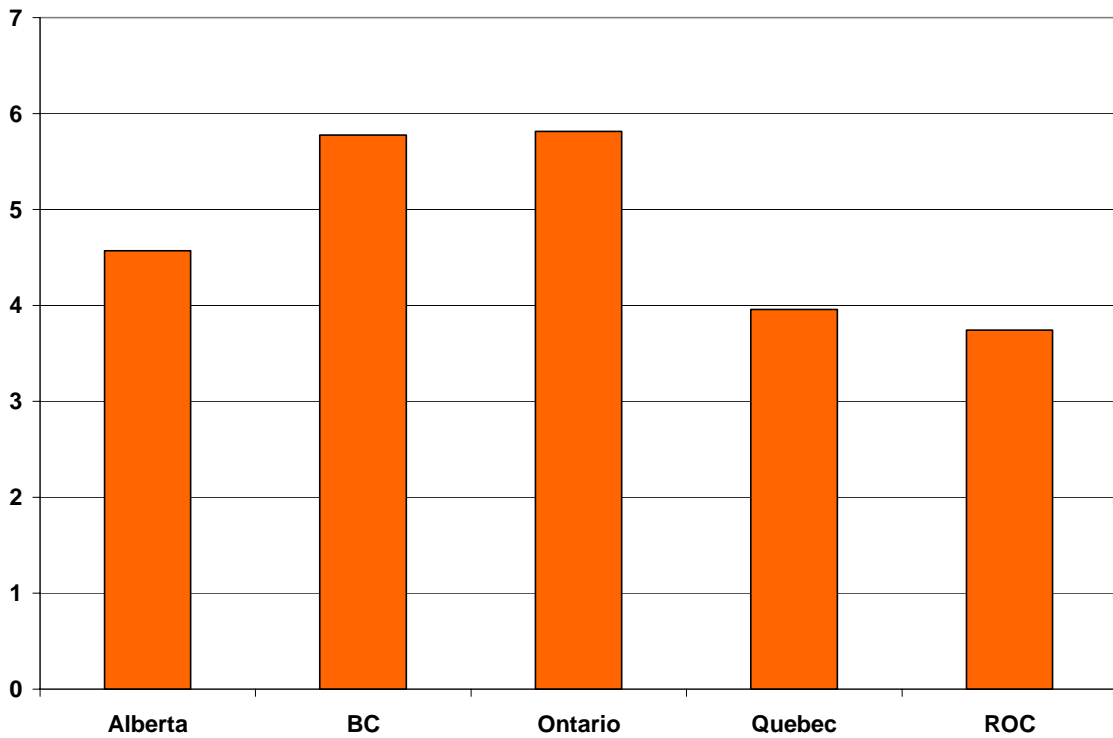
Chart 7A, B and C show that California and Massachusetts are distinct outliers with significantly higher exit values per GDP. This confirms the widely held notion that these two states constitute the leading jurisdictions for venture capital. Another interesting insight comes from comparing Chart 7A with Chart 7A. While Massachusetts is significantly behind California terms of its total exit value, it has an almost identical exit performance once we normalize by GDP. Put differently, California may seem a much larger venture capital market than Massachusetts, but this can be fully accounted for by the fact that California has a much larger economy.

Another important insight from Chart 7A is that three of the Canadian provinces make it into the top ten. In particular Ontario ranks 7<sup>th</sup>, British Columbia 8<sup>th</sup> and Alberta 10<sup>th</sup>. This challenges the widely-held belief that the Canadian provinces are far behind US states. Chart 7B compares the exit values per GDP for the leading Canadian provinces. There is a relatively little difference between Ontario and British Columbia. Alberta is lagging only slightly on these terms, and Quebec (as well as the rest of Canada) is not far behind. Chart 7C shows the exit performance for the US comparison states. While Texas outperforms the other comparisons states in terms of total exit value, this is mainly due to the size of its economy. Indeed, Chart 7C shows that Texas has a comparable per GDP exit performance to that of North Carolina and Connecticut. Another interesting result is that Washington State has a better exit performance than the other US comparisons states. Finally, Oregon has a weaker performance, one that cannot be explained away by the smaller size of its economy.

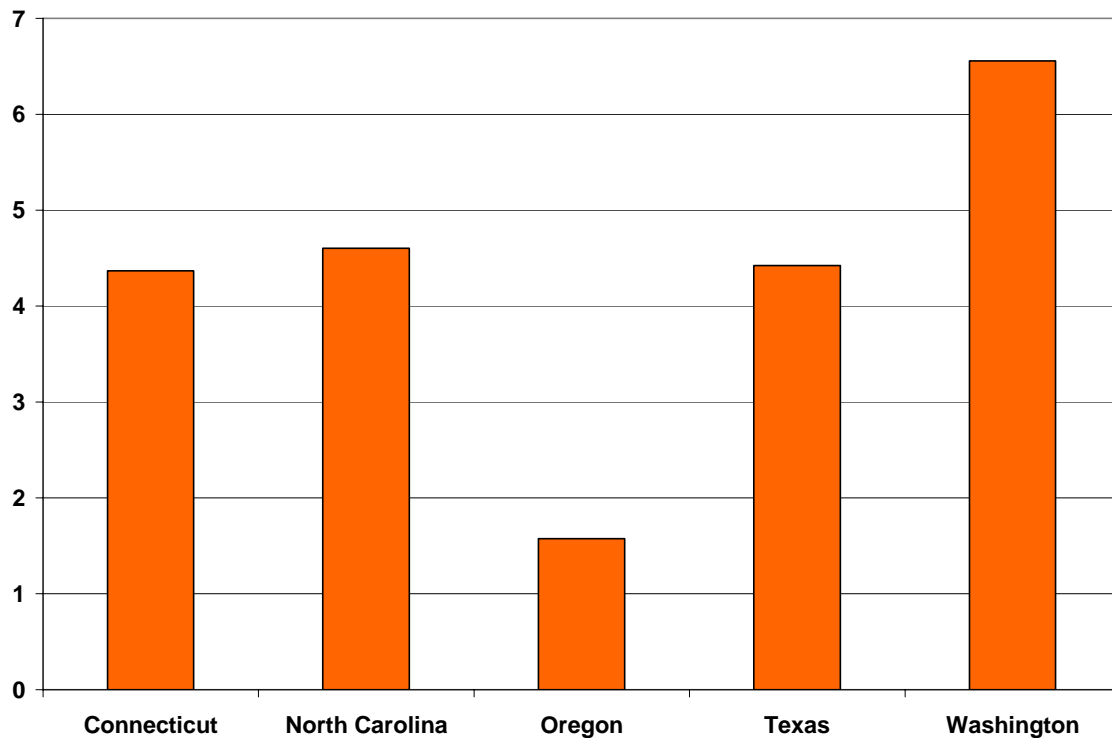
**Chart 7A: Total Value of Exits per \$1000 GDP – Top 10 Jurisdictions**



**Chart 7B: Total Value of Exits per \$1000 GDP – Canadian Provinces**



**Chart 7C: Total Value of Exits per \$1000 GDP – US Comparison States**

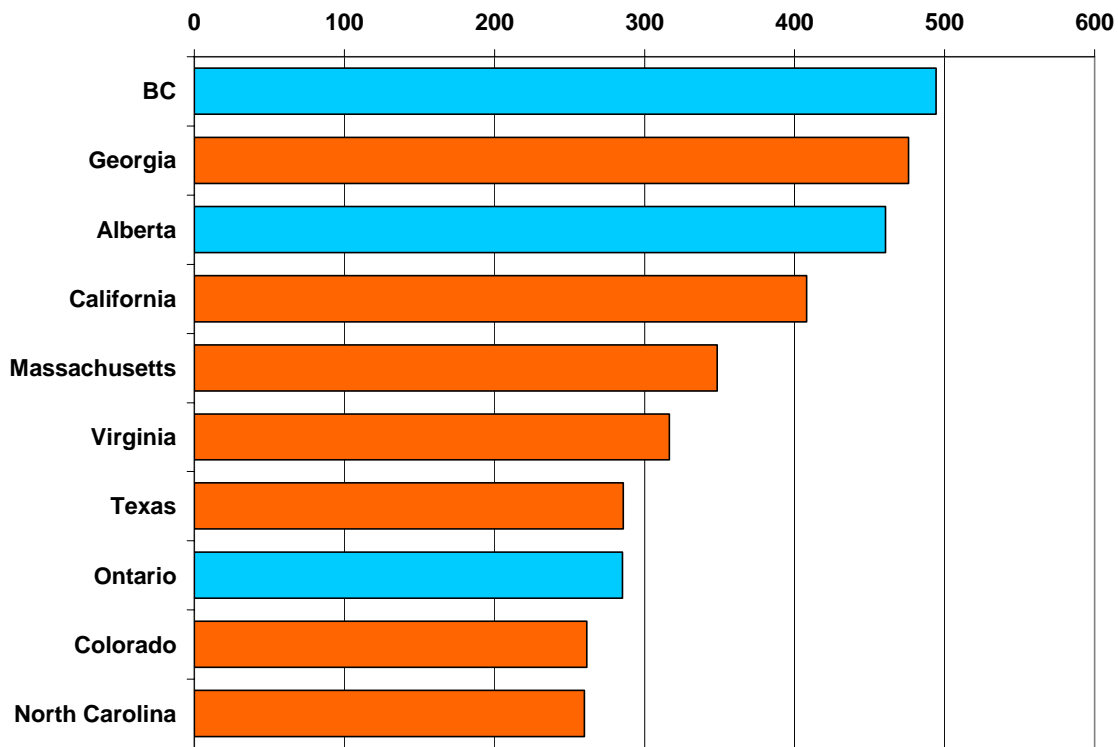


The GDP benchmark controls for the overall size of the economy. But there are many sectors of the economy that have little to do with venture capital, and different jurisdictions may differ in terms of the relative importance of their research-intensive sectors. We therefore consider two benchmark measures that address the degree to which the economy of each jurisdiction is focused on research and innovation. In particular we compare the total exit value to the investments in research and development. For this we consider both total spending on R&D (measured by GERD), as well as total business spending on R&D (measured by BERD).

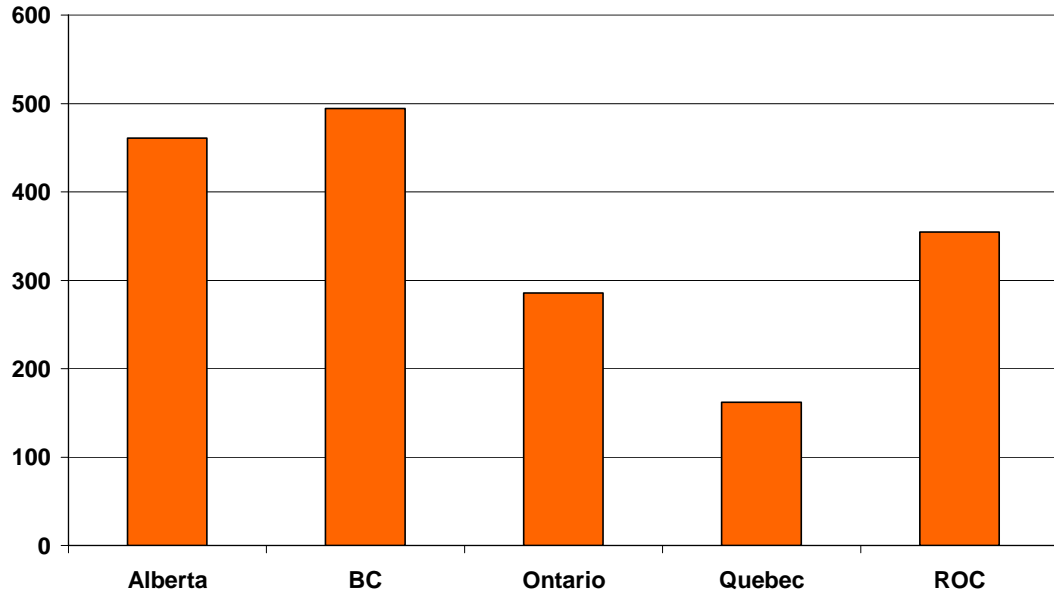
Chart 8A shows that British Columbia has the highest exit value per dollar spent on R&D. Moreover, Alberta ranks 3<sup>rd</sup> and Ontario 8<sup>th</sup>. This suggests that Canadian provinces, especially British Columbia, are particularly efficient in converting R&D spending into value creation by venture-capital backed companies. Put differently, when we compare exit values against a measure of the size of the research sector, we find that Canadian provinces perform very well. What is particularly remarkable about this result

is that British Columbia and Alberta (as well as Georgia) outperform the two leading venture capital jurisdictions of California and Massachusetts. It suggests that one of the main factors that can explain the success of California and Massachusetts is the large amount of research spending obtained by these two states. Once we control for the amount of money spent on R&D, we find that their performance is still very strong, but no longer an outlier. Chart 8B compares the main Canadian provinces, showing that the two Western provinces of Alberta and British Columbia are particularly efficient in terms of converting R&D dollars into exit values. Chart 8C shows that the cluster-oriented US comparisons states, North Carolina and Texas, outperform the other comparisons states on this benchmark.

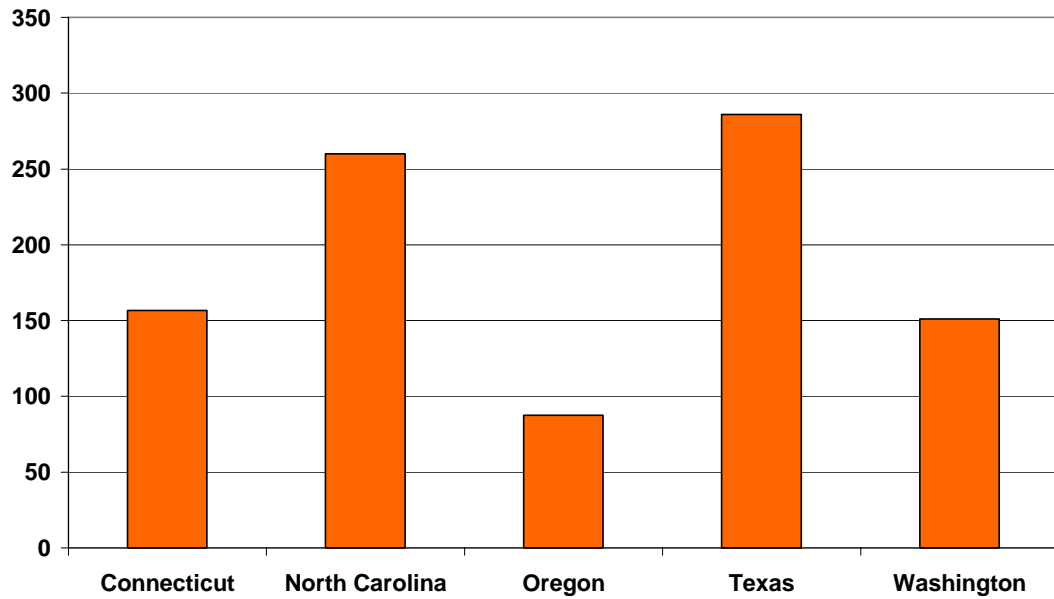
**Chart 8A: Total Value of Exits per \$1000 GERD – Top 10 Jurisdictions**



**Chart 8B: Total Value of Exits per \$1000 GERD – Canadian Provinces**

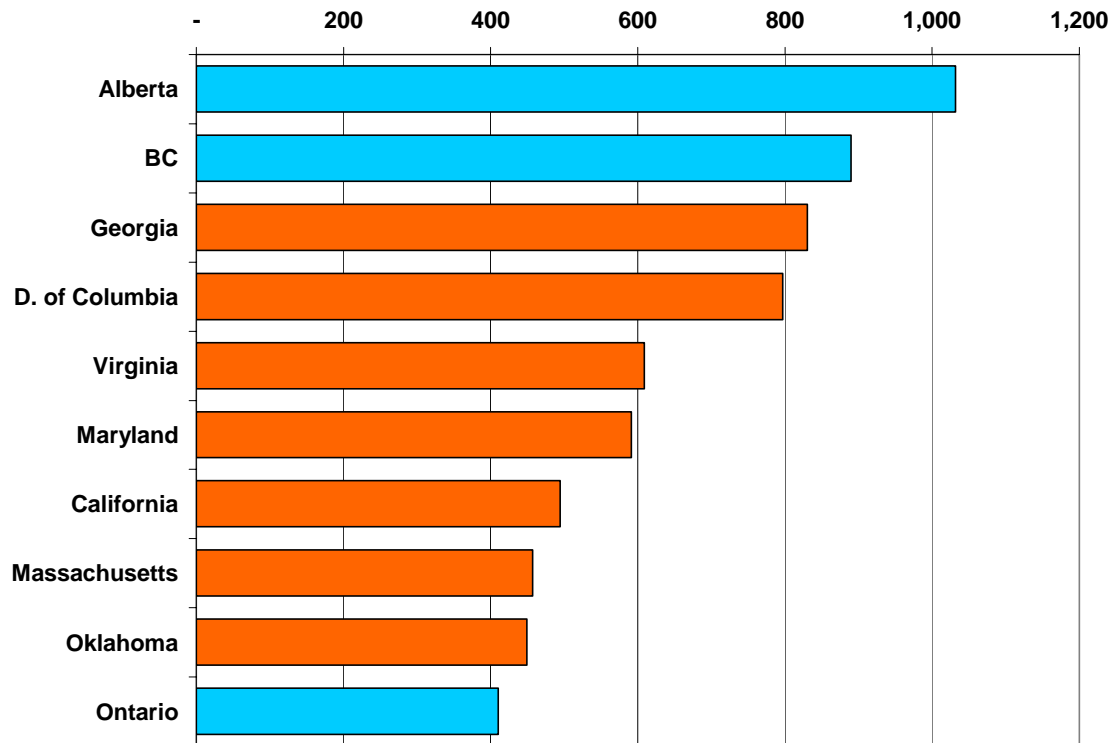


**Chart 8C: Total Value of Exits per \$1000 GERD – US Comparison States**

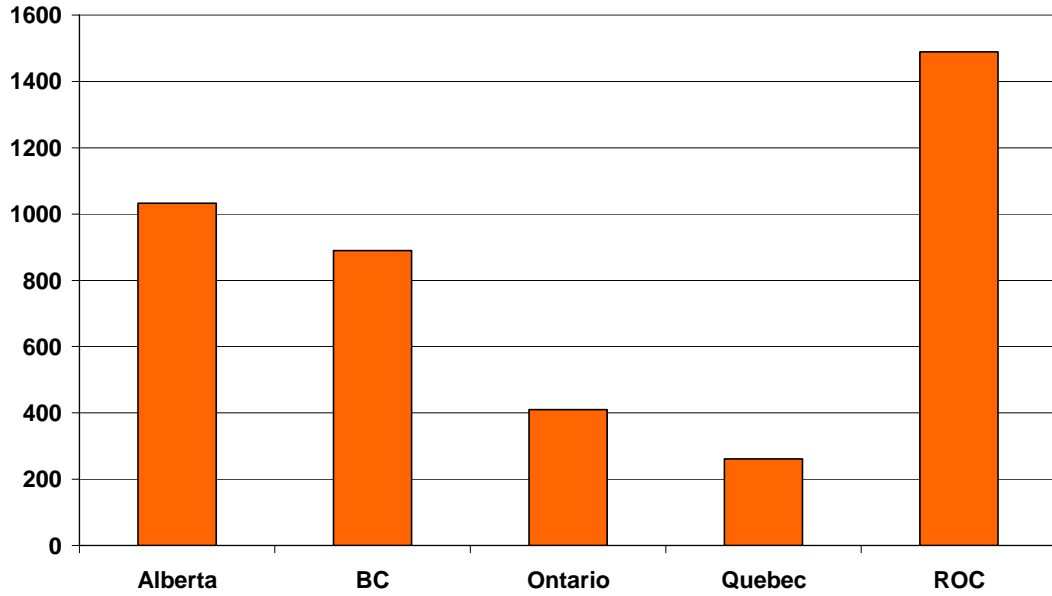


Charts 9A, B and C perform a similar analysis to Charts 8A, B and C, using total private business expenditures on R&D (as measured by BERD). The overall pattern of results is very similar. Alberta now has a slightly better performance than British Columbia. And the relative ranking of some US states is also slightly different. One notable result is that, in addition to Georgia, we now find that the District of Columbia, Virginia and Maryland also outperform California and Massachusetts. The main reason for this is that these states receive significant amounts of public R&D spending, especially related to the defense sector.

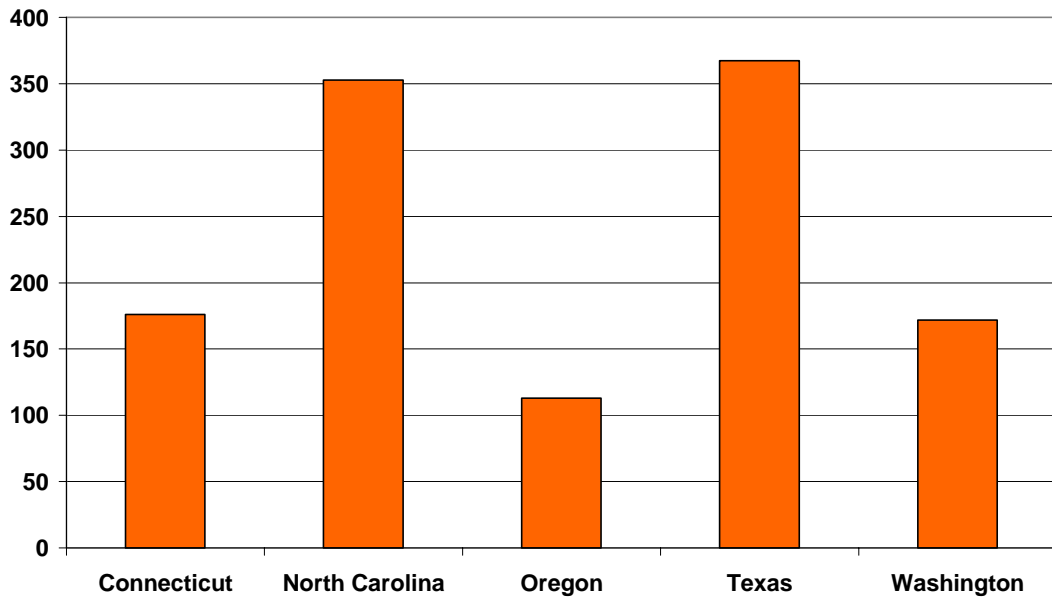
**Chart 9A: Total Value of Exits per \$1000 BERD – Top 10 Jurisdictions**



**Chart 9B: Total Value of Exits per \$1000 BERD – Canadian Provinces**



**Chart 9C: Total Value of Exits per \$1000 BERD – US Comparison States**





Our next benchmark compares the total exit value to a 5-year moving average of venture capital investments. Chart 10A shows that three smaller states, The District of Columbia, Oklahoma and Indiana, rank at the top. We therefore should not infer too much from this particular result. The reason for this is that in a small market, it only takes one or two large exits to create such a high ratio.

The most interesting results from Chart 10A is that neither California nor Massachusetts are in the top ten. This suggests that California and Massachusetts do not necessarily constitute the most attractive venture capital markets, in terms of generating a return to venture capital investments. Another interesting finding is that British Columbia continues to perform well on this metric. Chart 10B suggests that British Columbia outperforms both Ontario and Quebec. However, it is worthwhile repeating the caveat from section 2.5, related to the quality of the underlying data. While we have a lot of confidence in the measurement of the exit value, we have less confidence in the available measures of aggregate venture capital investments in Canada. This also explains the absence of Alberta from Charts 10A and B. In addition, it is possible that there is significant underreporting of venture capital investments in some of the smaller Canadian provinces, which would explain why the rest of Canada appears to perform so well in Chart 10B. Chart 10C shows the result for our US comparison states. Again, we find that the cluster-oriented states of North Carolina and Texas perform particularly well.

**Chart 10A: Total Value of Exits by Preceding 5 Year Average VC Investment – Top 10 Jurisdictions**

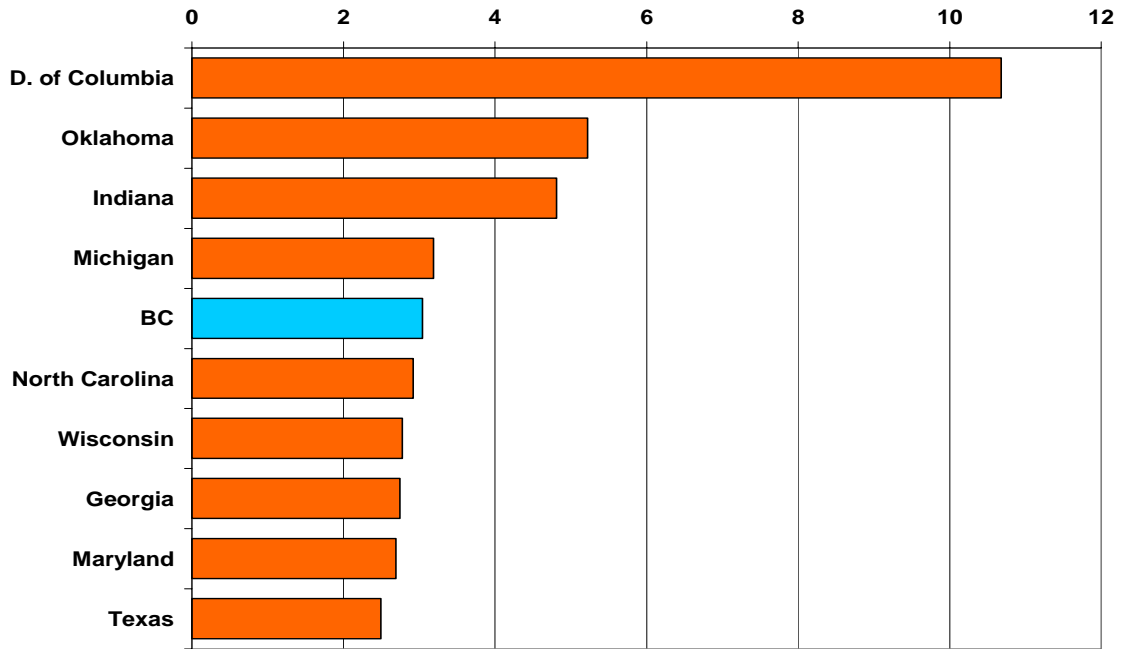


Chart excludes Alberta and the District of Columbia

**Chart 10B: Total Value of Exits by Preceding 5 Year Average VC Investment – Canadian Provinces**

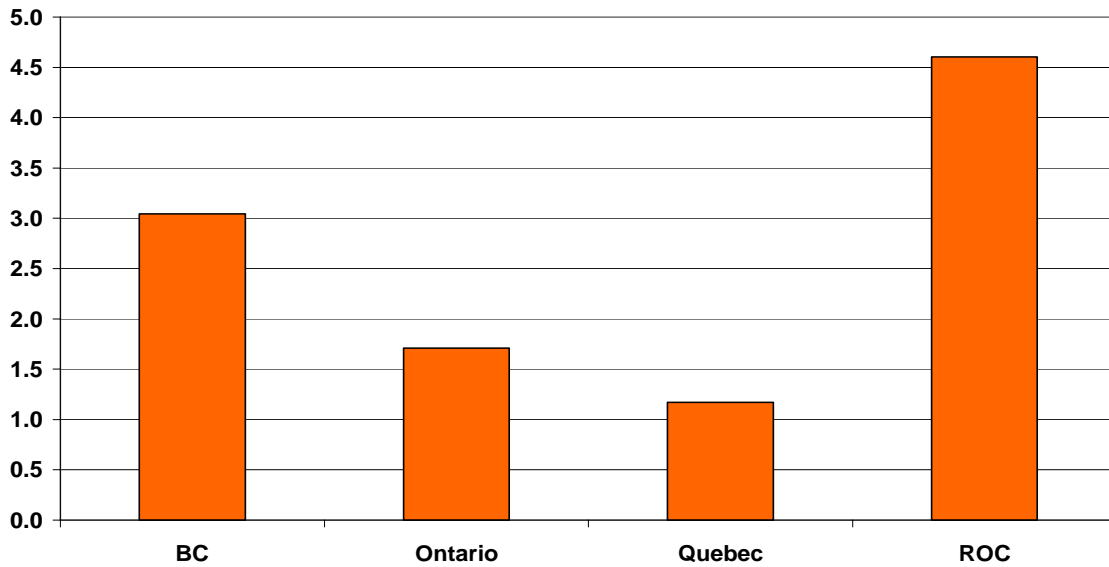
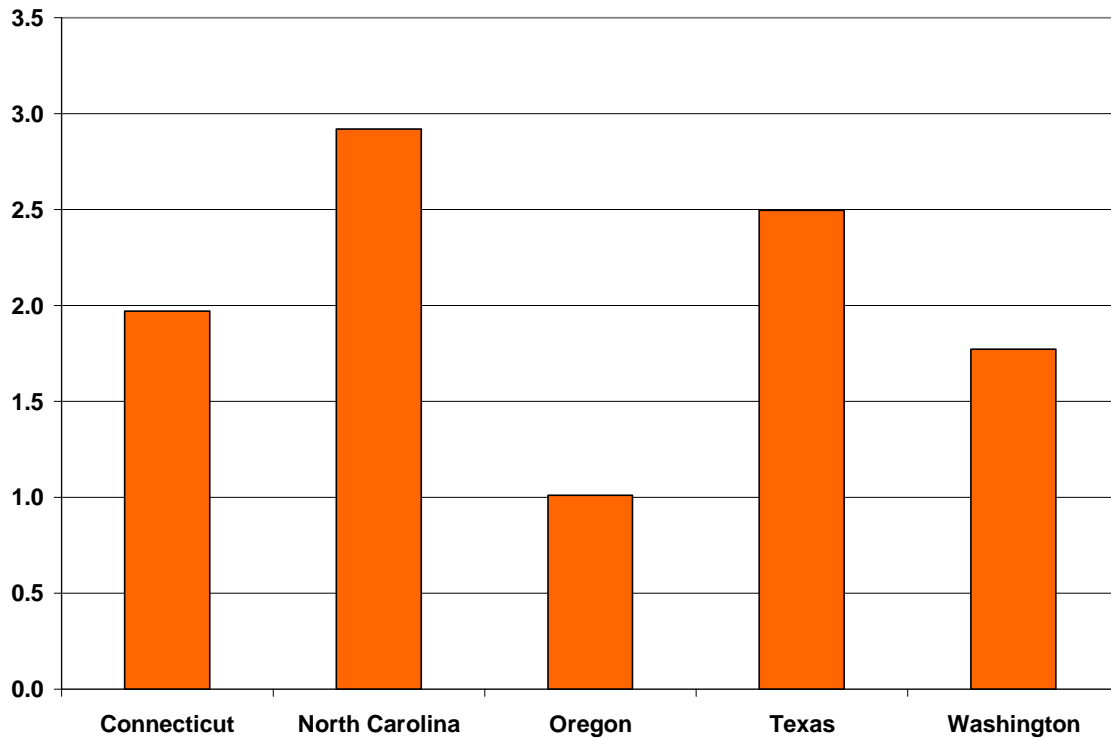


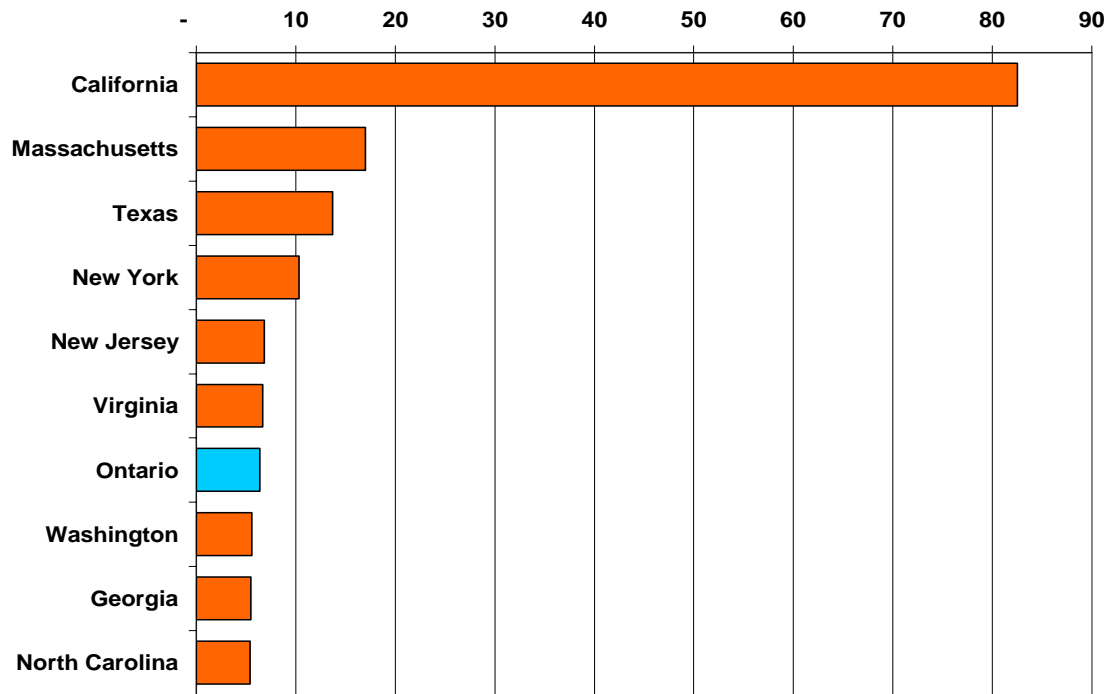
Chart excludes Alberta

**Chart 10C: Total Value of Exits by Preceding 5 Year Average VC Investment – US Comparison States**

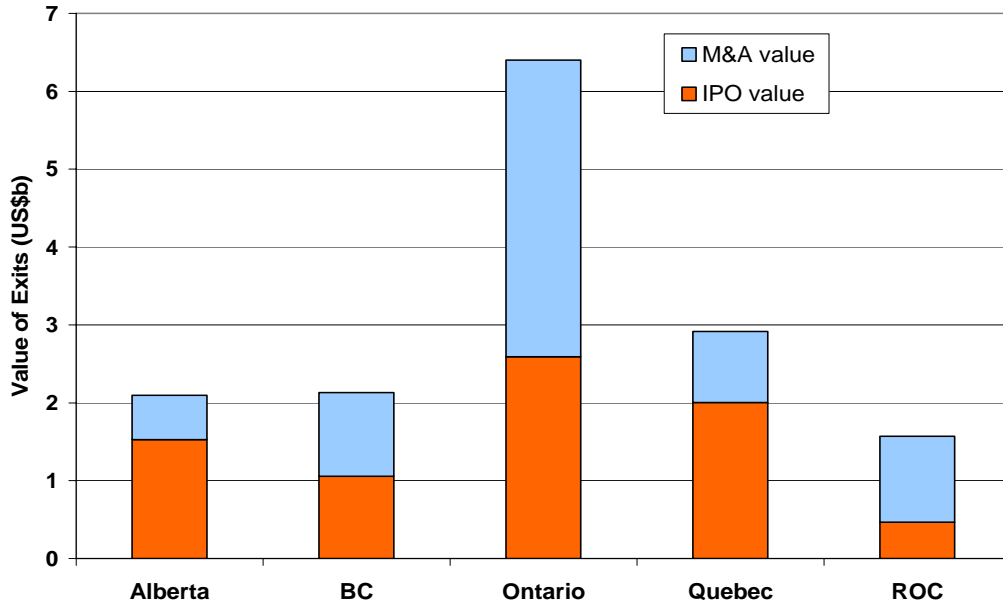


Our final benchmark takes a slightly different approach for measuring exit values. One notable feature of our sample is that it includes the so-called dotcom boom and bust. Our measurement of exit values is therefore influenced by the performance of the stock market at the time of exit. To account for any possible distortion that this may create in our comparison of jurisdictions, we consider a measure of exit performance that accounts for the timing of the exit events. Specifically we divide each exit value by the index value of the NASDAQ at the time of exit. Essentially, this allows us to deflate the high exit values that occurred at the peak of the dotcom bubble. Chart 11A, B and C show the results. Comparing this with Charts 1A, B and C, we notice that the normalization hardly affects the relative ranking of jurisdictions. Chart 11D compares the Canadian provinces using the TSX index as an alternative to the NASDAQ index. The results are very similar to Chart 11B.

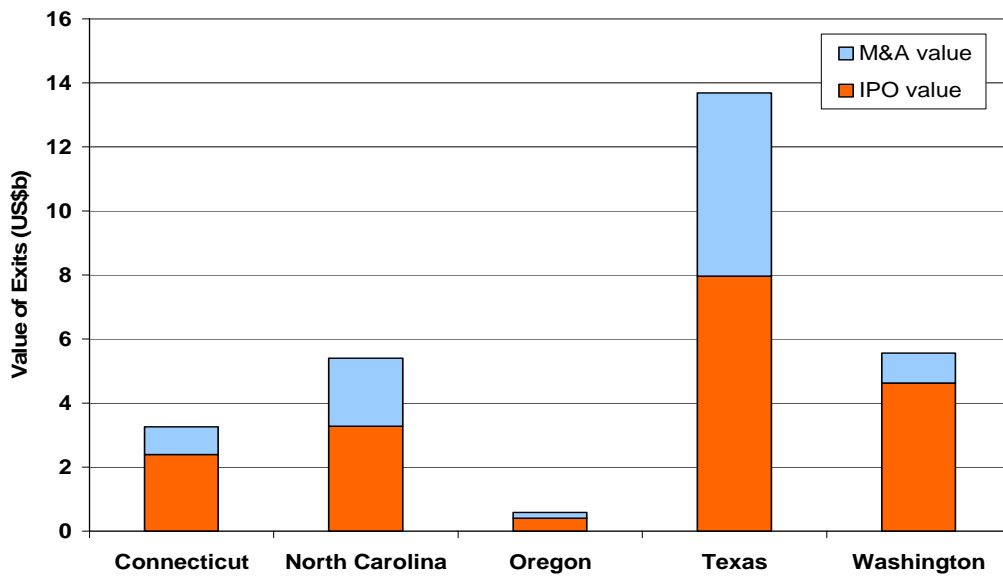
**Chart 11A: Total Value of Exits Normalized by the NASDAQ Composite Index – Top 10 Jurisdictions**



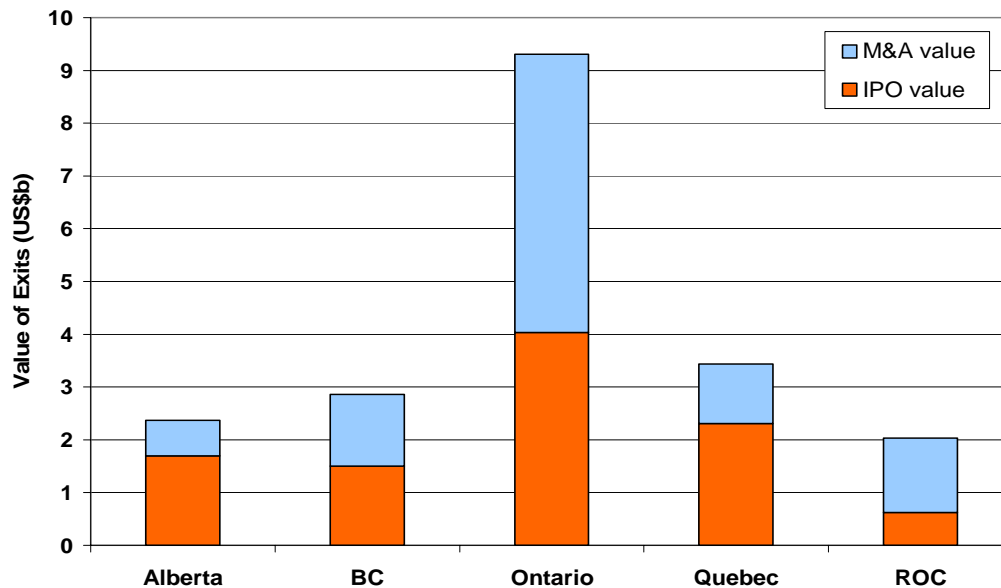
**Chart 11B: Total Value of Exits Normalized by the NASDAQ Composite Index – Canadian Provinces**



**Chart 11C: Total Value of Exits Normalized by the NASDAQ Composite Index – US Comparison States**



**Chart 11D: Total Value of Exits Normalized by the TSX Composite Index – Canadian Provinces**



#### 4.3. Sector comparisons

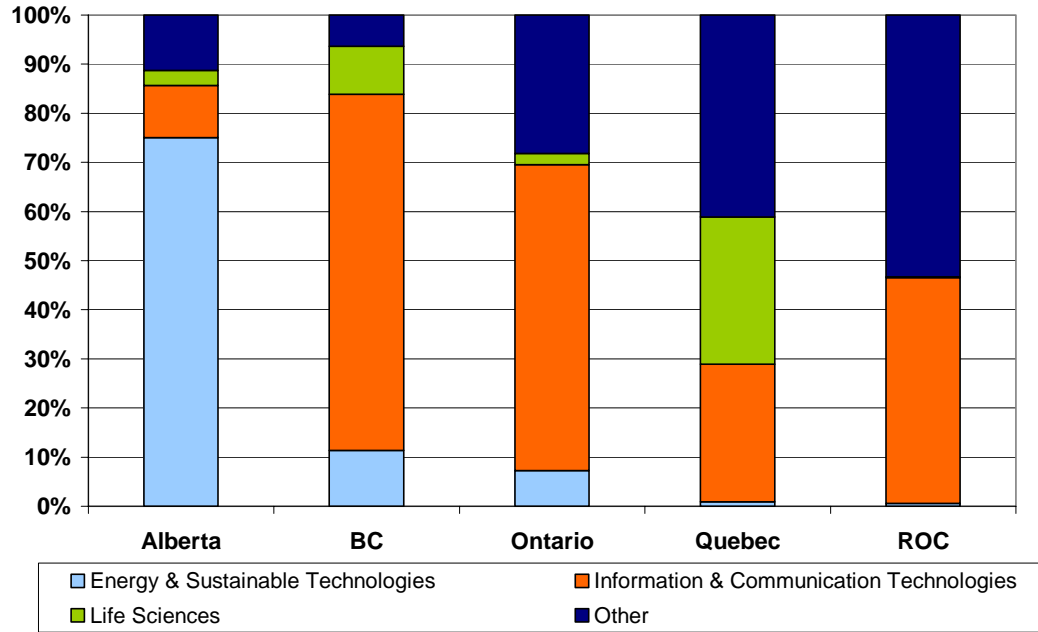
In this section we examine how exit values differ across different sectors. We focus on Information and Communications Technology (ICT), Life Sciences, Energy and Sustainable Technology (EST), and “other” sectors (mainly manufacturing and services). Table A3 in the appendix contains a more detailed breakdown of the four sectors, for all Canadian provinces, and the US states with more than US\$1 billion in exit value.

Chart 12A and B show the relative contributions of each of these sectors to the total exit value. Chart 12A shows that there are considerable differences across the various Canadian provinces in terms of their sector focus. EST accounts for the majority of exit values in Alberta. ICT accounts for the majority of exit values in British Columbia. Quebec is particularly unique, in that the majority of its investments are classified as “other.”, but Life Sciences and ICT are also important in Quebec. Chart 12B shows that the US comparisons states resemble each other in terms of their sector compositions. ICT is the dominant sector for all of the five provinces. One surprising result is that in North

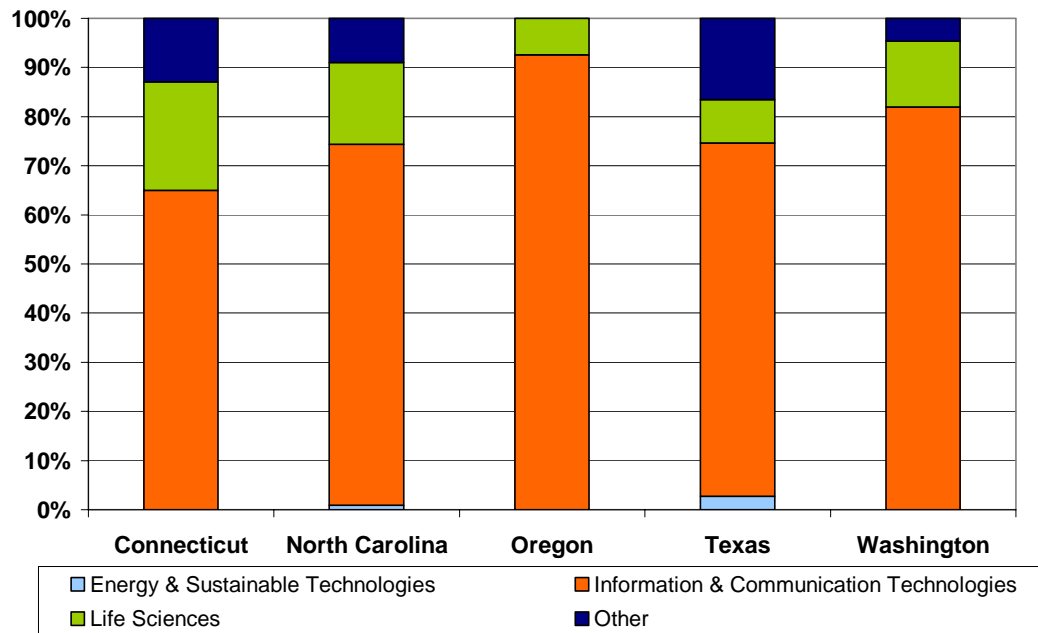
Carolina, which is widely known for its life sciences, ICT continues to be the largest contributor to exit values.

Charts 13A and B show the percentage that each of these sectors contributes to the total exit value. They show a similar pattern of results than Charts 12A and B.

**Chart 12A: Composition of Total Value of Exits – Canadian Provinces**

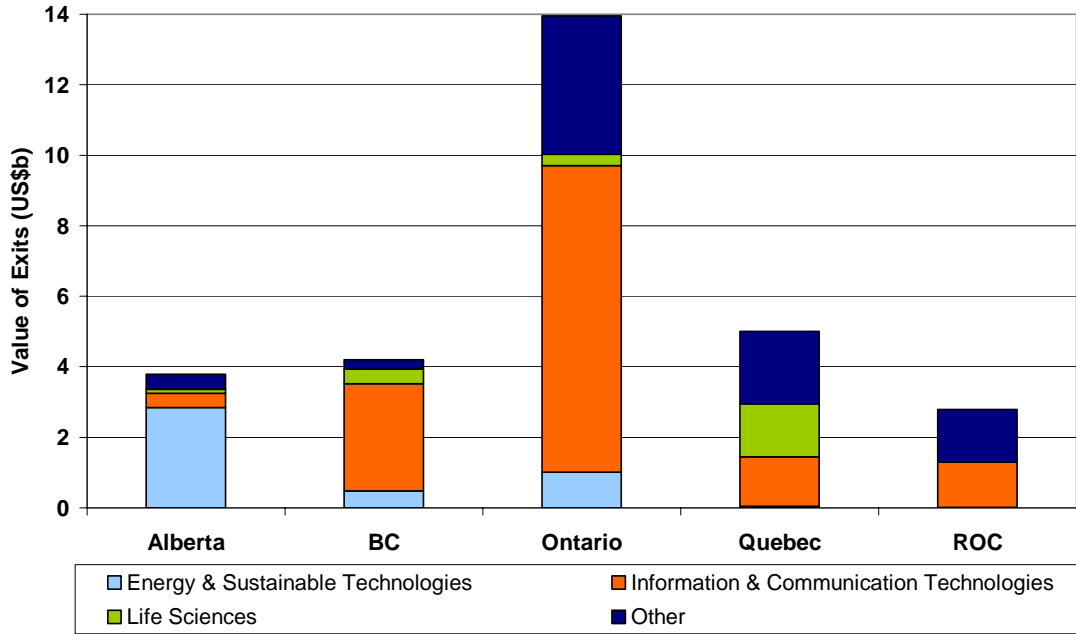


**Chart 12B: Composition of Total Value of Exits – US Comparison States**

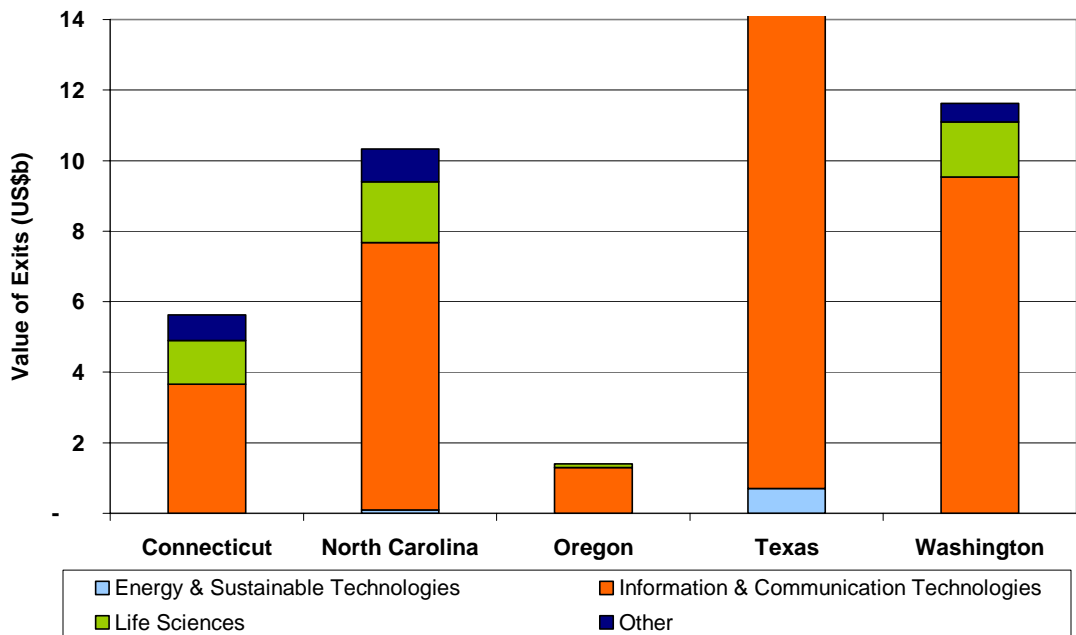




**Chart 13A: Total Value of Exits by Sectors – Canadian Provinces**

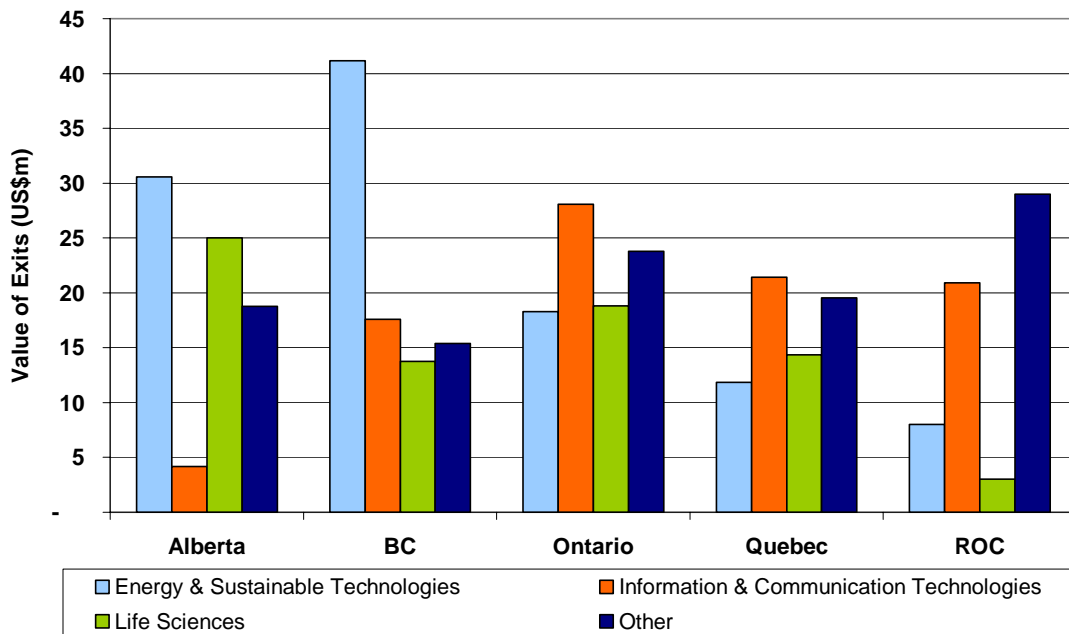


**Chart 13B: Total Value of Exits by Sectors – US Comparison States**

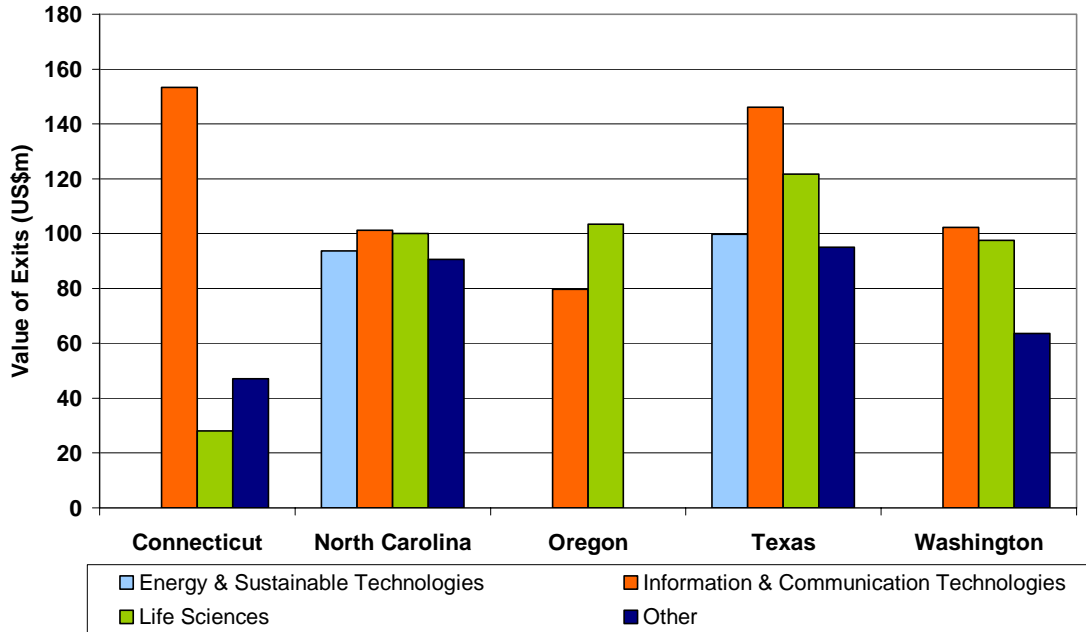


Charts 14A and B show the median exit value for each of the four sectors. One interesting finding is that EST attracts the highest exit values in the two western provinces of Alberta and British Columbia, while ICT dominates for the two eastern provinces of Ontario and Quebec. In the US, ICT and life sciences generate the largest median exit values. Oregon, in fact, does not even have any exits outside of these two sectors.

**Chart 14A: Median Value of Exits by Sectors – Canadian Provinces**



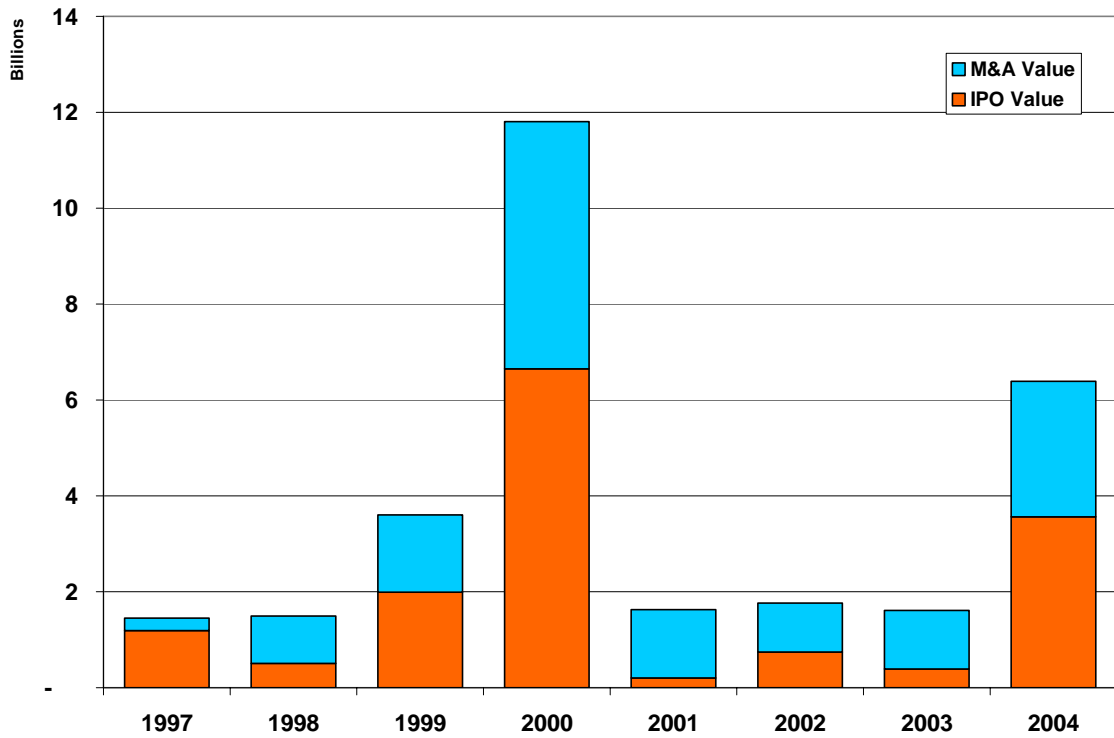
**Chart 14B: Median Value of Exits by Sectors – US Comparison States**



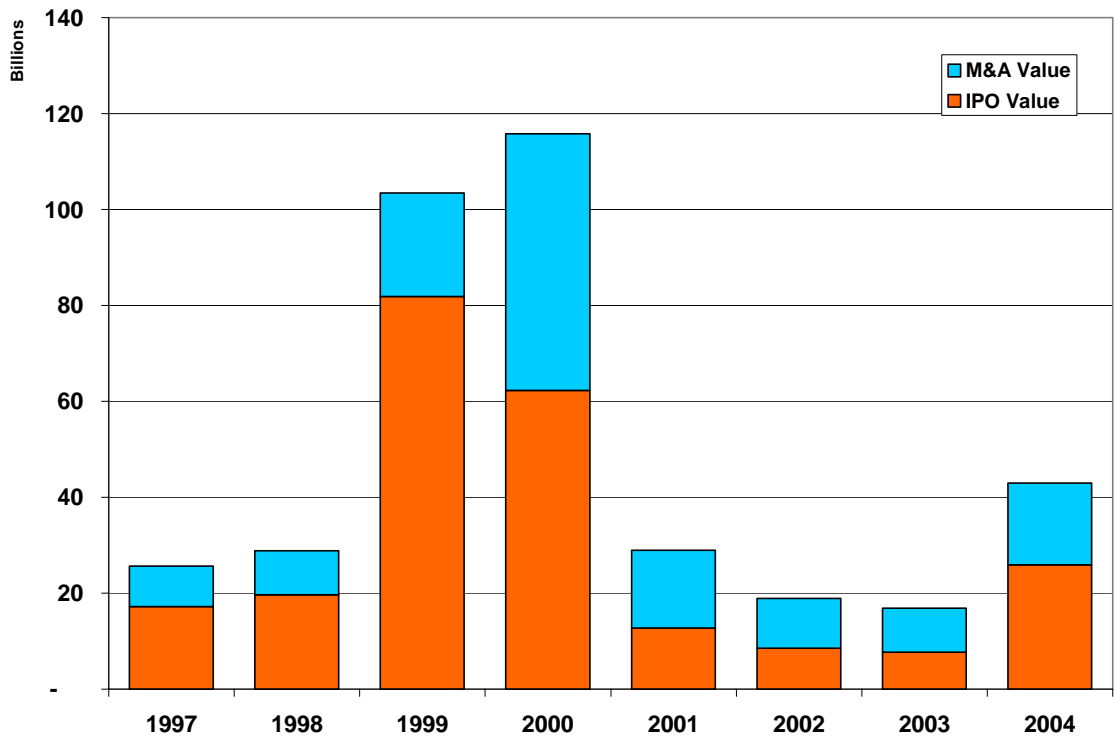
#### 4.4. Time trends

Our data allows us to examine how exit values change over time. We briefly examine some of the broad trends that can be observed over the period 1997 to 2004. Charts 15A and B shows the evolution of total exit values for Canada and the US respectively. We immediately note that exit values move in tandem with stock markets. We find that exit values peaked in 2000 in Canada. In the US, exit value peaked in both 1999 and 2000. Another interesting trend is that exit values made a significant comeback in 2004, both in Canada and the US. Indeed, while the period 2001 to 2003 witnessed lower exit values than before the dotcom bubble, 2004 shows a significant recovery, with exit values that exceed those from the period before 1999.

**Chart 15A: Total Value of Exits by Year – Canada**

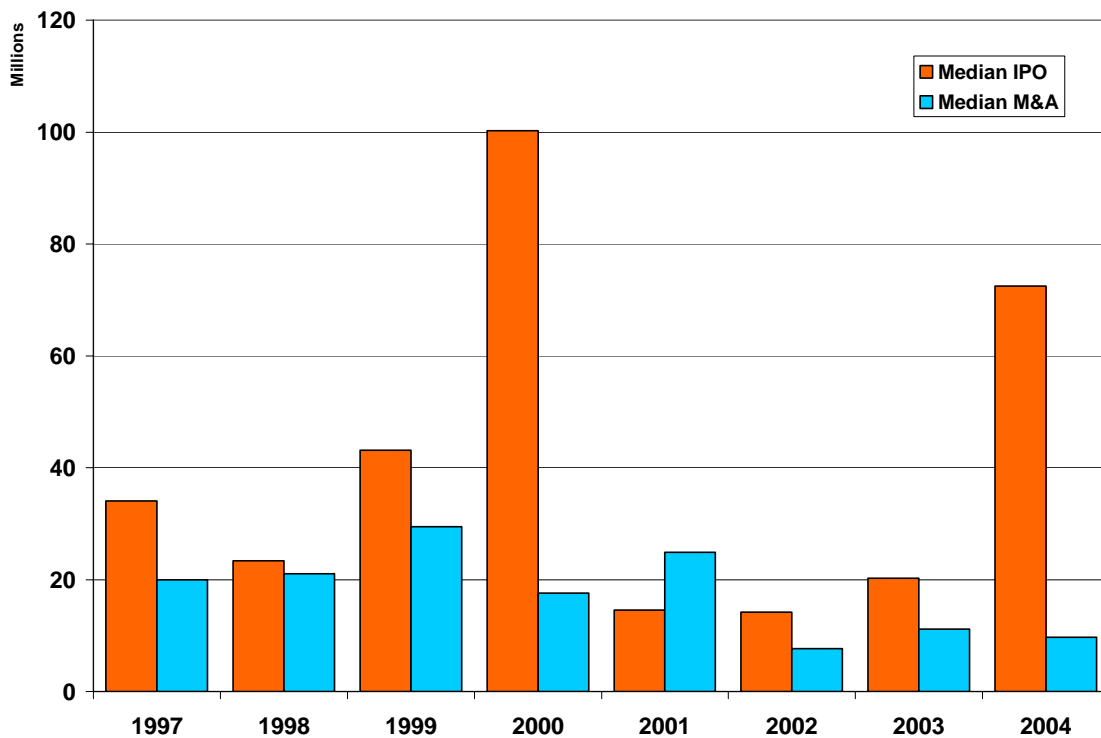


**Chart 15B: Total Value of Exits by Year – US**

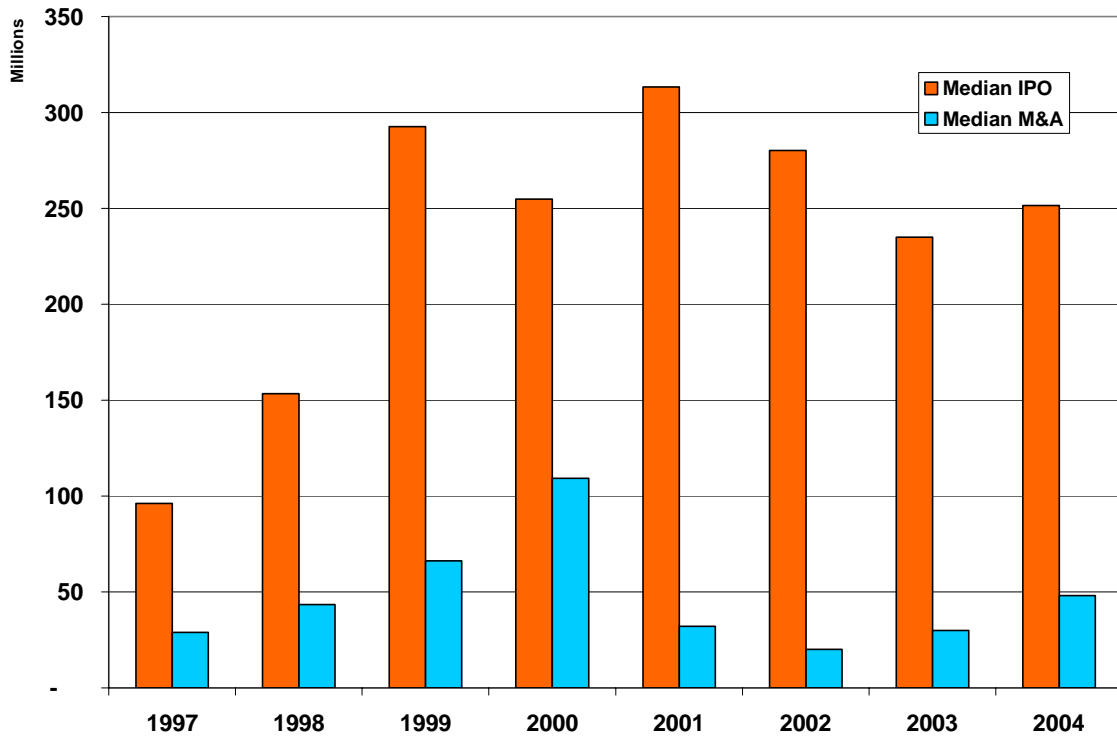


Charts 16A and B examine the time trends of the median exit value for Canada and the US respectively. The Canadian data for median exit values has a very similar pattern than the total exit value. The same can be said for the median exit values of acquisitions in the US. However, an interesting result is that the median IPO value in the US remained high, even throughout the period 2001 to 2003. While there were significantly fewer companies that went public during this period, those few companies that did manage to go public retained high exit values.

**Chart 16A: Median Value of Exits by Year – Canada**

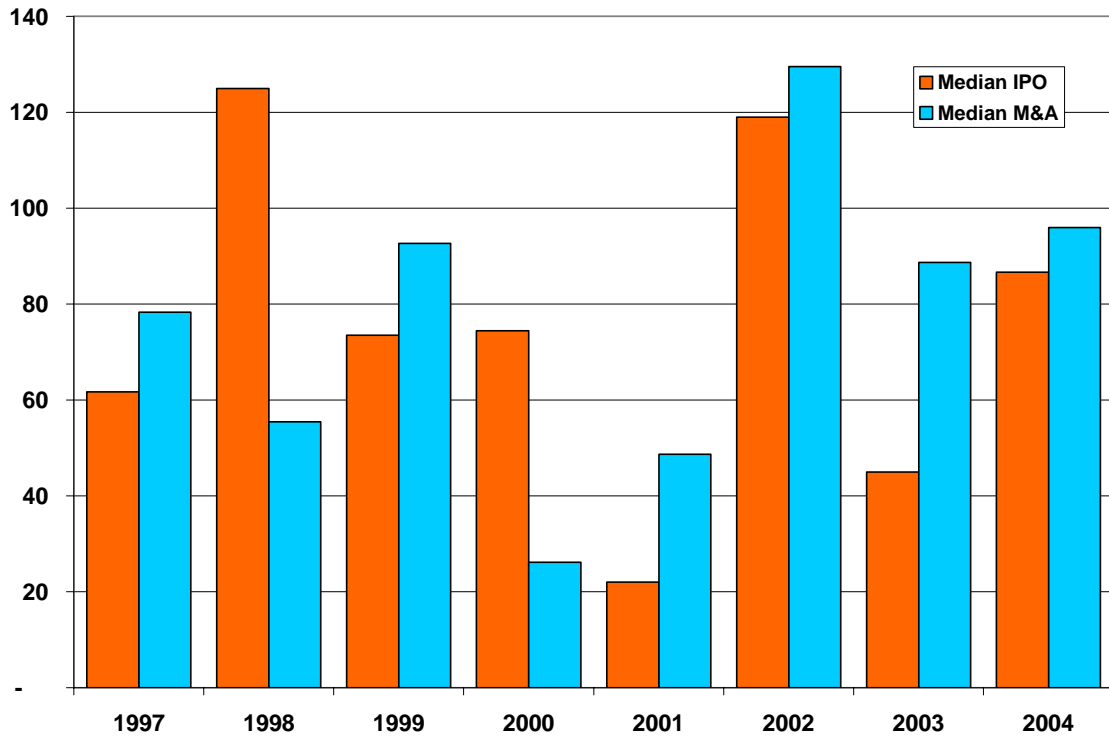


**Chart 16B: Median Value of Exits by Year – US**

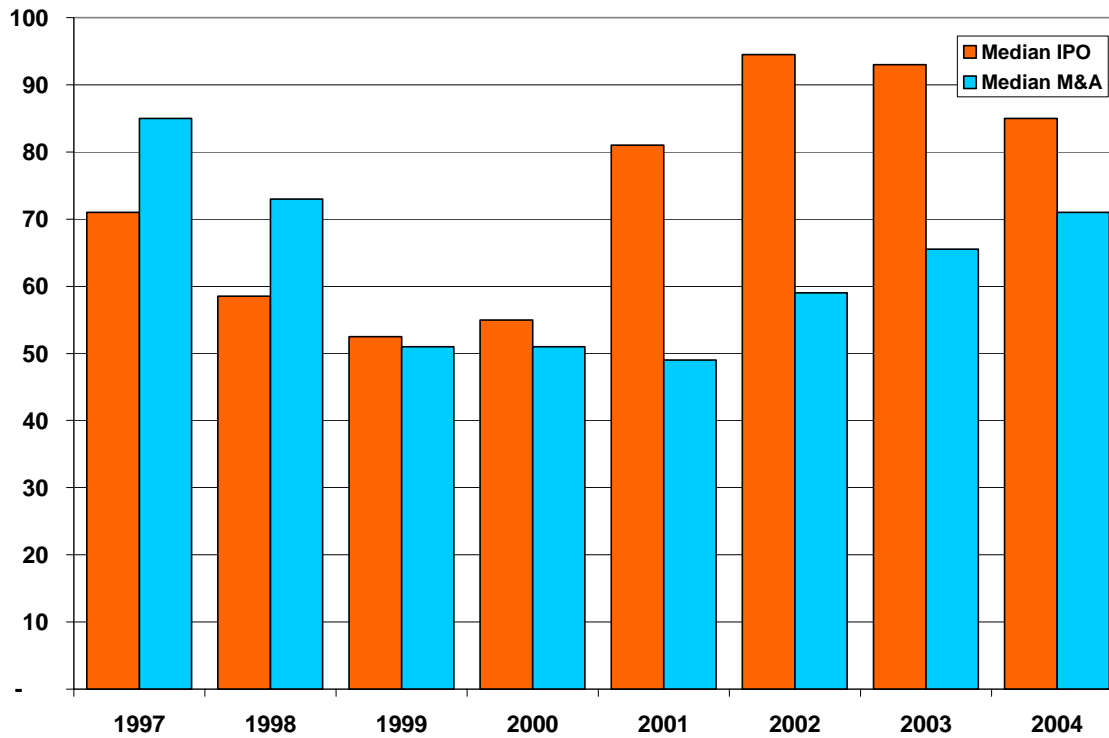


Charts 17A and B examine the time trends of the median time to exit. An interesting trend is that at the height of the dotcom bubble, companies were particularly young at the time of exit. However, as the bubble burst, the median age of companies rose dramatically. This trend is apparent not only for the US, but also for Canada.

**Chart 17A: Median Time from Founding to Exit, by Exit Year – Canada**



**Chart 17B: Median Time from Founding to Exit, by Exit Year – US**



## **5. Conclusion**

This study is the first to compare the exit values of venture capital backed companies in Canada and the US. Our results challenge the notion that the Canadian venture capital market is significantly behind that of the US. While it is true that total and average exit values are smaller in Canada, our analysis shows that once we account for the different sizes of the two economies, the Canadian venture capital market performs surprisingly well and, if anything, better than the U.S.

Our analysis has several important policy implications. First, in evaluating the efficiency of a venture capital market it is important to go beyond the measurement of inputs, (i.e. beyond just venture capital investments). Our analysis provides one method of measuring the most critical output in the venture capital market, namely the value created by its companies. A second important policy implication of our analysis is that in evaluating the performance of a venture capital market it is important to consider not only the successes from initial public offerings, but also from acquisitions of venture-backed enterprises. Finally our analysis suggests that any performance evaluation also needs to incorporate proper benchmarks. In addition to measuring the total value created, it is important to benchmark these values against their inputs, such as the amount of venture capital investment, or the amount of relevant R&D spending.



## References

- Brander, James A., Raphael Amit, and Werner Antweiler. 2002. Venture-Capital Syndication: Improved Venture Selection vs. the Value-Added Hypothesis. *Journal of Economics and Management Strategy* 11, no. 3:423-52.
- Cochrane, John H. 2005. The Risk and Return of Venture Capital. *Journal of Financial Economics* 75, no. 1:3-52.
- Cumming, Douglas J., and Jeffrey G. MacIntosh. 2003. A Cross-Country Comparison of Full and Partial Venture Capital Exits. *Journal of Banking and Finance* 27, no. 3:511-48.
- Gompers, Paul and Josh Lerner. 1997. Venture Capital and the Creation of Public Companies: Do Venture Capitalists Really Bring More than Money? *Journal of Private Equity*, 1 (Fall 1997) 15-32.
- Jones, Charles and Mathew Rhodes-Kropf, 2002. The Price of Diversifiable Risk un Venture Capital and Private Equity, Columbia University Working Paper.
- Kaplan, Steven and Antoinette Schoar. 2005. Private Equity Performance: Returns, Persistence and Capital Flows, forthcoming, *The Journal of Finance*.
- Kaplan, Steven, Berk Sensoy and Per Strömberg, 2004, How well do venture capital databases reflect actual investments, Mimeo, University of Chicago
- Lerner, Joshua, 1995, Venture Capitalists and the Oversight of Private Firms, *Journal of Finance*, 50, 301-18.
- Ljungqvist, Alexander and Mathew Richardson. 2003. The cash flow, return and risk characteristics of private equity, Working paper, New York University.
- Moskowitz, Tobias J., and Annette Vissing-Jorgensen. 2002. The Returns to Entrepreneurial Investment: A Private Equity Premium Puzzle? *American Economic Review* 92, no. 4:745-78.

## Appendix I: Industry Classifications

### NAIC codes for Energy and Sustainable Technology

| NAIC   | Description   |
|--------|---|
| 211111 | Crude Petroleum and Natural Gas Extraction  |
| 211112 | Natural Gas Liquid Extraction   |
| 212111 | Bituminous Coal and Lignite Surface Mining  |
| 212112 | Bituminous Coal Underground Mining  |
| 212291 | Uranium-Radium-Vanadium Ore Mining  |
| 213111 | Drilling Oil and Gas Wells  |
| 213112 | Support Activities for Oil and Gas Operations   |
| 221110 | Other Clean Energy  |
| 221111 | Hydroelectric Power Generation  |
| 221112 | Fossil Fuel Electric Power Generation   |
| 221113 | Nuclear Electric Power Generation   |
| 221119 | Other Electric Power Generation   |
| 221121 | Electric Bulk Power Transmission and Control  |
| 221122 | Electric Power Distribution   |
| 221210 | Natural Gas Distribution  |
| 221310 | Water Supply and Irrigation Systems   |
| 221320 | Sewage Treatment Facilities   |
| 221330 | Steam and Air-Conditioning Supply   |
| 324110 | Petroleum Refineries  |
| 333411 | Air Purification Equipment Manufacturing  |
| 333611 | Turbine and Turbine Generator Set Units Manufacturing   |
| 333612 | Speed Changer, Industrial High-Speed Drive, and Gear Manufacturing                            |
| 333613 | Mechanical Power Transmission Equipment Manufacturing   |
| 333618 | Other Engine Equipment Manufacturing  |
| 333911 | Pump and Pumping Equipment Manufacturing  |
| 333912 | Air and Gas Compressor Manufacturing  |
| 333913 | Measuring and Dispensing Pump Manufacturing   |
| 333995 | Fluid Power Cylinder and Actuator Manufacturing   |
| 333996 | Fluid Power Pump and Motor Manufacturing  |
| 335311 | Power, Distribution, and Specialty Transformer Manufacturing                                  |
| 335312 | Motor and Generator Manufacturing   |
| 335911 | Storage Battery Manufacturing   |
| 335912 | Primary Battery Manufacturing   |
| 335931 | Current-Carrying Wiring Device Manufacturing  |
| 423930 | Recyclable Material Merchant Wholesalers  |
| 424710 | Petroleum Bulk Stations and Terminals   |
| 424720 | Petroleum and Petroleum Products Merchant Wholesalers<br>(except Bulk Stations and Terminals) |
| 447110 | Gasoline Stations with Convenience Stores   |
| 447190 | Other Gasoline Stations   |
| 454311 | Heating Oil Dealers   |
| 454312 | Liquefied Petroleum Gas (Bottled Gas) Dealers   |
| 454319 | Other Fuel Dealers  |

|        |  |
|--------|--|
| 486110 | Pipeline Transportation of Crude Oil   |
| 486210 | Pipeline Transportation of Natural Gas                                       |
| 486910 | Pipeline Transportation of Refined Petroleum Products                        |
| 486990 | All Other Pipeline Transportation  |
| 541620 | Environmental Consulting Services  |
| 562111 | Solid Waste Collection   |
| 562112 | Hazardous Waste Collection   |
| 562119 | Other Waste Collection   |
| 562211 | Hazardous Waste Treatment and Disposal                                       |
| 562212 | Solid Waste Landfill   |
| 562213 | Solid Waste Combustors and Incinerators                                      |
| 562219 | Other Nonhazardous Waste Treatment and Disposal                              |
| 562910 | Remediation Services   |
| 562920 | Materials Recovery Facilities  |
| 562991 | Septic Tank and Related Services   |
| 562998 | All Other Miscellaneous Waste Management Services                            |
| 813312 | Environment, Conservation and Wildlife Organizations                         |
| 924110 | Administration of Air and Water Resource and Solid Waste Management Programs |
| 924120 | Administration of Conservation Programs                                      |

## NAIC Codes for Information and Communication Technology

| NAIC   | Description   |
|--------|---|
| 333295 | Semiconductor Machinery Manufacturing   |
| 334111 | Electronics Computer Manufacturing  |
| 334112 | Computer Storage Device Manufacturing   |
| 334113 | Computer Terminal Manufacturing   |
| 334119 | Other Computer Peripheral Equipment Manufacturing                                     |
| 334210 | Telephone Apparatus Manufacturing   |
| 334220 | Radio and Television Broadcasting and Wireless Communications Equipment Manufacturing |
| 334290 | Other Communications Equipment Manufacturing  |
| 334413 | Semiconductor and Related Device Manufacturing  |
| 334611 | Software Reproducing  |
| 335921 | Fiber Optic Cable Manufacturing   |
| 335929 | Other Communication and Energy Wire Manufacturing                                     |
| 423430 | Computer and Computer Peripheral Equipment and Software Merchant Wholesalers          |
| 443120 | Computer and Software Stores  |
| 511210 | Software Publishers   |
| 516110 | Internet Publishing and Broadcasting  |
| 517110 | Wired Telecommunications Carriers   |
| 517211 | Paging  |
| 517212 | Cellular and Other Wireless Telecommunications  |
| 517310 | Telecommunications Resellers  |
| 517410 | Satellite Telecommunications  |
| 517910 | Other Telecommunications  |
| 518111 | Internet Service Providers  |
| 518112 | Web Search Portals  |
| 518210 | Data Processing, Hosting, and Related Services  |
| 519190 | All Other Information Services  |
| 541511 | Custom Computer Programming Services  |
| 541512 | Computer Systems Design Services  |
| 541513 | Computer Facilities Management Services   |
| 541519 | Other Computer Related Services   |
| 611420 | Computer Training   |
| 811212 | Computer and Office Machine Repair and Maintenance                                    |
| 811213 | Communication Equipment Repair and Maintenance  |

## NAIC Codes for Life Sciences

| NAIC   | Description  |
|--------|--|
| 325221 | Cellulosic Organic Fiber Manufacturing                         |
| 325222 | Noncellulosic Organic Fiber Manufacturing                      |
| 325411 | Medicinal and Botanical Manufacturing                          |
| 325412 | Pharmaceutical Preparation Manufacturing                       |
| 325413 | In-Vitro Diagnostic Substance Manufacturing                    |
| 325414 | Biological Product (except Diagnostic) Manufacturing           |
| 334510 | Electro-medical and Electrotherapeutic Apparatus Manufacturing |
| 339110 | Medical Supplies   |
| 339112 | Surgical and Medical Instrument Manufacturing                  |
| 339113 | Surgical Appliance and Supplies Manufacturing                  |
| 339114 | Dental Equipment and Supplies Manufacturing                    |
| 339115 | Ophthalmic Goods Manufacturing                                 |
| 339116 | Dental Laboratories  |
|        | Medical, Dental, and Hospital Equipment and Supplies Merchant  |
| 423450 | Wholesalers  |
| 423460 | Ophthalmic Goods Merchant Wholesalers                          |
| 424210 | Drugs and Druggists' Sundries Merchant Wholesalers             |
| 446110 | Pharmacies and Drug Stores                                     |
| 446130 | Optical Goods Stores   |
| 541380 | Testing Laboratories   |
| 621111 | Offices of Physicians (except Mental Health Specialists)       |
| 621112 | Offices of Physicians, Mental Health Specialists               |
| 621210 | Offices of Dentists  |
| 621310 | Offices of Chiropractors                                       |
| 621320 | Offices of Optometrists  |
| 621330 | Offices of Mental Health Practitioners (except Physicians)     |
|        | Offices of Physical, Occupational and Speech Therapists, and   |
| 621340 | Audiologists   |
| 621391 | Offices of Podiatrists   |
| 621399 | Offices of All Other Miscellaneous Health Practitioners        |
| 621410 | Family Planning Centers  |
| 621420 | Outpatient Mental Health and Substance Abuse Centers           |
| 621491 | HMO Medical Centers  |
| 621492 | Kidney Dialysis Centers  |
| 621493 | Freestanding Ambulatory Surgical and Emergency Centers         |
| 621498 | All Other Outpatient Care Centers                              |
| 621511 | Medical Laboratories   |
| 621512 | Diagnostic Imaging Centers                                     |
| 621610 | Home Health Care Services                                      |
| 621910 | Ambulance Services   |
| 621991 | Blood and Organ Banks  |
| 621999 | All Other Miscellaneous Ambulatory Health Care Services        |
| 622110 | General Medical and Surgical Hospitals                         |
| 622210 | Psychiatric and Substance Abuse Hospitals                      |
| 622310 | Specialty (except Psychiatric and Substance Abuse) Hospitals   |
| 623110 | Nursing Care Facilities  |

|        |  |
|--------|--|
| 623210 | Residential Mental Retardation Facilities                |
| 623220 | Residential Mental Health and Substance Abuse Facilities |
| 623311 | Continuing Care Retirement Communities                   |

**Mapping from Thomson’s Venture Economics “Industry Sub Group 2” classification to our industry classification**

EST stands for “Energy and Sustainable Technology”

ICT stands for “Information and Communication Technology”

| <b>Thomson Industry Sub Group 2</b>   | <b>Our sector definition</b> |
|---------------------------------------|------------------------------|
| Agricultural, Forestry                | Other                        |
| Batteries                             | EST                          |
| Biosensors                            | Life Sciences                |
| Biotech Equipment                     | Life Sciences                |
| Biotech Other                         | Life Sciences                |
| Biotech Research                      | Life Sciences                |
| Biotech-Animal                        | Life Sciences                |
| Biotech-Human                         | Life Sciences                |
| Biotech-Industrial                    | Life Sciences                |
| Business Services                     | Other                        |
| Chemicals and Materials               | Other                        |
| Comm. Other                           | ICT                          |
| Commer Comm.                          | ICT                          |
| Computer Other                        | ICT                          |
| Computer Peripherals                  | ICT                          |
| Computer Programming                  | ICT                          |
| Computer Services                     | ICT                          |
| Computer Software                     | ICT                          |
| Computers Hardware                    | ICT                          |
| Construction                          | Other                        |
| Consumer Products                     | Other                        |
| Consumer Services                     | Other                        |
| Consumer, Other                       | Other                        |
| Data Comm.                            | ICT                          |
| Digital Imaging and Computer Graphics | ICT                          |
| E-Commerce Technology                 | ICT                          |
| Electronics Equipment                 | Other                        |
| Electronics, Other                    | Other                        |
| Energy, Alternative                   | EST                          |
| Energy, Coal                          | EST                          |
| Energy, Conservation                  | EST                          |
| Energy, Enhanced Recovery             | EST                          |
| Energy, Other                         | EST                          |
| Entertainment and Leisure             | Other                        |
| Facsimile Trans                       | Other                        |
| Fiber Optics                          | ICT                          |

|  |               |
|--|---------------|
| Financial Services                       | Other         |
| Food and Beverage                        | Other         |
| Industrial Automation                    | Other         |
| Industrial Equipment                     | Other         |
| Industrial Products, Other               | Other         |
| Industrial Services                      | Other         |
| Internet Communications                  | ICT           |
| Internet Content                         | ICT           |
| Internet Ecommerce                       | ICT           |
| Internet Programming                     | ICT           |
| Internet Services                        | ICT           |
| Internet Software                        | ICT           |
| Laser Related                            | ICT           |
| Manufacturing                            | Other         |
| Med/Health Products                      | Life Sciences |
| Med/Health Services                      | Life Sciences |
| Medical Diagnostics                      | Life Sciences |
| Medical Therapeutics                     | Life Sciences |
| Oil & Gas Exploration                    | EST           |
| Optoelectronics                          | ICT           |
| Other                                    | Other         |
| Pharmaceutical                           | Life Sciences |
| Pollution and Recycling                  | EST           |
| Power Supplies                           | EST           |
| Retailing Related                        | Other         |
| Satellite Comm                           | ICT           |
| Scientific Instrumentation               | ICT           |
| Semiconductors/Other Electronics         | ICT           |
| Telephone Rel.                           | ICT           |
| Transportation                           | Other         |
| Turnkey Integrated Systems and Solutions | Other         |
| Utilities                                | EST           |
| Wireless Communications                  | ICT           |

## Appendix II: Extensive data tabulation

**Table A1: Total Exit Value by Exit Type: Canadian Provinces**

|                           | <b>IPO<br/>(US\$m)</b> | <b>M&amp;A<br/>(US\$m)</b> | <b>Total<br/>(US\$m)</b> |
|---------------------------|------------------------|----------------------------|--------------------------|
| <b>Canadian Provinces</b> |                        |                            |                          |
| Alberta                   | 2,723                  | 1,066                      | 3,789                    |
| British Columbia (BC)     | 2,102                  | 2,098                      | 4,201                    |
| Manitoba                  | 423                    | 517                        | 940                      |
| New Brunswick             | 278                    | 598                        | 877                      |
| Newfoundland              | 6                      | 2                          | 8                        |
| Nova Scotia               | 138                    | 741                        | 879                      |
| Ontario                   | 6,275                  | 7,683                      | 13,958                   |
| Quebec                    | 3,271                  | 1,732                      | 5,002                    |
| Saskatchewan              | 8                      | 76                         | 84                       |
| <b>Canada Total</b>       | <b>15,224</b>          | <b>14,514</b>              | <b>29,737</b>            |



**Table A1 (continued): Total Exit Value by Exit Type: US States**

| <b>US States</b> | <b>IPO<br/>(US\$m)</b> | <b>M&amp;A<br/>(US\$m)</b> | <b>Total<br/>(US\$m)</b> |
|------------------|------------------------|----------------------------|--------------------------|
| Alabama          | -                      | 54                         | 54                       |
| Arizona          | 614                    | 450                        | 1,064                    |
| Arkansas         | -                      | 40                         | 40                       |
| California       | 104,854                | 62,020                     | 166,874                  |
| Colorado         | 5,652                  | 3,017                      | 8,669                    |
| Connecticut      | 4,522                  | 1,103                      | 5,626                    |
| D. of Columbia   | 1,201                  | 296                        | 1,497                    |
| Delaware         | 77                     | -                          | 77                       |
| Florida          | 5,376                  | 2,262                      | 7,638                    |
| Georgia          | 7,609                  | 2,720                      | 10,328                   |
| Hawaii           | 314                    | 23                         | 337                      |
| Idaho            | 66                     | 43                         | 109                      |
| Illinois         | 4,484                  | 3,377                      | 7,860                    |
| Indiana          | 76                     | 942                        | 1,018                    |
| Iowa             | -                      | 23                         | 23                       |
| Kansas           | 533                    | 95                         | 628                      |
| Kentucky         | 137                    | 734                        | 871                      |
| Louisiana        | 642                    | 34                         | 676                      |
| Maine            | 49                     | -                          | 49                       |
| Maryland         | 6,711                  | 2,176                      | 8,887                    |
| Massachusetts    | 13,166                 | 22,265                     | 35,432                   |
| Michigan         | 679                    | 1,142                      | 1,821                    |
| Minnesota        | 4,218                  | 2,385                      | 6,602                    |
| Mississippi      | -                      | 216                        | 216                      |
| Missouri         | 739                    | 737                        | 1,475                    |
| Montana          | 202                    | 3                          | 206                      |
| Nebraska         | 267                    | 10                         | 277                      |
| Nevada           | 232                    | -                          | 232                      |
| New Hampshire    | 469                    | 288                        | 757                      |
| New Jersey       | 5,161                  | 5,723                      | 10,884                   |
| New York         | 17,159                 | 3,374                      | 20,533                   |
| North Carolina   | 5,804                  | 4,521                      | 10,325                   |
| North Dakota     | 220                    | -                          | 220                      |
| Ohio             | 234                    | 1,727                      | 1,961                    |
| Oklahoma         | 103                    | 1,112                      | 1,215                    |
| Oregon           | 968                    | 432                        | 1,400                    |
| Pennsylvania     | 5,929                  | 3,048                      | 8,977                    |
| Puerto Rico      | -                      | 75                         | 75                       |
| Rhode Island     | -                      | 15                         | 15                       |
| South Carolina   | -                      | 671                        | 671                      |
| Tennessee        | 1,931                  | 825                        | 2,756                    |
| Texas            | 15,574                 | 10,286                     | 25,860                   |
| Unknown          | -                      | 207                        | 207                      |
| Utah             | 252                    | 656                        | 908                      |
| Vermont          | 207                    | 28                         | 235                      |
| Virginia         | 8,741                  | 3,769                      | 12,511                   |
| Washington       | 9,935                  | 1,694                      | 11,629                   |
| Wisconsin        | 813                    | 831                        | 1,643                    |
| <b>US Total</b>  | <b>235,920</b>         | <b>145,448</b>             | <b>381,367</b>           |

**Table A2: Summary Statistics for Canadian Provinces and US States (above \$1B)**

|                           | <b>Total Value of Exits (US\$m)</b> | <b>Number of Exits (Total)</b> | <b>Avg. Exit Value (US\$m)</b> | <b>Median Exit Value (US\$m)</b> | <b>Avg. Time Founding to Exits (Months)</b> | <b>Median Time Founding to Exit (Months)</b> |
|---------------------------|-------------------------------------|--------------------------------|--------------------------------|----------------------------------|---|--|
| <b>Canadian Provinces</b> |                                     |                                |                                |                                  |   |  |
| Alberta                   | 3,789                               | 60                             | 63                             | 15                               | 39  | 26   |
| British Columbia          | 4,201                               | 70                             | 61                             | 18                               | 47  | 41   |
| Manitoba                  | 940                                 | 11                             | 85                             | 18                               | 43  | 30   |
| New Brunswick             | 877                                 | 8                              | 110                            | 50                               | 95  | 76   |
| Newfoundland              | 8                                   | 2                              | 4                              | 4                                | 47  | 47   |
| Nova Scotia               | 879                                 | 7                              | 126                            | 104                              | 36  | 36   |
| Ontario                   | 13,958                              | 223                            | 63                             | 25                               | 81  | 46   |
| Quebec                    | 5,002                               | 118                            | 42                             | 16                               | 98  | 5,002  |
| Saskatchewan              | 84                                  | 10                             | 8                              | 4                                | 154   | 154  |
| <b>US States</b>          |                                     |                                |                                |                                  |   |  |
| Arizona                   | 1,064                               | 19                             | 89                             | 52                               | 117   | 89   |
| California                | 166,874                             | 1,209                          | 207                            | 101                              | 72  | 56   |
| Colorado                  | 8,669                               | 90                             | 152                            | 75                               | 90  | 67   |
| Connecticut               | 5,626                               | 43                             | 176                            | 97                               | 97  | 72   |
| D. of Columbia            | 1,497                               | 11                             | 214                            | 156                              | 193   | 51   |
| Florida                   | 7,638                               | 65                             | 178                            | 81                               | 121   | 82   |
| Georgia                   | 10,328                              | 96                             | 178                            | 110                              | 74  | 59   |
| Illinois                  | 7,860                               | 64                             | 212                            | 97                               | 84  | 68   |
| Indiana                   | 1,018                               | 10                             | 145                            | 101                              | 99  | 70   |
| Maryland                  | 8,887                               | 56                             | 254                            | 95                               | 90  | 68   |
| Massachusetts             | 35,432                              | 336                            | 159                            | 80                               | 87  | 68   |
| Michigan                  | 1,821                               | 23                             | 166                            | 86                               | 97  | 87   |
| Minnesota                 | 6,602                               | 52                             | 194                            | 137                              | 123   | 107  |
| Missouri                  | 1,475                               | 14                             | 148                            | 135                              | 112   | 95   |
| New Jersey                | 10,884                              | 80                             | 202                            | 113                              | 93  | 76   |
| New York                  | 20,533                              | 147                            | 214                            | 72                               | 88  | 66   |
| North Carolina            | 10,325                              | 72                             | 220                            | 99                               | 66  | 50   |
| Ohio                      | 1,961                               | 34                             | 123                            | 87                               | 181   | 84   |
| Oklahoma                  | 1,215                               | 10                             | 135                            | 86                               | 71  | 60   |
| Oregon                    | 1,400                               | 24                             | 108                            | 97                               | 81  | 59   |
| Pennsylvania              | 8,977                               | 88                             | 147                            | 52                               | 96  | 69   |
| Tennessee                 | 2,756                               | 30                             | 138                            | 85                               | 120   | 97   |
| Texas                     | 25,860                              | 155                            | 259                            | 109                              | 97  | 63   |
| Virginia                  | 12,511                              | 78                             | 284                            | 116                              | 78  | 66   |
| Washington                | 11,629                              | 97                             | 176                            | 100                              | 62  | 53   |
| Wisconsin                 | 1,643                               | 14                             | 137                            | 32                               | 153   | 122  |

**Table A2 (continued)**

|                           | <b>Ratio to<br/>GDP<br/>(Per \$1k)</b> | <b>Ratio to<br/>GERD<br/>(Per \$1k)</b> | <b>Ratio to<br/>BERD<br/>(Per \$1k)</b> | <b>Ratio to<br/>VC<br/>Invest<br/>(Per \$1)</b> | <b>Value<br/>over<br/>NSDQ<br/>(US\$m)</b> | <b>Value<br/>over<br/>TSX<br/>(US\$m)</b> |
|---------------------------|--|---|---|---|--|---|
| <b>Canadian Provinces</b> |  |   |   |   |  |   |
| Alberta                   | 4.57                                   | 460.68                                  | 1031.89                                 | 21.99   | 2,098                                      | 2,373                                     |
| British Columbia          | 5.78                                   | 494.24                                  | 889.76                                  | 3.04  | 2,130                                      | 2,859                                     |
| Manitoba                  | 4.93                                   | 431.29                                  | 1282.54                                 | N/A   | 626  | 770                                       |
| New Brunswick             | 7.92                                   | 963.98                                  | 4344.49                                 | N/A   | 378  | 579                                       |
| Newfoundland              | 0.10                                   | 10.96                                   | 84.01                                   | N/A   | 6  | 6   |
| Nova Scotia               | 6.47                                   | 472.66                                  | 2511.74                                 | N/A   | 525  | 626                                       |
| Ontario                   | 5.81                                   | 285.40                                  | 410.20                                  | 1.71  | 6,401                                      | 9,305                                     |
| Quebec                    | 3.96                                   | 161.86                                  | 261.72                                  | 1.17  | 2,918                                      | 3,435                                     |
| Saskatchewan              | 0.47                                   | 43.26                                   | 183.81                                  | N/A   | 39   | 53  |
| <b>US States</b>          |  |   |   |   |  |   |
| Arizona                   | 0.82                                   | 41.95                                   | 52.56                                   | 0.74  | 513  | N/A                                       |
| California                | 16.31                                  | 407.99                                  | 494.48                                  | 1.89  | 82,505                                     | N/A                                       |
| Colorado                  | 6.41                                   | 261.69                                  | 351.70                                  | 1.10  | 4,330                                      | N/A                                       |
| Connecticut               | 4.37                                   | 156.74                                  | 175.99                                  | 1.97  | 3,259                                      | N/A                                       |
| D. of Columbia            | 1.96                                   | 0.00                                    | 0.00                                    | 10.68   | 900  | N/A                                       |
| Florida                   | 4.43                                   | 205.67                                  | 299.53                                  | 1.13  | 3,857                                      | N/A                                       |
| Georgia                   | 2.11                                   | 475.87                                  | 830.32                                  | 2.75  | 5,479                                      | N/A                                       |
| Illinois                  | 0.65                                   | 86.93                                   | 105.99                                  | 1.50  | 4,033                                      | N/A                                       |
| Indiana                   | 5.92                                   | 40.29                                   | 48.73                                   | 4.81  | 610  | N/A                                       |
| Maryland                  | 16.29                                  | 133.30                                  | 591.33                                  | 2.69  | 4,599                                      | N/A                                       |
| Massachusetts             | 0.68                                   | 348.42                                  | 456.99                                  | 1.75  | 16,991                                     | N/A                                       |
| Michigan                  | 4.38                                   | 12.92                                   | 13.84                                   | 3.19  | 851  | N/A                                       |
| Minnesota                 | 1.03                                   | 201.15                                  | 232.26                                  | 1.90  | 3,218                                      | N/A                                       |
| Missouri                  | 3.84                                   | 79.23                                   | 109.64                                  | 1.40  | 693  | N/A                                       |
| New Jersey                | 3.33                                   | 109.24                                  | 119.28                                  | 1.67  | 6,833                                      | N/A                                       |
| New York                  | 4.60                                   | 190.25                                  | 241.00                                  | 1.66  | 10,315                                     | N/A                                       |
| North Carolina            | 0.66                                   | 259.94                                  | 352.82                                  | 2.92  | 5,405                                      | N/A                                       |
| Ohio                      | 1.67                                   | 32.41                                   | 41.48                                   | 1.31  | 1,281                                      | N/A                                       |
| Oklahoma                  | 1.57                                   | 237.33                                  | 449.51                                  | 5.22  | 617  | N/A                                       |
| Oregon                    | 14.56                                  | 87.60                                   | 113.04                                  | 1.01  | 589  | N/A                                       |
| Pennsylvania              | 2.79                                   | 116.77                                  | 144.81                                  | 1.41  | 4,020                                      | N/A                                       |
| Tennessee                 | 1.90                                   | 165.58                                  | 251.20                                  | 1.73  | 1,586                                      | N/A                                       |
| Texas                     | 4.42                                   | 285.90                                  | 367.27                                  | 2.50  | 13,686                                     | N/A                                       |
| Virginia                  | 5.85                                   | 316.59                                  | 608.73                                  | 2.15  | 6,664                                      | N/A                                       |
| Washington                | 6.56                                   | 151.17                                  | 171.92                                  | 1.77  | 5,559                                      | N/A                                       |
| Wisconsin                 | 1.14                                   | 79.06                                   | 106.16                                  | 2.78  | 896  | N/A                                       |

**Table A3: Sector Statistics for Canadian Provinces and US States (above \$1B)**

| <b>Total Exit Value</b>   | <b>EST<br/>(US\$m)</b> | <b>ICT<br/>(US\$m)</b> | <b>Life Sciences<br/>(US\$m)</b> | <b>Other<br/>(US\$m)</b> |
|---------------------------|------------------------|------------------------|----------------------------------|--------------------------|
| <b>Canadian Provinces</b> |                        |                        |                                  |                          |
| Alberta                   | 2,843                  | 402                    | 115                              | 429                      |
| British Columbia          | 101                    | 3,045                  | 413                              | 642                      |
| Manitoba                  | -                      | 478                    | -                                | 462                      |
| New Brunswick             | -                      | 299                    | -                                | 577                      |
| Newfoundland              | -                      | 2                      | -                                | 6                        |
| Nova Scotia               | -                      | 485                    | -                                | 394                      |
| Ontario                   | 1,006                  | 8,698                  | 327                              | 3,927                    |
| Quebec                    | 45                     | 1,401                  | 1,501                            | 2,056                    |
| Saskatchewan              | 16                     | 18                     | 3                                | 47                       |
| <b>US States</b>          |                        |                        |                                  |                          |
| Arizona                   | 159                    | 242                    | 185                              | 477                      |
| California                | 345                    | 132,816                | 22,089                           | 11,625                   |
| Colorado                  | 1,408                  | 5,321                  | 1,245                            | 695                      |
| Connecticut               | -                      | 3,656                  | 1,243                            | 727                      |
| D. of Columbia            | -                      | 1,254                  | 163                              | 80                       |
| Florida                   | 22                     | 5,109                  | 1,273                            | 1,234                    |
| Georgia                   | 46                     | 8,270                  | 1,003                            | 1,010                    |
| Illinois                  | 549                    | 4,185                  | 309                              | 2,817                    |
| Indiana                   | -                      | 50                     | 36                               | 932                      |
| Maryland                  | 988                    | 6,451                  | 704                              | 744                      |
| Massachusetts             | 232                    | 28,360                 | 4,239                            | 2,601                    |
| Michigan                  | -                      | 978                    | 398                              | 445                      |
| Minnesota                 | -                      | 4,789                  | 742                              | 1,071                    |
| Missouri                  | -                      | 168                    | 361                              | 947                      |
| New Jersey                | 5                      | 7,173                  | 1,749                            | 1,958                    |
| New York                  | 280                    | 14,202                 | 1,750                            | 4,301                    |
| North Carolina            | 94                     | 7,585                  | 1,723                            | 924                      |
| Ohio                      | 84                     | 1,470                  | 262                              | 145                      |
| Oklahoma                  | 677                    | 50                     | 191                              | 297                      |
| Oregon                    | -                      | 1,297                  | 103                              | -                        |
| Pennsylvania              | -                      | 4,337                  | 2,819                            | 1,821                    |
| Tennessee                 | -                      | 443                    | 1,556                            | 757                      |
| Texas                     | 703                    | 18,603                 | 2,274                            | 4,281                    |
| Virginia                  | -                      | 10,773                 | 1,227                            | 511                      |
| Washington                | -                      | 9,533                  | 1,562                            | 534                      |
| Wisconsin                 | -                      | 4                      | 793                              | 846                      |

**Table A3 (continued)**

| <b>Median Exit Value</b>  | <b>EST<br/>(US\$m)</b> | <b>ICT<br/>(US\$m)</b> | <b>Life Sciences<br/>(US\$m)</b> | <b>Other<br/>(US\$m)</b> |
|---------------------------|------------------------|------------------------|----------------------------------|--------------------------|
| <b>Canadian Provinces</b> |                        |                        |                                  |                          |
| Alberta                   | 31                     | 4                      | 25                               | 19                       |
| British Columbia (BC)     | 29                     | 18                     | 14                               | 23                       |
| Manitoba                  | -                      | 27                     | -                                | 8                        |
| New Brunswick             | -                      | 21                     | -                                | 117                      |
| Newfoundland              | -                      | 2                      | -                                | 6                        |
| Nova Scotia               | -                      | 105                    | -                                | 32                       |
| Ontario                   | 18                     | 28                     | 19                               | 24                       |
| Quebec                    | 12                     | 21                     | 14                               | 20                       |
| Saskatchewan              | 8                      | 9                      | 3                                | 5                        |
| <b>US States</b>          |                        |                        |                                  |                          |
| Arizona                   | 159                    | 32                     | 185                              | 57                       |
| California                | 12                     | 92                     | 118                              | 132                      |
| Colorado                  | 704                    | 59                     | 93                               | 70                       |
| Connecticut               | -                      | 153                    | 28                               | 47                       |
| D. of Columbia            | -                      | 156                    | 163                              | 80                       |
| Florida                   | 22                     | 113                    | 298                              | 49                       |
| Georgia                   | 46                     | 109                    | 89                               | 142                      |
| Illinois                  | 275                    | 63                     | 80                               | 102                      |
| Indiana                   | -                      | 25                     | 36                               | 166                      |
| Maryland                  | 988                    | 45                     | 170                              | 177                      |
| Massachusetts             | 116                    | 90                     | 50                               | 55                       |
| Michigan                  | -                      | 40                     | 199                              | 86                       |
| Minnesota                 | -                      | 146                    | 57                               | 141                      |
| Missouri                  | -                      | 14                     | 141                              | 392                      |
| New Jersey                | 5                      | 120                    | 112                              | 108                      |
| New York                  | 280                    | 50                     | 73                               | 116                      |
| North Carolina            | 94                     | 101                    | 100                              | 91                       |
| Ohio                      | 84                     | 88                     | 131                              | 42                       |
| Oklahoma                  | 338                    | 50                     | 95                               | 81                       |
| Oregon                    | -                      | 80                     | 103                              | -                        |
| Pennsylvania              | -                      | 48                     | 77                               | 28                       |
| Tennessee                 | -                      | 73                     | 97                               | 38                       |
| Texas                     | 100                    | 146                    | 122                              | 95                       |
| Virginia                  | -                      | 94                     | 262                              | 256                      |
| Washington                | -                      | 102                    | 98                               | 64                       |
| Wisconsin                 | -                      | 4                      | 356                              | 32                       |