

**THE VALUATION EFFECT OF LISTING STANDARDS:  
AN ANALYSIS OF CANADIAN AND U.S. IPOs\***

**Cécile Carpentier**

Professor, Laval University and CIRANO Fellow  
European Center for Corporate Control Studies  
Faculty of Administrative Science  
2325 de la Terrasse, Laval University  
Québec (Québec) Canada G1V 0A6  
phone: 418 656 2131 #6385  
email: [Cecile.Carpentier@fsa.ulaval.ca](mailto:Cecile.Carpentier@fsa.ulaval.ca)

**Douglas Cumming**

Professor and Ontario Research Chair  
York University - Schulich School of Business  
4700 Keele Street  
Toronto, Ontario M3J 1P3, Canada  
phone: 416 736 2100 #77942  
email: [dcumming@schulich.yorku.ca](mailto:dcumming@schulich.yorku.ca)

**Jean-Marc Suret**

Professor, Laval University and CIRANO Fellow  
European Center for Corporate Control Studies  
Faculty of Administrative Science  
2325 de la Terrasse, Laval University  
Québec (Québec) Canada, G1V 0A6  
phone: 418 656 7134  
email: [Jean-Marc.Suret@fsa.ulaval.ca](mailto:Jean-Marc.Suret@fsa.ulaval.ca)

This Draft : December 8, 2010

\* The IPO data in this paper were provided by Douglas Cumming through York University's access to Tompson Financial SDC. Cécile Carpentier and Jean-Marc Suret thank the Fonds pour l'éducation et la saine gouvernance de l'Autorité des marchés financiers du Québec and the Social Sciences and Humanities Research Council (SSHRC) of Canada for financial support. We are grateful for the very valuable research assistance from Nicolas Ros. We also thank participants of the European Financial Management Symposium (Montréal, April 2010), and on the Société Canadienne de sciences économiques, Québec, (May 2010) as well as François Derrien and Richard Guay.

**THE VALUATION EFFECT OF LISTING STANDARDS:  
AN ANALYSIS OF CANADIAN AND U.S. IPOs**

This Draft: December 8, 2010

**Abstract**

This paper examines the valuation of matched IPOs in Canada and the U.S. over the 1986-2007 period. Significant differences exist in listing standards between Canada and the U.S. and, according to previous theoretical work, the lower requirements that prevail in Canada should imply a higher cost of capital and a lower valuation for IPOs. We find evidence that IPOs are valued substantially lower in Canada. We consider alternative matched samples based on factors that include size, sector and expected liquidity, and consider several alternative explanations that might affect IPO valuations, including the quality of the issuer, VC involvement, investment bank prestige, as well as mispricing. Significant differences in valuation exist, even when we restrict the analysis to the subsample of issues with similar expected liquidity.

**Keywords:** Securities Regulation, Listing Standards, Valuation, Initial Public Offerings

**JEL Classification:** G24; G32; G14; G15

## 1. Introduction

IPO valuations are important for both well functioning stock markets and entrepreneurship markets. Exchanges that can facilitate high IPO valuations promote investor confidence, exchange liquidity, and attract the highest quality issuers (La Porta *et al.*, 2002; Aggarwal *et al.*, 2009; Boulton *et al.*, 2010). Likewise, high IPO valuations encourage entrepreneurs to start up new ventures, and make it worthwhile for investors in private entrepreneurial ventures to provide financing, as IPOs are arguably the most important form exit for entrepreneurs and investors alike in terms of motivating high levels of entrepreneurial activity (Black *et al.* 1998). In this paper, we study IPO valuations across countries by creating for the first time a sample of U.S. and Canadian IPOs that is matched on offer year, industry and size and venture capital (VC) backing. Our matched sample comprises 420 U.S. and Canadian IPOs over the years 1986-2007. We consider robustness to matching on numerous dimensions such as expected liquidity and investment bank reputation. Further, we consider a number of competing explanations for international differences in IPO valuations, including listing standards, liquidity, irrational pricing, issuer quality, and investment bank quality.

The data show that for matched IPOs, average (median) valuations are roughly 10% (46%) higher in the U.S. than Canada. Regression analyses indicate that country effects give rise to higher IPO valuations in the U.S. than Canada by 40-45%, depending on the matched sample and control variables. For the subset of the Canadian and U.S. data that only considers non-prestigious investment banks (where regulation arguably matters more), IPO valuations are as much as 87% higher in the U.S. In view of the focused market segment examined, the most plausible explanation for these strong differences in valuations is the substantially lower listing standards in Canada. In view of the pronounced impact that IPO valuations can have on both the financing of privately held and publicly traded companies, such a large impact of listing standards on IPO valuations is of great concern to entrepreneurs, investors and policymakers alike.

Our findings are robust to a number of alternative specifications for matching and alternative control variables. For instance, the data show that liquidity matters for IPO valuations, and the liquidity of newly listed companies is a by-product of regulation: poorer regulation reduces liquidity stocks exchanges and regulators induce the creation of an illiquid

stock market. Listing requirements also influence directly secondary market liquidity, but our findings pertaining to regulation are robust for all levels of matching on liquidity.

Likewise, we show that VC-backing and investment banking reputation affect valuations and find IPO valuations are 25% higher for VC-backing when a prestigious investment bank is involved, and 55% higher when a prestigious investment is not involved. These findings are consistent with practitioner concerns, such as that posed by the Canadian Venture Capital Association (Duruflé 2006), that the U.S. offers superior exit opportunities than Canada due to higher IPO valuations, thereby worsening the entrepreneurial environment in Canada. Likewise, our findings are consistent with previous studies that show the involvement of VCs influences several characteristics, including the valuation of IPOs (Chemmanur and Loutskina, 2007). We control for a variety of other competing explanations for the differences in valuations, and regardless of the controls considered, the differences are best explained by listing standards.

The findings in this paper highlight a principal role of stock exchange listing requirements to facilitate investing and trading of securities by ensuring a minimum level of firm quality, monitoring and governance. Minimum listing standards are therefore a signal of quality to market participants, which in turn facilitates liquidity by attracting investors to the market (Macey et O'Hara 2002; Harris 2006). The level of regulation in a stock market influences its cost of capital and the values of the firms listed on the different markets (La Porta et coll. 2002; Doidge et coll. 2004; Hail et Leuz 2006).<sup>1</sup> Our findings complement and build on the literature on cross national studies of securities regulation and IPOs, and more generally the role of institutions in international business (Henisz and Swaminathan, 2008; Boulton et al, 2010). The quality of securities regulation is similar in the U.S. and in Canada (Hail and Leuz 2006). King and Segal (2008) show that larger<sup>2</sup> publicly traded Canadian firms have lower valuations than their U.S. counterparts based on multiples of market-to-book, price-to-last 12-month earnings, Tobin's q, and enterprise value-to-EBITDA, despite exhibiting higher sales growth and profitability. Hail

---

<sup>1</sup> Standard setters frequently refer to the link between accounting information and firms' cost of capital. For example, Arthur Levitt, the former chairman of the Securities and Exchange Commission (SEC), suggests that "high quality accounting standards ... reduce capital costs" (Levitt 1998 p. 81), and this view is supported by academic work (see Lambert et coll. 2007) Similarly, Neel Foster, a former member of the Financial Accounting Standards Board (FASB), claims that "More information always equates to less uncertainty, and people pay more for certainty. In the context of financial information, the end result is that better disclosure results in a lower cost of capital" (Foster 2003 p.1).

<sup>2</sup> King and Segal (2008) reject from their sample companies with sales (or total assets) less than \$25 million. The median total asset is \$142 million and the median ROA is 3.7%.

and Leuz (2006) use earning forecasts to estimate the cost of capital, which requires restricting their sample to the largest Canadian companies which offer sufficient coverage by analysts and are typically cross-listed. Hail and Leuz estimate the cost of capital to be only slightly higher in Canada than the U.S., and as such find that all else being equal the implied valuations of matched companies is only 3% lower in Canada relative to the U.S. While Hail and Leuz (2006) and King and Segal (2008) analyze a sample of medium and large firms which are generally profitable, in this paper we study small publicly traded firms, generally unprofitable, at an early stage of development, without any significant analyst coverage, and with massive information asymmetry. The Canadian market is, for the most part, a penny stock market and IPOs firms are particularly small and at a development stage (Carpentier et al., 2010). Our new evidence shows that listing standards have a much more pronounced impact on smaller firms: while large firms are valued 3% lower in Canada than the U.S., we show in this paper that small firms are valued at least 40% lower in Canada.

This paper is organized as follows. Section 2 reviews potential alternative explanations for differences in valuations of VC-backed IPOs in Canada and the U.S. and develops our main hypothesis. Section 3 introduces the data, matching process and stylized facts. Among other things, the summary statistics test whether the matched IPOs in Canada and the U.S. differ along quality, investors' rationality and post-IPO liquidity. Section 4 presents the econometric models, our multivariate regression results and robustness checks. Concluding remarks follow in Section 5.

## **2. Hypothesis development**

First we consider how listing standards might explain differences in IPO valuations in Canada and the U.S. Second, we consider alternative explanations for international differences in IPO valuations.

### *2.1. Listing standards*

Stock exchanges face a trade-off in deciding which firms should be eligible for a listing. On one hand, lower listing standards enable a greater number of companies to meet those standards, which in turn increases the exchange's listing revenues and associated fees. On the other hand, lower listing standards potentially reduce governance standards and reputational

capital, which in turn lowers liquidity insofar as investors are dissuaded from participating in the market.

IPOs face strict regulation in the U.S. The rationale has been that the regulators are gatekeepers whose strict requirements protect investors, enhance market integrity and, in turn, reduce the cost of capital for listed firms. U.S. regulations have become more stringent in recent years. For IPOs, the Penny Stock Reform Act (PSRA) of 1990 placed severe restrictions on IPOs that were priced below \$5 (Beatty et Kadiyala 2003). When the SEC revised the Penny Stock Rule in 2005, the SEC required newly listed firms to have a positive net income, a market value of listed securities of \$50 million and a minimum bid price of \$4 per share.<sup>3</sup> Furthermore, the SEC also reinforced the disclosure requirements for stocks not listed on a national market. On January 4, 1999, the SEC approved the “eligibility rule”, which required all domestic over the counter bulletin board (OTCBB) firms to comply with the reporting obligations under the 1934 Act (Bushee et Leuz 2005). The rationale underlying these recent U.S. regulatory reforms has been challenged by the recent surge of less regulated markets, such as the AIM in London. The AIM has challenged the dominant situation of the U.S. stock market. Healy and Palepu (2001 p.431) argue that the comparative rise of the AIM subsequent to these U.S. regulatory changes make further work on disclosure and capital market research worthwhile to assess the effect of regulation on capital market development.

Listing requirements do differ across Canada and the U.S. (Harris 2006). Unlike their counterparts in the U.S., Canadian regulators and exchanges have set minimal listing requirements so low that almost any firm can list via an IPO, even without revenues or earnings. One of the main Canadian stock markets, the TSX Venture (TSXV), describes itself as a “public venture market”. New firms can list with no revenues, the stock price should be higher than CAN\$0.15, and the minimal net tangible assets, including the IPO proceeds, has been set at CAN\$500,000 or \$750,000 depending on the period.<sup>4</sup> More than half of Canadian IPOs comprise firms without revenues, which creates a situation in which there is very pronounced asymmetric information, risk and uncertainty faced by purchasers of newly listed firms. Moreover, because

---

<sup>3</sup> See: <http://www.sec.gov/rules/final/34-51983.pdf>. See also Klein and Mohanram (2006). Other papers that evocate the regulation of IPOs in the U.S. include Cox (2000) on reforming securities regulation and Cohn (1999) on the impact of securities law on small business.

<sup>4</sup> Corresponding values for NASDAQ from June 1999 to June 2001 were U.S.\$4 (price), U.S.\$4 million for shareholders' equity, and U.S.\$5 million for market capitalization.

the IPO process is costly, and particularly costly relative to the capital raised for smaller firms, regulators have permitted access to the market via “backdoor listings”,<sup>5</sup> including reverse mergers (RMs) and Capital Pool Companies (CPCs).<sup>6</sup> The lax security regulatory regime prevailing in Canada allows firms to choose to list via a RMs or an IPOs. The result of these low regulatory requirements is a market where most of the Canadian listed firms can be considered as micro or small stocks firm. Carpentier *et al.* (2010) report that 3,857 new companies listed on the TSXV from 1986 to 2006, which is equal to 60% of the number of IPOs reported in the U.S. during the same period (see also Harris 2006; Cumming et Johan 2009). The entrants are characterized by the following three figures: 49.26% report no revenues, the pre-listing median shareholders’ equity is CAN\$260,000, and the median gross proceeds are CAN\$650,000. These new listings are new business ventures, which are in fact penny stock IPOs. Their reported sales and assets are considerably lower than those of any junior market, including the London Alternative Investment Market (AIM).

Closely related to listing standards is the regulation of subsequent disclosure obligations. Disclosure regulation has been very similar in Canada and the U.S. The implementation of the Multijurisdictional Disclosure System (MJDS) in 1991, which allows Canadian issuers to meet their U.S. filing requirements using Canadian disclosure documents illustrate the closeness between the disclosure rules in both countries. One notable difference stays in the implementation of Sarbanes Oxley legislation (June 2002) in the U.S. As such, in order to assess the effect of international differences in listing standards on IPO valuations, we necessarily control for Sarbanes Oxley. A second difference stands in the implementation of several elements of proportionate regulation for disclosure, for venture issuers.<sup>7</sup> Proportionate regulation “*is the*

---

<sup>5</sup> According to the TSX Manual, a “backdoor listing” occurs when an issuance of securities of a listed issuer results, directly or indirectly, in the acquisition of the listed issuer by an unlisted issuer with an accompanying change in effective control of the listed issuer. A transaction giving rise to a backdoor listing may take one of a number of forms, including an issuance of securities for assets, an amalgamation or a merger. Transactions will normally be regarded as backdoor listings if they could result in the security holders of the listed issuer’s owning less than 50% of the securities or voting power of the resulting issuer, with an accompanying change in effective control of the listed issuer.

<sup>6</sup> CPCs are similar to Special Purpose Acquisition Companies (SPAC) in the U.S., but they involve much smaller amount of money. A CPC is a listed corporation (a shell) with no assets (except cash), no business plan and no operating history, and is solely intended to find and acquire assets or firms as takeover targets. Once the qualifying transaction (QT) is completed, the resulting issuer may be listed for regular trading (Carpentier et Suret 2006).

<sup>7</sup> A venture issuer is defined as a reporting issuer that does not have any of its securities listed or quoted on any exchange other than the TSXV, the Alternative Investment Market of the London Stock Exchange or the PLUS markets.

*notion that securities regulation should recognize the different risks and benefits of issuers by their size, experience in the market, resources or capacity to act*” (Sarra 2009, p. 12). Since the beginning of the 20s, junior issuers have been exempted from particular disclosure requirements like the annual information form and the critical accounting estimates of the management’s discussion and analysis. These issuers now have more time to comply with periodic disclosure requirements and benefit from modified requirements in terms of details to disclose.<sup>8</sup>

### 2.1. Previous evidence

Differences between regulation, including listing standard and disclosure, can indeed imply differences in cost of equity (Hail et Leuz 2006). Several studies illustrated by Hail and Leuz, use valuation models to compare the cost of equity in several countries. Hail and Leuz evidence that regulation matters internationally, but conclude that the difference between the costs of equity in Canada and the U.S. is very low based on data from large established companies (10.2% in the U.S. versus 10.5% in Canada). Moreover, Hail and Leuz show that the cost of capital is lower in Canada than in several developed countries, including the UK, Australia and Netherlands. He and Kryzanowski (2007) conclude that there is no difference in costs of equity after taking into account industry controls. Witmer and Zorn (2007) evidence differences in the cost of capital but they reject the hypothesis that risk premiums do differ between Canada and the U.S. The overall conclusion is that, for large firms, there is no difference between the costs of capital in both countries. This can be traced to the lack of strong differences between the regulation applied to large Canadian and U.S. companies and to the market integration that prevails at this level. Moreover, the Canadian and U.S. stock markets for larger stocks are generally considered to be only partially integrated.<sup>9</sup> As most of the estimation models

---

<sup>8</sup> Venture issuers must file a business acquisition report if the size of the acquired business exceeds 40% of the size of the acquiring company (20% for non-ventures), and a venture issuer needs only to disclose one year of audited financial statements of the acquired firm. Non-venture issuers should disclose three years of financial statements. Venture issuers listed in British-Columbia are not required to file such a report. Sarra (2009) provides an analysis of the treatment of junior issuers in Canada, and a list of the regulatory differences between venture and non-venture issuers can be consulted on the Canadian Securities Administrators’ website, at: <http://www.gov.ns.ca/nssc/docs/cdbrochure.pdf>.

<sup>9</sup> See Beaulieu *et al.* (2009) for a review and recent evidence of mild integration between U.S. and Canadian market. Indeed, very few regulatory dispositions limit cross-border investment or listing. However, as foreign investors are generally not aware of newly listed companies and because the floats of these stocks are often too low to attract institutional investors, segmentation can exist between the higher and the lower segments of the markets (Elyasiani et coll. 2000).

rely on financial analysts forecasts, the previous studies focused on the main segments of both markets.

A parallel stream of research focused on the comparison of values of similar firms in both countries. King and Segal (2008) conclude that the Canadian and U.S. markets are segmented. They establish this result by comparing the valuation multiples assigned to the equity of a sample of approximately 600 Canadian firms listed exclusively in the home market with a matched sample of U.S. firms over the period 1989-2004. King and Segal conclude that Canadian firms have lower valuations based on multiples of market-to-book, price-to-last 12-month earnings, Tobin's q, and enterprise value-to-EBITDA. However, their results evidence also a strong effect of the firm's inclusion in the indexes in both countries. The valuation effect of the inclusion in the index is generally explained by the increased demand generated from index funds or exchange-traded funds (Morck et Yang 2001). Our setting, which excludes firms included in the indexes, overcomes this problem.

Another stream of research on cost of capital is based on the cross-listing premium (CLP) concept. Companies that cross-list in the U.S. benefit from a CLP: their value is higher than the value of similar companies that are not cross-listed. This premium exists for companies from all countries, and is not specific to Canada. On average, the CLP is estimated at between 17% and 22% (according to estimation methods) for a listing on a U.S. exchange (Doidge *et al.*, 2004, p. 31). Several explanations have been proposed to explain this premium, including the bonding proposition: a company that is listed in the U.S. subjects itself to a more stringent regulatory environment as well as to greater scrutiny by the authorities, analysts and institutional investors (Doidge *et al.*, 2004, p.3). However, the premium can also be linked to better possibilities for financing growth. Doidge *et al.* (2004) show that growth opportunities are more highly valued for firms that choose to cross-list in the U.S., particularly those from countries with poorer investor rights. Growth opportunities of these cross-listed firms are likely to be more valuable not only because the firms are better able to take advantage of them, but also because a smaller fraction of firm resources is expropriated by controlling shareholders in firms that find it optimal to list.

Recent papers, however, question the bonding explanation for the CLP and offer two alternative propositions. Litvak (2009) observes that the CLP is strongly correlated with U.S. stock indexes for firms that list on major markets, but not for firms listed on cross-listed firms

traded OTC or on PORTAL. Moreover, the CLP exists only in firms with above-median ratio of U.S. to total trading volume, and declines significantly for firms with a low volume of trading. Litvak concludes that these results weaken the law-based explanation for cross-listing premia (bonding to U.S. securities regime) and strengthen liquidity and visibility explanations. Litvak suggests a behavioral explanation that is important in our setting: U.S. investors treat high trading volume, exchange traded firms partly like U.S. firms, but treat OTC firm, PORTAL firms and low-trading-volume exchange-traded firms like other foreign firms. Sarkissian and Schill (2008) observe that cross-listing “waves”, that occur when the market does relatively well, are consistent with the recent literature. They find little evidence that overseas listing is associated with any appreciable increase in the long-term valuation ratio of listing firms. They suggest that these short-term valuation gains surrounding cross-listing provide the impetus for listing overseas. In the same vein, Abdallah and Ioannidis (2009) evidence that before firms cross-list they exhibit strong performance in their domestic market, but after cross-listing their performance declines.

King and Segal (2009) find that cross-listed firms in the U.S. with a single class of shares enjoy a permanent increase in valuation if they attract and maintain investor recognition over time. Valuations of firms that fail to widen their U.S. shareholder base return to pre-listing levels within two years. Cross-listed firms with dual-class shares exhibit a permanent increase in valuation regardless of the level of U.S. investor holdings, consistent with firm-level bonding. This seems to indicate that a U.S. listing can increase the values of some categories of stocks. King and Segal (2008) and related studies, however, do not consider small companies which generally do not cross-list in the U.S. In our analyses, by contrast, we focus on substantially smaller stocks.

In sum, for large firms the extant evidence is such that there are comparatively small differences in the cost of capital due to Canada’s regulatory structure. For smaller firms, however, there is no prior evidence. Our central hypothesis is as follows:

*Given the pronounced differences in listing standards for smaller firms, Canadian IPOs are valued substantially lower than their U.S. counterparts.*

We test this hypothesis by considering differences across countries while at the same time controlling for alternative explanations. Several alternative explanations are examined below.

## *2.2. Alternative explanations for international differences in IPO valuation*

In this section we briefly review a number of alternative explanations for international differences in IPO valuation, including liquidity, , the quality of issuers, investment banker pricing rationality, and VC and investment bank reputation.

### *2.2.1. Liquidity*

Investors price liquidity (Litvak 2009). There is substantial evidence of a significant liquidity premium that is robust to the CAPM and the Fama-French three-factor model, and that liquidity is an important source of priced risk (Liu 2006). In the private placement sector, there is strong evidence that liquidity influences the discount, which is the difference between the issue price and the market price (Maynes et Pandes 2010). In an illiquid market, while quoted prices exist, these prices have biases which reflect individual beliefs about the best and worst possible outcomes and are not averages across all possible outcomes. Investors heavily discount the value of securities that are not frequently traded (Easley et O'Hara 2009). Differences in liquidity should be linked to the assumed differences in the future level of liquidity and these levels can differ across the countries.

### *2.2.2. Better quality of issuers*

It is possible that U.S. IPOs firms are of better quality than their Canadian counterparts. U.S. firms might have, for example, more R&D projects of better quality, better management teams or larger opportunity to implement strategic alliances. In such a context, higher IPO valuations in a country can reflect higher growth expectations and various characteristics of issuers that can be appreciated by investment bankers and investors. However, investors have few opportunities to assess the real quality of emerging firms with no sales or negative earnings at the time of listing.

### *2.2.3. Irrational pricing*

An extensive literature address the pricing and underpricing of IPOs (Ljungqvist 2007). Behavioral explanations can account for IPO pricing (Loughran et Ritter 2002). Behavioural explanations are important in explaining international differences in IPO valuations to the extent that behavioural biases are different across countries. Individual and institutional investors can play different roles in the IPO markets in both countries. These two groups exhibit different levels of bias and knowledge during the IPOs. For example, Dorn (2009) indicates that retail

investors overpay the stocks at the IPO and exhibit lower long run returns. According to Chiang *et al.* (2009) the bids of individual investors during auctioned IPOs exhibit evidence of return chasing. The unexpected entry of more individual investors is related to lower returns. We cannot rule out the possibility that pricing differ in both countries because of differences in the rationality and information of the investors. If differences exist at this level, we should observe differences between underpricing and long run performance of IPOs, depending on the country.

#### *2.2.4. Investment bank and auditor reputation, Venture capital*

Investment bank and auditor reputation can positively influence IPO valuation. Investment banks and auditors provide certification about the quality of the IPO firm to the new investors (Carter et Manaster 1990; Ljungqvist 2007). Similarly, VCs provide certification about the quality of the IPO firm to new investors as well as monitor the quality of the firm before the IPO and prior to their exit after the expiration of the restricted period.

Further, VCs attract market power in terms of attracting a greater number and higher quality of market participants such as underwriters, institutional investors, and analysts to an IPO, thus obtaining a higher valuation for the IPOs of firms backed by them (Chemmanur et Loutskina 2007; Ivanov et Xie 2010). VC-backed firms have larger and more independent boards, and their monitoring shareholders own a higher percentage of the firm. Further, VC-backed firms have governance structures with higher levels of monitoring at the time of the IPO and four years following the offering (Manigart et coll. 2002; Baker et Gompers 2003; Nahata 2008; Suchard 2009). We have considered the VC involvement in the matching process, and we included a dummy variable to identify VB-IPO in the models.

#### *2.3. Summary and test strategy*

Our main proposition is that given the pronounced differences in listing standards, Canadian IPOs are valued substantially lower than their U.S. counterparts. Accordingly, our main test will be a valuation model where a dummy variable accounts for the country. To be able to reject alternative specifications, we also include in the model several variables that are observable at the IPO time. This is, for example, the case for the quality of investment bankers or VCs backing. However, this strategy cannot be used with each of the alternative explanations, because we do not have clear indicators of several variables at the IPO time. Mainly, the quality of issuers, possible irrational pricing, and future liquidity cannot be observed before the issue.

To cope with this problem we use a two-step strategy. First, we test the differences in quality, rationality and liquidity between the Canadian and U.S. sub sample using ex-post data, in section 3. When we reject the hypothesis of significant difference along one dimension between both groups, the corresponding explanation for difference in valuation can be eliminated. Second, if significant difference between both groups appears for one or several dimensions, we develop an ex-ante indicator for this dimension and use this indicator in the main econometric model.<sup>10</sup>

### **3. Data, matching process and stylized facts**

#### *3.1. Sample selection*

Our sample of matched IPOs in Canada and the U.S. spans the years 1986-2007. Our full sample comprises 260 Canadian IPOs that are matched with 260 U.S. IPOs, for a total of 420 IPOs. Our sample is derived from the list of Canadian IPOs from FPIInfomart.ca since 1993 and from the annual list of the Financial Post for the previous years. We excluded privatization of state-owned companies, demutualizations, creation of income trusts and Capital Pool Companies Program IPOs.<sup>11</sup> We obtained prospectuses from SEDAR (the Canadian equivalent of EDGAR) since 1997, and those of previous years from the Autorité des Marchés financiers du Québec, investment bankers and academic libraries. We supplemented the accounting information with historical records from Thomson's CanCorp Financials. Data sources and variable definitions are provided in the Appendix.

Our Canadian sample comprises 137 VC-backed IPOs. To identify Canadian VC-backed IPO we obtained a partial list of VC-backed IPOs from Thomson Financial VC Reporter, a major provider of data on the VC industry. VC Reporter summarizes the deals made by the members of this industry in Canada. We supplemented and verified these data by analyzing the list of large shareholders in prospectuses.<sup>12</sup> The frequency of VC-backed IPOs in Canada is relatively low. Cumming and Johan (2009) report that the proportion of VC investment in Canada that exit through an IPO is 5.85%, from 1991 to 2004, compared to a proportion of 35.65% in the U.S.

---

<sup>10</sup> Another option can be to develop ex-ante indicator for each of the dimensions, with the risk to develop highly correlated indicators.

<sup>11</sup> The Capital Pool Program has been implemented in Canada to ease the creation of shells, ultimately used in reverse merger listings by operating companies (Carpentier and Suret 2006). Their IPOs result in the listing of a non-operating company; we consequently exclude CPC IPOs from our sample.

<sup>12</sup> We compile a list of VCs operating in Canada from 1986 to 2003 from the lists of the Canadian VC Association, the summary of VC lists of Industry Canada (Strategis) and the lists of the equity sources provided by Mike Volker at <http://www.sfu.ca/~mvolker/biz/moneylnk.htm>

during the same period. In our sample, we identified 197 VC-backed IPOs between 1986 and 2007, and all available data sources and historical records indicates our sample covers 100% of Canadian VC-backed IPOs over this period. Similarly, we collected the U.S. IPOs from SDC Platinum and the prospectus on Edgar. We identify VC-backed IPOs using data from Thompson Financial SDC.

The proportion of Canadian VC-backed firms that list directly in the U.S. is relatively low. The data available on the Thomson VC reporter site indicate that over our sample period 20 of the 122 Canadian VC-backed IPOs were listed in the U.S. IPOs of Canadian firms listed in the U.S. are excluded from the sample.<sup>13</sup> There are 17 non-VC backed Canadian firms that listed in the US, and they are likewise excluded from our sample. Also, 2 IPOs were listed simultaneously in Canada and the U.S. We considered keep these 2 cross-listed IPOs separately from our sample; regardless, treatment of these 2 cross-listed IPOs has no material influence on our results. IPOs of Canadian firms listed in the US are excluded from the sample.<sup>14</sup>

### *3.2. Matching process*

IPOs in the U.S. in general and VC-backed IPOs in particular are different in Canada and the U.S. For example, the mean gross proceeds is U.S.\$201.57 million in the U.S. (Ritter 2006) and only U.S.\$114 million in Canada over the years 2001-2003 (Carpentier et Suret 2009). The comparison of IPOs in Canada and the U.S. requires that we match each Canadian IPO with a comparable IPO in the U.S. As a consequence of the differences in the distributions of size, it is worth noting that matched U.S. IPOs are smaller than Canadian IPOs in our sample.

First, we match each Canadian IPO with a U.S. IPO occurring during a 12 month window centered on the Canadian IPO date, from the same two digit industry code, and for gross proceeds adjusted for exchange rates do not differ from more than 50%. We match each Canadian VC-backed IPO with a U.S. VC-backed IPO, and Canadian non VB-IPO with U.S. non VB-IPO. We get 233 perfect matches in this first step. Second, we relax the gross proceeds criteria or widen the industry criteria and match based on the description of activity provided in the prospectus. In several cases, Canadian IPOs are so small that we cannot find an U.S.

---

<sup>13</sup> The number of Canadian firms backed by VC that exit in the U.S. through an IPO is too small to constitute a distinct group.

<sup>14</sup> The number of Canadian firms backed by VC that exit in the U.S. through an IPO is too small to constitute a distinct group.

equivalent, and we are unable to match the sample without replacement. In a few cases, two or even three Canadian IPOs are matched with the same U.S. IPO. Overall, we get a sample of 302 pairs of IPOs. In order to assess the robustness of the results to the matching process, we also run the tests on the restricted sample of 260 pairs without multiple matches.

### *3.3. Summary statistics*

Table 1 Panel A reports the main characteristics of the issues for the matched Canadian and U.S. samples. We report in Table 1 the statistics from the matching process without replacement in order to mitigate potential bias in the statistical tests (as discussed, U.S. IPOs are typically not small enough to be matched with Canadian IPOs.) We report only the mean and median for each variable for which a value is available in both countries.

Regardless of the matching process, gross proceeds are higher for the U.S. sample of VC-backed IPOs. This is particularly evident from the medians, with a difference of approximately 10 million dollar. This result is perhaps best attributable to the lower listing requirements in Canada relative to the U.S. We allowed for a difference of 50% between the gross proceeds in the matching process, but this difference was systematically in favour of the U.S. sample. We report the comparison of gross proceeds by sector. The difference is significant in the oil and gas sector, where smaller issuer do not list in the U.S.

[Insert Table 1 About Here]

Table 1 Panel B presents the main characteristics of the issuers. Canadian issuers are younger than their U.S. counterparts, but the difference is not statistically significant at the 5% level. There are differences in the two samples for shareholders' equity, total assets, EBITDA and net income, but none of these differences are significant. Based on net income and EBITDA, Canadian issuers appear in better condition than U.S. issuers. Average and median net income is negative among U.S. IPOs. By contrast, average and median income are positive in the Canadian sample. This surprising result can be attributed to the fact that we selected the smallest IPOs in the U.S. to be able to match with IPOs in Canada. The differences between both samples are statistically significant.

Table 1 Panel B also presents ratios. Because several values used in the denominator of the ratios are negative or zero in our sample, we apply the following rules to calculate the ratios:

when the shareholders' equity is negative and the net income positive, we attribute the value of 100% to ROE. When the shareholders' equity and the net income are both negative, we use -100% for ROE. Return on assets (ROA) and return on equity (ROE) are significantly lower in the U.S. sample, which is attributable to the poor operating performance of small IPOs in the U.S. Net margin is also significantly lower in the U.S., while the debt to asset ratio is higher, due to the negative values of equity. In short, the U.S. IPOs selected for matching purposes report significantly poorer operating performance than Canadian IPOs.

Table 1 Panel C reports the main multiples. We estimate the price to sale and the price to earnings on a pre-money base, following Zheng (2007). Zheng contends that the conventional use of post money multiple biases the comparisons, mainly when the proportion of primary shares sold at the IPO differs. In our setting, this bias should be particularly strong because, all else being equal, U.S. IPOs have larger gross proceeds than Canadian IPOs even if they have lower shareholders equity before the IPO. Moreover, U.S. IPOs comprise a smaller proportion of the IPOs with primary shares. Price to book is estimated on a post money base, because both values can be expressed on the same basis. Prices to sales, price to earnings or market to book ratios can take extreme values when the denominator is close to zero, and is undefined when the sales are 0 or when the earnings or book value of equity is negative. As these multiples are often used in the literature related to the IPO valuation, we report their mean and median values. However, we apply the following adjustments to the calculations. The multiples are not estimated when sales are zero (price to sales), or when earnings or book value of equity is negative (respectively price to earnings and price to book). In order to mitigate the impact of very low denominators, we winsorize the distribution of the multiples at the 5<sup>th</sup> and 95<sup>th</sup> percentile.

Table 1 Panel C shows, for each multiple, that U.S. IPOs are valued higher than their Canadian counterparts, and this difference is statistically significant for the price to book ratio (at the 1% level), for the price to EBITDA ratio (at the 1% level) and for the price to earnings ratio (at the 10% level). This result is surprising in view of the poor operating performance of U.S. IPOs. For example, median price to sales is 3.17 in the U.S. and 2.95 in Canada. The median price to earnings is 20.38 in the U.S. and 15.87 in Canada; these differences are significant for median values but not for average values because of the high variance in the distributions. Even if we winsorize these distributions we get maximum values in the vicinity of 450%. Note that the

characteristics of the distribution give rise to the choice of our empirical models, as explained below in Section 4.

Table 1 Panel D shows that prestigious investment banks subscribe larger issues than non prestigious investment bankers, in both countries. As well, both mean and median valuations are higher in the U.S. than in Canada for prestigious and non-prestigious investment banks. Prestigious investment banks are used with the same frequency in the U.S. and Canada (160 of 260), which is useful and highlights the quality of our matching process.

Table 1 Panel E shows the same proportion of IPOs in the Canadian and US subsamples use VC backing (122 of 260). VC- and non-VC-backed IPOs are valued higher in terms of both mean and median values in the U.S.

Table 2 presents descriptive statistics for the change in ownership at the IPO, post-IPO accounting and market performance, post-IPO liquidity and the survival of the issuer. We present data on the percentage of the pre-IPO firms sold by the CEOs.

A first observation is that the proportion of IPOs with shareholder's sale is larger in Canada than in the U.S.. Post-IPO ownership retention of pre-IPO shareholders is significantly higher in average and in median (70.52% and 72.11) in the U.S. than in Canada (64.05% and 68.67) and this difference is significant at the 5% level. There are no statistically significant differences in the percentage change sold between Canada and the U.S. for any of the types of shareholders, except for other principal shareholders. The decrease in shareholdings of principal shareholders is higher in Canada (-15,89% in average) than in the U.S. (mean of -0.38) . This is consistent with the larger part of primary shares sold by Canadian firms at the IPO. These differences indicate that the changes in ownership should be included in the econometric valuation models.

[Insert Table 2 About Here]

Table 2 Panels B-E provide summary test statistics for whether the matched IPOs in Canada and the U.S. differ along the following characteristics: the quality, the investors' rationality and the post IPO liquidity. These characteristics cannot be observed ex-ante. We use ex-post data to determine in what extent both groups indeed differ. To the extent that they do

differ, it is important to add an ex-ante estimator of these characteristics to complement the econometric model in our empirical analyses described below in section 4.

Quality is difficult to define for firms with most of their value in growth opportunities. Helwege and Liang (2004 p.543) include the performance in years following the IPO as a measure of quality. Following this path, and in line with Zheng and Stangeland (2007), in Table 2 Panel B we use a variable that measures growth rates of accounting performance (including earnings and revenues) as measures of firm quality. We complete the analysis of operating performance by the comparison of survival rates in both samples.

Several firms report no sales, negative earnings and tiny book value of equity and asset before the IPO. Pre-IPO values of these variables cannot be used to estimate growth rates. Accordingly, we use the gross proceeds to deflate the change in the performance indicators. The summary statistics in Table 2 Panel B indicate no significant differences between the growths in accounting numbers of Canadian versus U.S. IPOs. On an ex post basis, these two samples can be considered as composed of firms with equivalent quality. Differences in valuations at the IPO cannot be explained by expected differences in performance, if the ex-post performance is used as an estimator of the expected performance at the IPO time. However, even if there is no significant difference but it is worth noting that the U.S. firms show lower net income, book equity and net earnings growth with the sole exception of the slightly lower median growth in net earnings in Canada (-0,06 against -0.05 in the U.S.), although they have higher IPO value. Table 2 Panel E shows that as at June 2009 U.S. IPOs are more likely to still be listed (46,4) than Canadian IPOs (36,80). Canadian IPOs are more likely to be acquired or merged with a public firm, privatized or merged with a private firm, or delisted for negative reasons than U.S. IPOs. The chi-square test of these differences in proportions is slightly statistically significant.

As we do not observe significant differences on an ex-post basis, we do not include ex-ante estimators of the issuer quality in the econometric models presented in section 4.

Another possibility is that valuations might be higher in the U.S. because investment bankers and their clients are more optimistic in the U.S. than in Canada. If so, we should observe significant differences in the long-run performance following the IPO. In order to test for the differences, in Table 2 Panel C we estimate the following market related variables: underpricing, RR, AR and  $PPF_0/P_0$ . The variables are defined in Table A-1. We estimate each variable at the

firm level, and report the statistics for the distribution. We do not use a portfolio approach. Essentially, the raw and abnormal returns do not differ significantly, and the median is perhaps more informative in view of the significant outliers. Due to the very low prices at the IPO, particularly for Canadian IPOs, there are a few very high returns and the average is thus highly right-skewed. The median monthly abnormal return is -0.92 in Canada and -1.17 in the U.S. BHAR can produce unreliable results when there are very large returns; therefore, we cross-check our results by reporting the ratios between the perfect foresight prices (that is, the price that the investors had expected at a three years horizon if he has a perfect foresight capacity and the issue price). The median of the ratio is 0.73 in Canada and 0.64 in the U.S., but the difference is not statistically significant. Table 2 Panel C further reports statistics for underpricing, which show some significant differences, but taken alongside the long-run performance it is less plausible that irrational pricing explains valuation differences.

Overall, the data indicate that differences in prices observed at the time of IPO cannot be explained by differences in the long-run market performance following the IPO. The lower underpricing of Canadian IPOs had been evidenced in other papers (Kooli and Suret 2003). Therefore, as with the quality of issuers explanation, irrational pricing therefore appears to be an implausible explanation for differences in IPO valuations between Canada and the U.S.<sup>15</sup>

Table 2 Panel D reports three measures of liquidity - the trade volume, the trade amount and the rotation – which are estimated three years after the IPO. As trade amounts and trade volume are affected by the differences in prices between Canadian and U.S. stocks, rotation is perhaps the most informative measure. The three variables indicate a large difference between the two sub samples. The median trade amount is 1.58 in Canada and 8.12 in the U.S., even if the initial sizes of the IPOs were in the same range. The rotation ratio we observe in the U.S. is three time the equivalent ratio in Canada. Accordingly, we cannot rule out the possibility that the differences in prices we observe can be traced to the expected differences in trading activity and liquidity. This implies that this dimension should be included in the econometric model. However, we cannot explain the price difference by a difference in liquidity observed three years after the pricing. We follow the methodology developed by Ellul (2006) in a similar context, to

---

<sup>15</sup> As a related matter, extant evidence in Derrien and Kecskés (2009) shows investor sentiment matters relatively little compared to fundamentals in equity issuance, at least in terms of the number of new listings and the proceeds. This evidence is consistent with the view that sentiment could not be a complete explanation for international differences in IPO valuations in Canada and the U.S.

develop an ex ante estimator of liquidity, based on a matched-firm approach. We assume that to forecast an IPO's future liquidity investors use the value observed for a previous IPO of comparable size, belonging to the same sector and from the same country. We estimate the trading volume and the rotation twelve months after this matched IPO and use this estimation as a proxy for the expected liquidity of our IPO sample - expected rotation. These expected rotations are reported in Table 2 Panel D. The median of the expected rotation in both countries are similar to the median of the observed rotation. Accordingly, we consider that the expected rotation is an acceptable proxy for the real ex-post rotation. Regardless, note that inferences drawn from our econometric tests below in section 4 are invariant to ex-ante versus ex-post measures of rotation, and alternative specifications not explicitly presented in section 4 are available on request.

Table 3 reports a correlation matrix for the restricted sample of matched firms. The correlations indicate valuations are significantly higher for IPOs with higher sales, higher R&D expenses, U.S. IPOs, and IPOs that use a prestigious investment bank. The correlation matrix indicates some degree of collinearity among our control variables (e.g., the correlation between prestigious investment banks and sales is 0.25), but for the most part the variables are not highly collinear. Nevertheless, we do assess robustness in our econometric tests by considering different sets of explanatory variables in our regressions.

[Insert Table 3 About Here]

Overall, the summary statistics and correlations highlight the importance of listing standards and liquidity in explaining international differences in the valuation of VC-backed IPOs, while suggesting less of a role for VC quality, issuer firm quality, and mispricing. We test these explanations further below in a multivariate setting.

## **4. Econometric models and results**

### *4.1. The models*

The analysis of valuation at the IPO is a challenging task, because numerous firms report negative earnings and, in some cases, no sale and even negative values for shareholders' equity. Accordingly, neither q ratios (King et Segal 2009) nor multiples (Purnanandam et Swaminathan 2004) can be used and we base our analysis on the model proposed by Aggarwal *et al.* (2009). In this model the dependent variable is the total offer value defined as offer price multiplied by the

post-IPO shares outstanding. The method proposed by Aggarwal *et al.* allows for catching the cases of negative earnings, a situation that prevails in Canadian and matched U.S. and IPOs. These authors use also a valuation based on first-day closing prices. The difference between first-day closing price (market value) and the offer price can be considered as the amount by which the investment bankers underprice the IPO.

Some variables, as book value of equity, can take on a negative value. Following Aggarwal *et al.* (2009) and Hand (2003), we use the Log transformation as follows, for each continuous variable:  $L(W) = \log_e(1+W)$  when  $W \geq 0$  in \$ million; and  $L(W) = -\log_e(1-W)$  when  $W < 0$  in \$ million.

We consider that the value at the IPO is explained by the three main valuation drivers: revenues, book value of equity and earnings. We use the earning before depreciation and interest (EBITDA) following Purnanandam and Swaminathan (2004). The analysis of the distribution of these values indicates they can have a negative or 0 value. We use the L transformation to keep these observations in the sample.

Stock prices are partially determined by growth opportunities, and this is particularly true in the situation of new ventures at the IPO stage. Classical indicators of growth opportunities, like Q ratios or Book-to-market ratio can hardly be introduced in a model explaining the price. We follow Aggarwal *et al.* (2009) who use R&D expenses as a proxy for growth opportunities.

Prior research has shown that ownership retention by pre-IPOs shareholders has a significant impact on firm value. Consistent with Aggarwal *et al.* (2009), we measure aggregate post-IPO ownership of pre-IPO shareholders, INSRET, as (shares outstanding after offering - primary and secondary shares issued) / shares outstanding after offering. As in Aggarwal *et al.* (2009), we study the impact of changes in ownership of different classes of shareholders, including CEOs, the other officers and directors, VCs and other blockholders. Ownership changes are as defined above in subsection 3.4 and presented in Table 2. Large sales of insiders provide a negative signal to the market and thereby lower IPO valuations.

The choice of a prestigious broker or auditor has generally been considered a positive signal, characterized by lower underpricing and better long-run performance, associated with a decrease in the asymmetry of information (Carter et Manaster 1990). The probability of survival is higher for issuers that hire a prestigious investment banker, according to Schultz (1993) and

Demers and Joos (2007). As the choice of prestigious intermediaries positively influences the probability of success, we can expect a positive association between the enrolment of prestigious intermediaries and the valuation. This result is evidenced by Aggarwal *et al.* (2009). Following Carter and Manaster (1990), we consider the most active investment bankers in Canada prestigious. During the period under study, seven investment bankers subscribed to 60% of all the initial and seasoned equity issues, and are thus considered prestigious.<sup>16</sup> We also consider as prestigious U.S. firms with a score higher than 7 in Carter *et al.* (1998). We add to this group international investment bankers such as BNP Paribas, Deutsche Bank and UBS, based on the list of the most active investment bankers worldwide provided by Ljungqvist *et al.* (2003 Table 2, p. 73). In the U.S., we consider as prestigious each investment banker with a rating higher or equal to 7 in the ranking provided by Loughran and Ritter (2004). The dummy variable PUND is 1 when the investment banker is considered prestigious. We observe that a proportion of 98% of VC-backed IPOs are audited by a prestigious auditor, in each country. Because there is close to no variability in auditor reputation for half of our sample, the dummy associated with the prestige of auditor is not included in the model.

Prior research evidences that VC backed start-ups obtain higher valuation at the IPO than non VC backed ones. (Chemmanur et Loutskina 2007; Ivanov et Xie 2010). The dummy variable PVB is 1 when the IPO is backed by a VC. Note that our central results pertinent to the country effect are invariant to the use of different variables pertaining to the involvement of VCs, such as controls for different types of VCs such as government funds. Alternative specifications with the use of different VC variables were explicitly shown in an earlier draft of the paper and are available on request.

Litvak (2009) provides evidence that the pair premia, (that is, the value of cross-listed firms in the U.S. relative to their comparable domestic firms) is strongly correlated with U.S. stock indexes and peaks during the bubble in early 2000. We control for the bubble period in one of the model. We considered various other variables but found them to be immaterial for our analysis. Note that we do not include variables for gross proceeds (a proxy for size) and industry

---

<sup>16</sup> They are: RBC Capital Markets, CIBC World Market Inc., BMO Nesbitt Burns Inc., TD Securities Inc., Scotia Capital Inc., Merrill Lynch Canada Inc. and Goldman, Sachs & Co. No other Canadian-based investment bankers control more than 5% of the total market.

as we have matched our samples precisely on size and industry. Finally, we do not control for hot and cold market IPOs as we have matched and controlled for the time of issue.

In sum, the base model takes the following form:

$$L(OV)_i = \alpha_1 + \alpha_2 L(\text{inc})_i + \alpha_3 L(\text{BV})_i + \alpha_4 L(\text{Sales})_i + \alpha_5 L(\text{R\&D})_i + \alpha_6 \text{DCountry}_i + \alpha_7 \text{INSRET}_i + \alpha_8 \text{IBP}_i + e_i \quad (1)$$

The variables are defined in Table A-1. We also report regressions with four alternative forms of the base model which include extra explanatory variables as indicated in Table 4.

#### *4.2. Base model regression results*

Table 4 Panels A and B present OLS regression analyses of IPO offer value models in subsection 4.1 for the two different matched samples as described above in subsection 3.2. We explicitly present height alternative models: five for each of the restricted matched sample (Table 4 Panel A) and the whole sample (Table 4 Panel B), as explicitly specified in subsection 4.1. We discuss a variety of additional specifications below that were considered but did not materially affect the main results.

[Insert Table 4 Panels A and B About Here]

The regressions provide very strong support for the proposition that IPOs are valued higher in the U.S. These estimates are statistically significant at the 1% level of significance and are economically large. The estimates from the restricted sample indicate valuations are higher by 40-45%% (Panel A), and the estimates from the whole sample indicate valuations are higher by 61-66% (Panel B). The country effect matters a great deal regardless of how IPOs are matched by size, industry and year. These results are central to our primary hypothesis. Given the robustness of these results to different specifications and control variables, as discussed below, the most plausible explanation for these country differences is the differences in listing standards between Canada and the U.S.

Many of the control variables in the models are statistically significant in ways that are quite intuitive and consistent with the prior literature. We find a positive, and generally significant at the 10% levels relation between income and IPO valuation. Our control variable for size in terms of the book value of equity is not significant in most of the models with the restricted sample; the size effect is likely to be trapped by the sale variable. The sales and R&D

variables are positively related to valuation in all of the models, and these effects are statistically significant at the 1% level for sales and at least at the 5% level for R&D in most of the models.

The effect on valuation from the percentage of the post-offering firm owned by the pre-IPO shareholders is positive and significant at the 1% level in all of the models. This finding is consistent with Ljungqvist and Wilhelm (2003), who reason that great insider ownership strengthens incentives to bargain for better offer terms. The variables for insider ownership change are insignificant.

We note there is a strong positive effect of prestigious investment bankers on IPO valuation. This effect is significant at the 1% level in all models. Investment bankers certify the quality of the IPO firm and facilitate greater investor confidence, which results in higher valuations (Carter et Manaster 1990; Carter et coll. 1998).

The involvement of a VC in the IPO firm significantly increases the IPO valuation. The coefficient is in the vicinity of 29-34% in Table 4 Panel A and 24-33% in Table 4 Panel B. This result indicates that VC-Backed IPOs sold at a significant premium relative to non VC backed IPOs.

To determine the extent that liquidity can explain most or the totality of the observed differences between the valuation of Canadian and U.S. VC-backed IPOs, we use a liquidity variable, namely the rotation. The log of this variable ( $L(\text{rotation})$ ) is insignificant in Table 4 Panels A and B.<sup>17</sup> Below in subsection 4.3, we consider this issue further by matching IPO samples based on expected liquidity.

#### *4.3. Additional robustness checks*

The expected rotation variable is closely related to the country and, for this reason, in this subsection we separately consider matched samples based on expected rotation in the two countries. That is, we test for the liquidity argument by using the expected rotation to define different sub samples. These sub samples include the paired observations only if the expected rotation of the U.S. firm is less than four (three, two, one) times the expected rotation of the Canadian matched firms.

---

<sup>17</sup> In other specifications not explicitly reported in Table 4, such as for the subsample of VC-backed IPOs that was used in an earlier draft of this paper, we did find a positive and significant effect of rotation, but there were no other differences in the results with the other variables. Alternative specifications are available on request.

Table 5 presents summary statistics for the matched samples based on rotation. The data show that both average and median IPO valuations are significantly higher in the U.S. than Canada for all of the different matched subsamples based on expected rotation. The gap between the median offer value increases when the differences between rotations decrease. However, the gap in value for similar rotations (>1 rightmost column) is .57, when the gap observed when we omit the most different rotations (>4 second column) is 0.47.

[Insert Table 5 About Here]

Table 6 presents regressions for each of the matches based on expected rotation. Table 6 shows that the country variable is statistically significant at the 1% even with the the reduced sample size. Also, the effect is economically large: valuations in the U.S. are at least 67% higher based on the most conservative estimate (>1), and 74% higher based on the least conservative estimate (>2). These results again show that the difference in valuation between Canada and the U.S. is most likely attributable to the difference of listing standards.

[Insert Table 6 About Here]

Table 7 presents some further robustness checks related to different subsets of the data for prestigious investment banks (or otherwise) and VC- versus non-VC-backing. At issue is the possibility that choice of investment bank (or possibly use of a VC) is endogenous to firm quality and hence valuation.<sup>18</sup> We do not believe that an ideal that is correlated with choice of investment bank or VC exists; as such, we consider subsamples of the data based on the reputation of the investment bank and VC.<sup>19</sup> In Table 7, the first column considers the subsample of non-prestigious investment banks, and the second column considers the subsample or prestigious investment banks. The third and fourth columns present the same respective subsamples for non VC-backing and VC-backing.

[Insert Table 7 About Here]

---

<sup>18</sup> The choice of the IB has be made several month before the pricing, and the choice of VC is years before the pricing. However, it is likely that the better firms choice the high quality IB, because they get more advantage to signal they are good firms than lower quality firms. Several dimension related to the quality are, however, included in the model. Moreover, as most firms do not report revenues or positive earnings, quality is not easy to determine upfront.

<sup>19</sup> Also, note that we considered excluding these investment bank and venture capitalist variables from the regressions presented in Table 4 and all of the results including those pertaining to the country effect were not materially different.

The regressions in Table 7 are very consistent with those reported earlier. The country effect is positive and significant in three of the four models at the 1% level and at the 10% level in the other model (with non-VC backing). Further, note that the effect is economically large, with the most conservative estimate at 36% (for the subsample of non-VC backing) and the least conservative estimate at 87% (for the subsample of non-prestigious investment banks).

Finally, note that we considered a number of additional specifications to assess robustness that are not explicitly reported for reasons of conciseness but nevertheless available on request. For example, we considered the effect of Sarbanes Oxley legislation (SOX) on IPO valuation. According Johnston and Madura (2009), SOX reduces IPO uncertainty and underpricing, and as such we cannot rule out an effect on valuation. Less uncertainty implies a lower cost of capital and higher valuations. We tested the effect of SOX with a post-July2002 dummy variable equal to 1, and we did not find any significant effect. Also, we ran regressions on different subsets of years (e.g., in a prior version with data up to 2004, while the current data are extended to 2007), and did not find any material differences in the results. These and other specifications are available on request.

## **5. Conclusion**

This paper empirically analyzed the valuation of IPOs with comparisons across Canada and the U.S.. We posited that the lower listing requirements in Canada would lead to valuations that are much lower in Canada relative to the U.S., all else being equal. Based on a unique sample of hand-collected data that matched IPOs by size, industry and year across Canada and the U.S., and controlling for numerous accounting and financial statement variables, ownership levels, ownership changes, and investment banking, and VC backing, we found robust statistically significant evidence that IPOs are valued lower in Canada. In particular, IPOs in Canada are valued in the range of 40-45% lower on average when we control for other things being equal. Our findings are new insofar as prior studies comparing valuations of publicly traded firms in Canada and the U.S. focus on larger companies with significant analyst coverage. Those prior studies show very small differences in the cost of capital and hence very small differences in valuation of approximately 3%.

We note that the pronounced differences in valuations of small IPO issuers across Canada and the U.S. over the 1986-2007 period are consistent with the view that the Canadian and U.S.

IPO markets are segmented due to the regulatory differences (King and Segal, 2008). In our empirical analyses, we matched by size, industry and year and controlled for a variety of variables pertaining to company financial statement performance and ownership. Still, companies continue to go public in Canada despite the lower valuations. The path Canadian companies follow to obtain U.S. listings is to first go public in Canada and then pursue cross-listing once successfully established in Canada. This strategy minimizes the costs of going public and avoids the more onerous regulations faced by companies going public in the U.S. (Industry Canada 2001).

By focusing on earlier stage companies where the regulatory environment has a more pronounced effect, the data herein show the economic costs of low listing standards are large. The policy implications are significant. Low levels of valuations for IPOs in Canada can exacerbate the comparatively lower performance of the Canadian VC market relative to the U.S. The evidence of a low valuation and post-listing performance of IPOs could be an explanation of the lack of IPO activity of Canadian VCs. The fact that IPOs are valued lower in Canada than in the U.S. can also explain why VC is less developed in Canada than in the U.S.

## Appendix: Data Sources and Definitions

Accounting and R&D data are directly extracted from the IPO prospectus or prior financial reports when such items were available. If not, we used the financial reports following the IPO and screened for historical data. EBITDA is not always displayed in financial statements. We compute EBITDA precisely where depreciation is reported (including all Canadian IPOs) and estimate EBITDA for some U.S. IPOs where depreciation is not reported for the relevant period. Estimated depreciation is based on the reported CFO depreciation where available (3 observations), and otherwise we compute a quasi-EBITDA by adding back G&A expenses to operating income.

We use the prospectus to identify the investment banks affiliated with each IPO. We determine the lead underwriter, when not explicitly indicated, as the one that sells the largest number of shares. We also determine if the deal was a best effort (BE) or a firm commitment (FC) from the *Underwriting* section in the prospectus. For example, statements such as “The underwriters are committed to take and to pay for all the shares if any of the shares are taken” were used to classify the IPO as a firm commitment.

We use the *principal and selling shareholders* section of the prospectus and the numbers of shares held before and after the offering to compute the changes in ownership. We record the transactions by the CEO, the Officers and Directors net of the CEO operations, and of the VC. We include in VC ownership all holdings of syndicated investors. We correct for holdings of insiders that also appear under VC holdings in the prospectus to avoid double counting. We report the change in ownership of all the other shareholders that own more than 5% before the IPO and who were not accounted for in any other class of shareholder.

Using several sources (including news releases, financial reports and press articles available on Edgar, Sedar, Factiva, FP Infomart and Mergent Online), we documented the fate the IPO firms in our sample from the time of IPO up until June 10, 2009. Some firms are still active and traded, while other are either acquired or merged, renamed, or delisted. We determine if delisting was for substandard performance, or pursuant to a going private transaction.

Table A-1 provides definitions for all of the variables.

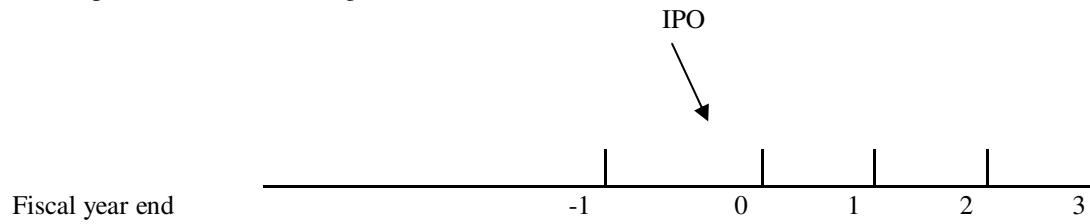
**Table A-1. Variable Definitions**

Variable	Definition
OV	Offer Value = Offer price x number of shares outstanding immediately after the IPO (in U.S. \$ million). $L(W)$ stands for the L transformation: $L(W) = \log_e(1+W)$ when $W \geq 0$ in \$millions; $L(W) = -\log_e(1-W)$ when $W < 0$ in \$millions
Underpricing	The initial return estimated between the IPO price and the closing price of the first month of trading. We use the first month closing price because several IPOs are not traded immediately and some of them are initially traded with low volumes.
$P_{36}$	Market price at the end of the 36 <sup>th</sup> month following the IPO
$RR_{36}$	Raw return, including the underpricing, estimated using BHAR methodology during the three years following the IPO. We report raw returns because the index we can use in both countries is not the same.
$AR_{36}$	Excess return estimated using BHAR methodology during the three years following the IPO. Small caps index relevant in each country has been used. We use the Russel 2000 – Index in the U.S. and the BMO Nesbitt Burns S/C Composite in Canada.
$PPF_0$	$P_{36} / I_{36} * I_0$ market price adjusted for the variation in the index between the issue time and the end of the 36 <sup>th</sup> month. $I_{36}$ , $I_0$ : value of the small caps index at month 36 and 0 respectively. This perfect foresight price had been observed on the prospectus given the investment bankers have had a perfect knowledge of the future. This is a proxy for the intrinsic value of the stock at the IPO time.
$PPF_0/P_0$	The ratio of the perfect foresight price to the issue price. A ratio lower than 1 indicates that the initial price was set at a too high level.
Inc	Net Income before extraordinary items and R&D during the fiscal year closed just before the IPO (year -1)
BV	Book value of equity at the end of the fiscal year closed just before the IPO
Sales	Sales during the fiscal year closed just before the IPO
R&D	Research and development costs during the fiscal year closed just before the IPO
DCountry	1 if the IPO is launched in the U.S.
INSRET	Percentage of the post-IPO firm owned by pre-offering shareholders: (shares outstanding after offering - primary and secondary shares issued) / shares outstanding after offering.
IBP	Investment bank prestige; IBP = 1 if the investment banker is prestigious.
CEO change	The percentage of the pre-IPO firms sold by the CEOs. Specifically, $CEO\ change = \% \text{ owned by the CEOs after the IPO} * (SOA / SOB) - \% \text{ owned by CEOs before IPO}$ , where SOA = number of Shares Outstanding after the IPO, and SOB = number of Shares Outstanding before the IPO
OD change	The percentage of the pre-IPO firms sold by the other directors and officers
VC change	The percentage of the pre-IPO firms sold by the VCs.
DBI	A dummy variable for the Internet bubble period (1999-2000) * Linc
DGov	A dummy variable for government or labour-sponsored VC funds.
$L(\text{exp. rot.})$	The log of the expected rotation (trade amount / market value of a country-size-sector matched IPO 12 months after the matched IPO)
$\Delta REV$ (Post-IPO Revenues Growth)	$(REV+3 - REV-1) / GP$ , where REV = total revenues
$\Delta BE$ (Post-IPO Book Equity Growth)	$(BE+3 - BE-1) / GP$ , where BE = book value of Equity, $\Delta BE = 1$ indicates that the growth in book value of equity is only explained by the proceed of the IPO
$\Delta NE$ (post-IPO Net	$(NE+3 - NE-1) / GP$ , where NE = net earnings

Earnings Growth)

**Table A-1 (Continued)**

Subscripts refer to the following time line:



The subscript -1 indicate the fiscal year preceding the IPO. 0 is the subscript of the IPO Year. +3 indicates the third fiscal year following the one including the IPO; When the firm has been deleted of acquired, of if less than 3 years are available since the IPO, we use the last completed fiscal year .

**Table 1: Characteristics of the matched sample of Canadian and US Venture-capital backed IPOs, 1986-2007.** Gross proceeds are expressed in million of US dollars (US\$M). Issue price is expressed in US\$. EBITDA stands for earnings before interest, tax, depreciation and amortization. Total assets, Shareholders' equity, sales, EBITDA and net income are expressed in US\$M. ROA is EBITDA divided by total assets. ROE is net income divided by shareholders' equity. In panel B, we winsorize the distribution of the multiple at the 95 percentile. The final two columns test whether the difference between the mean (median) summary statistics is statistically significant across sample. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, \*\*\*, respectively.

	Canadian IPOs			US IPOs			mean	median		
	#	mean	median	#	mean	median	difference	difference		
							t test	p value		
							p value	(sign rank)		
<b>Panel A : Characteristics of the issue</b>										
Gross Proceeds (GP)	260	42.16	21.68	260	46.20	31.75	0.4954	0.0001	***	
Oil & Gas issuers' GP	7	26.51	7.40	7	71.17	86.25	-	-		
High-Tech issuers' GP	135	41.58	20.23	135	39.51	30.00	0.8309	0.0014	***	
Other issuers' GP	118	43.75	23.49	118	52.38	32.10	0.2087	0.0663	*	
Issue Price	260	6.53	6.11	260	11.17	11.00	0.0000	***	0.0000	***
% of post-IPO shares sold	237	0.36	0.31	237	0.29	0.28	0.0000	***	0.0040	***
% of firm's commitment	131	0.83	-	225	0.98	-	-	-	-	
<b>Panel B : Characteristics of the issuer prior to the issue</b>										
Age, in year	244	10.95	6.50	244	13.71	7.12	0.0805	*	0.0752	*
Total assets	221	88.29	19.29	221	94.22	14.71	0.8747		0.0037	***
Shareholders' equity (SE)	245	18.09	4.51	245	16.55	4.49	0.8193		0.5498	
Negative SE	53	21.63	-	73	28.08	-	-		-	
Sales	245	87.45	18.97	245	100.42	25.34	0.6494		0.6590	
EBITDA	231	14.28	2.67	231	9.73	1.76	0.4877		0.0080	***
Net Income	245	0.57	0.76	245	-0.82	0.06	0.4368		0.0097	***
Negative net income	84	34.29	-	130	50.00	-	-		-	
ROA	216	0.06	0.12	216	-0.01	0.13	0.0870	*	0.7842	
ROE	244	0.03	0.12	244	-0.16	0.00	0.0019	***	0.0087	***
Net margin	245	0.57	0.76	245	-0.82	0.06	0.4368		0.0097	***
Asset turnover	220	1.19	1.07	220	-0.46	0.74	0.3368		0.0099	***
Debt to Asset	220	0.73	0.72	220	1.34	0.84	0.1078		0.0000	***
<b>Panel C : Multiples</b>										
Price to sales	196	29.78	2.95	196	43.60	3.17	0.1981		0.4847	
Price to earnings	85	42.81	15.87	85	37.90	20.38	0.6083		0.0769	*
Price to book value	213	3.41	2.84	213	3.93	3.20	0.0318	**	0.0012	***
Price to EBITDA	103	17.12	6.67	103	20.00	9.57	0.4837		0.0031	***
<b>Panel D : Prestige of investment bank</b>										
Prestigious investment bank	160	59.55	32.32	160	63.45	48.00	0.6647		0.0001	***
Non prestigious investment bank	100	14.33	10.66	100	18.60	14.21	0.0922	*	0.0052	***
<b>Panel E : Venture-capital backed issuer</b>										
Venture-capital backed	122	50.79	27.08	122	58.56	47.13	0.4789		<0.0001	***
Non venture-capital backed	138	34.53	19.77	138	35.28	20.53	0.8891		0.7092	

**Table 2: Change in ownership at the IPO and survival of the issuer.** Panel A reports the shareholders' sale of shares. Panel B reports the fate of the issuer at the end of the study period (June 10, 2009). Negative reasons include bankruptcy, dissolution, delisting for failure to sustain listing requirements and reverse takeover on the company. Gross proceeds (GP) are expressed in U.S.\$M. INSRET is post-IPO ownership retention of pre-IPO shareholders and is measured as: (share outstanding after offering – primary and secondary shares issued) / share outstanding after offering. Underpricing is the initial return estimated between the IPO price and the closing price of the first month of trading. RR (AR) is the raw return (abnormal return), including the underpricing, using a BHAR methodology. PFP<sub>0</sub>/P<sub>0</sub> is the ratio of the perfect foresight price to issue price. Exp. rotation means expected rotation (Trade amount / Market value) of a country-size-sector matched IPO 12 months after the matched IPO). The final two columns test whether the difference between the mean (median) summary statistics is statistically significant across then samples. Statistical significance at the 10%, 5%, and 1% levels is indicated by \*, \*\*, \*\*\*, respectively.

	Canadian IPOs			U.S. IPOs			Mean difference	Median difference		
	#	mean	median	#	mean	median	t test	p value	p value	(sign rank)
<b>Panel A : Change in ownership, shareholders' sale of shares</b>										
IPOs without shareholders' sale, GP	204	37.33	20.33	163	42.61	30.40	0.2850		0.0209	**
IPOs with shareholders' sale, GP	56	59.75	30.32	97	52.25	36.91	0.7267		0.0173	**
INSRET, in %	260	64.05	68.67	260	70.52	72.11	<0.0001	***	0.0111	***
Change in ownership, in %:										
CEO	18	-4.08	-3.08	23	-2.75	-1.54	0.4224		0.2193	
Other officers and directors	20	-2.64	-1.54	33	-4.72	-3.15	0.3358		0.2144	
VC	21	-5.21	-3.13	15	-3.20	-1.27	0.5783		0.6333	
Other principal shareholders	22	-15.89	-7.66	20	-0.38	-3.13	0.0352	**	0.0440	**
<b>Panel B: Post IPO growth and accounting performance indicators, for the three years following the IPO</b>										
Δ REV (Post IPO Revenues Growth)	173	2.64	1.34	173	2.24	1.05	0.2644		0.2158	
Δ BE (Post IPO Book Equity Growth)	173	2.10	1.47	173	1.92	1.32	0.3870		0.2146	
Δ NE (post IPO Net Earnings Growth)	173	-0.15	-0.06	173	-0.19	-0.05	0.5153		0.4009	
<b>Panel C: Post IPO and stock performance indicators, for the three years following the IPO</b>										
Underpricing	206	4.77	0.00	206	42.86	10.82	<0.0001	***	0.0005	***
RR (BHAR)	206	-1.04	-0.45	206	-1.54	-0.87	0.2739		0.3776	
AR (BHAR)	206	-1.38	-0.92	206	-1.95	-1.17	0.2135		0.3442	
PFP <sub>0</sub> /P <sub>0</sub>	206	1.62	0.73	206	33.71	0.64	0.3290		0.1781	
<b>Panel D: Liquidity related variable, for the third anniversary of the IPO</b>										
Trade volume, in million	206	1.24	0.36	206	9.21	1.22	0.0170	***	<0.0001	***
Trade amount, in \$ million	206	25.62	1.58	206	317.84	8.12	0.1379		<0.0001	***
Rotation (Trade amount / Market value)	206	0.05	0.03	206	0.19	0.10	<0.0001	***	<0.0001	***
Exp. Rotation	206	0.05	0.02	206	0.12	0.09	<0.0001	**	<0.0001	***
<b>Panel E: Survival of the issuers</b>										
	#	%		#	%		Chi-square test of proportion			
Still listed	92	36.80		116	46.40					
Acquired of merged with a public firm	75	30.00		62	24.80		Chi-square : 27.1814			
Privatized of merge with a private firm	46	18.40		21	8.40		p value : <0.0001***			
Delisted for negative reasons	37	14.80		51	20.40					

**Table 3 : Pearson correlation coefficient matrix.** This table presents Pearson correlation coefficients for each of the variables in the dataset for the restricted sample (126 matched IPOs for a total of 252 observations). L(OV) is the L transformation of the offer value, which is the offer price multiplied by the number of shares outstanding immediately after the IPO (in U.S.\$M). L(inc) is the L transformation of net Income before extraordinary items and R&D, L(BV) is the L Transformation of Book value of equity, L(sales) is the L transformation of Sales, L(RD) is the L transformation of R&D expenses. All these accounting data are measured at the end of the fiscal year closed just before the IPO. DCountry is equal to 1 if the issue's country is the U.S.. INSRET is percentage of the post-IPO firm owned by pre-offering shareholders. IBP is equal to 1 if the investment banker is considered as prestigious. DLSVCC is equal to 1 if a labour-sponsored VC had been involved with the firm prior to IPO. DVB is equal to 1 if a venture capital firm had been involved with the issuer prior to IPO. FAII means ratio of Canadian to U.S. financial assets of institutional investors. Correlations greater than 0.11, 0.13, and 0.18 in absolute value are significant at the 10%, 5% and 1% levels, respectively.

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)	L(OV)	1.00													
(2)	L(inc)	0.02	1.00												
(3)	L(BV)	0.28	0.04	1.00											
(4)	L(sales)	0.43	-0.13	0.65	1.00										
(5)	L(RD)	0.07	-0.04	0.02	-0.04	1.00									
(6)	DCountry	0.19	-0.02	-0.08	0.03	-0.39	1.00								
(7)	INSRET	0.28	-0.03	0.03	0.01	0.12	0.19	1.00							
(8)	CEO change	-0.04	-0.03	0.02	-0.01	-0.10	0.01	0.02	1.00						
(9)	OD change	-0.14	-0.05	0.00	-0.07	0.04	-0.08	0.04	0.16	1.00					
(10)	VC Change	-0.05	-0.04	-0.01	-0.02	-0.15	0.04	0.05	0.06	0.06	1.00				
(11)	O5 change	0.01	-0.01	0.03	0.06	-0.04	0.09	0.20	-0.01	0.03	0.07	1.00			
(12)	IBP	0.55	0.00	0.11	0.25	0.05	0.00	-0.04	-0.04	-0.08	0.00	-0.04	1.00		
(13)	DVB	0.19	-0.04	-0.10	-0.09	0.22	0.00	0.11	-0.04	-0.03	-0.10	-0.09	0.10	1.00	
(14)	L(rotation.)	0.14	-0.07	-0.02	0.03	-0.12	0.34	0.01	-0.02	0.01	-0.01	0.02	0.08	0.12	1.00

**Table 4: Ordinary least squares regression analysis of offer value on fundamental values, country dummy and control variables.** The dependent variable is the L transformation of the offer value, which is the offer price multiplied by the number of shares outstanding immediately after the IPO (in U.S.\$M). The restricted sample is reduced to the issues matched without replacement (126 matched IPOs) in Panel A, and in Panel B the whole sample includes the issues with multiples matches (158 matched IPOs). L(inc) is the L transformation of net income before extraordinary items and R&D, L(sales) is the L transformation of Sales, L(R&D) is the L transformation of R&D expenses, L(BV) is the L Transformation of Book value of equity. All these accounting data are measured at the end of the fiscal year closed just before the IPO. DCountry is equal to 1 if the issue's country is the U.S. INSRET is percentage of the post-IPO firm owned by pre-offering shareholders. CEO (OD, VC, O5) change is the percentage of the pre-IPO firms sold by the selling CEOs (Other directors and officers, venture capitalists and other blockholders). IBP is equal to 1 if the investment banker is considered as prestigious. DBI is the interaction between a dummy variable for the internet and Linc. DVB is equal to 1 if a venture capital firm had been involved with the issuer prior to IPO.. FAII means ratio of Canadian to U.S. financial assets of institutional investors. \*, \*\*, \*\*\* Significant at the 10%, 5% and 1% levels, respectively.

Panel A. Restricted Matched Sample without replacement								
	Model 1		Model 2		Model 3		Model 4	
Intercept	2.3033		2.2296		2.1331		2.0527	
	13.0032	***	12.1932	***	11.5837	***	8.9363	***
L(inc)	4.1155		3.5572		4.9996		9.3486	
	1.9540	**	1.6876	*	2.3552	**	4.1371	***
L(BV)	0.9238		1.0418		1.1867		1.0489	
	1.1112		1.2551		1.4551		1.1018	
L(sales)	2.0440		1.9604		2.1369		2.2890	
	5.8046	***	5.5627	***	6.1126	***	6.4547	***
L(RD)	0.2053		0.1877		0.1636		0.0997	
	2.6912	***	2.4254	**	2.1559	**	1.2243	
DCountry	0.4144		0.4027		0.4388		0.4493	
	4.1779	***	4.0582	***	4.3573	***	3.8727	***
INSRET	1.6100		1.7147		1.6012		1.7654	
	6.5449	***	6.7968	***	6.4531	***	6.8198	***
CEO change			-0.1732		-0.3635		-0.9928	
			-0.0825		-0.1769		-0.3215	
OD change			-3.1589		-3.0750		-2.2906	
			-2.1620	**	-2.1506	**	-1.3099	
VC change			-1.4626		-1.1754		-1.3945	
			-1.3501		-1.1062		-1.3726	
O5 change			-0.4501		-0.3902		-0.3280	
			-0.6921		-0.6129		-0.5431	
IBP	1.2190		1.2055		1.1519		1.0107	
	14.2121	***	14.0500	***	13.5582	***	11.4072	***
DBI					-22.3348		-36.7958	
					-2.2102	**	-3.3958	***
DVB					0.2897		0.3446	
					3.4595	***	3.9518	***
L(rotation)							0.0091	
							0.3458	
Number	410		410		410		318	
Adjusted R <sup>2</sup>	0.5141	***	0.5184	***	0.5393	***	0.5739	***

Panel B. Whole Sample with Multiple Matches								
	Model 1		Model 2		Model 3		Model 4	
Intercept	2.0581		1.8871		1.8110		1.7734	
	11.9891	***	10.5748	***	10.0392	***	8.2054	***
L(inc)	3.2814		2.7627		4.3165		8.8666	
	1.5392		1.3038		1.9991	**	4.0013	***
L(BV)	1.2700		1.4313		1.4813		1.1020	
	1.5532		1.7615	*	1.8423	*	1.2581	
L(sales)	1.9691		1.8287		2.0234		2.2184	
	5.6493	***	5.2512	***	5.7993	***	6.5898	***
L(RD)	0.2477		0.2073		0.1933		0.0592	
	3.2615	***	2.6786	***	2.5289	***	0.7187	
DCountry	0.6427		0.6350		0.6590		0.6094	
	6.7228	***	6.6887	***	6.8394	***	5.7277	***
INSRET	1.5459		1.7797		1.6740		1.8410	
	6.4253	***	7.1602	***	6.7822	***	7.3623	***
CEO change			-0.4906		-0.7076		0.0731	
			-0.2304		-0.3368		0.0253	
OD change			-2.4819		-2.3507		-2.2196	
			-2.5178	***	-2.4146	**	-2.3188	**
VC change			-2.6767		-2.3748		-2.8644	
			-2.2003	**	-1.9726	**	-2.5332	**
O5 change			-0.8962		-0.8460		-0.7121	
			-1.3877		-1.3274		-1.2192	
IBP	1.3869		1.3802		1.3346		1.1944	
	16.6967	***	16.6842	***	16.1811	***	14.5344	***
DBI					-20.7016		-34.3556	
					-2.1487	**	-3.6888	**
DVB					0.2352		0.3334	
					2.8923	***	4.1725	***
L(rotation)							0.0054	
							0.2215	
Number	476		476		476		380	
Adjusted R <sup>2</sup>	0.5472	***	0.5566	***	0.5688	***	0.6070	***

**Table 5: Comparison tests for different matched rotations.** This table reports comparison tests of the log of the transformation of the offer value, which is the offer price multiplied by the number of shares outstanding immediately after the IPO (in U.S.\$M). Test values are presented for Canada (DCountry=0) versus the U.S. (DCountry=1) subsamples. Tests are provided for all the observations in the second column (0). The third (>4), fourth (>3), fifth (>2) and sixth (>1) column include only the paired observations when the rotation of the U.S. firm is less than four (three, two, one) times the rotation of the Canadian matched firms. \*, \*\*, \*\*\* Significant at the 10%, 5% and 1% levels, respectively.

Deleted Rotations		0	>4	>3	>2	>1
Dcountry=0	mean	4.30	4.31	4.29	4.24	4.29
Dcountry=1	mean	4.74	4.77	4.76	4.76	4.80
	difference	0.44	0.45	0.47	0.52	0.51
	t test	<0.0001	0.0002	0.0001	<0.0001	0.0003
		***	***	***	***	***
Dcountry=0	median	4.26	4.30	4.27	4.18	4.25
Dcountry=1	median	4.73	4.77	4.74	4.74	4.82
	difference	0.47	0.47	0.47	0.56	0.57
	p value	<0.0001	0.0002	0.0002	0.0001	0.0005
		***	***	***	***	***

**Table 6: Ordinary least squares regression analysis of offer value on fundamental values, country dummy and control variables including rotation.** The dependent variable is the L transformation of the offer value, which is the offer price multiplied by the number of shares outstanding immediately after the IPO (in U.S.\$M). The restricted sample is reduced to the issues matched without replacement (126 matched IPOs). L(inc) is the L transformation of net Income before extraordinary items and R&D, L(sales) is the L transformation of Sales, L(RD) is the L transformation of R&D expenses, DVB is equal to 1 if a venture capital firm had been involved with the issuer prior to IPO. All these accounting data are measured at the end of the fiscal year closed just before the IPO. DCountry is equal to 1 if the issue's country is the U.S. IBP is equal to 1 if the investment banker is considered as prestigious. The second column (0) includes all the observations. The third (>4), fourth (>3), fifth (>2) and sixth (>1) column include only the paired observations when the rotation of the U.S. firm is less than four (three, two, one) times the rotation of the Canadian matched firms. \*, \*\*, \*\*\* Significant at the 10%, 5% and 1% levels, respectively.

Deleted rotations	0		>4		>3		>2		>1	
Intercept	3.0150		3.0052		3.0090		2.9668		3.0484	
	27.1116	***	23.1432	***	22.8712	***	21.1680	***	20.3639	***
Linc	4.8298		4.1020		3.9663		3.9956		4.4621	
	2.2541	**	1.7456	*	1.6751	*	1.6202		1.7620	*
DVB	0.3573		0.2969		0.2856		0.2386		0.2293	
	4.1914	***	2.9285	***	2.7710	***	2.1495	**	1.9231	*
Lsales	2.4666		2.3195		2.2904		2.2173		2.2835	
	9.0686	***	7.8500	***	7.6767	***	6.5670	***	6.4440	***
LRD	0.3198		0.3815		0.3550		0.3889		0.3935	
	4.2045	***	4.1727	***	3.7591	***	3.8742	***	3.6120	***
DCountry	0.6722		0.6839		0.6740		0.7356		0.6652	
	6.8945	***	5.8653	***	5.6930	***	5.8584	***	4.9441	***
IBP	1.1694		1.2221		1.2392		1.2801		1.2724	
	13.3668	***	11.6626	***	11.6125	***	11.1966	***	10.2775	***
Number	420		313		306		274		241	
Adjusted R2	0.4892	***	0.4950	***	0.4961	***	0.4995	***	0.4949	***

**Table 7: Ordinary least squares regression analysis of offer value on fundamental values, country dummy by subset based on investment bankers and venture capitalists.** The dependent variable is the L transformation of the offer value, which is the offer price multiplied by the number of shares outstanding immediately after the IPO (in U.S.\$M). The restricted sample is reduced to the issues matched without replacement (126 matched IPOs). L(inc) is the L transformation of net Income before extraordinary items and R&D, L(sales) is the L transformation of Sales, L(RD) is the L transformation of R&D expenses, L(BV) is the L Transformation of Book value of equity. All these accounting data are measured at the end of the fiscal year closed just before the IPO. DCountry is equal to 1 if the issue's country is the U.S. IBP is equal to 1 if the investment banker is considered as prestigious. DBI is the interaction between a dummy variable for the internet and L(inc). \*, \*\*, \*\*\* Significant at the 10%, 5% and 1% levels, respectively.

Subset	IBP=0	IBP=1	DVB=0	DVB=1
Intercept	2.4818	4.3220	3.0962	3.5161
	9.3883 ***	20.7448 ***	10.4708 ***	18.5059 ***
Linc	-45.4659	8.6264	8.4639	11.5809
	-2.5142 ***	3.5723 ***	2.6202 ***	2.0646 **
DVB	0.5455	0.2502		
	3.4997 ***	2.2423 ***		
Lsales	15.3822	2.4635	2.5437	2.5081
	5.1370 ***	8.9260 ***	6.0006 ***	5.2680 ***
LRD	0.4983	0.0823	0.1774	0.2908
	3.2974 ***	0.8409	0.9856	3.0600 ***
DCountry	0.8714	0.4750	0.3587	0.8282
	4.0636 ***	3.5042 ***	1.7340 *	5.9007 ***
IBP			1.0985	0.8253
			7.4379 ***	6.7206 **
DBI	-95.0710	-42.9350	27.0894	-47.9524
	-1.6739 *	-3.6979 ***	0.6758	-3.8906 ***
L(rotation)	-0.0014	0.0038	-0.0434	0.0230
	-0.0395	0.0949	-0.8654	0.6960
Number	114	209	143	180
Adjusted R2	0.3684 ***	0.3282 ***	0.5172 ***	0.5084 ***

## References

- ABDALLAH, A. A.-N. AND C. IOANNIDIS (2009). °« Why Do Firms Cross-List? International Evidence from the U.S. Market ». *The Quarterly Review of Economics and Finance* Forthcoming.
- AGGARWAL, R. K., S. BHAGAT AND S. P. RANGAN (2009). °« The Impact of Fundamentals on IPO Valuation ». *Financial Management* 38(2): 253-284.
- BAKER, M. AND P. A. GOMPERS (2003). °« The Determinants of Board Structure at the Initial Public Offering ». *Journal of Law and Economics* 46(2): 569-598.
- BEATTY, R. AND P. KADIYALA (2003). °« Impact of the Penny Stock Reform Act of 1990 on the Initial Public Offering Market ». *Journal of Law and Economics* 46(2): 517-541.
- BEAULIEU, M., M. GAGNON AND L. KHALAF (2009). °« A Cross-section Analysis of Financial Market Integration in North America using a Four Factor Model ». *International Journal of Managerial Finance* 5(3): 248-267.
- BLACK, B. S. AND R. J. GILSON (1998). °« Venture Capital and the Structure of Capital Markets: Banks Versus Stock Markets ». *Journal of Financial Economics* 47: 243-277.
- BOULTON, T.J., S.B. SMART, and C. J. ZUTTER. 2010. IPO underpricing and international corporate governance. *Journal of International Business Studies* 41 (February/March): 206-222.
- BUSHEE, B. J. AND C. LEUZ (2005). °« Economic Consequences of SEC Disclosure Regulation: Evidence From the OTC Bulletin Board ». *Journal of Accounting and Economics* 39(2): 233-264.
- CARPENTIER, C., J.-F. L'HER AND J.-M. SURET (2010). °« Stock Exchange Markets for New Ventures ». *Journal of Business Venturing* 25 (4): 403-422.
- CARPENTIER, C. AND J.-M. SURET (2006). °« Bypassing the Financial Growth Cycle: Evidence from Capital Pool Companies ». *Journal of Business Venturing* 21(1): 45-73.
- CARPENTIER, C. AND J.-M. SURET (2009). °« The Survival and Success of Canadian Penny Stock IPOs ». *Small Business Economics* In Press, Corrected Proof. doi: 10.1007/s11187-009-9190-x
- CARTER, R. AND S. MANASTER (1990). °« Initial Public Offerings and Underwriter Reputation ». *The Journal of Finance* 45(4): 1045-1067.
- CARTER, R. B., F. H. DARK AND A. K. SINGH (1998). °« Underwriter Reputation, Initial Returns, and the Long-run Performance of IPO Stocks ». *The Journal of Finance* 53(1): 285-311.
- CHEMMANUR, T. J. AND E. LOUTSKINA (2007). « The Role of Venture Capital Backing in Initial Public Offerings: Certification, Screening, or Market Power? ». Working Paper, Boston College Available at SSRN: <http://ssrn.com/paper=604882>
- CHIANG, Y., Y. QIAN AND A. SHERMAN (2009). °« Endogenous Entry and Partial Adjustment in IPO Auctions: Are Institutional Investors Better Informed? ». *Review of Financial Studies* Forthcoming.
- COHN, S. R. (1999). °« Impact of Securities Laws on Developing Companies: Would the Wright Brothers Have Gotten off the Ground? ». *Journal of Small and Emerging Business Law* 3: 315-366.
- COX, J. D. (2000). °« Premises for Reforming the Regulation of Securities Offerings : an Essay ». *Law and Contemporary Problems* 63(3): 11-44.
- CUMMING, D. AND S. JOHAN (2009). *Venture Capital and Private Equity Contracting: An International Perspective*. San Diego, Elsevier Science Academic Press.
- DEMERS, E. A. AND P. JOOS (2007). °« IPO Failure Risk ». *Journal of Accounting Research* 45(2): 333-371.

- DERRIEN, F. AND A. KECSKÉS (2009). °« How Much Does Investor Sentiment Really Matter for Equity Issuance Activity? ». *European Financial Management* 15(4): 787-813.
- DOIDGE, G., A. KAROLYI AND R. STULZ (2004). °« Why Are Foreign Firms that List in the U.S. Worth More? ». *Journal of Financial Economics* 71(2): 205-238.
- DORN, D. (2009). °« Does Sentiment Drive the Retail Demand for IPOs? ». *Journal of Financial & Quantitative Analysis* 44(1): 85-108.
- DURUFLÉ, G. (2006). « The Driver of Canadian VC Performance ». Canadian Venture Capital Association Annual Conference, June 6, 2006
- EASLEY, D. AND M. O'HARA (2009). °« Liquidity and Valuation in an Uncertain World ». *Johnson School Research Paper Series 13-08*.
- ELLUL, A. AND M. PAGANO (2006). °« IPO Underpricing and After-Market Liquidity ». *Review of Financial Studies* 19(2): 381-421.
- ELYASIANI, E., S. HAUSER AND B. LAUTERBACH (2000). °« Market Response to Liquidity Improvements: Evidence from Exchange Listings ». *The Financial Review* 35(1): 1-14.
- FOSTER, N. (2003). « The FASB and the Capital Markets ». The FASB Report (June 2003)
- HAIL, L. AND C. LEUZ (2006). °« International Differences in the Cost of Equity Capital: Do Legal Institutions and Securities Regulation Matter? ». *Journal of Accounting Research* 44 (3): 485-531.
- HAND, J. R. M. (2003). « Profits, Losses and the Non-Linear Pricing of Internet Stocks ». *Intangible Assets: Values, Measures and Risks*. J.R.M.HAND AND B. LEV EDS. New York, NY: , Oxford University Press.
- HARRIS, A. D. (2006). °« The Impact of Hot Issue Markets and Noise Traders on Stock Exchange Listing Standards ». *University of Toronto Law Journal* 56(Summer): 223-280.
- HE, Z. AND L. KRYZANOWSKI (2007). °« Cost of Equity for Canadian and U.S. sectors ». *The North American Journal of Economics and Finance* 18(2): 215-229.
- HEALY, P. M. AND K. G. PALEPU (2001). °« Information Asymmetry, Corporate Disclosure, and the Capital Markets: A Review of the Empirical Disclosure Literature ». *Journal of Accounting and Economics* 31(1-3): 405-440.
- HENISZ, W. AND A. SWAMINATHAN, 2008. [Institutions and International Business](#), *Journal of International Business Studies*, 39(4): 537-539.
- HELWEGE, J. AND N. LIANG (2004). °« Initial Public Offerings in Hot and Cold Markets ». *Journal of Financial and Quantitative Analysis* 39(3): 541-569.
- INDUSTRY CANADA (2001). « Issues Surrounding Venture Capital, Initial Public Offering (IPO) and Post-IPO Equity Financing for Canadian Small and Medium-Sized Businesses (SMEs) ». Report prepared for the Small Business Policy Branch by E. Wayne Clendenning & Associates
- IVANOV, V. I. AND F. XIE (2010). °« Do Corporate Venture Capitalists Add Value to Start-Up Firms? Evidence from IPOs and Acquisitions of VC-Backed Companies ». *Financial Management (Blackwell Publishing Limited)* 39(1): 129-152.
- JOHNSTON, J. AND J. MADURA (2009). °« The Pricing of IPOs Post Sarbanes-Oxley ». *The Financial Review* 44(2): 291-310.
- KING, M. AND D. SEGAL (2008). °« Market Segmentation and Equity Valuation: Comparing Canada and the United States ». *Journal of International Financial Markets, Institutions and Money* 18(3): 245-258

- KING, M. R. AND D. SEGAL (2009). °« The Long-Term Effects of Cross-Listing, Investor Recognition, and Ownership Structure on Valuation ». *Review of Financial Studies* Forthcoming.
- KOOLI, M. AND J.-M. SURET (2003). °« How Cost-Effective are Canadian IPO markets ». *Canadian Investment Review* 16(4): 20-28.
- LA PORTA, R., F. LOPEZ-DE-SILANES, A. SHLEIFER AND R. VISHNY (2002). °« Investor Protection and Corporate Valuation ». *The Journal of Finance* 57(3): 1147.
- LAMBERT, R., C. LEUZ AND R. E. VERRECCHIA (2007). °« Accounting Information, Disclosure, and the Cost of Capital ». *Journal of Accounting Research* 45(2): 385-420.
- LEVITT, A. (1998). °« The Importance of High Quality Accounting Standards ». *Accounting Horizons* 12(1): 79-82.
- LITVAK, K. (2009). « The Relationship Among U.S. Securities Laws, Cross-Listing Premia, and Trading Volumes ». CELS 2009 4th Annual Conference on Empirical Legal Studies Paper Available at SSRN: <http://ssrn.com/abstract=1443590>
- LIU, W. (2006). °« A Liquidity-augmented Capital Asset Pricing Model ». *Journal of Financial Economics* 82(3): 631-671.
- LJUNGQVIST, A. (2007). « IPO Underpricing: A Survey ». *Handbook in Corporate Finance : Empirical Corporate Finance, Volume 1*. B. ESPEN ECKBO ED, North-Holland: 375-422.
- LJUNGQVIST, A. AND W. J. WILHELM (2003). °« IPO Pricing in the Dot-com Bubble ». *The Journal of Finance* 58(2): 723-752.
- LJUNGQVIST, A. P., T. JENKINSON AND W. J. WILHELM JR (2003). °« Global Integration in Primary Equity Markets: The Role of U.S. Banks and U.S. Investors ». *Review of Financial Studies* 16(1): 63-99.
- LOUGHRAN, T. AND J. RITTER (2004). °« Why Has IPO Underpricing Changed Over Time? ». *Financial Management* 33(3): 5-37.
- LOUGHRAN, T. AND J. R. RITTER (2002). °« Why Don't Issuers Get Upset About Leaving Money on the Table in IPOs? ». *Review of Financial Studies* 15(2): 413-444.
- MACEY, J. R. AND M. O'HARA (2002). °« The Economics of Stock Exchange Listing Fees and Listing Requirements. ». *Journal of Financial Intermediation* 11(3): 297-319.
- MANIGART, S., K. BAEYENS AND W. V. HYFTE (2002). °« The Survival of Venture Capital Backed Companies ». *Venture Capital : An International Journal of Entrepreneurial Finance* 2(2): 103-124.
- MAYNES, E. AND J. A. PANDES (2010). °« The Wealth Effects of Reducing Private Placement Resale Restrictions ». *European Financial Management*: Forthcoming.
- MORCK, R. AND F. YANG (2001). « The Mysterious Growing Value of S&P 500 Membership ». NBER working Paper 8654, Available at SSRN: <http://ssrn.com/abstract=302013>
- NAHATA, R. (2008). °« Venture Capital Reputation and Investment Performance ». *Journal of Financial Economics* 90(2): 127-151.
- PURNANANDAM, A. K. AND B. SWAMINATHAN (2004). °« Are IPOs Really Underpriced? ». *Review of Financial Studies* 17(3): 811-848.
- RITTER, J. R. (2006). « Some Factoids About the 2005 IPO Market ». Working Paper
- SARKISSIAN, S. AND M. J. SCHILL (2008). « Cross Listing Waves and the Search for Value Gains ». Available at SSRN: <http://ssrn.com/abstract=1244042>
- SARRA, J. (2009). « Proportionate Securities Regulation: The Potential for Scaled Treatment of Junior Issuers ». Study commissioned by the Expert Panel on Securities Regulation, Available at:

- SCHULTZ, P. (1993). °« Unit Initial Public Offerings: A Form of Staged Financing ». *Journal of Financial Economics* 34(2): 199-230.
- SUCHARD, J.-A. (2009). °« The Impact of Venture Capital Backing on the Corporate Governance of Australian Initial Public Offerings ». *Journal of Banking and Finance* 33(4): 765-774.
- WITMER, J. AND L. ZORN (2007). « Estimating and Comparing the Implied Cost of Equity for Canadian and U.S. Firms ». Working Paper 2007-08, Bank of Canada, Available at: <http://www.bank-banque-canada.ca/en/res/wp/2007/wp07-48.pdf>
- ZHENG, S. X. (2007). °« Are IPOs really overpriced? ». *Journal of Empirical Finance* 14(3): 287-309.
- ZHENG, S. X. AND D. A. STANGELAND (2007). °« IPO Underpricing, Firm Quality, and Analyst Forecasts ». *Financial Management* 36(2): 1-20.