

**THE VALUATION EFFECT OF LISTING STANDARDS:
AN ANALYSIS OF CANADIAN AND US IPOs**

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This paper examines the valuation of matched IPOs in Canada and the US over the 1993-2007 period. Significant differences exist in listing standards between Canada and the US, 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 show that IPOs are valued substantially lower in Canada, although firm quality is similar in both countries. However, we observe significant differences in liquidity between both markets. To disentangle the liquidity from the regulation effect, we compose subsamples based on expected liquidity. The valuation difference vanishes when we restrict the analysis to the subsample of issues with similar liquidity. This indicates that the liquidity gap is the main driver of the differences in valuation.

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

JEL Classification: G24; G32; G14; G15

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INTRODUCTION

Stock exchanges worldwide have engaged in strong competition to attract new listings from existing or newly listed foreign companies (Zingales 2007; Mizuno and Tabner 2008; Doidge et al. 2009). From 1999 to 2009, the number of listed companies on the NASDAQ fell from 4,828 to 2,852. During the same period, several markets have attracted numerous new listings of small companies. The Alternative Investment Market (AIM) in London and, to a lesser extent, the Toronto Stock Exchange (TSX) can be considered as winners in this competition. While the US market reports 1,301 IPOs from 2000 to 2009, the corresponding numbers are 1,488 on the AIM and 635 on the Toronto Stock Exchange (TSX) in Canada, a market one tenth of the size of the US market. Both the AIM and the TSX apply low listing requirements: firms can list at an early stage before they exhibit positive earnings and often at a pre-revenue stage. In the US, initial listing requirements are strong and the strategy to attract new listings relies on the bonding effect. According to this proposition, high requirements induce foreign firms to list to increase their value and reduce their cost of capital. Indeed, the level of initial listing requirements is a strategic choice for a country. Exchanges can choose strong requirements to facilitate high IPO valuations, to promote investor confidence, exchange liquidity, and attract the highest quality issuers (La Porta et al. 2002; Aggarwal et al. 2009; Boulton et al. 2009). Low listing requirements can attract numerous listings, but this strategy can lead to lower valuations or higher underpricing (Boulton et al. 2009). Empirical evidence of the consequences of the listing standard is very scarce, and the desirability and efficacy of regulation through listing requirements remains an open and important question (Bottazzi and Da Rin 2005, p.28; Klein and Mohanram 2006).

The aim of this paper is to determine the economic effect of low listing requirements. To reach this objective, we examine IPO valuations in two countries with similar securities regulation, investor protection and disclosure requirements but very different initial listing requirements. The quality of securities regulation is similar in the US and in Canada (Hail and Leuz 2006), but the US applies strong listing requirements. Conversely, Canadian exchanges apply the lowest requirements in the world. We create for the first time a sample of US and Canadian IPOs that is matched on offer year, industry, size and venture capital (VC) backing. We consider several

competing explanations for international differences in IPO valuations, including issuer quality, liquidity, and exchange reputational effects.

Our motivation to examine IPO pricing comes from the observation that several recent US regulatory reforms, including SOX, have been challenged by the recent surge of less regulated markets, such as the AIM. Healy and Palepu (2001 p.431) argue that the comparative rise of the AIM subsequent to these US regulatory changes makes further work on disclosure and capital market research worthwhile to assess the effect of regulation on capital market development. Setting optimal listing requirements is also of great interest for developing countries (Friedman and Grose 2006). Lastly, our investigation of IPOs is also motivated by practitioner concerns, such as the argument posed by the Canadian Venture Capital Association (Duruflé 2006) that the US offers superior exit opportunities than Canada due to higher IPO valuations, thereby worsening the entrepreneurial environment in Canada.

Examining 286 pairs of matched US and Canadian IPOs over the years 1993-2007, we find that valuations are roughly 36% to 52% higher in the US than in Canada, for firms of similar quality. However, this difference vanishes when the sample is restricted to the pairs of IPOs with similar expected liquidity. This indicates that post-IPO liquidity is the first driver of the valuation differences between pairs of newly listed firms. Because of the pronounced impact that IPO valuations can have on both the financing of privately held and publicly traded companies, such a large impact on IPO valuations is of great concern to entrepreneurs, investors and policymakers alike. We also find that IPO valuations are higher for VC-backing and when a prestigious investment bank is involved.

The findings in this paper highlight a crucial role of stock exchange listing requirements to facilitate investing and trading of securities by ensuring a minimum level of firm quality and liquidity. Minimum listing standards are therefore a signal of quality to market participants, which in turn facilitates liquidity by attracting investors to the market (Macey and O'Hara 2002; Harris 2006). Our findings complement and build on the literature on cross-national studies of securities regulation and IPOs, and more generally on the role of institutions in international business (Henisz and Swaminathan 2008; Boulton et al. 2009).

HYPOTHESIS DEVELOPMENT

Stock exchanges face a trade-off in deciding which firms should be eligible for a listing. On the one hand, lower listing standards enable more companies to meet those standards, which in turn increases the exchange's listing revenues, associated fees and even economic growth and employment (Weild and Kim 2010). On the other hand, lower listing standards potentially reduce reputational capital and allow for the listing of smaller firms, which in turn lowers liquidity.

IPOs face strict regulation in the US. 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. US regulations have become more stringent in recent years. The Penny Stock Reform Act of 1990 placed severe restrictions on IPOs priced below \$5 (Beatty and Kadiyala 2003). In 2005, the SEC required newly listed firms to have positive net income, a market value of listed securities of \$50 million and a minimum bid price of \$4 per share. Conversely, Canadian regulators and exchanges have set minimal listing requirements so low that almost any firm can list, even without revenues or earnings. The senior market in Canada shares many characteristics with the AIM. The junior 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 minimum net tangible assets, including the IPO gross proceeds, has been set at CAN\$500,000 or \$750,000 depending on the period. In Canada, penny stock IPOs are the rule, in sharp contrast with the US situation. Carpentier *et al.* (2010) report that 3,857 new companies listed on the TSXV from 1986 to 2006. 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 low listing requirements serve to attract junior listings from other countries, mainly in the area of natural resources.ⁱ The largest Canadian IPOs can be considered equivalent to the smaller US IPOs, a situation that grounds our empirical study.

Even if new listing requirements differ sharply between the US and Canada, disclosure regulation has been very similar in both countries. The implementation of the Multijurisdictional Disclosure System in 1991, which allows Canadian issuers to meet their US filing requirements using Canadian disclosure documents, illustrates the closeness between the disclosure rules in both countries. One notable difference lies in the implementation of Sarbanes Oxley legislation (June

2002) in the US. As such, to assess the effect of international differences in listing standards on IPO valuations, we necessarily control for Sarbanes Oxley.

Such low requirements are likely to have two interrelated effects. The first one is a reputational effect: investors will require a higher cost of equity in a market with low listing requirements. Investors will provide lower valuation because they consider the market as riskier than a market with higher listing requirements. The second effect is the liquidity effect. Small capitalized firms exhibit low trading volumes and turnover and fail to attract institutional investors. The economic effect of reputation effect and liquidity effect is likely to be similar: valuation should be lower in Canada than in the US. The aim of this paper is to determine the extent to which such a valuation effect prevails, and to discriminate between the reputation and the liquidity effects. However, we cannot rule out the possibility that Canadian IPOs are of lower quality than US matched IPOs; this proposition should be tested in the first step.

Strong regulation, mainly governing IPOs, is a prerequisite to the establishment of a sound equity market (Black 2001; La Porta et al. 2006). Security issuance is subject to the promoter problem that leads entrepreneurs to sell bad securities to the public (Mahoney 1995). Strong minimum listing requirements thus become a "necessary safeguard" for investors. Low listing requirements are likely to promote a *lemon equilibrium*, where bad quality firms exclude good quality issuers. According to this proposition, US IPOs firms are likely to be of better quality than their Canadian counterparts. US firms might have, for example, more R&D projects of better quality, better management teams or more opportunities to implement strategic alliances. In such a context, higher IPO valuations in a country can reflect higher growth expectations. This effect can prevail even if we use matching pairs of IPOs, because firm quality cannot be easily appraised upfront.

To capture the multidimensional characteristics of an issuer, we use several indicators of quality. First, it is generally assumed that the proportion of shares retained by the insiders at IPO is a good signal of the quality of the issue. Second, better quality issuers will deliver stronger post-listing operating performance, even if the issuers share similar characteristics at IPO. We follow Zheng and Stangeland (2007) and Helwege and Liang (2004), who use growth in operating performance to assess IPO issuers' quality. Third, underpricing should be higher for lower quality firms that are associated with greater uncertainty (Ljungqvist 2007 p.387). Fourth, if the quality of issuers does differ, and to the extent that investors are generally unable to correctly set

the IPO prices, the long run performance following low quality issuers should be lower than the performance following high quality IPOs. Lastly, the survival of IPOs should be positively linked to the issuer's quality. This leads to our first hypothesis:

Hypothesis 1: Given the pronounced differences in listing standards for smaller firms, Canadian IPOs are of lower quality than similar US IPOs.

This implies that, for IPOs sharing the same characteristics:

- H1a: The proportion of shares retained by the insiders at IPO is lower in Canada than in the US.
- H1b: the post-IPO operating performance is poorer in Canada than in the US.
- H1c: underpricing is higher in Canada than in the US.
- H1d: the long run performance of IPOs is poorer in Canada than in the US.
- H1e: the IPO survival rate is lower in Canada than in the US.

The low Canadian listing requirements are likely to explain a lower valuation of IPOs according to two separate effects: the liquidity effect and the reputation-regulation effect. Liquidity is higher in the US than in Canada. Using matching pairs of Canadian and US firms, King and Segal (2008 p.4) report that the turnover in the US (0.729) is 44 times the Canadian turnover (0.017). Investors price liquidity (Litvak 2009). There is substantial evidence of a significant liquidity premium and that liquidity is an important source of priced risk (Liu 2006). Investors heavily discount the value of securities that are not frequently traded (Easley and O'Hara 2009). They also discount the valuation of shares with a low expected liquidity (Ellul and Pagano 2006). Accordingly, the lower valuation of Canadian IPOs can be traced to the lower liquidity of the Canadian market. However, the main argument to explain such a difference is based on the reputation argument. Lenient listing rules open the door to riskier companies, which, in turn, implies a higher cost of capital and lower valuation for newly listed companies. Accordingly, our second hypothesis is:

Hypothesis 2: Expected liquidity and listing requirements positively influence IPO valuation.

Liquidity in the US is generally similar to or greater than that in Canada, for firms exhibiting similar characteristics. The correlation between the liquidity measure and the country dummy is

very high (58%), and a model including both variables cannot provide a definitive answer to the following question: is the valuation effect linked to the reputation of the market (the low regulation effect) or to the liquidity effect? To disentangle both effects, we have to consider sub-samples of issues with similar expected liquidity. Because the low listing requirements in Canada should imply a reputation effect that increases the cost of equity of the issuers, we expect that a country effect remains even for pairs of firms with similar expected liquidity.

Hypothesis 3: Valuation differs significantly between US and Canadian IPOs with similar expected liquidity.

DATA, MATCHING PROCESS AND DESCRIPTIVE STATISTICS

Sample

Our sample of matched IPOs in Canada and the US spans the years 1993-2007. Our full sample comprises 286 Canadian IPOs that are matched with 286 US IPOs, for a total of 572 IPOs.ⁱⁱ We collect the US IPOs and VC-backing from Thomson Financial SDC Platinum. We get the prospectuses from Edgar. The 37 Canadian firms that listed in the US during the period under analysis are excluded from our sample.ⁱⁱⁱ

First, we match each Canadian IPO with a US 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 that do not differ by more than 50%.. We match each Canadian VC-backed IPO with a US VC-backed IPO, and Canadian non-VC-backed IPO with US non-VC-backed IPO. We get 233 perfect matches in this first step. Second, we 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 any US 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 US IPO. Overall, we get a sample of 286 pairs of IPOs. To assess the robustness of the results to the matching process, we also run the tests on the restricted sample of 247 pairs without multiple matches.

Descriptive Statistics

In Table 1 we report the statistics from the matching process without replacement to mitigate potential bias in the statistical tests. We report only the mean and median for each variable for which a value is available in both countries.

Gross proceeds are higher in the US, and the medians differ by approximately \$10 million (Panel A). This result is perhaps attributable to the lower listing requirements in Canada relative to the US. We allow for a difference of 50% between the gross proceeds in the matching process, but this difference was systematically in favor of the US sample.

[Insert Table 1 About Here]

Table 1 Panel B presents the main characteristics of the issuers. Canadian issuers are younger than their US counterparts, but the difference is not statistically significant at the 5% level. There are differences in the two samples for total assets, EBITDA and net income. Based on net income and EBITDA, Canadian issuers appear to be in better condition than US issuers. Average and median net income is negative among US IPOs, but positive in the Canadian sample. This surprising result can be attributed to the fact that we selected the smallest IPOs in the US to be able to match with IPOs in Canada.

Table 1 Panel B also presents ratios.^{iv} Return on equity (ROE) is significantly lower in the US sample, which is attributable to the poor operating performance of small IPOs in the US. Net margin is also significantly lower in the US, while the debt to asset ratio is higher, due to the negative values of equity. In short, the US IPOs 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 basis, following Zheng (2007). Zheng contends that the conventional use of a 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, US IPOs have larger gross proceeds than Canadian IPOs even if they have lower shareholders' equity before the IPO. Further, US IPOs comprise a smaller proportion of the IPOs with primary shares. Price to book is estimated on a post-money basis, because both values can be expressed on the same basis.^v

For each multiple, US IPOs are valued higher than their Canadian counterparts, and this difference is statistically significant for the price to book ratio and the price to EBITDA ratio (at the 5% level). This result is surprising given the poor operating performance of US IPOs. For example, median price to sales is 3.21 in the US and 2.95 in Canada. The median price to earnings is 20.38 in the US and 17.43 in Canada. However, these univariate tests cannot be considered strong evidence of valuation differences between the two sets of IPOs.

Panel D in Table 2 reports three measures of liquidity - trade volume, trade amount and turnover – which are estimated three years after the IPO. Because trade amounts and trade volume are affected by the differences in prices between Canadian and US stocks, turnover is perhaps the most informative measure. The three variables indicate a large difference between the two subsamples. The median trade amount is \$1.50 million in Canada and \$8 million in the US, even if the initial sizes of the IPOs were in the same range. The turnover ratio we observe in the US is about five times 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, and a liquidity variable 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 solve this methodological problem following Ellul and Pagano (2006), who 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, sector and country. We estimate the trading volume and the turnover twelve months after this matched IPO and use this estimation as a proxy for the expected liquidity of our IPO sample. These expected turnovers are reported in Table 2 Panel D. The medians of the expected turnover in both countries are similar to the medians of the observed turnover. Accordingly, we consider that the expected turnover is an acceptable proxy for the real ex-post turnover.

Test of Hypothesis 1

Table 2, Panel A presents descriptive statistics for the change in ownership at IPO. The proportion of IPOs with sale by shareholders is larger in Canada than in the US. Post-IPO ownership retention of pre-IPO shareholders is significantly higher on average (median) in the US than in Canada: 70.62% versus 66.74% (72.18% versus 69.70%), and this difference is

significant. There are no statistically significant differences in the change in ownership between Canada and the US for any type of shareholders, except for the other principal shareholders. The decrease in shareholdings of principal shareholders is higher in Canada (-15.89% on average) than in the US (mean of -0.23%). This is consistent with hypothesis H1a, and with the general hypothesis that Canadian IPOs are of lower quality than US similar IPOs. Such differences suggest that the changes in ownership should be included in the econometric valuation models.

[Insert Table 2 About Here]

Table 2 provides summary statistics to test whether the matched IPOs in Canada and the US differ along the following characteristics: the operating performance following the IPOs (Panel B), the investors' rate of return (panel C) and the survival of IPO firms (Panel D). Each group of indicator is associated with a section of our first hypothesis. In Panel B we use a variable that considers growth rates of accounting performance (earnings and revenues) measures of firm quality. 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. We find no significant differences between the growth in accounting numbers of Canadian versus US IPOs. On an *ex post* basis, these two samples can be considered as composed of firms with equivalent quality. However, even if there is no significant difference. The US firms show lower book equity and revenue growth. The sole exception is the slightly lower (not significant) median growth in net earnings in Canada (-0.10 versus -0.07 in the US). Based on this evidence, we can reject the second part of our first hypothesis (H1b).

The first line of panel C reports the values and tests for underpricing (defined in Table A-1). Underpricing is significantly lower in Canada than in the US. The lower underpricing of Canadian IPOs had been evidenced in other papers (Kooli and Suret 2003). This can probably be traced to the stronger competition between investment bankers in Canada, and to the lesser effect of the Internet bubble in this country. Hypothesis H1c is thus refuted.

To test for the differences in investors' return, we estimate the raw return (RR) and the abnormal return (AR). 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. The median is perhaps more informative owing to the significant outliers.

Due to the very low prices at 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 -1.14% in Canada and -1.42% in the US. This is not consistent with hypothesis H1d.

Table 2 Panel D shows that in June 2009, Canadian IPOs were more likely to survive (84.38% including acquisition and going private transactions) than US IPOs (78.91%). Canadian IPOs are less likely to be delisted for negative reasons (15.61%) than US IPOs (21.10%). The chi-square test of these differences in proportions is statistically significant. The hypothesis H1e can then be rejected.

Except for the proportion of shares retained by insiders after the IPO, all the indicators we analyse point toward similar or higher quality of Canadian IPOs than matched US IPOs. The operating performance following the issue is higher, albeit non-significant in Canada. The same is true for stock market performance, and the underpricing is significantly lower in Canada than in the US. Survival of newly listed companies is also higher in Canada. Therefore, the quality of issuers appears to be an implausible explanation for a possible difference in IPO valuations between Canada and the US. Further, because 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.

ECONOMETRIC MODELS AND RESULTS

The models

The analysis of valuation at IPO is a challenging task, because numerous firms report negative earnings and, in some cases, no sales and even negative values for shareholders' equity. Accordingly, neither q ratios nor multiples (Purnanandam and Swaminathan 2004) can be used; 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. We consider that the value at IPO is explained by the three main valuation drivers: revenues, book value of equity and earnings. The analysis of the distribution of these values indicates they can have a negative or 0 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.

Stock prices are partially determined by growth opportunities. This is particularly true in the situation of new ventures at the IPO stage. 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-IPO shareholders has a significant impact on firm value, and we detect significant differences between US and Canadian IPOs. 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. Similar to Aggarwal *et al.*, 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 presented in Table 2. Large sales by insiders provide a negative signal to the market and thereby lower IPO valuations.

Investment bank and auditor reputation can positively influence IPO valuation. Investment banks and auditors provide certification of the quality of the IPO firm to new investors (Ljungqvist 2007). Similarly, VCs provide certification of the quality of the IPO firm to new investors and 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 VC-backed firms' IPOs (Chemmanur and Loutskina 2007; Ivanov and Xie 2010). We have considered VC involvement in the matching process, and we included a dummy variable to identify VC-backed IPOs in the models ($DVB=1$). We observe that a proportion of 98% of VC-backed IPOs are audited by a prestigious auditor, in each country. Because there is almost no variability in auditor reputation for half of our sample, the dummy associated with auditor prestige is not included in the model.^{vi}

Litvak (2009) provides evidence that the pair premia (that is, the value of cross-listed firms in the US relative to their comparable domestic firms) is strongly correlated with US stock indexes and peaks during the bubble in early 2000. We control for the bubble period in one of the models. Note that we do not include variables for gross proceeds (a proxy for size) and industry as we have matched our samples precisely on size and industry. Finally, we do not control for hot and cold market IPOs because 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 three alternative forms of the base model that include extra explanatory variables as indicated in Table 4.

Liquidity, listing requirement and valuation: Test of Hypothesis 2

Table 3 presents OLS regression analyses of IPO offer value models for the restricted matched sample.^{vii} We discuss a variety of additional specifications below that were considered but did not materially affect the main results.

[Insert Table 3 About Here]

The regressions provide very strong support for the proposition that IPOs are valued higher in the US. These estimates are statistically significant at the 1% level of significance and are economically large. Each estimate indicates that valuations are 36% to 52% higher. The country effect matters a great deal regardless we control for changes in shareholding (Model 2) and for the venture capital involvement (model 3). The country effect is still significant when liquidity is introduced in the model. However, the coefficient of the Country dummy decreases from 52.31% (model 3) to 36.41% (model 4), indicating a link between the country and the liquidity variables. These results are central to our second hypothesis. Given the robustness of these results to different specifications and control variables, the most plausible explanation for these country differences are the differences in listing standards and the associated difference in liquidity.

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% confidence level) relation between income and IPO valuation. Our control variable for size, the book value of equity, is not significant in most of the models; 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. 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 models. This finding is consistent with Ljungqvist and Wilhelm (2003), who reason that considerable insider ownership strengthens incentives to bargain for better offer terms. The variables for insider ownership change are insignificant.

We observe 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 heighten investor confidence, which results in higher valuations. The involvement of a VC in the IPO firm significantly increases the IPO valuation. The coefficient is in the vicinity of 24-27%: VC-backed IPOs are sold at a significant premium relative to non-VC backed IPOs.

Liquidity and reputation effects: Tests of Hypothesis 3

To determine the extent that liquidity can explain most or all of the observed differences between the valuation of Canadian and US VC-backed IPOs, we use a liquidity variable, namely the expected turnover. The log of this variable, $L(\text{exp. turnover})$, is significant in model 4 of Table 3. However, this variable is highly correlated (58%) with the country dummy, and this situation deserves complementary analysis. We estimate the ratio of expected turnover (RET) for each pair of observations: $\text{RET} = (\text{US expected turnover} / \text{Canadian expected turnover})$. We compose several sub-samples by removing the pairs for which RET is higher than 4, 3 and 2. In the last group, we keep only the pairs with a ratio of expected turnover lower than or equal to 2. Because the expected turnover is an ex-ante estimation of the future turnover, we consider that the liquidity of the firms in this group is in the same range.

Table 4 presents summary statistics related to the offer value for the matched samples based on liquidity. The data show that both average and median IPO valuations are significantly higher in the US, except when the expected turnover becomes similar (>2 rightmost column). In this group, we do not observe any significant differences between the means or the medians of the offer value distribution. When all the observations are left in the sample (leftmost column) the value in the US is four times the value observed in Canada. The gap between the median offer value decreases when the difference between expected turnover decreases.

[Insert Table 4 About Here]

Table 5 presents regressions for each of the samples based on RET. The country variable is statistically significant at the 5% level for all subsamples except when we restrict the sample to the firms with similar levels of expected turnover. The country effect is economically large as soon as liquidity differs, and it increases with the difference in liquidity. Valuations in the US are at least 37% higher based on the sample where differences in liquidity higher than 4 times are

deleted, but it reaches 51.6% for the whole sample. These results again show that the difference in valuation between Canada and the US is most likely attributable to the difference in liquidity than to differences in reputation. However, listing standards and liquidity are not totally independent.

[Insert Table 5 About Here]

Finally, note that we considered a number of additional specifications to assess robustness that are not explicitly reported for reasons of conciseness but nevertheless are available on request. For example, we considered the effect of Sarbanes Oxley legislation (SOX) on IPO valuation. According to 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.

CONCLUSION

This paper empirically analyzes the valuation of IPOs with comparisons across Canada and the US. We posited that the lower listing requirements in Canada and the lower liquidity lead to valuations that are much lower in Canada relative to the US, 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 US, and controlling for numerous accounting and financial statement variables, ownership levels, ownership changes, 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 36% to 52% lower on average when we control for other things being equal. However, the differences in valuation vanish for IPOs with expected liquidity in the same range. Accordingly, the liquidity effect appears to be the main factor that drives the difference in value between Canadian and US IPOs. Our findings are new insofar as prior studies comparing valuations of publicly traded firms in Canada and the US 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%. Our results have

direct implications for firms seeking international listing, for venture capitalists contemplating an exit and for stock exchanges that attempt to attract new foreign listings.

Firms seeking a foreign listing should analyze the host market liquidity, a very important determinant of IPO value. Countries interested in attracting foreign listings should devote ample attention to their market liquidity.

Table A-1. Variable Definitions

Variable	Definition
OV	Offer Value = Offer price x number of shares outstanding immediately after the IPO (in US \$ 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 \$million
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 are initially traded with low volumes.
P_{36}	Market price at the end of the 36 th 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 same index cannot be used in both countries.
AR_{36}	Excess return estimated using BHAR methodology during the three years following the IPO. Regarding small cap indices, we use the Russell 2000 Index in the US and the BMO Nesbitt Burns S/C Composite Index in Canada.
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 US.
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 pre-IPO firms sold by other directors and officers
VC change	The percentage of pre-IPO firms sold by VCs.
Exp. turnover	Expected turnover = trade amount/market value of a country-size-sector matched IPO 12 months after the matched IPO
Turnover	Observed turnover = trade amount/market value 36 months after the IPO
Δ REV (Post-IPO Revenues Growth)	$(REV+3 - REV-1)/GP$, where REV = total revenues and GP= gross proceeds
Δ BE (Post-IPO Book Equity Growth)	$(BE+3 - BE-1)/GP$, where BE = book value of Equity, and GP = gross proceeds, Δ BE = 1 indicates that the growth in book value of equity is explained only by the proceeds of the IPO
Δ NE (post-IPO Net Earnings Growth)	$(NE+3 - NE-1)/GP$, where NE = net earnings and GP = gross proceeds

Table 1: Characteristics of the matched sample of Canadian and US IPOs, 1993-2007. 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 C, we winsorize the distribution of the multiples at the 95th percentile. The final two columns test whether the difference between the mean (median) summary statistics is statistically significant across samples. 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)		
Panel A: Characteristics of the issue										
Gross Proceeds (GP)	247	40.60	20.28	247	43.06	30.00	0.6870		0.0001	***
Issue Price	247	6.51	5.87	247	10.94	10.00	0.0000	***	0.0000	***
% of post-IPO shares sold	225	0.33	0.30	225	0.29	0.27	0.0042	***	0.0413	**
% of firm's commitment	119	0.82		214	0.98		-		-	
Panel B: Characteristics of the issuer prior to the issue										
Age, in years	236	11.17	6.94	236	13.55	6.93	0.1409		0.1907	
Total assets	209	86.74	17.85	209	88.82	11.37	0.9581		0.0016	***
Shareholders' equity (SE)	232	17.19	4.36	232	17.61	4.34	0.9525		0.7135	
Negative SE	51	21.98	-	68	27.53	-	-		-	
Sales	232	86.51	18.24	232	90.92	23.03	0.8817		0.8253	
EBITDA	218	14.25	2.34	218	8.57	1.48	0.4100		0.0055	***
Net Income	232	0.36	0.69	232	-1.42	-0.28	0.3350		0.0032	***
Negative net income	82	35.34	-	128	51.82	-	-		-	
ROA	204	0.06	0.11	204	-0.01	0.13	0.1047		0.7470	
ROE	231	0.01	0.10	231	-0.19	-0.02	0.0020	***	0.0068	***
Net margin	232	0.36	0.69	232	-1.42	-0.28	0.3350		0.0032	***
Asset turnover	208	1.19	1.05	208	-0.58	0.66	0.3308		0.0043	***
Debt to Assets	208	0.73	0.72	208	1.34	0.84	0.1287		0.0001	***
Panel C: Multiples										
Price to sales	190	32.64	2.95	190	45.54	3.21	0.2621		0.6384	
Price to earnings	77	46.98	17.43	77	37.57	20.38	0.3692		0.5117	
Price to book value	202	3.60	2.96	202	3.73	3.17	0.5816		0.0503	*
Price to EBITDA	94	18.67	7.87	94	19.43	9.42	0.8617		0.0426	**
Panel D: Liquidity related variables										
Trade volume, in million	196	1.24	0.34	196	9.08	1.09	0.0251	**	<0.0001	***
Trade amount, in \$ million	196	26.17	1.50	196	320.18	8.00	0.1557		<0.0001	***
Turnover (Trade amount/Market value)	196	0.04	0.01	196	0.17	0.07	<0.0001	***	<0.0001	***
Exp. Turnover	196	0.03	0.02	196	0.12	0.09	<0.0001	**	<0.0001	***

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 US\$. INSRET is post-IPO ownership retention of pre-IPO shareholders and is measured as: (shares outstanding after offering – primary and secondary shares issued)/shares 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. Exp. turnover means expected turnover (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 samples. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, ***, respectively.

	Canadian IPOs			US IPOs			Mean difference t test p value	Median difference p value (sign rank)
Panel A: Change in ownership, shareholders' sale of shares								
	#	mean	median	#	mean	median		
IPOs without shareholders' sale, GP	192	34.82	19.77	159	41.02	30.00	0.2066	0.0060 ***
IPOs with shareholders' sale, GP	55	60.78	30.54	88	46.75	31.00	0.5199	0.1047
INSRET, in %	247	66.74	69.70	247	70.62	72.18	0.0064 ***	0.0855 *
Change in ownership, in %:								
CEO	18	-4.08	-3.08	18	-2.59	-1.50	0.4189	0.1680
Other officers and directors	20	-2.64	-1.54	26	-3.99	-3.16	0.5181	0.3294
VC	21	-5.21	-3.13	13	-3.34	-1.27	0.6113	0.6480
Other principal shareholders	22	-15.89	-7.66	18	-0.23	-3.71	0.0438 **	0.0701 *
Panel B: Post-IPO growth and accounting performance indicators, for the three years following the IPO								
Δ REV (post-IPO Revenue Growth)	163	2.77	1.36	163	2.25	1.02	0.1830	0.1678
Δ BE (post-IPO Book Equity Growth)	164	2.19	1.56	164	1.89	1.31	0.1725	0.0705 *
Δ NE (post-IPO Net Earnings Growth)	163	-0.17	-0.10	163	-0.21	-0.07	0.6186	0.4252
Panel C: Post-IPO and stock performance indicators, for the three years following the IPO								
Underpricing	196	4.23	0.00	196	44.17	10.57	<0.0001 ***	0.0004 ***
RR (BHAR)	196	-1.14	-0.74	196	-1.63	-0.95	0.3039	0.4742
AR (BHAR)	196	-1.45	-1.14	196	-2.03	-1.42	0.2210	0.4073
Panel D: Survival of the issuers								
	#	%		#	%		Chi-square test of proportion	
Still listed	84	35.44		106	44.73			
Acquired or merged with a public firm	74	31.22		60	25.32		Chi-square: 23.3294	
Going Private	42	17.72		21	8.86		p value: <0.0001***	
Delisted for negative reasons	37	15.61		50	21.10			

Table 3: 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 US\$M). The sample is reduced to the issues matched without replacement (247 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 US. 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. DVB is equal to 1 if a venture capital firm had been involved with the issuer prior to IPO. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, ***, respectively.

Panel A. Restricted Matched Sample without replacement								
	Model 1		Model 2		Model 3		Model 4	
Intercept	1.9471		1.7252		1.7077		2.0797	
	8.8778	***	7.3727	***	7.3785	***	7.2065	***
L(inc)	4.2550		3.4647		4.1107		3.9632	
	1.9260	*	1.5749		1.8809	*	1.8382	*
L(BV)	0.6774		0.7894		0.9039		0.9813	
	0.7596		0.8920		1.0319		1.1331	
L(sales)	2.1819		2.0745		2.1971		2.1396	
	5.5757	***	5.3260	***	5.6742	***	5.6025	***
L(RD)	0.2326		0.2165		0.2014		0.1837	
	3.0239	***	2.7917	***	2.6209	***	2.3551	***
DCountry	0.4543		0.4638		0.5231		0.3641	
	4.4729	***	4.5811	***	5.1310	***	2.9826	***
INSRET	2.0782		2.3688		2.1386		2.1452	
	6.9087	***	7.4496	***	6.6173	***	6.6131	***
CEO change			-0.8249		-0.9172		-0.2965	
			-0.3827		-0.4303		-0.1401	
OD change			-4.1769		-4.1625		-4.0957	
			-2.4386	**	-2.4577	**	-2.4540	**
VC change			-1.5272		-1.2046		-1.3099	
			-1.4094		-1.1190		-1.2305	
O5 change			-1.0620		-0.8475		-0.7694	
			-1.5857		-1.2728		-1.1328	
IBP	1.1599		1.1347		1.1233		1.1021	
	13.2849	***	13.0251	***	13.0287	***	12.6979	***
DVB					0.2703		0.2445	
					3.0798	***	2.7503	***
L(exp. turnover)							0.0722	
							2.1056	**
Number	385		385		385		375	
Adjusted R ²	0.5201	***	0.5296	***	0.5400	***	0.5464	***

Table 4: Comparison tests for sub-samples based on the ratio of expected turnover. 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 US\$M) for the restricted sample (247 matched IPOs). Test values are presented for Canada (DCountry=0) versus the US (DCountry=1) subsamples. Tests are provided for all the observations in the second column (0). The third (>4), fourth (>3) and fifth (>2) columns include only the paired observations when the turnover of the US firm is less than four (three, two, one) times the expected turnover of the Canadian matched firms. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, ***, respectively.

Deleted Turnovers		0	>4	>3	>2
Dcountry=0	mean	0.03	0.05	0.05	0.05
Dcountry=1	mean	0.12	0.08	0.07	0.06
	difference	0.09	0.04	0.02	0.01
	t test	<0.0001 ***	<0.0001 ***	0.0135 ***	0.2516
Dcountry=0	median	0.02	0.04	0.04	0.04
Dcountry=1	median	0.09	0.05	0.05	0.04
	difference	0.08	0.01	0.01	0.00
	p value	<0.0001 ***	0.0039 ***	0.1000 *	0.9073

Table 5: Ordinary least squares regression analysis of offer value on fundamental values, country dummy and control variables by sub-samples based on expected turnover. 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 US\$M). The sample is reduced to the issues matched without replacement (247 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 the 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 US. IBP is equal to 1 if the investment banker is considered prestigious. INSRET is percentage of the post-IPO firm owned by pre-offering shareholders. The second column (0) includes all the observations. The third (>4), fourth (>3) and fifth (>2) columns include only the paired observations when the expected turnover of the US firm is less than four (three, two, one) times the turnover of the Canadian matched firms. Statistical significance at the 10%, 5%, and 1% levels is indicated by *, **, ***, respectively.

Deleted turnovers	0		>4		>3		>2	
Intercept	1.8728		2.1262		2.0142		2.0403	
	8.7283	***	6.9316	***	5.4626	***	5.1299	***
Linc	5.3169		5.8215		5.5852		5.1975	
	2.4978	**	2.1631	**	1.9623	**	1.7611	*
DVB	0.2904		0.3508		0.3884		0.3645	
	3.3611	***	2.5577	***	2.4994	***	2.0182	**
Lsales	2.5630		2.5738		2.4995		2.2620	
	9.1525	***	5.9721	***	5.4791	***	4.6742	***
LRD	0.2156		0.1916		0.1794		0.0517	
	2.8430	***	1.6605	*	1.3437		0.3437	
DCountry	0.5162		0.3715		0.3698		0.1331	
	5.1330	***	2.3374	**	2.0618	**	0.6445	
INSRET	1.9097		1.6992		1.8260		1.9559	
	6.3590	***	4.0868	***	3.4601	***	3.3873	***
IBP	1.1271		1.2464		1.2874		1.4805	
	13.1986	***	9.1577	***	8.3117	***	8.1793	***
Number	389		171		145		114	
Adjusted R2	0.5331	***	0.5239	***	0.5223	***	0.5563	***

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Endnotes

ⁱ See, for example, *Australians rush to TSX to meet investment demand*, Media Release, March 3, 2008, available at miningweekly.com: www.miningweekly.com/attachment.php?aa_id=11850

ⁱⁱ Our sample is derived from FPInfomart.ca. We excluded privatization of state-owned companies, demutualizations, Income trusts and Capital Pool Companies' IPOs. 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.

ⁱⁱⁱ The number of Canadian firms backed by VC that exit in the US through an IPO is too small to constitute a distinct group.

^{iv} 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.

^v 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. 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 5th and 95th percentile.

^{vi} 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 are available on request.

^{vii} We do not report the results obtained with the whole sample, because they are similar to those obtained with the restricted sample. However, the estimates from the whole sample indicate valuations are higher by 61-66% in the US than in Canada.