

Directors' Insurance and the Expected Cost of Frivolous Litigation when Cross-Listing into the U.S.

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Abstract. We study the expected liability cost of cross-listing into the United States by examining the change in the structure of a Canadian firm's directors' and officers' liability insurance contract (D&O insurance) before and after cross-listing. All else being equal, we show that neither the likelihood of having insurance nor the D&O liability insurance coverage change following cross-listing. The D&O insurance premium and premium per dollar of coverage do change, however as both double following cross-listing. As operations are unlikely to have changed dramatically from before to after cross-listing, our results provide evidence that the increased litigation risk associated with being listed in the United States is due to an increase in the frequency rather than the severity of such litigation. As D&O insurers clearly update a firm's expected litigation cost as a function of where its shares are traded, our results provide support for the view that D&O insurers have information that is relevant for investors.

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1. Introduction

There are still a lot of unanswered questions as to what motivates an international company to list its shares on a non-domestic stock market. Whatever are the motivations, investors have determined that this cross-listing is generally a positive net present value project. Examining what happens to the domestic stock market returns of international companies from 35 countries that decided to be willing participants in "American Depositary Receipts" from 1985 to 1995 (that is, shares traded on an American stock exchange that mirror an international firm's domestic stocks), Miller (1999) came to the conclusion that there was on average an abnormal and statistically significant increase of 1.15% in the stock's price following the announcement that the international firm was to cross-list in the United States.

If one focuses exclusively on the domestic market's reaction to the cross-listing announcement, it seems clear that listing one's shares of common stock on an American exchange has positive net effects. It is with respect to the channels through which cross-listing creates value that the debate rages amongst financial economists. Indeed, researchers and other financial market participants don't agree on what could be the greater benefits for investors of cross-listing.

In this paper, we will focus on the immediate expected liability cost of cross-listing. In particular, we examine the increase in the cost of the directors' and officers' liability insurance premium following cross-listing into the United States.¹ Put differently, we examine whether firms must pay more in D&O insurance premium when they cross-list their shares of common stock in the United States, and if so how much more.

According to Bancel and Mittoo (2004) the financial advantages of cross-listing, such as the firm's increased visibility among foreign investors and international financial institutions, largely outweigh the cost. Liquidity also increases, which Amihud and Mendelson (1986) argue is good for

¹ Previous research on D&O insurance has typically looked at large established firms and constructed a dummy variable that accounts for whether the company is cross-listed or not in a given year (see Core 1997 for a study using the fiscal year 1993, and Gillan and Panasian 2014 for a study using the year 2005). Ours is the first study, to our knowledge, to examine the direct impact of cross-listing on D&O insurance.

the company's stock value. Foerster and Karolyi (1998) find that Canadian companies cross-listing in the United States between 1981 and 1990 and show an average increase of 29% in the volume of daily exchanges on the domestic market and an average decrease of the bid-ask spread of approximately 44 basis points following cross-listing. Lastly, shareholders should benefit from the better corporate governance standards observed in the United States, but that seems to be a very secondary concern of CEOs according to Bancel and Mittoo (2004). Even if one believes that improved corporate governance is a benefit of cross-listing from the point of view of the firm's shareholders (see Doidge 2003 and Doidge *et al.* 2004), it seems a bit unlikely that such governance benefits would befall firms whose domestic market is already well developed, such as those of the United Kingdom, Canada, and Australia.

In contrast to the measurable notions of liquidity and financing conditions, corporate governance is a more qualitative concept, which has attracted much interest in the past decade, especially in terms of its definition. Arguably the best type of measure would be the one where parties have a financial vested interest in the way corporate governance is measured. Of all the possible measures (see Gompers *et al.* 2003, Romano 2006, Rose 2007, Bebchuk *et al.* 2009, Bebchuk and Hamadi 2009, Adams *et al.* 2010, Bebchuk *et al.* 2013, Larcker and Tayan 2013 and Boyer 2013), the only one that originates from actual transactions – rather than a checklist of characteristics that have been hypothesized to be associated with problematic corporate governance features – is the information embedded in the firms' directors' and officers' liability insurance contract (*D&O insurance from now on*).² Succinctly, a D&O liability insurance contract is purchased by the

² Although over 95% of American firms purchase such a contract, the details of the D&O liability insurance contracts are not available in the United States – or for most countries for that matter. When studying D&O insurance in publicly traded firms, most researchers have relied on using Canadian companies (see Core 1997 & 2000, Boyer 2005, Park Wynn 2008, Lin *et al.* 2011, Gillan and Panasian 2014 & 2015, *inter alia*). Another approach is to have access to proprietary data as in Chalmers *et al.* (2002) and Kaltchev (2006). Consequently, apart from having access to proprietary data, the best one can do in terms of examining the link between corporate governance, firm value and D&O insurance in the United States is to look at Canadian companies that are also listed on a stock market in the United States. It is only for those companies where the information related to D&O insurance is publicly disclosed. Griffith (2006), Baker and Griffith (2007a and 2007b) and Gupta and Prakash (2012) have recommended that more information on a firm's D&O insurance protection and price for that protection be shared with investors. The results in Boyer and Stern (2014) which link D&O insurance characteristics with firm returns in the first year post-IPO is the most direct evidence of

company, to protect the financial wealth of its directors and officers in the event that a lawsuit is brought against them based on their involvement with the firm.

Baker and Griffith (2007a) argue that D&O insurance underwriters have developed an unbiased expertise³ that allows them to measure the risk of litigation against the firm, its directors, and its managers. This measure is revealed in the insurance premium that firms pay to protect their managers. Because most lawsuits (and the most expensive lawsuits) against a firm's managers originate from the shareholders as the result of an accounting event (see the different Towers-Watson surveys), one can use the protection that firm managers are obtaining to shield themselves against the financial repercussions of "corporate governance accidents" as a governance indicator. Put differently, we argue that there is a direct link between D&O litigation risk and corporate governance quality.

As we will show, Canadian firms that cross-list their shares of common stock on a market in the United States do not purchase more D&O insurance coverage in the year after cross-listing than in the year before. The difference we find, however, is related to the fact that D&O insurance premium paid is much higher after cross-listing. We also find an increase in the price per unit of coverage (a statistic known as the Rate-on-line in the insurance industry) as the firm decides to cross-list on an American stock market. The increase is not trivial. We can infer from our results that firm that are cross-listing their shares in the United States expose themselves to more risk of litigation, not in severity terms, but in terms of the frequency of litigation.

Using this well-defined and measurable expected litigation cost of cross-listing, we find that the D&O liability insurance premium roughly doubles following cross-listing into the United States. The results we present are unlikely the result of any differences across firms, or of any change in the cross-listing firms' operations, or of the specific aspects of the D&O insurance market in a

the value to investors of such information.

³ The insurance underwriters' expertise is unbiased because of market competition amongst them. If one underwriter charges a premium that is systematically too low, not enough money will have been accumulated in the event of a claim, which would increase the D&O insurer's risk of bankruptcy. If the premium is systematically too high on the other hand, then the D&O insurer would not have any business.

given year. The magnitude in the premium increase we find is similar to that of Gillan and Panasian (2014), but much higher than the 30% increase found in Core (2000). The absence of any change in the coverage contrasts with the 40% increase reported in Core (1997). In all three cases, the authors used a single year of data (1993-1994 in Core 1997 & 2000, and 2005 in Gillan and Panasian 2014) for firms that could have been traded a long time in the United States.

Given that we find that D&O insurers adjust the basic structure of insurance contracts to reflect the higher risk of litigation associated with being listed in the United States, our results provide a basis for measuring corporate governance risk that is market based. Although we concentrate only on Canadian firms, there is no reason to believe that D&O insurers should not also be able to measure a firm's litigation risk irrespective of where their shares are traded. The evidence we find with respect to a firm's litigation risk – what Baker and Griffith (2007a) call the firm's risk culture and the character of its managers – provides support to the idea presented in Griffith (2006), Baker and Griffith (2007b & 2008), Gupta and Prakash (2012), and Boyer and Stern (2012 & 2014) that more D&O liability insurance information should be made public because it represents a non-biased measure of what one could call the firm's governance risk.

The present paper is divided as follows. Section 2 presents a literature review on corporate governance, on the value of cross-listing, and on D&O liability insurance. Section 3 describes the sample and the methodology used in the different tests. Section 4 presents the analysis of the test results. Finally, section 5 concludes the research.

2. A Review of Cross-listing, Governance, and D&O Insurance

2.1. Corporate governance, litigation risk, and cross-listing

Many researchers have studied the disciplinary aspect of cross-listing. In particular, Stulz (1999) suggested the *Bonding hypothesis* to explain cross-listing (see also Karolyi 2012 for a recent defense of that hypothesis). In a context of financial market globalization few phenomena are associated with the lowering of a firm's cost of capital more than an increased in the quality of corporate governance through managerial oversight.

The bonding hypothesis rests upon the superiority of the governance system in the United States. And even though the Canadian financial market is mature in terms of investor protection, and its legal environment mostly governed by common law principles, its legal system does not offer the same level of protection to small shareholders as the one in place in the United States. This raises the question of corporate governance quality measurement.⁴

The quest for a proper measure of corporate governance risk (possibly starting with the G-index of Gompers *et al.* 2003 and the E-index of Bebchuk *et al.* 2009) has given rise to an entire academic literature (see the survey of Bebchuk and Hamadi 2009), and even to a new industry (see Rose 2007). So, what governance measures matter? Lately Bebchuk *et al.* (2013) have found disappearing support for the popular G-index and E-index (see also Larcker and Tayan 2013). One explanation is that investors have started incorporating corporate governance measure in their portfolio choices so that we no longer find a link between corporate governance quality and stock market returns (see also Core *et al.* 2006 and Cremers *et al.* 2009 for an alternate explanation). Morck (2005) writes:

“Erroneous governance metrics (and indeed, a reliance on one-size-fits-all governance checklists) not only affect important shareholder decisions and decisions on whether to invest in or divest from a particular company, but may also have a more general, harmful effect on corporate governance regulation” (p. 891).

The new governance advising industry (Rose 2007) promotes the use of governance indices that guide investors through the forest of possible measures. As a whole, the governance industry does not seem to use private information; rather, each industry participant uses its own recipe of inputs to come up with a number that supposedly reflects the quality of the firm’s governance practices. Commercial indices promoters do not have much to lose directly in the event of a suboptimal index construction or recommendation... Except perhaps a reputation risk, which makes them

⁴ Morck (2005) provides a thorough survey of the history of corporate governance around the world from which one has to wonder if one system (i.e., the common law system in place in most countries of English tradition such as the United States, the United Kingdom, Canada, India, and Australia) is really better than the others. Even the notion of corporate governance quality is murky and goes beyond the protection of so-called widow-and-orphan shareholders (see Morck and Steier 2005).

similar to credit agencies that do not share any direct financial burden of providing an erroneous credit quality rating.

2.2. D&O liability insurance

Commercial governance indices are often a checklist of characteristics that have been hypothesized to be associated with problematic corporate governance features. In contrast, measures based on D&O insurance contracts originate from actual transactions. One useful measure is the D&O insurance *rate-on-line* (i.e., the premium-to-coverage ratio); it gives us the lowest price that an insurer is willing to accept to protect a firm's directors and officers against the cost associated with lawsuits.

Because insurers conduct a thorough audit of what Baker and Griffith (2007a) call the firm's "deep governance" features (i.e. it's the firm's *culture* and the *character* of the management team), they have had to develop an optimal technology that transforms a firm's observable and audited characteristics into a D&O liability insurance premium. And because they are directly financially responsible for paying the claims as well as for defense costs, insurers have the appropriate incentives to correctly measure the expected cost of litigation against the insured firm's directors and officers; if an insurer was to systematically over-charge for the risk it assumes then it would lose business, whereas if it was to systematically under-charge for the risk it would probably go out of business (i.e., it would not accumulate enough reserves to pay for the losses). A D&O insurance contract should therefore be seen as an unbiased measure of a firm's litigation risk. What does that have to do with governance?

Starting with Core (1997), it has been common to link D&O liability insurance with litigation risk and firm governance. Core (2000) finds that there are only two types of variables that explain the D&O insurance premium: business risk and governance risk. These results argue in favor of using D&O insurance as an indicator of governance risk. For Griffith (2006), D&O liability insurance is seen as an instrument which encourages the monitoring of directors insurers that must correctly assess the risk associated with the company's governance practices. In Boyer and Stern (2012),

D&O insurance is also linked to governance as riskier corporate structure are found to pay higher premiums per dollar of coverage. D&O insurers also have the potential of being efficient corporate monitors (see Holderness 1990, and O'Sullivan 1997).

The information embedded in D&O insurance has also been linked to more than just governance risk and has had a real measurable impact in the corporate world. It seems that more generous D&O insurance protection has been linked to more aggressive bids during mergers and acquisitions (Lin *et al.* 2011), to lower underpricing at the time of an IPO (Chalmers *et al.* 2002), to lower returns in the first year post-IPO (Boyer and Stern, 2014), to lower Tobin-Q (Chen and Li 2010), to more aggressive earnings management (Chung and Park-Wynn 2008, Cao and Narayanamoorthy 2011 and Boyer and Tennyson 2014), and to higher cost of equity (Chen, Li and Zou 2012). On the positive side, D&O insurance is associated with a lower risk of bankruptcy (Zou and Adams 2008), and lower managerial risk aversion (Hwang and Kim, 2013).

3. Hypothesis Development, Data, and Econometric Methodology

The current section of the paper is devoted to the development of the testable hypothesis, to the description of the sample and variable construction, and to the econometric approach used. It is important to keep in mind the relatively small number of observations (at most, there will be 98 firms in our sample, which gives us only 196 potential observations) to which we have access when developing the hypotheses and the econometric approach.

There is ample evidence that the legal system in the United States is more litigious than Canada's. Heys *et al.* (2014) and Comolli and Starykh (2014) present the number of new security class actions in Canada and in the United States from 1997 to 2013.⁵ There were on average 4 new class action lawsuits filed in Canada each year for the years 1997-2006 compared to over 200 in the United States. Heys *et al.* (2014) report that of the 48 class action lawsuits that were filed in the United States against Canadian companies between 1997 and 2005, only 8 had a parallel Canadian filing.

⁵ Although D&O liability insurance covers more than security class actions lawsuits, these are the most common and costly lawsuits against firm directors and officers according to the different Towers-Watson surveys.

It therefore seems that lawsuits are more likely to occur in the U.S. than in Canada. In terms of severity, however, the legal system in the United States does not seem to be much more generous with plaintiffs than Canada's. For the same years, the median settlement in Canada was 12.7 million Canadian dollars whereas approximately half of the settlements in the U.S. were worth less than 8 million American dollars.

Given that the frequency of lawsuits is much larger in the U.S. than in Canada, but the size of the settlements are approximately the same, we should see premiums increasing faster than coverage. This suggests that the D&O liability insurance premium should increase faster than coverage.

The four testable hypotheses (with their respective alternate) follow:

- H1: Firms are no more likely to purchase D&O insurance after cross-listing in the United States; H1A: Firms are more likely.
- H2: Firms do not increase their D&O insurance policy limit after cross-listing in the United States; H2A: Firms increase their policy limit.
- H3: Firms do not have to pay more for their D&O insurance after cross-listing in the United States; H3A: Firms pay more for their insurance.
- H4: Firms do not have to pay more per unit of D&O insurance coverage after cross-listing in the United States; H4A: Firms pay more per unit of coverage.

As insurers have the ability to measure the litigation risk associated with cross-listing into the United States, one should presume that they should be able to correctly grasp the firm's very own litigation risk independent of where the shares are traded. And if that is the case, then perhaps D&O insurers have developed a technology that allows them to properly price the risk of lawsuits against managers, which is one manifestation of corporate governance. In essence, can D&O insurance contracts be used as a market-based indicator of a firm's governance risk?

3.1. Sample description

Our sample is limited to Canadian-listed firms that decided to cross-list in the United States. Our

sample choice is dictated by an availability issue: In contrast to U.S.-listed firms, Canadian-listed firms report the basic information (coverage and premium) about the D&O liability insurance contract they offer to their directors and officers. In other countries, the same information about D&O insurance is not generally available (except in Taiwan – see Chen, Yi and Lin 2012). The initial sample included 131 Canadian-listed companies that cross-listed their shares of common stock in the United States between 1987 and 2006. Because of missing financial statements (mostly prior to 1996) only 98 firms remain in the final sample.

Because we are interested in how D&O insurance premiums and coverage changes as a company decides to cross-list, we need financial statements and managerial proxy and information circular before and after cross-listing. For each cross-listing event we use information in the year prior to cross-listing and information in the year after the cross-listing year, thus deleting the year of the cross-listing itself.⁶ Our final sample therefore contains two observations per cross-listed firm.

The accounting data was primarily gathered from the Compustat's database, and completed using Bloomberg's financial data platform when the information was missing in Compustat. The data pertaining to the structure of the board of directors, including its size, the independence of its directors, the dual CEO and chairman of the board roles as well as the presence of a majority stockholder, was gathered by hand using the firm's managerial proxy and information circular available for those years in www.sedar.com. The D&O liability insurance information also comes from those circular; firms that provide no information about D&O insurance are deemed to have no insurance. Table 1 presents the sample distribution by year.

INSERT TABLE 1 HERE

For firms covered by a D&O insurance contract, we collected the premium paid and the coverage obtained for the respective years. The statistics on premiums, coverage, and the ratio of premium to 1000\$ of coverage are shown in the last two columns of Table 1. We can see an upward trend

⁶ For example, for a cross-listing that took place during the 2001 financial year, we use data from financial year 2000 (prior to cross-listing) and financial year 2002 (after cross-listing).

in the average premium of D&O insurance contracts and a hump-shape trend in the coverage. More interestingly, we observe an important break in the premium-to-coverage ratio between 2001 and 2002, which corresponds to the bursting of the dotcom bubble. It thus appears to be important to account for year effects in the regressions.

3.2. Variable definition and construction

We now present the different variables used in the analysis, starting with the dependent variables, and moving on to the control variables and their hypothesized impact on the dependent variable.

3.2.1. Dependent variables

There are essentially four dependent variables in the analysis in line with the four aforementioned testable hypotheses. First, we will determine whether a firm has purchased D&O insurance or not. This binary variable (called *Purchase*) takes the value 1 if the firm has purchased insurance and zero otherwise. We will identify a firm as having D&O insurance based on the information in the firm's management proxy. If the proxy makes no mention of D&O insurance then the firm will be deemed to have no insurance (see Park-Wynn 2008 *inter alia*).

We will also be using the total premium paid (*Premium*) in thousands of dollars, as well as the D&O liability insurance policy limit (*Coverage*) in millions of dollars, which is the maximum amount an insurer will pay in the event of a claim or in a year. We will also use the log transformation of these two variables which will then be named *Ln_Premium* and *Ln_Coverage* respectively.

The last dependent variable we construct is known as the rate-on-line in the insurance industry. We will calculate it as the ratio of the premium paid to 1000\$ dollars of coverage (as defined by the policy limit). In other words, $Rate-on-line = Premium / Coverage$. We will also be using the log transformation of *Rate-on-line* so that $Ln_ROL = Ln_Premium - Ln_Coverage$.

The average values of these variables by year were presented in Table 1 already. We saw that approximately 53% of firms reported having D&O insurance before or after they cross-listed into the United States (47% before cross-listing and 60% after). This proportion is much less than in the

United States where over 95% of public firms report have D&O insurance (see the different Towers-Watson reports on D&O insurance in the United States). D&O insurance penetration is even lower than what the different Towers-Watson surveys report for Canada, and lower than what has been reported in previous work on Canadian data (see for instance Boyer and Tennyson 2014) which hovers at around 75%.

3.2.2. Main independent variable

The independent variable of interest is *Crosslisting*. By construction, *Crosslisting* is equal to zero in the year prior to cross-listing (listed in Canada only) and to one in the year posterior (listed in Canada and the United States). The cross-listing year is omitted.

If cross-listing in the United States increases litigation risk, then we should expect to see *Crosslisting* having a positive and significant impact on *Purchase*, *Coverage* and *Premium*. The impact on the *Rate-on-line* is not obvious though since the increase in premium following cross-listing may not be as large (or may be larger) than the increase in coverage. If the United States represent a more litigious environment, and that a more litigious environment creates greater compliance costs for the corporation, we should then expect to find an increase in the firm's D&O insurance *Rate-on-line* following cross-listing. If that is the case, then we will be able to conclude that the increase in litigation risk that a firm is exposed to when cross-listing in the United States comes not only as a result of much larger lawsuits (because of the greater reliance of class action and derivative lawsuits – see McTier and Wald 2011) but also because of more frequent lawsuits.

3.2.3. Control variables

3.2.3.1 Financial variables

The set of financial control variables grasps the importance of financial risk factors in determining the amount of D&O insurance a firm purchases. Of particular importance are firm size, accounting profitability, and debt financing.

MVE represents for the company's stock market capitalization (and *ln_MVE* its log transformation

to reduce the impact of potential outliers). A larger company is more at risk of being sued by an angry shareholder if only because there are more of them. Also D&O insurance claims are often related to the amount of wealth shareholders lost because of a managerial mishap (see Boyer and Tennyson 2014 for such a model) or as a very deep out-of-the-money put option for shareholders.⁷ In both cases larger corporations should require more insurance so that we should see a positive correlation between \ln_MVE and both *Coverage* and *Premium*.⁸ The net impact on *Rate-on-line* is not clearly identifiable. \ln_Assets represents the log of the firm's book value of assets, another proxy for size.

GrowthOpp represents the ratio of the firm's quasi-market value of assets (market value of equity plus book value of debt) to the firm's book value of assets. It captures the companies' growth opportunities. We hypothesize that a company that has important growth opportunities faces greater litigation risk because of the greater likelihood of missing its growth goals. We therefore expect *GrowthOpp* to be positively related to *Coverage* and to *Premium*, and probably to *Rate-on-line* as well as more intangible and frivolous lawsuits should be expected because of the nature of the variable. *MB-ratio* is the ratio of the firm's market value of equity to its book value of equity; it should have the same impact as *GrowthOpp*.

DebtRatio is calculated as the ratio of the firm's book value of total liabilities to the book value of assets. All else equal, a higher leverage leads to higher financial distress risks, thus leading to higher litigation risk. Higher debt can also provide some sort of discipline to firm managers who must make regular payments to the firm's creditors, thus reducing the possibility of funds expropriation. This means that directors and officers of more levered firms will be less likely to invest in projects that would endanger the firm's ability to meet its financial obligations. On the other hand, creditors are more likely to oversee the managers' actions if they have more to lose, thus reducing the need for monitoring on the part of the D&O insurers. Because of the conflicting

⁷ This is true even if the median ratio of settlement-to-investor losses is about 3% according to Comolli and Starykh (2014).

⁸ A counter argument is that large companies are more likely to have in-house lawyers for their defense and potential lawsuits, therefore substituting their need for D&O insurance, especially for smaller claims.

effects, we cannot clearly hypothesize what impact *DebtRatio* will have on coverage.

The *ROA* variable represents the firm's return on assets (net income divided by the book value of assets). A high *ROA* could indicate that a company is performing well and is therefore less likely to be sued, or it could indicate aggressive earnings management, which would increase the firm's chance of being sued in the future. This second possibility is especially likely given that firms in our sample have decided to cross-list into the United States, which is possibly a good reason to make a firm's financial situation look better than it really is (see Park Wynn 2008, and Cao and Narayanamoorthy 2011). The net effect is therefore uncertain.

3.2.3.2 Governance variables

The next set of control variables we present includes the company's governance measures.

Independence is calculated as the percentage of directors on the board that are deemed to be independent. On the one hand, a higher proportion of independent directors should decrease the risk of litigation. On the other hand, a more generous insurance protection should be necessary to attract more competent independent directors. Moreover, D&O insurers should feel that their monitoring role is less important when supervision is done by a more independent board. The impact of board *Independence* on *Coverage* is thus uncertain.

Duality is a binary variable equal to 1 if the roles of CEO and Chairman are held by the same person and 0 otherwise. A CEO who is also chairman is usually associated with more power in the hands of the executive arm of a corporation, which is generally associated with weaker governance practices. We therefore expect *Duality* to have a positive impact on *Premium*.

Board_size represents the number of members sitting on the board of directors. The greater the number of members on the board, the greater should be the demand for D&O insurance since more members could require defense attorneys. We should therefore see a positive link between *Board_size* and both *Coverage* and *Premium*. The impact on *Rate-on-line* is ambiguous, however.

Blockholder is a binary variable equal to 1 if one of the company's shareholders owns at least 10%

of the stock – the cut-off point for reporting their existence in Canada. Coffee (1999, 2002) argues that a company with a concentrated ownership will have a tendency to avoid listing its stock in a jurisdiction where minority investors are better protected, fearing that minority shareholders may feel more optimistic in the outcome of litigation against a block holder in a jurisdiction where their rights are more important. Therefore, the presence of a *Blockholder* could be seen as a greater litigation risk. On the other hand, the presence of a *Blockholder* reduces the need for the D&O insurer to monitor as closely the behaviour of the management team. The impact of *Blockholder* on *Coverage* should be positive, and it is ambiguous with respect to *Premium* and *Rate-on-line*.

3.2.3.3 Other variables

Riskiness is a binary variable equal to 1 if the firm operates in a risky industry and 0 otherwise. Using the definitions of Bajaj *et al.* (2000) and Comolli and Starykh (2014),⁹ we use the SIC codes to identify whether the industry in which a firm operates is risky. Firms that operate in riskier industries should pay higher premiums, and their managers should require more protection.

3.3. Summary statistics

Before getting into the regression results, it is worth examining in Table 3 some descriptive sample statistics.¹⁰ We note that the *ln_MVE* variable has an average value of 6.01 (median of 5.87). This corresponds to an average stock market capitalization of \$400M. Although not reported, the sample is heavily skewed with an average firm value of \$1,877M and a median of \$354M. 95% of the firms have a market value between \$39M and \$8,319M. We see why the log transformation is potentially important. *GrowthOpp* is also skewed (mean of 3.82 and median of 2.30), but not as much as the market value of equity.

On average the sample firms' *ROA* is negative. This is due to the fact that over half of the firms in

⁹ Our data includes firms from only four of the ten industries identified in Bajaj *et al.* (2000): biotech, telecommunication, media, and financial services. In Comolli and Starykh (2014), the top-three litigation-prone industries are electronics, health, and finance.

¹⁰ Obviously the average of the *Crosslisting* variable is 0.5 since the complete firm-year sample is composed of the same companies before and after cross-listing in the United States.

our sample have negative net income, perhaps because of the presence of many small to medium size growth enterprises. On the capital structure side, the average sample firm has a *Debt ratio* of 0.34, which means 34% of the firms' book value is in the form of debt.

With respect to governance-related variables, we see that there are between 7 and 8 members on our sample firms' board, approximately 70% of which are independent. We note the presence of a *Blockholder* in a little over than half the cases.

Finally, the D&O insurance variables tell us that the average D&O liability insurance premium paid was close to \$300,000 for an average coverage of 38 million Canadian dollars. The average *Rate-on-line* is \$11.69 per thousand dollars, which is greater than the median *Rate-on-line*. Only 54% of observations are associated with a firm purchasing D&O insurance.

3.4. Econometric approaches and methodology

We use four approaches to examine D&O insurance contracts around cross-listing: 1- A test of means and medians; 2- OLS & probit regressions; 3- A Heckman (1979) two-step approach to control for the potential selection bias between purchasers and non-purchasers of insurance; and 4- A simultaneous equation regression to account for the possible endogenous aspects of *Premium* and *Coverage*.

The two-step approach is necessary to account for the potential selection bias that could affect our regressions' coefficients. The problem stems from the fact that not all of the companies in our sample subscribe to D&O insurance so that they may not be randomly selected into the insured and the non-insured samples. Indeed, in the first step of the Heckman (1979) approach, we isolate the decision to purchase a D&O insurance policy. We then examine in a second step the impact of the control variables on D&O insurance premium and coverage. The selection bias correction is done using the inverse Mills ratio.

Finally, it is reasonable to think that coverage and premium are determined simultaneously through negotiation between the insured and the insurer. We will therefore control for this

simultaneity

4. Analysis of results

The results section is divided along the line of our methodology. We first present the descriptive statistics of the sub-samples and compare means and median. We then present the OLS and Probit regressions results. Third we present the regression results obtained using Heckman's two-step approach. Finally we provide the simultaneous equation regression results.

4.1 Statistical analysis of the variables

Table 4 presents the descriptive statistics before and after cross-listing into the United States, with the t-test of whether the means are the same and the Wilcoxon z-test of whether the medians are the same.

INSERT TABLE 4 HERE

Interestingly only two control variables are significantly different before and after cross-listing: firm size, as measured by the market value of equity (*MVE*) for the median or its log transformation (*ln_MVE*) for the mean and median, and the presence of a *Blockholder*. More specifically, we find that firms are statistically larger – approximately 30% larger – after cross-listing in the United States (at least as measured by the market value of equity) and are less likely to have an important shareholder. No other control variable is significantly different before and after cross-listing.

It is normal for the companies' stock capitalization to increase on average in time since this effect only reflects the positive yield of these companies' stock. However, it seems odd to us that the stock's market value increases (increasing *ln_MVE*) whereas the ratio representing the *Growth* opportunities decreases (although the decrease is not statistically significant). Since the companies' average debt ratio for this sample remains stable (*Debt_ratio*), the reduction in *Growth* must mean that the companies' book value of the assets increases more quickly on average than their market value. This can be due to the fact that these small and medium size

firms are naturally becoming more mature, which by definition means fewer investment opportunities. Another possibility is that in the two years between the annual reports we use the companies grew through a series of acquisitions which would have the effect of making assets, and especially of intangible assets such as the goodwill, increase rapidly.

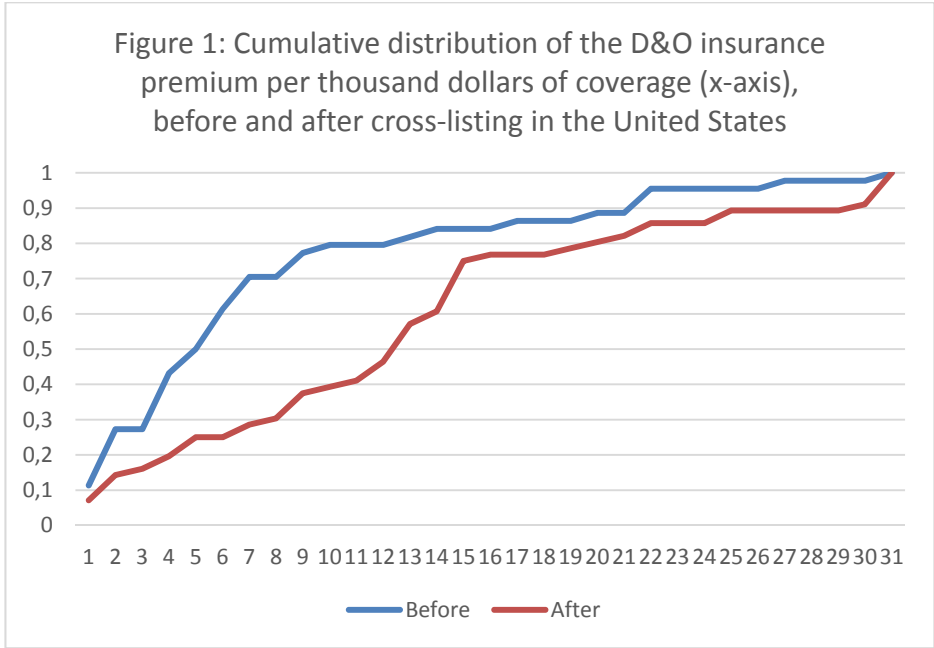
With respect to the governance variables, we see that the proportion of independent directors did not change significantly with cross-listing. We observe also that the proportion of firms with an important shareholder (*Blockholder*) decreased from 60% to 44% following cross-listing. Although this effect could be subject to more extensive research, it seems to concur with Stulz (1999) and Coffee (1997, 2002) who both suggest that cross-listing in the United States decreases the advantages (pecuniary or not) of being an important shareholders. A reduction in the presence of block holders is not necessarily a good thing, however. Alchian and Demsetz (1972) and Shleifer and Vishny (1986) suggest that because large shareholders have more to lose, they can be better monitors;¹¹ the same can actually be said about D&O insurers.

For the D&O insurance data that can be found at the bottom of Table 4, we note that 47% of the companies in the sample had D&O insurance before compared to 60% after cross-listing. This effect is consistent with our main hypothesis and with the observations made by Clarkson and Simunic (1994) that having a company's shares listed in the United States exposes its directors and officers to more litigation. Although companies are more likely to purchase D&O insurance after cross-listing in the United States, *Coverage* does not increase significantly. This is not due to the addition of new insured companies since if we were to concentrate only on those 44 companies that were insured before cross-listing, their average policy limit is \$37 million after cross-listing compared to \$35 million before cross-listing (a non-significant change). With *Premium* increasing two-fold after cross-listing, it is normal for *Rate-on-line* to increase from \$8.72 per \$1000 of coverage before to \$14.01 per \$1000 after cross-listing.

The results in Table 4 allow us to reach the following conclusions. First, listing in the United States increases the likelihood of having D&O insurance by approximately 20%, but the impact on the

¹¹ See Morck *at al.* (1988), and especially Shleifer and Vishny (1997) for more on the topic

amount of coverage sought does not increase. Second, the premium that firms must pay to protect their directors' and officers' personal wealth in the event of a lawsuit increases two-fold. Third, the unit price of insurance also increases significantly after cross-listing. The change is made clearer in Figure 1 where we plot the cumulative distribution before and after cross-listing (the x-axis is the *Rate-on-line*). We see a clear rightward shift in the distribution of Rate-on-line.



It seems that being listed in the United States does not increase a Canadian firm's market value of equity faster than its book value, and does not increase the amount of protection sought by managers who were already covered by a D&O liability insurance policy. Cross-listing does, however, increase the premium paid for D&O insurance. The control variables hardly vary on average and those that do are intuitively opposite to the observed increase in the D&O premiums. Obviously, an in-depth econometric analysis is warranted to verify our main hypotheses.

In addition to comparing the variables before and after cross-listing, it is worthwhile to compare the companies based on their managers' decision to have D&O insurance or not before and after cross-listing. Table 5 presents such an analysis, both with respect to means and medians.

INSERT TABLE 5 HERE

It seems that insured firms are statistically different from non-insured firms, both before and after cross-listing in terms of size (insured firms are larger), and in terms of board independence (insured firms seem to have more independent directors). Insured firms also seem to have less growth prospect and a lower market-to-book ratio, but only before cross-listing into the United States. After cross-listing there is no statistical difference. A possible explanation is that firms that have insurance are able to gain more in market value compared to their book value, an explanation that is supported by the fact that only the insurance firms gain significant market value (*ln_MVE*) following cross-listing. Interestingly, the uninsured firms only grow in terms of *ln_Assets*.

Comparing medians and means with respect to whether the firms has insurance or not gives us an idea of how we should proceed with the model specification of the probit analysis of whether a firm has insurance or not.

4.2 Basic regression models: Probit and OLS

Given the documented higher propensity to litigate in the U.S. than in Canada (see Clarkson and Simunic 1994, Heys and Berenblut 2012, and Heys *et al.* 2014), the decision to purchase D&O insurance or not is not to be taken lightly when a firm decides to cross-list into the United States. We will therefore use a probit analysis, with *Purchase* being the dependent variable. We will also use simple OLS regressions to explain *Premium*, *Coverage* and *Rate-on-line*, in dollar values as well as in log-transformations.

4.2.1 Purchasing decision: Probit analysis

Table 6 shows the results for the probit regressions¹² of the *Purchase* variable on the relevant independent variables. The different regression models in the table tell the following story: Apart from firm size and the board's independence, no other variable seem to have an impact on a firm's decision to purchase D&O liability insurance.

¹² We will be using robust standard errors throughout unless otherwise specified.

INSERT TABLE 6 HERE

The first model explains the decision to purchase insurance using firm size (*ln_Assets* or *ln_MVE*), *Crosslisting*, growth opportunities (*Growth*) and the proportion of independent directors on the board (*Independence*). These were the only variables that seemed to be statistically different across insurance protection. As it will be the case in most regression models throughout the paper, the variable of interest is *Crosslisting* since we want to see a firm's decision to cross-list its shares of common stock has an impact on its decision to have insurance, on the amount of insurance it purchases and on the premium it pays for that insurance. As we see in Model 1 of Table 6, cross-listing does not seem to have any impact on the firm's decision to have insurance or not. It appears clear that only firm size¹³ and the proportion of independent directors on the board have an impact on the decision to carry insurance or not.

In Model 2, we include a dummy for the riskiness of the industry (*Riskiness*), the fact that the CEO is also chairman of the board (*Duality*), the size of the board (*BoardSize*) and the presence of at least one important shareholder (*Blockholder*). As we see, none of these variables seem to have an impact on the firm's decision to insure its directors and its officers. Moreover, the significance of firm size decreases to less than five percent.¹⁴ The only variable that remains significant is that of the proportion of independent directors whose presence increases the likelihood of having D&O insurance. This result is consistent with the view that to attract more independent directors a firm must offer them protection in the event that a lawsuit is brought against them as representatives of the firm.

Model 3 presents the same regression as in Model 1, but with time fixed effects. The results remain generally the same (and none of the year dummy variables appear to be significant at the 5% level or better). In Model 4 and 5, we run the same regression as Model 1, but selecting only

¹³ Whether we use *ln_Assets* or *ln_MVE* makes no difference (and the model has a better fit with the log transformation of firm size than with *Assets* or *MVE* directly); we present the results for only one to lighten the reading of the paper.

¹⁴ The reduction in the level of significance of firm size is not due to the 10 observations that are lost because of missing variables.

those observations prior (Model 4) and posterior to cross-listing (Model 5). In both subsamples we see that *Independence* is significant. Firm size is significant at the 5% level only after cross-listing whereas Growth has a significant impact (at the 10% level) only before cross-listing.

In all the regression models, the only constant is the fact that the purchase of D&O insurance is positively linked to the proportion of independent directors. All other variables are either not significant or are not reliably significant in explaining the likelihood of purchasing D&O insurance across different specifications. *Independence* is therefore a very likely candidate for an instrument when we will be running our Heckman selection regression. This instrument will be the more useful that the correlation between *Independence* and *Premium*, *Coverage*, *Rate-on-Line*, and their log transformation is less than 10% in absolute value.

4.2.1 Coverage and Premium: OLS analysis

We present in Table 7 the basic OLS regression results that can explain the D&O liability insurance policy limit (*Coverage*) in Panel A, the *Premium* paid in Panel B, and the ratio of the two (*Rate-on-Line*) in Panel C, and their log transformation in their respective panels.

INSERT TABLE 7 HERE

With respect to coverage, we hypothesized earlier that firm size as measured by market value of equity, *Growth*, *Independence*, *BoardSize*, and *Blockholder* should have a positive impact on *Coverage*. The impact of *DebtRatio* and of the firm's return on assets (*ROA*) are uncertain. Of course, the variable of interest remains *Crosslisting*, which also should be positively related to *Coverage* if larger lawsuits are indeed more important in the United States. Model 1 of Panel A of Table 7 presents the most simple regression with only size and *Crosslisting* as explanatory variables. In Model 2 we include all other control variables, and we add time fixed effects in Model 3. In Models 4, 5, and 6 are equivalent to Models 1, 2, and 3, with the difference that we use the log transformation of the policy limit (*ln_Coverage*) as the dependent variable and the log of the market value of equity (*ln_MVE*) as a control.

In all model specifications, we observe that only size and DebtRatio are significant in explaining the amount of D&O liability insurance coverage purchased by the firms. This implies that larger firms and firms that rely more on debt financing will purchase more insurance to protect their directors and officers. Board and Governance characteristics do not seem to have an impact on the amount of D&O liability insurance that was purchased. What is surprising is that the main variable of interest, *Crosslisting*, is not significant in any of the regression models.

In Panel B we present OLS regressions to explain the D&O liability insurance premium. We hypothesize again that firm size and *Crosslisting* should be important positive factors in the determining *Premium*. We also expect *Growth*, *Duality*, and *BoardSize* to have positive effects on *Premium* because the first two are linked with greater probability of litigation (more risk of free cash flows and more risk of managerial shirking) and greater cost of litigation because more people need to be defended in the event of a lawsuit. *ROA* and the presence of a *Blockholder* could also affect *Premium*, but the net effect is not obvious.

Panel B of Table 7 provides our most interesting result in terms of the impact of cross-listing into the United States as the *Crosslisting* variable is significant in explaining the D&O insurance premium in all regressions. The point estimate of the *Crosslisting* variable is also economically significant: Following cross-listing D&O insurance premiums increase by approximately \$200,000. When we look at the *ln_Prem* regressions instead, the increase is also significant of the order of 75% of the initial premium amount. That is also statistically and economically significant.

Firm size also seems to have an impact on the premium paid, especially when we look at the log premium. The impact of size is less obvious when the premium dollar amount is used instead of its log transformation. As expected, return on assets seems to have a negative impact on premium since more profitable firms (and firms with higher and more stable cash flows) are less likely to be sued since they are less likely to see their stock price drop.

The final panel of Table 7 presents the regression results for the *Rate-on-line*, which is calculated as the premium per 1000 dollars of coverage. We hypothesized that whatever control variable

had a positive (resp. negative) impact on *Premium* in Panel B would have a positive (resp. negative) impact on *Rate-on-line*, and that whatever control variable had a positive impact (resp. negative) on *Coverage* in Panel A would have a negative (resp. positive) impact on *Rate-on-line*. The variables for which we have a clear prediction are *Crosslisting*, which should increase the Rate-on-line since it had no impact on *Coverage* and a significant impact on *Premium*, *DebtRatio*, which should decrease *Rate-on-line*, *ROA*, which should decrease *Rate-on-line*, and *BoardSize* which should increase *Rate-on-line*.

Models 1 of Panel C presents this exact regression whereas Model 4 uses the log transformation of *Rate-on-line*. As we see, only the *Crosslisting* and the *ROA* variables are significant in explaining the *Rate-on-line* in both regression models. In fact, no variable other than *Crosslisting* is significant in every model specification.¹⁵ *BoardSize* is never significant, and neither is firm size. *DebtRatio* is significant at the 10% level in Model 1 only. Focusing on the *Crosslisting* coefficient, which is the variable of interest in this regression, we see that cross-listing into the United States increases the firm's cost of D&O insurance by approximately \$5 dollars per thousand of coverage (or \$5000 per one million dollars of coverage).

These OLS regression results neither account for the possible selection bias associated with the decision to purchase insurance, nor the simultaneous nature of premium and coverage. Although the next section of the paper addresses those issues, the basic OLS results will not change: Cross-listing increase the premium and the rate-on-line, but does not affect the amount of coverage purchased.

4.3 Heckman two-step analysis

What if the decision to insure is endogenous? If firms are not randomly assigned to the insured

¹⁵ Another possible model specification would have been to include the premium index in the regression. This is not necessary given our use of year fixed effects that essentially takes the place of the premium index. Nevertheless, because of the relatively small number of data points, it may be important to bear in mind that the premium index represents an alternate specification that has the benefit of being slightly more parsimonious than the array of year fixed effect variables.

and uninsured samples, then the OLS estimations of coverage, premium, and rate-on-line suffer from a selection bias. We can correct for this possible bias using the two-step approach developed by Heckman (1979). To do so, we need to specify a selection equation (i.e., the decision to insure or not) and the effect regression (premium, coverage or rate-on-line). Model 1 in Table 6 will be our main selection equation. The result of the second stage of the Heckman selection model using a maximum likelihood estimator are displayed in Panels A (*Coverage*), B (*Premium*), and C (*Rate-on-line*) of Table 8.

INSERT TABLE 8 HERE

In short, every OLS regression results we had in Table 7 remain valid in Table 8.

Models 1 & 2 of Panel A present the regression results with *Coverage* as the dependent variable, whereas Models 3 & 4 present the regression results with the log transformation of coverage as the dependent variable. Models 2 & 4 include year fixed effect in the second stage regression. As we stated previously, the first stage regression (or the *selection regression*) is the same as that of Model 1 in Table 6.

Throughout the four Models of Panel A, the only variable that has a significant impact on the policy limit is the firm's debt-to-asset ratio. All other variables are either always insignificant or they are only significant in some model specification. Of particular interest is the result that cross-listing in the United States does not seem to have an important impact on the amount of coverage purchased to cover their directors and officers in the event of litigation.

In Panel B we present regression results that explain the D&O liability insurance premium pre- and post-cross-listing into the United States. The regression results (Models 1-3 explain the premium in thousands of dollars, Model 4-6 explain log-*Premium*) for *Premium* presented in Panel B are quite similar to the OLS results of Table 7, at least when it comes to the *Crosslisting* variable: The D&O insurance premiums rise by \$164,000 to \$195,000 following cross-listing. This represents a doubling of the average premium paid. This result holds even when we control for the potential selectivity bias (which is significant in only one regression model), year fixed-effects, and the

amount of D&O insurance coverage chosen (Models 3 and 6) to test whether firms only choose coverage whereas the premium is obtained mechanically. No other control variable explains significantly the premium paid in every regression model. Interestingly we find a marked increase in the coefficient of *Crosslisting* in explaining both the Premium and its log transformation when *Coverage* is included in the regression. Because *Coverage* (a choice variable) is significantly related to *Premium* (another choice variable), it could be that our econometric models are mis-specified in the sense that *Coverage* and *Premium* are chosen simultaneously. We address this question in Section 4.4 of the paper.

Finally, Panel C presents the regression results for *Rate-on-line* and *In_RoL*. Again we find in the four regression models (1 & 2 in value, 3 & 4 in log, 2 & 4 using year fixed effects, all controlling for the potential selection bias) that the only variable that is constantly and significantly significant in explaining the premium-to-coverage ratio is whether the firm has cross-listed its shares of common stock on a market in the United States.

4.4 Simultaneity issues

We present in Table 9 the results of the simultaneous three-stage-least-square regressions for *Coverage* and *Premium* (and *In_Cov* and *In_Prem*) controlling for year effects in all models, and controlling for the selection bias (using Model 1 of Table 6) in Models 3 & 4. Models 2, 3, & 4 include *Coverage* in determining *Premium*. There are only 95 observations that can be used since we need both the *Coverage* and the *Premium* to be observed.

INSERT TABLE 9 HERE

The results in Table 9 relay the same message as the other results of the paper: choosing to cross-list into the United States increases the D&O insurance premium significantly, but not the coverage. The increase in the D&O liability insurance premium is approximately \$200,000 (or doubles using Model 4) even though the policy limit does not change. Even more interesting perhaps is the fact that once we control for the simultaneous choice of *Premium* and *Coverage*, *Coverage* no longer has any predictive power on *Premium*... and neither does firm size for that

matter when *Coverage* is included in the *Premium* regression.

4.5 Limited sample with more information

Because some firms do not have the same insured before and after cross-listing, and because some information about the contract is not provided in all cases before and after cross-listing, we do not exactly have the same sample of companies for which the *Rate-on-line* can be calculated before and after cross-listing into the United States. To make sure that the message of the paper is not due to the differences in the samples pre and post cross-listing, we present simultaneous regression results (akin to Table 9) but using only those 40 firms (80 observations) that purchased D&O liability insurance before **and** after cross-listing and for which we have all the necessary information on *Coverage* and *Premium*. The results are presented in Table 10.

INSERT TABLE 10 HERE

By limiting our simultaneous equation analysis to only those firms that have D&O insurance before and after cross-listing, we note some small changes in the results, but none more spectacular than what we observe with respect to the *Crosslisting* variable. It is true that following cross-listing one can infer from Model 2 that the amount of coverage needed decreases, but such a conclusion is not obvious in the other regression models. The impact of cross-listing on the D&O liability insurance premium increases sizeably, however, compared to our previous results. According to the Model 2 regression results, cross-listing into the United States is associated with an increase of the D&O liability insurance premium of approximately \$290,000. The economic significance of the regression results of Model 4 (in log) is more striking: Premiums seem to increase by close to $e^{1.067}-1=192\%$. These results are statistically and economically significant.

5. Conclusion

The main goal of our study was to establish and to quantify the expected litigation risk associated with having one's shares listed in the United States by focusing at the change in a firm's Directors' and Officers' liability insurance coverage and premium surrounding a Canadian listed firm's

decision to cross-list its shares in the United States. Compared to the year prior to cross-listing, we find a marked increase in the D&O insurance premium of between 65% and 200% of the premium paid before cross-listing. Our conclusions are economically and statistically robust. We find no evidence that cross-listing is associated with a higher likelihood of having insurance or with a higher level of insurance protection. In other words, the only effect that cross-listing has on the D&O liability insurance contract is on its premium.

What can our results tell us? If D&O liability insurance is indeed a non-biased indicator for litigation risk, as suggested by Core (2000) and by Boyer and Stern (2014), then the D&O premium is able to measure a company's increased litigation risk when cross-listing in the United States. And this litigation risk does not come from an increase in the severity of the lawsuits (that is, the settlement amounts), but rather from an increase in the frequency of the lawsuits. Focussing on class action lawsuits, which are only a part of the reason why directors and officers could be sued, the studies of Heys *et al.* (2014) and Comolli and Starykh (2014) tell us that for each new class action lawsuit filed in Canada, 50 are filed in the United States. This is a disproportionately high number of lawsuits given that neither the economy nor the capital market in United States is 50 times larger than Canada's. Clearly the frequency of the lawsuits is much higher in the U.S. A completely different picture appears when we focus on the class-action settlements since the median settlement in Canada was \$12.7 million compares to less than \$8 million in the United States.

These results raise the question of the effectiveness of civil courts to arrive and an optimal level of litigation. Suppose that the monetary penalty is used by the policymaker (or by the courts in the grand scheme of things) to impart the cost of enforcing litigation effort to the private sector by rewarding the efficient use of lawsuits. As highlighted in Landes and Posner (1975), the main problem with this line of argument is that the social loss is greater with the private rather than the public enforcement of rules. This is true even though the probability of conviction is greater under private enforcement. In Becker (1968), having a high probability of apprehension and a low fine to be paid in the event of conviction (akin to what we observe directly with respect to class-action lawsuits in Heys *et al.* 2014 and Comolli and Starykh 2014, and indirectly in the current paper with respect to D&O insurance when stock listings move from Canada to the United

States) is an optimal strategy provided that the potential perpetrators are risk *loving*. Being a risk loving manager is not a problem per se. It is, however, incompatible with a manager who buys insurance because he is risk averse over the same random event! Given our examination of D&O insurance where directors appear risk averse given their insurance requirements, it would be best for society to set the penalty quite high and to reduce the probability of enforcement. This is quite contrary to what we observe in reality, especially given the size of the firms involved.

Assuming that litigation risk is one manifestation of governance risk, the present study reinforces if not the usefulness of D&O insurance statistics such as the rate-on-line with regards to corporate governance, at least the necessity to investigate the matter more thoroughly. Of course the rate-on-line measure is not a perfect measure of corporate governance risk. It does have an advantage that many other measures do not have: It is based on actual transactions in which all parties have something to lose by not measuring the risk properly.

In future work, it would be interesting to assess whether there are other types of relationship between D&O liability insurance and governance practices or manifestation. One possible area of such manifestation would be on the level of aggressive accounting practices such as strategic earnings management, or on the quality of the operational and financial guidelines that management teams often provide during their conference calls with investors.