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The Demand for Directors' and Officers' Insurance in Canada*

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Résumé / Abstract

Cette recherche se penche sur la demande d'assurance de la responsabilité civile des administrateurs et des dirigeants d'entreprise en utilisant des données pour plus de 350 compagnies canadiennes entre 1993 et 1999. Les firmes dans les secteurs des services financiers et des mines ne sont pas incluses. Plus précisément, nous nous intéressons à la demande d'assurance de la responsabilité civile des administrateurs et des dirigeants. Nos résultats suggèrent qu'il est plus probable pour une corporation de grande taille d'avoir une assurance D&O que pour une corporation de petite taille. Les corporations qui ont une bonne santé financière ont moins de chance d'avoir une assurance, tout comme les corporations où la présence d'administrateurs indépendants au conseil d'administration est importante. De plus, plus les membres des conseils d'administration sont impliqués financièrement dans la santé d'une corporation, moins importante est la probabilité que cette compagnie possède une assurance D&O. Un résultat surprenant que nous obtenons est le fait que d'être enregistré dans une bourse américaine ne semble pas avoir d'impact sur la demande d'assurance D&O, contrairement aux études précédentes.

This paper looks at the insurance demand of a firm's directors and officers using a sample of Canadian corporations (excluding firms from the Financial services and Mining sectors) from 1993-1999. More to the point, we study the demand for director's and officer's insurance. Our results suggest that larger corporation are more likely to purchase D&O insurance. Firms that are strong financially are less likely to purchase D&O insurance. Firms are also less likely to purchase D&O insurance when there are many outsiders on the board of directors and when the board member have an important financial stake in the corporation. Surprisingly, being listed on a stock exchange in the United States does not seem to have an impact on the demand for D&O insurance, contrary to previous results.

Mots clés : Rémunération des dirigeants, assurance D&O.

Keywords: Executive Compensation, D&O Insurance.

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1 Introduction

1.1 Motivation

In the wake of the Enron debacle many pundits suggested that company managers may be faced with more and more lawsuits by angry stakeholders who feel they are kept in the dark regarding the company's operations. Shareholders are arguably the most likely stakeholders to complain about the management team in place, and they are more likely to do so when the situation is not going well. On top of shareholder activism and new possible disclosure rules of the SEC, another interesting aspect of studying D&O insurance is that it may shed light on why corporation purchase insurance; one of the many puzzles found in modern finance theory.

Although it has been argued that progressive tax systems induce corporations to smooth earnings, no earning insurance contract exists (at least not any that has a decent basis risk). In fact, insurance is usually purchased to cover risks that are often uncorrelated with earning, which means that insurance offers earnings coverage with a large basis risk. Another aspect of the tax code, the possibility to carry forward and carry back earnings, also puts a dent in the argument of taxes to explain the purchase of insurance since firms can use these tools to smooth earnings over time. A final argument against the tax-reason for purchasing insurance is that we observe corporations purchasing insurance even if the tax schedule is not progressive. Although insurance is only one of the many hedging tools available to corporation, it is the oldest and it represents an important economic sector in the United States as around 20 trillion dollars are paid in premiums every year to cover commercial multiple peril risks. That is on top of the 30 trillion dollars paid by insurers in worker's compensation insurance and the 20 trillion dollars paid for other types of liability coverages (including insurance for corporate directors and officers). These three insurance lines represent about 20 % of the 340 trillion dollars paid in property and casualty insurance premiums in the United States 2000. This is down from 27 % in 1994.

Researchers have argued that non-tradable human capital is a good explanation to insure. Given that some stakeholders in a corporation such as workers and managers may have the great majority of their human capital tied up in a given corporation, it becomes essential for such corporation to offer insurance in a way to attract and retain the best workers and the best managers. This fear of financial distress is also argued to be a good reason to hedge to calm consumer fears and supplier fears that the corporation will be there in a few month either to offer consumer services or pay for

merchandises bought.

The type of insurance we want to look at in this paper is indeed linked to the argument that a corporation must insure itself in order to attract and retain the best human capital within the corporation. Although Directors' and Officers' insurance (D&O insurance) does indeed offer protection to managers of the corporation, it does so for strange events. D&O insurance protects a corporation's managers against liability lawsuits brought upon them as managers of the corporation. In this sense, this is not too different from other types of insurance. What is surprising, however, is that most lawsuits are brought by stockholders against management. According to a study of Tillinghast-Towers Perrin (1999), lawsuits usually originate from shareholders (44%), employees (29%) and clients (14%). We are then faced with shareholders who offer managers as part of their compensation package insurance against the possibility that shareholders will sue managers. D&O insurance covers managers for their court expenses as well as for any settlement arising from the lawsuit.

The goal of this paper is to present an analysis of the demand for D&O insurance for Canadian corporations. The reason why we use Canadian corporations instead of U.S. corporation is that Canadian corporation listed on the Toronto Stock Exchange (Canada's most important exchange) have been required by law since 1993 to divulge information pertaining to their D&O insurance coverage.

As representative of the corporation managers may be liable for some of their actions committed in the name of the corporation. Directors are personally responsible for their actions. This means that their own personal assets are at risk in the event of a lawsuit against the corporation and its management.

D&O insurance is quite common amongst U.S. and Canadian public corporations. According to Tillinghast-Towers Perrin (1998, 1999) the proportion of U.S. firms that had D&O insurance was 92% in 1998 and 93% in 1999. The proportion is a bit smaller in Canada where 84% of surveyed corporation had D&O insurance in 1998, and 73% in 1999. The proportion of corporation with D&O insurance has been rising in the nineties as only 81% of U.S. firms had D&O insurance coverage in 1992. This is a possible indication that D&O insurance is an important feature of the compensation package of managers.

One possible reason why D&O insurance has become more and more popular is that lawsuits against management are becoming more frequent. Tillinghast-Towers Perrin (1999) reports that

about 24% of U.S. public corporation (and 14% of Canadian public corporations) had to face lawsuits related to the behavior of their management between 1989 and 1999. This proportion was 64% for U.S. corporations whose assets are worth in excess of 10 billion dollars. It appears clear that D&O insurance is an essential element of corporate governance, and it is very much present in the economy. One must then wonder what affects the purchase of D&O insurance and its structure.

1.2 Relevant literature

It should be straightforward to see that if there is a market for D&O insurance it is because managers are risk averse. Given that their own personal wealth is fair game when a suit is filed against a corporation and its representatives, and given that there is a probability that the corporation will not be able to compensate the managers for their court expenses (or the required settlement), managers require that their personal wealth be insured if they are to manage a given corporation. In place of insurance, managers may demand higher pay to compensate for the risk they are facing. D&O insurance is therefore a risk management tool to manage the risk faced by risk averse managers (sic!).

Few studies have been conducted on the demand for D&O insurance. This is mainly due to the fact that information has not been available in any country prior to 1990.¹ The Cadbury report in the United Kingdom and the Dey report in Canada changed all that by recommending to their respective securities commission to make available more information on the risk faced by publicly traded corporation and the tools used to manage that risk. The reports also recommended that more information be made available regarding managerial compensation. Given that the purchase of D&O insurance is one part risk management tool and two parts managerial compensation, corporations in the United Kingdom and in Canada were mandated to make public that information.

Core (1997) was the first to use the newly available data on D&O insurance purchases by Canadian companies. Using a sample of 222 firms whose fiscal year ended between 31 May 1994 and 31 December 1994, he finds that the most important determinants of D&O insurance purchase is whether the risks of a lawsuit are high² and whether the risks of financial distress are high. Although he finds significant determinants of the corporate demand for D&O insurance, his overall

¹The only information available prior to 1990 was collected by Wyatt and Associates (now part of the Tillinghast-Towers Perrin group) via surveys.

²Romano (1991) argues that the most important factor used to determine the risk of a future lawsuit is whether the corporation was sued in previous years.

goodness of fit is quite low. His model correctly predicts only about 34% of the firms that do not purchase any insurance, versus 76% of the firms that do purchase insurance. Moreover, he cannot find any evidence that D&O insurance is in any way part of the overall compensation package offered to managers. Our study builds upon his approach by increasing the sample size and the number of years used. In a following study, Core (2000) examines the premium paid by corporations to insure managers. He finds that the factors explaining premium are about the same as the factors explaining the demand for D&O insurance.

Using a sample of 366 corporations in the United Kingdom, O'Sullivan (1997) finds that the factors that explained D&O purchase in Canada (Core, 1997) also explain D&O purchase in the United Kingdom. He hastily concludes that D&O insurance coverage is used by large corporations as an incentive tool for managers to work in the best interest of shareholders. He finds that the manager share ownership and D&O insurance coverage seem to be corporate governance instrument substitutes.

Earlier papers by Bhagat, Brickley and Coles (1987) and Janjigian and Bolster (1990) find that D&O insurance coverage does not seem to alter shareholder wealth nor returns. A similar result is obtained by Brook and Rao (1994) who find that corporations who make provisions for lawsuits do not have significantly different stock returns than corporations who do not make any provisions.

There are many reasons why the study of D&O insurance is important. First, it remains an unexplored territory, Few papers have been devoted to this aspect of corporate governance. Is D&O insurance part of the compensation package, or is it a way to align the manager's incentives with those of the shareholders? Second, it gives us a further insight into the general corporate demand for insurance. Why do firms hedge their risk given that it is more costly to them than to shareholders? Finally, we are able to observe how presumably highly rational agents (i.e., the managers) behave when faced with a possible catastrophic personal loss.

Our approach to corporate risk management issues is similar to that used by Mayers and Smith (1982, 1987). Given that it is near impossible to obtain data on corporate risk management directly, Mayers and Smith had to infer the behavior of corporation faced with the possibility of managing risk indirectly. To do that they studied the demand for reinsurance of insurance companies. Our approach looks at the behavior of directors and officers in choosing their insurance contract. Our approach is logical is one may infer that the only reason firms manage risk is to reduce indirect cost of going bankrupt. Indeed, without insurance employees, whether at the bottom of the pyramid of

at the top, may not invest an optimal level of effort in increasing their firm-specific human capital. Thus, by managing risk firms may reduce labor costs and/or increase productivity.

The setup of the paper is as follows. We first present a short primer on D&O insurance. The data and the theoretical predictions are presented in section 3. Section 4 presents the results. We divided the result section into four parts. In the first part, we determine the likelihood that an agent will purchase D&O insurance. In the second and third part we find the determinants of the policy limit and deductible amount respectively. The fourth part of section 4 presents the case where it is assumed that the policy limit and the deductible amounts are chosen simultaneously. Finally, section 5 concludes.

1.3 A Primer on D&O Insurance

The environment in which directors and officers of a corporation operate may sometimes be extremely difficult. As managers of the corporation, their fiduciary duty as well as their behavior as representatives of the corporation may be called into question by any stakeholder in the economy, whether they are the corporation's shareholders, employees, consumers or government agencies. Not only can the corporation be liable for its behavior, its managers may also be personally liable. This means that lawsuits may be brought upon the managers personally arguing that they did not meet their fiduciary duty toward a stakeholder of the corporation. Although managers may have made a mistake in good faith, the strict liability rule governing the fiduciary duty of managers does not allow a good faith defense. To compensate managers for their legal fees and any loss they are assessed corporations can either purchase D&O insurance coverage prior to the lawsuit, or use a pay-as-you-go-like legal indemnization scheme (see Moreau, 1995). Our study focuses exclusively on the insurance component recourse because the firm's indemnization scheme may not be available to managers in case of bankruptcy.

The D&O contract is purchased by corporations to protect their managers. The insurance covers all expenses and losses incurred by a manager as the result of a lawsuit brought upon him as a representative of the corporation. The insurance company indemnifies the corporation and/or the manager only if the manager acted in good faith on behalf of the company. Depending on the type of D&O contract, sometimes the manager will be indemnified directly, other times the corporation will be indemnified for the expenses incurred in the manager's defense (for example when the corporation has its own in house legal team). As with other standard insurance contracts,

D&O insurance contracts stipulate a premium to be paid, a policy limit as well as a deductible.

A particular feature of D&O insurance contracts is that it is written on a *claim made and reported* basis, similarly to most professional liability insurance contracts. In contrast with *occurrence* contracts, claims-made contracts cover the policyholder for claims that are reported during the policy year, no matter when the loss was incurred in the past, subject to a retrospective date before which losses are not covered.³ Occurrence contracts cover the policyholder for losses that are incurred during the policy year, no matter when the claim is reported in the future. According to Doherty (1992), this difference in the two types of contracts is due to the increased uncertainty in the liability rules. A consequence of the so-called liability crisis in professional liability insurance of the late 70s and early 80s (especially medical malpractice insurance) induced insurers to create organizations and contracts whereby part of the liability-rule risk was passed on the policyholder. Doherty concludes that the emergence of mutual insurers and claims made contracts can be directly attributed to this liability rule uncertainty. Building upon Doherty (1992), Boyer and Gobert (2002) assert that claims-made policies can also be used to separate good risks from bad risks, risk averse agents from risk neutral agents and to smooth individual consumption over time.

An important feature of claims made contracts is that the insured's past behavior is both a signal for future losses as well as current claims. Observed past behavior then becomes a double whammy; past behavior may not only be an indication of what behavior the insured will have in the future, it also is an indication of the losses to be paid in the present because of such past behavior.

2 Econometric Approach

2.1 Data Source and Sample

Our sample includes 354 Canadian corporations drawn from 8 economic sectors: biopharmaceutical, forest and paper, industrial products, technological, consumer products, consumer and industrial products, merchandising, and communication and media.⁴ Because of holes in the data, 27 firms, mainly smaller firms were deleted from the start. There is no survivor bias as we collected data on new companies as well as companies that disappeared during the sampled years. Because of this incomplete panel, we have 1594 observations, which gives us an average of 4.9 years per company

³Typically insured either did not need insurance prior to the retro date, or they were covered under an occurrence insurance policy.

⁴Two very big sectors of the Canadian economy were deliberately omitted: Financial and Mining. We did that in order to keep our sample more homogenous.

(out of a maximum of 7). Of the 327 firms used in our final sample, close to 60% have information for 5 years or more, including 22% for all the years. 73.4% of the firms (241 firms) purchased D&O insurance at least once during those seven years. Of the 327 firms, over 17% did not exist anymore at the start of 2000. Table 1 in the appendix⁵ presents a detailed account of the number of firms per year included in our sample, firms being divided by sector. One may refer to André, Boyer and Gagné (2002) for more details on the database.

The proportion of firms in our sample that purchased D&O insurance increased from 61% in 1993 to 70% in 1998 and 75% in 1999. For the same years, Tillinghast-Towers Perrin (1999) reports that the proportion of U.S. corporations who purchased D&O insurance increased from 84% in 1993 to 92% in 1997 and 93% in 1999. In Canada, Tillinghast-Towers Perrin (1999) reports that 84 % of corporations purchased D&O insurance in 1998 compared to 73% in 1999 (no Canadian data is available prior to 1998).

By law (see the statutes of the Ontario Securities Commission), all the information regarding D&O coverage is available from the management proxies, along with details related to managerial compensation and board composition. We obtained financial data from three different sources, depending on the company: Compustat, Stock Guide and CanCorp Financial. Stock prices and total returns are drawn from the TSE-Western tapes. All values are in Canadian dollars; any U.S. dollar figure has been converted to Canadian dollar using the exchange rate at the fiscal year-end of each company.

We collected precise information regarding executive compensation of publicly traded Canadian companies listed on the Toronto Stock Exchange. Since 1993 every company traded on the TSE must make public a lot more information that was required previously. They also needed to divulge information regarding 1991 and 1992 in order for the investor public to get an historical point of view. This information is made public once a year in the management proxy (information circular). The information contained in these proxies include 1) the name of the main stockholder; 2) the total compensation package (base salary, bonus, number of common shares and call options received) for the firm's top-5 executives; 3) the number of exercised options and their value, as well as the number and the value of vested and non-vested options; and 4) the board structure (name and position) and the number of shares owned by each member. Management proxies also gives us the details about the type of vesting rights the executives have, as well as the voting rights of each type

⁵All tables may be found in the appendix.

of common shares.

Since 1996 all this information is available on the internet site of SEDAR (<http://www.sedar.com/>). Prior to this date the information must be collected from the companies directly (for free allegedly), or from Micromedia (at a price).

2.2 Variables Used

2.2.1 Director's and Officers' Insurance

Since 1993, corporations are required to state whether it purchased insurance to compensate their directors and officers in case of a lawsuit brought upon them as a representative of the corporation. Although corporations may have management legal indemnification schemes such that the purchase of insurance is not required, such information is not available. We are constrained on using whether insurance was purchased by corporations. Our dependent variable in this study is thus whether D&O insurance was purchased or not. We will assign the value 1 to companies that state that they do have D&O insurance and 0 otherwise.

Similarly to previous research on D&O insurance (Core, 1997, 2000, and O'Sullivan, 1997), we have two classes of explanatory variables that are hypothesized to have an impact on the of a corporation's likelihood of having D&O insurance. The first class is related to the corporation, the second to the corporate officers and directors.

2.2.2 The Corporation

Starting with size, we feel that size should be important factor in determining whether a firm will need insurance.⁶ We use two measures of size: The log of the assets (*Assets*), in millions of dollars, and the log of the market value of equity (*MVE*), also in millions of dollars.⁷ Each measure has its importance. The log of assets measures the importance of a firm's operations. The greater the size of a firm's operations, the more likely it will need D&O insurance coverage because, for example, it has more employees, more clients and more exposure. Also, operations of larger corporations are harder to oversee by management because the chain of information is longer. The market value of equity is also an important measure of size as it measure an aspect that is not completely measured

⁶One could also argue that larger corporations are more able to self-insure (see Stulz, 1996). Although one could interpret this as saying that larger corporations are less likely to need insurance, the actual interpretation should rather be that larger corporations are willing to increase the size of their deductible. The need for insurance should not be reduced because of size.

⁷Of course we will correct for the high correlation between these two variables in the regressions.

with assets: The exposure to litigation arising from shareholder losses. Given that almost half of lawsuits originate from shareholders (presumably because they lost money), it becomes important to measure that type of exposure. According to these arguments, larger corporations both in terms of assets and equity are more likely to have D&O insurance.

To measure returns, we will also use two measures; the accounting measure of return on assets (*ROA*) and the market measure of the volatility of the corporation's stock return (*Volatility*). To measure volatility, we used the annual volatility of compounded daily returns of the stock (see Hull, 2000). Although one could think that volatility would increase the likelihood of having insurance, it is rather the opposite. Indeed, suppose that stock returns reflect both managerial qualities and noise. If noise is an important aspect of returns, it may completely mask the impact of managerial quality, which reduce the likelihood that a lawsuit will be successful. It follows that poor returns may not be followed by lawsuits because such poor returns may not be a consequence of bad managerial quality. Moreover, individuals who invest in high volatile stock know that low returns are likely, which means that lawsuits are not automatic following a bad stock return. High volatility would therefore decrease the need for D&O insurance. High return on assets should also decrease the likelihood that a firm will purchase D&O insurance. Presumably, the higher the ROA, the more likely shareholders will be happy, and clients and employees will feel safe with the company. We calculated the ROA using the ratio of net earnings excluding extraordinary items to total assets.

The way in which a corporation is financed should affect the decision to purchase D&O insurance. For example, a corporation in financial distress stands a better chance to go bankrupt. Given that a bankrupt firm cannot honor its promise to financially support its managers' legal fees in the event of a lawsuit, the potential loss borne by the managers should increase as a corporation finds itself in financial distress. We will use minus the log of the asset-to-debt ratio divided by the standard error of the stock's daily return over the previous year as our measure of financial distress (*Distress*). This variable measures the probability that a put option on the corporation's assets will be exercised at a strike price equal to the book value of debt. To capture more precisely the role and the risk associated with debt, we will use the pure debt ratio (*DebtRatio*) measured as the book value of debt divided by market value of equity. This variable is traditionally used to measure the credit risk of a corporation. Our hypothesis is that the higher the ratio, the more likely will financial problems arise. Thus the pure debt ratio should be positively related to the frequency of litigation.

Finally, the litigation environment should have an important impact on the need for D&O insurance. According to Core (1997), lawsuits against managers are more costly and more frequent in the United States than in Canada. The laws governing corporations in the United States allow more lawsuits than the laws governing Canadian corporations. Moreover, the jurisprudence in the United States is such that lawsuits are very common; this is not the case in Canada where lawsuits are not considered a normal business expense for corporations. The probability of litigation is therefore higher for firms that are listed in both the United States and Canada as opposed to firms listed in Canada only (*USListing*). Although it is true that sexual harassment and/or employment discrimination suits against managers fall under the D&O coverage, most lawsuits are brought by stockholders under the different security laws. We therefore believe that a pure dichotomous variable is sufficient to measure the exposure to litigation risk outside Canada.⁸

2.2.3 The Governance

D&O insurance may be considered part of the overall compensation package of managers. Instead of receiving insurance coverage managers could instead opt for greater compensation. This means that all aspect of corporate governance should have an impact on the demand for D&O insurance. For example, litigation frequency should be smaller when managers are overseen more closely by the board of directors.

To control for corporate governance, we will use five variables. Our first variable is the proportion of outsiders (*Outsiders*) on the board of directors. We define as an external member any person that is not the chief executive officer, the chairman of the board, an officer of the corporation, an employee of the corporation or a member of their family. We hypothesize that the greater the proportion of outside members on the board, the more closely will the board oversee the behavior of managers. Possible mistakes by managers should therefore be prevented with greater ease, thus litigation less likely.

Whether a single person holds both titles of chief executive officer and chairman of the board (*CEO = COB*) is important as it makes the board less independent, which means that litigation

⁸ A second litigation measure that could also be used is whether the firm faced litigation in the past. According to Romano (1991) and Core (2000) firms that have faced litigation in that past are more likely to face litigation in the future. A possible explanation is that plaintiff lawyers who incurred important sunk costs in acquiring information related to the inner working of the corporation (full disclosure of the information related to the case) may be inclined to recoup those costs by suing the corporation more often. The problem with this measure is that it is often not disclosed in annual statements, and if it is, they are only for those lawsuits that are expected to be paid in the future and for which the corporation needs to make provisions.

should be more likely because the decisions of the CEO are less closely monitored. This variable is dichotomous, taking the value one when the one persons holds both positions.

Another important aspect of corporate governance is whether there are block holders in the corporation. Contrary to the United States where all stockholders that own more than 5% of the outstanding stock must be listed as such, Canadian corporations only need to report stockholders that own more than 10%. To control not only for block holders, but also their relationship with the corporation's managers, we constructed three control variables. First, we calculated the ownership percentage (votes⁹) of the chief executive officer, the chairman of the board and their immediate family (*CEOVotes*). The more votes held by these managers directly or indirectly, the more likely a corporation will purchase insurance since the managers do not need to answer for their behavior as much as in corporations where the CEO has less voting power. Second, we calculated the ownership percentage (votes) of external entities that own blocks. This variable includes both individual external stock holders as well as important interest of other non-financial corporations (*OutVotes*). External block holders have the ability to oversee the behavior of managers, which reduces the likelihood of mistakes by managers and thus the need for insurance. Our third variable is the percentage of votes held by financial groups (*FinVotes*). As for the percentage of votes held by outsiders, we expect more monitoring of managers as financial groups have more power, thus reducing the need for insurance.

Our last corporate governance variable will be the board member's interest (in market value) in the corporation as a proportion of total book equity (*BoardWealth*). Board members that have more invested in the corporation will oversee operations more closely, thus reducing the need for insurance. Also, wealth can be seen as a proxy for risk aversion. If boardmembers' utility is such that the third derivative with respect to wealth is positive - a less binding constraint than the normally assumed non-increasing risk aversion - then the more equity owned by boardmembers of the firm the less risk averse they should be. All else being equal, less risk averse individuals are less likely to purchase insurance. We therefore expect *BoardWealth* to have a negative impact on D&O insurance purchase.

⁹Canadian law allows very openly the distribution of multiple-voting shares. It becomes important to make a difference between the percentage of votes and the percentage of value of the different stakeholders in the corporation.

3 Results

Table 2 summarizes the explanatory variables used, the expected sign on the likelihood that a firm purchased D&O insurance and their summary statistics. We see that almost 70 % of the firms in our sample purchased D&O insurance. The average size of these corporations is almost the same whether we consider the log of total assets or the log of the market value of equity. About 10 % of the firms are listed in the United States. In close to 44 % of the cases the chief executive officer is also the chairman of the board. On average, the CEO holds 19 % of the voting shares, which is more than the average block holding of firm outsiders which stands at 16 %. An interesting statistic is that on average the value of the board members' holding hold about 23 % of the firm's book equity.

Table 3 presents the results of the probit regressions. The regression results presented in the columns labelled ModelA1 and ModelA2 do not consider the fact that some exogenous variables are highly correlated, such as the size of the corporation as measured by the log of assets or the log of the market value of equity. In ModelA2 we include time and sector fixed effects to control for time specific and sector specific shocks. In the last two models we control for the correlation between the variables. In ModelA3, we correct for the correlation between the first seven variables (LnAssets, LnMVE, Volatility, ROA, Distress, DERatio and USlisted). In ModelA4, we control for all the correlation. Our main results are more or less robust to the different specifications. Our discussion will mainly focus on ModelA4.

It appears that larger corporations are more likely to purchase D&O insurance, and that the most important measure of size when D&O insurance is concerned is the value of the corporation's assets. The market value of equity seemed to be important only when we did not control for time or sector effects. As soon as we control for these fixed effects this variable is no longer significant. A results that is consistent in the four model specifications is the volatility measure. It appears the greater the volatility of the stock price the less likely are corporations to purchase insurance. This supports our contention that the more volatile the stock price, the easier it is for managers to hide their incompetence behind the veil of investor sentiment. As manager actions are hidden from view, they do not need insurance as much. Thus they are less eager to demand insurance coverage.

A corporation's return of assets (ROA) also has a negative impact on the likelihood of purchasing D&O insurance. The logic is that as accounting returns are high, it is either less likely that managers

will get sued because the firm is performing well (since stockholders are the main source of lawsuits), or the firm is less likely to find itself in a position that it will not be able to compensate the managers for their legal bill. As such it is logical to observe firms with a higher measure of performance to be less likely to purchase D&O insurance than firms whose accounting returns are low. The same logic applies to the measure of financial distress used in this paper. As firms enter periods of financial distress, managers are more likely to demand D&O insurance protection in the more likely event that the firm goes into bankruptcy and is unable to compensated the manager for their legal bill.

Surprisingly, and contrary to what Core (1997, 2000) found, the fact that a corporation is listed on a U.S. stock exchange does not seem to have an impact on the demand for D&O insurance (except when we do not control for fixed effects or correlation). We expected firms that were listed in the U.S. to be more likely to purchase insurance as the U.S. business environment is much more litigious than the Canadian business environment. Our empirical findings indicate that this is not the case. One possibility is that it is larger corporations that are stock cross-listed in the United States. As such the U.S. business environment is controlled for using assets. Although it appears from ModelA1 that firms listed in the U.S. are more likely to purchase D&O insurance, it did not control for time or sector effects. As we control for these effects, the significance of being cross-listed in the U.S. disappears (as the market value of equity did).

When we look at board composition, we observe that only two measures are significant: The proportion of outsiders on the board of directors and the importance of financial institution stock votes ownership. In the two cases the impact is negative, which suggests that the greater the proportion of outsiders on the board, and the greater financial institution ownership, the less likely are corporation to have D&O insurance. A possibility is that firms feel that the greater the number of outsiders, the more likely they are to oversee closely the behavior of managers, and thus the less likely are managers to err by mistake. The same logic applies to financial institution, who also are perhaps able to back financially firms in which their implication is important in case such firms are faced with D&O litigation. CEO power, as measured by whether the CEO is also the chairman of the board and the stock ownership votes of the CEO, does not seem to have an impact on the likelihood of purchasing D&O insurance.

The last variable of interest is the wealth of the corporate board members in the corporation. As the board owns more wealth in the corporation, the corporation is less likely to purchase D&O insurance. One possible explanation is similar to that of outside board presence: Board members

who have more to lose verify more closely the behavior of corporate officers. Another explanation is that wealthier boards are less risk averse, which reduces their demand for D&O insurance, and thus the likelihood that a corporation will purchase D&O insurance.

4 Conclusion

The goal of this paper was to further our understanding of the corporate demand for insurance. To do so we analyzed the determinants of the demand for insurance of corporate managers as part of their function within the corporation. Directors' and Officers' liability insurance protects managers against lawsuits brought onto them as representative of the corporation. Corporation can buy insurance coverage to compensate their managers in the event of losses arising from such lawsuits. In this paper we analyzed the purchase by a corporation of Directors' and Officers' insurance.

Our results indicate that size is an important factor in the decision to purchase insurance. It appears that larger corporation are more likely to have D&O insurance, contrary to Stulz (1996) assertion. Interestingly, size is an important factor only when it is measured as the value of the assets; the market value of equity does not seem to have any bearing on the decision to purchase insurance. Basic measures of financial health also have an important impact on the decision to have D&O insurance as firms that have a high return on assets as well as a low measure of financial distress are less likely to purchase D&O insurance. A large stock volatility reduces the likelihood of purchasing insurance. Finally, board composition and wealth is an important factor contributing to the decision to purchase D&O insurance. As the personal wealth of directors increases and as the proportion of outside members on the board increases, the firm is less likely to purchase D&O insurance, perhaps because these board members supervise more closely the officers of the corporation, including the CEO.

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6 Appendix: Tables

Table 1. Number of firms per year by economic sector.

Year	1993	1994	1995	1996	1997	1998	1999	
Sector								% of total
Biopharmaceutical	4	9	10	13	19	19	16	5.83
Forest and Paper	19	27	31	32	29	29	25	12.11
Industrial Products	30	63	79	82	83	80	64	30.18
Technological	5	15	21	28	37	36	33	11.04
Consumer Products	21	38	44	47	48	48	37	11.75
C & I Products	4	5	9	8	8	8	7	3.07
Merchandizing	15	27	33	36	35	29	23	12.42
Media	<u>9</u>	<u>18</u>	<u>21</u>	<u>22</u>	<u>17</u>	<u>17</u>	<u>17</u>	<u>7.56</u>
Total	107	202	248	268	276	266	222	1594

Table 2. Summary of the Explanatory Variables.

Variable	Predicted Impact	Mean	Standard Deviation	Min	Max
Insurance		0.6939	0.4610	0	1
Assets	+	5.2270	1.7707	0.1044	10.998
MVE	+	5.000	1.8708	-0.3320	16.260
ROA	-	0.0162	0.1478	-0.9939	1.9937
Volatility	-	0.5157	0.3392	0.0298	4.1176
Distress	+	-0.2048	0.1975	-3.9898	0.1074
D/E Ratio	+	1.3938	4.5580	0.0040	141.13
US Listed	+	0.1028	0.3038	0	1
Outsiders	-	0.6983	0.1448	0.1429	1
CEO=COB	+	0.4390	0.4964	0	1
CEOVotes	+	0.1934	0.2622	0	0.9840
OutVotes	-	0.1623	0.2463	0	0.9940
FinVotes	-	0.0948	0.1993	0	1.0000
BoardWealth	-	0.2325	0.2610	0	2.3780

Table 3. The Determinants of D&O Purchase

The dependent variable is equal to 1 if the company had Directors' and Officers' Insurance in a given year and 0 otherwise.

Variable	Model A1 Probit	Model A2 Probit FE	Model A3 Probit FE Correlation Corporation	Model A4 Probit FE Correlation All variables
Intercept	1.185*** (0.252)	1.651*** (0.335)	1.563*** (0.273)	0.864*** (0.161)
Assets	-0.170*** (0.048)	-0.041 (0.054)	0.063*** (0.023)	0.063*** (0.023)
MVE	0.173*** (0.045)	0.075 (0.049)	0.028 (0.042)	0.028 (0.042)
Volatility	-0.229 (0.133)	-0.359*** (0.136)	-0.358** (0.156)	-0.358** (0.156)
ROA	-0.268 (0.244)	-0.034 (0.258)	-1.251*** (0.468)	-1.251*** (0.468)
Distress	0.451** (0.202)	0.504** (0.206)	0.591*** (0.201)	0.591*** (0.201)
D/E Ratio	0.020 (0.011)	0.018 (0.010)	0.010 (0.010)	0.010 (0.010)
US Listed	0.241** (0.123)	0.064 (0.129)	0.154 (0.128)	0.210 (0.125)
%Out.Board	-0.534** (0.254)	-0.812*** (0.265)	-0.781*** (0.266)	-0.747*** (0.266)
CEO=COB	-0.065 (0.070)	-0.043 (0.072)	-0.043 (0.072)	-0.040 (0.070)
%CEOVotes	0.290 (0.180)	0.290 (0.190)	0.290 (0.190)	0.250 (0.140)
%Out.Votes	0.050 (0.160)	0.070 (0.160)	0.050 (0.160)	0.110 (0.150)
%Fin.Votes	0.310 (0.180)	-0.350 (0.190)	-0.380** (0.190)	-0.500*** (0.190)
BrdWealth	-0.439*** (0.152)	-0.570*** (0.157)	-0.562** (0.157)	-0.562*** (0.157)
Year Fixed Effects		YES	YES	YES
Sector Fixed Effects		YES	YES	YES
<i>LL</i>	-949.34	-911.56	-906.25	-906.25
<i>n</i>	1585	1585	1585	1585

significant at the 5 % level; *significant at the 1 % level. Standard error in parentheses.