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Is the Demand for Corporate Insurance a Habit? Evidence of Organizational Inertia from Directors' and Officers' Insurance

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Is the Demand for Corporate Insurance a Habit? Evidence of Organizational Inertia from Directors' and Officers' Insurance

Martin Boyer[*]

Résumé / *Abstract*

De toutes les questions fondamentales qui demeurent en finance, celle que j'adresse dans ce document est liée à la gestion du risque au sein des entreprises. L'hypothèse que j'élabore dans cette étude est que les habitudes des dirigeants et l'inertie organisationnelle contribuent aux décisions d'achat d'assurance et de gestion des risques par les entreprises. Puisqu'il est impossible d'obtenir des données publiques sur la gestion des risques et l'achat d'assurance par les entreprises, j'examine un aspect particulier de cette demande d'assurance pour laquelle l'information existe : l'assurance de la responsabilité civile des administrateurs et des dirigeants. Les résultats que je présente supportent l'hypothèse selon laquelle les habitudes et l'inertie organisationnelle contribuent à la fonction de demande d'assurance des administrateurs et des dirigeants. Mes résultats soulèvent la question des rôles que jouent les habitudes des dirigeants et l'inertie organisationnelle dans les stratégies plus globales de gestion des risques d'une entreprise.

Mots clés : assurance de la responsabilité civile des administrateurs et des dirigeants, formation d'habitudes, assurances et gestion des risques des entreprises, rémunération des conseils d'administration.

Of the many fundamental questions left unanswered in finance, one relates to corporate risk management practices. My contention in this paper is that managerial habits and organizational inertia play an important role in the decision to purchase corporate insurance and engage in risk management activities. Because public access to corporate insurance purchases and risk management strategies is limited, I examine a particular aspect of the corporate demand for insurance for which public information is available: Directors' and officers' insurance. My results show that some measure of organizational inertia is an important determinant of the demand for insurance. This raises the interesting question of how big of a role does managerial habit and corporate inertia play in the firm's overall risk management strategy?

Keywords: *directors' and officers' insurance, habit formation, corporate insurance and risk management, board compensation.*

Codes JEL : G34, G22, J44

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1 Introduction and Motivation

1.1 Introduction

Of the many fundamental questions left unanswered in finance, one relates to corporate risk management practices. Put differently, it is still relatively unclear why corporations actively manage their idiosyncratic risk. Purchasing insurance policies and investing in risk management are two common practices that are inherently costly but that do not necessarily increase shareholder wealth. Indeed, because shareholders have access to the financial markets, they are better equipped than corporations to hedge idiosyncratic risk through diversification. A recent article by Guay and Kothari (2003) shows that the value created in non-financial firms through the use of derivatives instruments is quite small. Moreover, if a clear consensus existed on the value to the firm of risk management, we should not see firms in the same industry (for example, the gold mining industry) arguing, often time vehemently, on whether risk management creates or destroys value, not only for each firm, but for the entire industry.

I argue in this paper that because corporations are plagued with inertia, risk management decisions (and general management decision for that matter) may have more to do with the managers' previous decisions than with a current and forward looking strategy. As a result, managerial habit and corporate inertia may be important risk management determinants. I define organizational inertia similar to Dewatripont and Tirole (1996), Prendergast and Stole (1996) and Boyer and Robert (2003): An organization is plagued with inertia if it is unwilling to change ex post what it did ex ante.

Many financial and governance measures have been hypothesized to have an impact on risk management. To show that managerial habit and organizational inertia may play a role, my contention is that none of these measures work as well as a measure of organizational inertia and/or of managerial habit formation.

Because public access to corporate insurance purchases and risk management strategies is limited, I examine a particular aspect of the corporate demand for insurance for which public information is available: Directors' and Officers' (D&O) insurance. My approach is similar to that used by Mayers and Smith (1990) who also inferred corporate risk management decisions indirectly by looking at insurer demand for reinsurance. My indirect look at corporate risk management rests on the assumption that the demand for insurance by directors and officers is a proxy for the firm's risk management strategy. Presumably, the variables that determine D&O insurance demand should also determine the firm's investment in risk management processes. Examples of such variables are the expected cost of bankruptcy and of financial distress.

Directors' and Officers' (D&O) insurance is also linked to the human capital argument wherein corporations must manage risk to attract and retain the best managers, officers and corporate di-

rectors; otherwise they need to pay them more.[1] As representatives of the corporation directors and officers are **personally responsible and liable** for actions committed by the corporation. This means that their own personal assets are at risk in the event of a lawsuit against the corporation. One way for a corporate director to protect his personal wealth is to have the corporation buy insurance on his behalf.

My paper's original contribution is two-fold. First, I study an aspect of corporate governance that has not been studied much in the past. Information regarding D&O insurance has never been publicly available before 1993. The public information I use is clearly more reliable than the survey data used in the past. Second, I test for the presence of organizational inertia in risk management activities.

1.2 Motivation and goal

The foremost reason why corporations should manage their risk is the progressive nature of the tax schedule (Smith and Stulz, 1985): The more volatile a corporation's earnings, the greater are the benefits associated with managing this risk. This argument holds best when earnings are indeed insurable. Unfortunately the basis risk associated with most insurance policies is very large. Another aspect of the tax code, the possibility to carry forward and carry back earnings, also weakens the convexity-in-the-tax-schedule argument to explain corporate insurance purchases (see Graham and Rogers, 2002).

The presence of non-tradable human capital within a corporation also appears to be a good intuitive explanation to insure. Given that some stakeholders, such as workers and managers, may have the great majority of their human capital tied up in the corporation, it becomes essential for it to manage its risk in order to attract and retain the best workers and managers. Financial distress is another good intuitive and theoretical reason to hedge to calm consumer and supplier fears about the future of the corporation. Finally, over-investment (investing in negative net present value projects) and under-investment (not investing in positive net present value projects) may be curtailed through risk management and insurance.[2]

Based on the theoretical findings of Froot et al. (1993) and Stulz (1996), Tufano (1996) conjectures that only two reasons explain why corporation should and would manage their risk. The first is to maximize the value of the firm; the second is to protect risk averse managers. (see also Smith and Stulz, 1985, and Dionne and Garand, 2000). Related to the human capital hypothesis, a special type of insurance, known as Directors' and Officers' (D&O) insurance, offers protection to corporate managers. If managerial risk aversion is an important determinant of risk manage-

[1] The few papers that studied D&O insurance did not consider the insurance aspects of the contracts. For example, researchers in finance (Holderness, 1990) and accounting (Core, 1997) view D&O insurance as part of the managers' compensation package. The insurance aspects of D&O insurance contracts is still largely left untouched.

[2] See Trieschmann et al. (1994) for a quick overview of the insurance practices in this area.

ment activities, managers should value the presence of an insurance contract that protects against liability lawsuits brought upon them as managers of the corporation. Suprisingly, according to a study of Tillinghast-Towers Perrin (1999), it is the firm's stakeholders who are the most likely to sue managers: 44% of lawsuits originate from shareholders, 29% from employees and 14% from clients.

D&O insurance covers managers for their court expenses as well as for any settlement arising from the lawsuit, subject of course to a policy limit (the maximum amount). As a result, The Economist (June 14th, 2003, p. 14) claims that D&O insurance provided by corporations goes against managerial accountability. Settlements may sometimes be substantial as shown in the 2001 Cendant Corp. case where a 2.83 billion dollars award was paid to the company's shareholders because of accounting fraud. The most notorious case is arguably that of Drexel Burnham Lambert Group Inc. where a 1.2 billion dollars settlement was paid.

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, up from 81 % in 1992. The market penetration of D&O insurance is smaller in Canada where 84% of surveyed corporation had D&O insurance in 1998, and 73% in 1999. 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. D&O insurance therefore appears to be an important feature of the compensation package of managers. One must then wonder what affects the purchase of D&O insurance and its structure.

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 managers for their court expenses (or settlement), managers should require that their personal wealth be insured if they are to be involved with a 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.

1.3 Findings

My findings lends support to some of the main economic theories that underly corporate risk management and insurance purchases. Managerial risk aversion and the need for real service appear to be determiants of the demand for D&O insurance. Size, financial distress and financial structure do not appear to play any significant role, however. Even corporate governance, which Tufano (1996) found to be an important determinant, plays no role. In contrast to Core (1997, 2000) and Chalmers et al. (2002), I find no evidence of managerial opportunism with respect to the D&O insurance coverage. One possible absence of any evidence may be due to the sunk cost associated

with risk management decisions as mentioned in Chacko et al. (2001) where they write

> "Risk management decisions seem motivated as much by fluctuations in the cost and availability of financing as by fluctuations in either operating cash flows or desired investments" (p. 451).

An important factor that determines the amount of D&O insurance coverage purchased is my measure of managerial habit and/or organizational inertia. This begs the interesting question of how big of a role does managerial habit and corporate inertia play in the firm's overall risk management strategy. Kaltchev (2003), using a proprietary database of U.S. public corporations, also finds that inertia play an important role in the structure of the D&O insurance policy, but not as important as the one I find. The difference in the results may be due to four factors. First, it may be that the U.S. corporations do not behave in the same way as Canadian corporations. Second, Kaltchev uses information from a unique insurance broker whereas I use information that is publicly available in the management proxies. Third, the period under study is different. Finally, it may also be that I have more years in my data, which allows a better test of the organizational inertia hypothesis.

Before discussing the previous literature, I present a short overview of the D&O insurance industry. Section 3 presents the empirical model and discusses why habit formation and organizational inertia are important factors to consider when studying the behavior of economic agents. In Section 4 I present the econometric approach used and the results of the analysis. I conduct robustness checks in Section 5. Finally, section 6 concludes.

2 Directors' and Officers' Insurance

2.1 A Short Overview

I present a short overview of the D&O insurance markets in North America based on the more detailed accounts found in Core (1997, 2000), Chalmers et al. (2002), Gutiérrez (2003) and Boyer (2003).

The environment in which directors and officers of a corporation operate may sometimes be extremely difficult. Not only can a corporation be liable for its behavior, the corporation's managers may also be liable. Any of the firm's stakeholders may question a manager's fiduciary duty toward them. Gutiérrez (2000) argues that lawsuits may be brought upon the managers personally. Corporations can purchase D&O insurance coverage to protect managers against losses associated with the lawsuit.

The D&O insurance policy covers all expenses and losses incurred by a manager as the result of a lawsuit brought upon him as a representative of the corporation, except in the case of gross

negligence or criminal behavior. As with other standard insurance contracts, D&O insurance contracts stipulate a premium to be paid, a policy limit as well as a deductible.

Most D&O insurance contracts are written on a "claims made and reported" basis (CMR).[3] CMR contracts differ from regular occurrence based contracts in that they cover losses that are made and reported during the policy year even though such claims may have been incurred in previous years. In contrast, occurrence based contracts cover losses that are incurred during the policy year no matter when the claim is reported in the future. Suppose for example that an incident occurs in 1995, but is not reported until 1998 when a claim is filed. Under a CMR contract, all the financial responsibility for the loss falls upon the 1998 insurer. Under an occurrence based insurance contract, it is the 1995 insurer who is responsible.

Directors' and Officers' insurance policies are mainly sold by insurance brokers who negotiate with insurance companies on behalf of the insured. In Canada, the top-2 insurance brokers hold a 66% market share in terms of the number of accounts. In premium terms, the top-2 insurers hold a 50% market share in the United States. In Canada, a majority of corporations receive their D&O insurance coverage from one unique insurer, namely Chubb. So-called sticky points also characterize the D&O insurance market: Coverage limits are sold by layers of $1,000,000, although the most important steps appear to be $5,000,000.

2.2 Previous Literature

Few studies have been conducted on the demand for D&O insurance. This is mainly due to the lack of public information prior to 1990.[4] The Cadbury report in the United Kingdom and the Dey report in Canada changed that by recommending to their respective securities commission to make available more information on the risk faced by publicly traded corporations and the tools used to manage that risk. The reports also recommended that more information be made available regarding managerial compensation. As a result, corporations in both countries were mandated to make public information related to their D&O insurance purchases.

Core (1997, 2000) 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 risk of a lawsuit[5] or the risk of financial distress are high. Although he finds significant determinants of the corporate demand for D&O insurance, he cannot find any evidence that D&O insurance is in any way part of the overall compensation package offered to managers. My study

[3] See Doherty (1991) for more details regarding claims made and reported insurance contracts compared with occurrence based contracts.

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

[5] As in Romano (1991), Core (1997) argues that the most important factor used to determine the risk of a future lawsuit is whether the corporation was sued in previous years.

builds upon his approach by increasing the sample size and the number of years used.

A second study, by O'Sullivan (1997), uses a sample of 366 corporations in the United Kingdom. O'Sullivan finds that the same factors that explained D&O purchase in Canada (Core, 1997) also explain D&O purchase in the United Kingdom. He concludes that large corporations use D&O insurance coverage as an incentive tool for managers to work in the best interest of shareholders so that manager share ownership and D&O insurance coverage are corporate governance instrument substitutes.

In the United States, Kaltchev (2003) uses a proprietary database obtained from an insurance broker to conduct a study similar to the one I present here. Contrary to the present study, he finds evidence in favor of some well-established theories about the demand for risk management. He also finds evidence supporting the organizational inertia hypothesis presented here. Related evidence of the importance of shareholder litigation in the United States can also be found in Romano (1991), Peng and Röell (2003) and Kim (2004).

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 or returns. A similar result is obtained by Brook and Rao (1994) who find that corporations that make provisions for lawsuits do not have significantly different stock returns than corporations that do not make any provisions.

A recent paper by Chalmers et al. (2002) studies the interaction between of D&O insurance coverage and IPO under pricing using an original sample of firms going public with a specific investment bank. Their study, using 72 observations points, is based on earlier studies by Ibbotson (1975) and Tinic (1988) who argued that IPOs are initially under priced as a way to prevent shareholder lawsuits when the stock falls in the long run. They find that corporations with substantial D&O insurance coverage were, on average, more likely to be sued in the future for mispricing. Specifically, the greater the D&O insurance coverage, the less under priced was the stock at the time of the initial public offering.

Only one paper to my knowledge examines in details the modelling of Directors' and Officers' insurance. Gutiérrez (2003) presents a model where D&O insurance is used as a commitment device for stockholders to monitor the behavior of corporate directors. The paper follows in the steps of Sarath (1991), but innovates by having an uninformed principal purchase insurance on behalf of an informed agent because the insurer cannot observe ex post the true effort of the agent.

3 The Determinant of D&O Insurance Purchases

I divided the determinants of D&O insurance purchase into two broad categories: Corporate risk management and Organizational inertia. In the first case, there are six traditional reasons that may explain D&O insurance purchase based on the corporate risk management literature. In the second case, I present why managerial habit and, to a lesser degree, organizational inertia may be

prime determinant of D&O insurance purchases.

The main hypothesis of this paper is that managerial habit is an important determinant of the use of D&O insurance in an organization. Because directors are, presumably, more aware and more preoccupied by their own personal assets than the shareholders' wealth, my results may be indicative of the overall determinant of what drives corporate investments in risk management.

3.1 Six traditional reasons to manage corporate risk

There are six traditional reasons why firms should manage their risk: Managerial risk aversion, asset substitution, real services, financial distress, managerial signalling, and the convexity of the tax schedule. I present each reason in turn.

1- Managerial Risk aversion

Risk averse managers may assign positive value to a financial instrument that protects their personal wealth in the event of a lawsuit. As a result, D&O insurance may be influenced by the composition and compensation of the board of directors and the ownership structure of the corporation. I use two measures of board composition, one of compensation and one of ownership.

In terms of board composition I expect that the greater the number of board members, the costlier a lawsuit would be. I therefore expect a greater policy limit and a greater deductible when the number of board members ($Members$) is larger. Board member origin should also be important. For example, a board member who is not an officer, related to an officer nor a former employee is defined as an outsider. I expect that the greater the proportion of outsiders ($Outsiders$) on the board, the greater the need for insurance in order to attract better directors to sit on the board. Corporations that have relatively more outsiders on its board should therefore purchase an insurance policy that has a greater limit and a smaller deductible. For board $Compensation$, I use the boards' total annual cash compensation. I do not include stock option awards or restricted stock awards in the directors' compensation.

My final measure of risk aversion is the corporation's ownership structure. A corporation whose ownership structure is more concentrated should manage risk more because owners are less likely to be well diversified (see Mayers and Smith, 1990). I measure stock ownership concentration using the Herfindahl index ($Herfindahl$) of the major shareholders: The more concentrated the ownership, the more risk averse should the corporation behave.

2- Asset substitution

Absent sound risk management practices, managers may under-invest in positive NPV projects because they focus too much on the downside of the project. The argument is basically that managers put too much weight on the bad outcomes and too little on the good outcomes. By managing risk, a manager can better evaluate the weights of the different outcomes so that the incentives to under-invest are reduced. Risk management forces managers to reinvest in risky

positive NPV projects in the event of an insured loss. Bessembinder (1991) suggests that large negative changes in the book value of assets may be a sign of under-investment. I then define my *Divestor* variable as equal to the log of last period's book value of assets when the book value of assets decreased by 20% over the previous year's and zero otherwise.

At the other end of the spectrum, over-investment may occur if managers, who act in the stockholders' best interest, over-invest in risky project (possibly in negative NPV projects) because all of the risk is borne by the creditors. Over-investment should be observed when managers go on a spending spree, perhaps by acquiring new business through investment, mergers or acquisitions. I measure over-investment (*Acquiror*) as the log of the book value of assets when the book value of assets increased by 20% or more and zero otherwise.

In both cases, I expect a larger policy limit following an important change in the book value of assets.

3- Real services

Firms that provide risk management and insurance services are often better equipped to assess and control the risk than the insured party: It is their core business. Insurer expertise should be needed more when litigation is more common. Clarkson and Simunic (1994) report that the Canadian legal system is less litigious than the American legal system so that corporations that have important activities in the United States are exposed to more litigation risk and thus in the direst need of insurer services. Because the majority of lawsuits are brought by shareholders under U.S. security laws (typically an accounting irregularity), the most important D&O risk for a corporation appear to be whether it violated some SEC rule (see Eitel, 2000).

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 so that insurer services may be more valuable for firms listed in the United States. Corporations that are listed on a U.S. stock exchange ($USListed$) should therefore have a greater policy limit and a larger deductible.

4- Cost of financial distress

As shown by Stulz (1996), risk management reduces the expected cost of bankruptcy and financial distress. I use six variables to measure these expected costs.

Size is an important determinant of a risk management practices because larger corporations incur lower expected bankruptcy costs (see Mayers and Smith, 1990, and Smith and Stulz, 1985). Another reason why larger corporation do not need as much insurance is that they may be better able to self insure (see Stulz, 1996). For example, large corporations may have an in house litigation department that handles lawsuits. As in Core (1997), I shall use both the log of the market value of equity ($Ln\,(MVE)$) and the log of the market value of assets ($LnAssets$) for my measure of size. The first one is a market measure whereas the second one is an accounting measure.

A corporation whose stock price is more volatile faces greater cost of financial distress, so that

directors in corporations whose stock price is more volatile will seek more protection. $Volatility$ is calculated as the annualized standard error of the stock's compounded daily returns. $Volatility$ increases the probability that the corporation will find itself in financial distress.

The way in which a corporation is financed should affect the decision to purchase D&O insurance. For example, a bankrupted corporation may not be able to honour its promise to financially support its managers' legal fees in the event of a lawsuit so that the expected loss borne by managers should increase as a corporation's bankruptcy risk increases. Bankruptcy risk is calculated as

$$Bankruptcy = -\left(\frac{\text{Book Value of Assets}}{\text{Book Value of Debt}}\right)\left(\frac{1}{Volatility}\right)$$

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. A higher bankruptcy risk should be associated with more insurance coverage.

The corporation's capital structure is measured through the ratio of the book value of debt to the quasi-market value of assets calculated as the book value of debt plus the market value of equity. Thus,

$$Debt = \frac{\text{Book Value of Debt}}{\text{Book Value of Debt+Market Value of Equity}}$$

Corporations that have a higher measure of $Debt$ are more at risk of being in financial distress.

It may also be important to control for a firm's profitability because financially healthy firms face lower financial distress costs. Presumably, the higher the return the happier shareholders, clients and employees will be. Thus the higher the past returns, the smaller should be the coverage. I use the firm's return on assets (ROA) as my measure of profitability.

5- Managerial signalling

According to DeMarzo and Duffie (1991), asymmetric information between managers and shareholders should force good managers to hedge to send a clearer signal as to their type. This information asymmetry should be more problematic when a firm's cash flows and investment opportunities are more difficult to assess. Information asymmetry may be related to whether a corporation is seen as a *growth* or a *value* company. Because managerial decisions are more complex in growth corporation, information asymmetry is more likely to occur in these types of firms. The deductible and the policy limit should therefore be larger for growth firms. I measure $Growth$ as the ratio of the market value of equity to its book value.

6- Taxes

The convexity of the tax schedule is the sixth argument in favour or risk management. Corporations that want to reduce their expected tax liability will want to smooth earnings when the tax schedule is convex. Moreover, the more convex the tax schedule the more important the smoothing of earnings is and the more important risk management becomes. This factor should have no

impact whatsoever on the demand to D&O insurance (see Core, 1997); as a result I do not include it in the analysis.

3.2 Corporate habits

An individual's habit is an organization's inertia. In both cases, the economic agent is unwilling (or unable) to change ex post what he decided to do ex ante.

3.2.1 Individual habits

For individuals, habits play a very important role. Smoking may have more to do with habit than a clear and calculated decision to light up. The medical profession recognizes the importance of habit in smoking so that it suggests to those who want to quit smoking to avoid places and circumstances they associate with smoking (bar, parties) until they no longer associate the place or the circumstance with their habit. Even buckling one's seat belt in an automobile has become a habit for many, even if it is only to drive around the block.

Habit is also an important part of political life. Shachar (2002) argues that one of the most important determinants of a voter's decision in the voting booth is for whom he voted in the previous election (see also Zuckerman, 1990). Habits are harder to change when individuals are set in them for a long time. For example Shachar shows that older voters are less likely to change the party they voted for than younger voters.

Economists are recognizing more and more the importance of habit formation in consumption. For example, although it is generally accepted that the consumer price index overstates increases in the real cost of living[6] because it assumes that agents do not change their consumption habit when prices fluctuate, for the elderly, however, the CPI overstates increases less. This is known as the substitution effect in the CPI-basket. One reason why the CPI overstates inflation less for the elderly is that they are less likely to alter their behavior than younger individuals. In other words, older individuals are more likely to keep their habits. Given that the substitution effect accounts for more than 40% of the overstatement, it is argued that the elderly have more to lose following a restatement of the CPI.

In the finance literature, Campbell and Cochrane (1999) present a model of habit formation to explain the equity premium puzzle. The Campbell and Cochrane argument relies on the fact that in periods of low consumption growth the marginal utility of consumers is very volatile so that they require a higher premium to invest in risky assets. Although Campbell and Cochrane assume a constant risk free rate to achieve their result, their model predicts relatively well the observed risk premium. Wachter (2002) relaxes the constant risk free rate assumption. Her contention is that

[6] The 1996 Boskin commission in the United States (see the Advisory Commission to the U.S. Senate, 1996) argued that the consumer price index overstates the real inflation by approximately 1.1%. See also Crawford (1998), Shapiro and Wilcox (1996), Cunningham (1996) and Hoffmann (1998).

past consumption growth is a good (negative) predictor of short-term interest rates. The reason is that agents finance their habits through short-term borrowing when past consumption growth has been low. As consumption growth is low, agents borrow more, which drives short-term interest rates up.

In each of these approaches it is always assumed, implicitly if not explicitly, that it is very costly for some individuals to move away from their habit. Although the habit is different in each setting (smoking in the case of addicts, personal consumption in the case of the elderly, party affiliation in the case of voters and aggregate consumption in the case of financiers), the gist of the argument is the same: Changing one's habit is difficult and costly.

3.2.2 Corporate inertia

Corporations may also be plagued with habits or organizational inertia. Inertia may play important roles in risk management decisions (and general management decision for that matter) and in corporate governance for two reasons.

First, managers may have taken an optimal decision in the past and wait a few years before amending it. As the outcome of a strategic decision may take a few years to pan out, it may appear that habits are important when in fact there is a clear decision to delay evaluating the past decision. Boyer and Robert (2003) follow this discourse in examining inertia in organizations. They assert that inertia in an organization is necessarily the result of asymmetric information. Following Rumelt (1995) who argues that it is the future promise of managerial inertia ex post that provides the incentives for change ex ante, Boyer and Robert build a model where a firm's strategic positioning on a market depends on the equilibrium between the ex ante gains associated with the commitment to a production process (the organization's inertia) and the ex post gains of flexibility in the production process chosen ex ante (see also Boyer and Moreaux, 1997). In other words ex ante efficiency is obtained to the detriment of ex post efficiency, as asserted by Dewatripont and Tirole (1996).

Another possible way to explain managerial habits is to say that managers may fear to look weak if they change their past decision in the future. Changing one's decision is to admit that one has made a mistake. In that exact vein, Prendergast and Stole (1996) develop a model where individuals are unwilling to change their decision even after new information has arrived. The corporate world may not be very kind to managers who admit to have made mistakes. Prendergast and Stole write: "Eventually changing the investment becomes associated with (the manager's) previous errors." Managers may therefore be unwilling to change their decision by fear of reprisal by the firm's stakeholders. Prendergast and Stole attribute this inflexibility of older managers to what is known in the psychology literature as *cognitive dissonance reduction*.

In both cases managers will appear to base their decisions more on what they did in the

past than on perceptions of what will happen in the future. In that sense, habit formation and corporate inertia are important factors in managing corporations and in managing the risk within the corporation.

3.2.3 Measuring inertia and habit

Organizational inertia and individual habits are arguably behavioral measures. As a measure of inertia, I shall use the number of years during which the D&O insurance contract has not changed. As a result, the *Inertia* variable may take values from 1 to 7, depending on the number of years since the corporation had a different deductible or policy limit. My main hypothesis in this paper is that *Inertia* should have a significant negative impact on insurance coverage. If this is the case (and it is, as we shall see), one is led to wonder to what extent risk management processes are determined by organizational inertia and managerial habit.

4 Econometric Approach

4.1 Data Source and Sample

The sample I used is drawn for the population of Canadian manufacturing corporations that does not include financial institutions, utilities or natural resource firms. The original sample of 1519 observations was reduced to 1502 because of incongruities in the financial statements. No survivor bias exists in the data since companies appeared or disappeared during the period under study. Of the final sample's 318 firms, 60% have information for five or more years and 17% no longer existed at the start of 2000.

D&O insurance was purchased by an average of 70% of the firms for any sample year, with a peak of 74% in 1998 and a through of 67% in 1993. For comparison, Tillinghast-Towers Perrin (1999) reports that 84 % of Canadian corporations purchased D&O insurance in 1998. In the United States, 92% or firms purchased D&O insurance in 1998.

By law (see the statutes of the Ontario Securities Commission), basic information regarding D&O coverage is available from the management proxies and information circular, along with details related to managerial compensation and board composition. 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). Financial data was obtained from three different sources, depending on the company: Compustat, Stock Guide and CanCorp Financial. I obtained stock prices and returns form the TSE-Western tapes.

4.2 Dependent Variables

I use three different dependent variables. First, I have a dichotomous variable to see whether D&O insurance was purchased or not. Of the 1502 observations, 1066 report the firm having D&O insurance. Second, I have the policy limit that gives us the maximum possible indemnity paid by the D&O insurance policy for any single event or year. Third, I have information regarding the contract's deductible. This deductible gives us the amount the corporation (or the managers) must pay out-of-pocket before the insurance coverage kicks in.[7] To reduce problems associated with the extreme measures, I used the logarithm of the dollar figure in the analysis.

5 Results

5.1 Basic Statistics

Table 1[8] presents the basic descriptive statistics of my data set before running the regressions. Once lagged variables are included, the number of observations in the data set is reduced from 1502 to 1158. Table 2 presents the descriptive statistics of the remaining observations. Looking only at those corporations that purchased D&O insurance on the open market (820 firms), Table 3 presents their descriptive statistics and highlights the statistical differences between the corporations that carry D&O insurance and the corporations that do not.

Based on this table one could think that there are indeed differences between corporations that purchase D&O insurance and corporations that do not. For instance, it appears that corporations that purchase D&O insurance are larger, more growth oriented, more likely to be cross-listed on an U.S. stock exchange, more likely to have acquired a new business unit and have more corporate insiders on the board.

5.2 D&O Purchase

Before exploring what affects the limit and the deductible of the policy, it is essential to determine D&O insurance purchases. An interesting characteristic of my sample regarding the D&O insurance is that firms that purchase D&O insurance do so for all the years, and firm that do not purchase D&O insurance never do. This means that there is no way to explain why some corporation purchase D&O insurance and other don't based on differences in the explanatory variables. In fact, by using a simple fixed effect model, I am able to completely separate the data according to D&O insurance purchases. As a result, all the variability of the model is explained using only firm fixed effects.

[7] I used the highest of the individual or corporate deductible as my deductible measure. In some instances the firm did not specify whether there was any deductible even though they had purchased D&O insurance. In that case I set the deductible to equal 10,000 dollars, the lowest amount in the data set. Results are sensibly the same if we set it to zero or omit the observation altogether.

[8] All tables are in the appendix.

The decision to manage board liability risk therefore appears to be more based on unobservable characteristics of the firms that do not change over time. This lends support, albeit unconvincing, to my inertia hypothesis in the determination of D&O insurance coverage. One can imagine that managers that never had D&O insurance coverage do not request it because they do not see its use; and managers that have had it cannot think why they would get rid of it.

How can we explain this dichotomy that does not appear to be related to the corporation's financial or governance structure? One possible explanation relies on the *claim made and reported (CMR)* structure of D&O insurance contracts. CMR contracts (see Doherty, 1991, for more details) act as a lobster trap in the sense that corporations who purchase it one year can never realistically get rid of it in the future. By their structure, CMR contracts act as a organizational inertia tool in the sense that firms have a difficult time dropping the insurance coverage altogether in the future.

Even if the CMR contract structure explains why corporations never get rid of their D&O insurance contract, it does not explain why some firms never purchase it. This observation is better explained by considering that some CEOs, like Warren Buffet of Berkshire-Hattaway, do not see the utility of protecting corporate directors because it reduces their incentives to work hard. As a result, the firm may never purchase D&O insurance only because the CEO does not want to. In both cases, the habit of managers in not purchasing the contract (or the CEO's beliefs) and the inherent inertia associated with CMR contracts seem to play an important role in the purchase for D&O insurance.

5.3 Policy Limits and Deductible

Although the previous section's results support the idea that market conditions have no impact on a corporation's decision to purchase D&O insurance or not, these conditions may have an impact on the contract's specifications such as the policy limit and the deductible. The current section of the paper is devoted to the analysis of the limit and of the deductible.

The two set of results I present in Table 4 (Model 4.1 does not include the *Inertia* variable whereas Model 4.2 does) assume that the deductible and the policy limit choices are made independently of each other. Even if this is not the case because policy limits and deductibles are, presumably, negotiated simultaneously, the OLS results using firm and year fixed effects are striking.[9]

In the first column of Model 4.1 I present the empirical model to explain Canadian corporations' policy limit purchases. It appears that none of theories presented in Section 3 of the paper are able to explain D&O insurance policy limit purchases. Although the size of the corporation as measured by the log value of assets has almost significant impact on the policy limit, the impact

[9] More sophisticated econometric techniques presented in the Robustness section of the paper do not provide much different results.

is the opposite of what was expected according to the financial distress cost hypothesis. No other variable has any significant impact on the policy limit.

On the deductible side of Model 4.1, two variables appear to have a significant impact: $Volatility$ and $USListed$. Corporations whose stock is more volatile and corporations that are listed on a U.S. stock market purchase D&O insurance policies that have larger deductibles. In the case of $Volatility$, the impact is opposite to what was expected according to the financial distress cost hypothesis. For $USListed$, the impact is positive, as hypothesized, so that the real service hypothesis appear to be supported. No other hypothesis is supported, however.

In Model 4.2 I include my measure of corporate inertia to the OLS regression. According to the corporate inertia hypothesis, the greater the $Inertia$, the smaller should be the policy limit and the deductible because they did not keep pace with the corporation's growth. In Model 4.2 regression results, the $Inertia$ measure reduces significantly both the policy limit and the deductible, as hypothesized. Corporate inertia therefore appears to be an important determinant of D&O insurance purchases. By adding $Inertia$ to the policy limit regression, the compensation and the asset variables become significant. In the first case, this is evidence in support of the risk aversion hypothesis. It appears that the greater the compensation of board members, the lower the protection (in terms of policy limit) that is needed. In effect, directors may require more compensation if they are not protected properly. With respect to the $Ln\,(Assets)$ variable, the positive impact on the policy limit is contrary to the predictions of the financial distress hypothesis. No other variable has any significant impact on the policy limit. In the case of the deductible, the results do not change compared to those of Model 4.1 as only the $Volatility$ and the $USListed$ variables are significant, and only $USListed$ has the expected sign.

The different hypotheses put forth in the finance and risk management literature to explain the amount of insurance purchased or the amount invested in risk management processes do not find much support in my analysis, except for the real service offered by insurers ($USlisted$). $Inertia$ and $USlisted$ are the only variables whose impact are significant and of the predicted sign.

The results presented in Table 4 are obtained using an OLS approach. This may not be the most suitable methodology if, for example, the policy limit and the deductible are chosen simultaneously. In the next section of the paper I conduct robustness checks to test whether the OLS analysis biases the results in any way; as will be evident, the OLS results are quite robust.

5.4 Robustness

I want to test the robustness of my results in three ways. First, I control for issues that may arise if the policy limit and the deductible are chosen simultaneously using the two-step approach shown in Woolridge (2002). Second, for each year I run a cross section regression similar to that of Model 3.1, but including a sector fixed effect instead of a firm fixed effect. This was the methodology used

by Core (1997) for his unique sample year. Third, instead of using a fixed effect approach, I use a first difference approach so that my dependent variables become the one-year difference in policy limit and deductible.

5.4.1 Simultaneous equations

Using a two-step approach (see Woolridge, 2002) I present in Table 5 the results when the deductible and the policy limit are assumed to be chosen simultaneously. Given the results of the OLS analysis presented in Table 4, the instrument I used for the policy limit is the log value of assets whereas the instrument for deductible is the stock return volatility. The structural equations (the results of the reduced form regressions are not presented) for the regression presented in Table 5 are

$$Limit_{i,t} = X_{i,t}^{Limit} + LnAssets_{i,t} + \widehat{Deductible}_{i,t} + d_t + d_i + \eta_{i,t}$$

and

$$Deductible_{i,t} = X_{i,t}^{Deduct} + Volatility_{i,t-1} + \widehat{Limit}_{i,t} + d_t + d_i + \xi_{i,t}$$

where X^k is the matrix of independent variables that explains dependent variable, where $k = \{Limit, Deductible\}$, d_t is the dummy variable for the years (the year fixed effect) and d_i is the dummy variable for the corporations (the firm fixed effect). Variables that have a$\widehat{\ }$are the predicted value of the dependent variables obtained from the reduced form regressions.

The results presented in Model 5.1, without the use of the *Inertia* variable, are sensibly the same as those of Model 4.1, with the difference that ownership concentration, as measured by the *Herfindahl* of block ownership, now has a negative impact on the deductible. The impact of all the other variables is the same as that presented in Model 4.1.

In Model 5.2, when the *Inertia* variable is included in the regression, the results are the same when looking at the determinant of the policy limit as those presented in Model 4.2. With respect to the deductible, however, the results are slightly different. For example, it seems that ownership concentration as measured by the Herfindahl index is significant. The negative impact of the *Herfindahl* variable on the deductible supports the risk aversion hypothesis. Corporations whose stock ownership is more concentrated will opt for more insurance coverage because the owners may not have a well-diversified stock portfolio. The *Inertia* variable is no longer significant in explaining the deductible once the possible simultaneous choice of the policy limit and of the deductible are taken into account. Interestingly, neither predicted dependent variable has any significant impact on the other dependent variable, which may raise doubts about the need to use a two-step approach.

5.4.2 Cross-Sections

Tables 6 and 7 present the OLS regressions for each sample year using the policy limit and the deductible, respectively, as the dependent variable. As is apparent in both tables, the only de-

terminant that consistently has a significant impact on either dependent variable is that of the *Inertia* variable on the policy limit (Table 6). No other variable has a significant impact on either dependent variable for every year. Interestingly, in Table 6, the coefficient for the *Inertia* variable changes radically in 1996 as its value drops by almost 50% from 0.311 to 0.150. At the same time, the size of the log of the book value of asset coefficient doubles from 0.373 to 0.772. In Table 7, the same radical shift occurs when one looks at the *Inertia* variable's impact on the deductible. Prior to 1996, *Inertia* had a significant and negative impact on the deductible, but not after 1996. One must the wonder whether there was a structural shift in the D&O insurance market in 1996.

In 1995, in the United States Congress passed a new securities law that would take effect in 1996. One of the goals of the Private Securities Litigation Reform Act (PSLRA) of 1995 was to encourage institutional investors to become more involved in the prosecution of securities' lawsuits. A direct impact was an increase in the size of the settlements, which means that larger corporations were more at risk of losing a lot of money. As a result, corporations with important activities in the United States had to change their insurance policies. This impact of the new U.S. legislation is quite evident in the Table 6. In 1997, we observe a sizable increase of the policy limit for Canadian corporations listed on an American stock exchange, as the $USListed$ variable is significant for that year only.

Another goal of PSLRA was to make it easier for judges to dismiss securities fraud class action lawsuits. This had the unanticipated result that plaintiffs sued for greater amount because plaintiffs, who saw an increase in the probability that their case was going to be dismissed, began to claim for higher damages in order to keep the same level of revenue as before the Reform Act of 1995. That is a perfect recipe for an increase demand for insurance. An agent whose loss occurs with greater severity but lower frequency will always be more likely to purchase insurance that an agent whose loss occurs with lower severity but greater frequency, even if the expected loss is the same for the two agents.

Overall, the *organizational inertia* hypothesis presented in section 3.2 of this paper seems to find robust support when looking at cross-sectional regressions. The evidence presented in Tables 6 and 7 is quite clear to that effect: *Inertia* has a significant negative impact on the policy limit for every sample year and on the deductible for the two years prior to the enactment of the PSLRA.

5.4.3 One-Year Variation

The last robustness check I conduct is to look at one-year variations instead of fixed effects. The dependent variables are now defined as year $t's$ policy limit (respectively deductible) minus year $t-1's$ policy limit (respectively deductible). The dependent variables are now called $DifLimit$ and $DifDeduct$. The basic results do not change much: The OLS regression results presented in Model 8.1 for the policy limit and in Model 8.2 for the deductible show no sign that the results

presented previously are not robust.

In both regressions the *Inertia* variable is negative and significant at the one percent level, indicating that changes in the insurance policy are less pronounced the longer the policy has been in place. This is consistent with the view that old habits are hard to change so that a board whose D&O insurance policy has not changed for five years will not see the need to change it now. On the other hand, a board that has changed its policy recently may wonder if last year's decision was the best so that it may consider altering the contract this year again. In any case, the organizational inertia hypothesis appears to be supported by the empirical results presented in Table 8.

6 Conclusion

The goal of this paper was to further our understanding of the corporate demand for insurance. To do so I 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 analyze what influences the purchase by a corporation of insurance on behalf of its corporate managers. Moreover, I determined how the policy limit and the deductible are chosen.

My conclusion is straightforward: D&O insurance purchases are strongly determined by to corporate habit and/or organizational inertia.

After controlling for time and firm fixed effects, few firm specific factors seem to be able to explain the amount of insurance purchased other than the variable used to measure organizational inertia. In fact, aside from the real service hypothesis, no corporate risk management theory appears to find validation in my analysis. For example, a firm's distress costs and financial structure do not appear to play any significant role. Even corporate governance, which Tufano (1996) found to be an important determinant, plays no role. Moreover, and in contrast to Core (1997, 2000) and Chalmers et al. (2002), I find no evidence of managerial opportunism.

The only factor that consistently appears to be significant in determining the amount of D&O insurance coverage purchased is my measure of managerial habit and/or organizational inertia. This prompts the question: How influential is corporate inertia in determining corporate risk management strategy? Dewatripont and Tirole (1996), Prendergast and Stole (1996) and Boyer and Robert (2003) present theoretical models where corporate inertia plays an important role. Using a proprietary database of U.S. public corporations, Kaltchev (2003) also finds that inertia play an important role in the structure of D&O insurance policies.

What do the results say about risk management and insurance practices within corporations? What is the implication of such practices when studying risk management strategies? If risk management practices are more due to habit than to a clear and concise strategy in managing the

risk faced by a corporation, then one has to wonder if managing idiosyncratic risk does not in fact waste valuable corporate resources. This argument has been used previously in the literature in trying to justify that stockholders are better equipped to manage idiosyncratic risk by diversifying their portfolio. On that point, Guay and Kothari (2003) show that non-financial firms have little use for derivative contracts, so that firms do not appear to manage idiosyncratic risk much.

Another possible explanation is that managers do not care about the cost of D&O insurance because the cost is borne by others. Basic microeconomic theory tells us that demand for a good is much larger than the equilibrium demand when the price is kept artificially below market. In the case of insurance in general and of D&O insurance in particular, moral hazard then leads to over-consumption of the insured product.

It therefore appears that the demand for directors' and officers' insurance may not be completely due to a rational planning on the part of the management team. This begs the question: What happens to other types of risk that may require management? If there is no explicit decision making in the management of corporate board risk - a risk that affects board members more directly than any other risk in the corporation - one has to wonder whether other types of risk are managed similarly. If that is the case, then surely corporations do not maximize their value when they engage in risk management.

7 References

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8 Appendix: Tables

Table 1.

Descriptive statistics for the initial 1502 observations.

Variable	N	Mean	Standard Deviation	Min	Max
Insured	1502	0.700	0.454	0	1
Log(Limit)	1066	16.52	1.005	13.82	19.24
Log(Deductible)	936	11.49	1.275	9.210	17.03
Log(MVE/1MM)	1476	5.049	1.863	0.236	16.26
Log(Assets/1MM)	1502	5.292	1.752	0.104	11.00
Volatility	1422	0.512	0.321	0.082	2.496
Growth	1476	8.995	120.9	-58.74	2980
Debt	1476	0.407	0.231	0.004	0.984
Bankruptcy	1411	-6.830	7.765	-165.0	-0.186
ROA	1502	0.018	0.150	-0.994	1.994
US Listed	1502	0.113	0.317	0	1
Outsiders	1502	0.621	0.169	0	1
Insiders	1502	0.297	0.144	0	0.857
NumBoard	1502	8.740	2.966	3	17
Herfindahl	1447	0.211	0.222	0	0.984

Some variables are not included in this table (Acquiror, Divestor, Compensation) because they rely on lagged values.

Table 2.

Descriptive statistics for the 1158 observations including lagged variables.

Variable	N	Mean	Standard Deviation	Min	Max
Insured	1158	0.723	0.448	0	1
Log(Limit)	837	16.60	0.991	13.82	19.24
Log(Deductible)	737	11.53	1.302	9.210	17.03
Log(MVE/1MM)	1149	5.133	1.885	0.236	16.26
Log(Assets/1MM)	1158	5.419	1.751	0.105	11.00
Volatility	1119	0.507	0.302	0.082	2.382
Growth	1149	9.389	129.2	-58.74	2981
Debt	1149	0.415	0.231	0.004	0.973
Bankruptcy	1112	-6.558	6.350	-96.55	-0.203
ROA	1158	0.018	0.152	-0.985	1.994
US Listed	1158	0.133	0.340	0	1
Outsiders	1158	0.623	0.171	0	1
Insiders	1158	0.293	0.144	0	0.857
NumBoard	1158	8.792	2.955	3	17
Compensation	1158	-0.010	0.103	-0.602	1.000
Herfindahl	1113	0.211	0.224	0	0.984
Acquiror	1158	1.807	2.732	0	10.32
Divestor	1158	0.242	1.069	0	9.266

None of the means in Table 1B are statistically different from the means in Table 1A

Table 3.

Descriptive statistics for the 837 observations where D&O insurance was purchased on the open market.

Variable	N	Mean	Standard Deviation	Min	Max
Log(MVE/1MM)	828	5.217*	1.858	1.018	16.26
Log(Assets/1MM)	837	5.438*	1.650	2.110	11.00
Volatility	801	0.501	0.284	0.082	2.094
Growth	828	12.22	152.1	-58.74	2981
Debt	828	0.403	0.235	0.004	0.973
Bankruptcy	794	-6.572	6.396	-96.55	-0.603
ROA	837	0.016	0.141	-0.865	0.519
US Listed	837	0.148*	0.355	0	1
Outsiders	837	0.631	0.162	0	1
Insiders	837	0.297*	0.143	0	0.857
NumBoard	837	8.748	2.834	3	17
Compensation	837	-0.010	0.110	-0.587	1.000
Herfindahl	805	0.203	0.222	0	0.96
Acquiror	837	1.914*	2.772	0	10.32
Divestor	837	0.244	1.063	0	8.103

* are variables whose mean between firms that purchased D&O insurance and firms that did not purchase D&O insurance is statistically different at the 5 % level. In each case the mean for corporations that do not carry D&O insurance was statistically smaller than the mean for corporation that do.

Table 4.
The Determinants of Policy Limit and Deductible Amounts
Ordinary Least Square Regressions with Firm and Year Fixed Effects

Variable	Model 4.1 No measure of inertia		Model 4.2 With organizational inertia	
	Limit	Deductible	Limit	Deductible
Ln(MVE)	0.026 (0.065)	0.081 (0.108)	-0.004 (0.056)	0.070 (0.108)
Ln(Assets)	0.167 (0.086)	-0.148 (0.142)	0.148* (0.073)	-0.155 (0.141)
Volatility	0.055 (0.070)	0.230* (0.116)	0.063 (0.060)	0.233* (0.115)
Growth /1000	-0.196 (0.252)	-0.040 (0.418)	0.019 (0.217)	0.036 (0.417)
Debt	-0.071 (0.275)	0.649 (0.456)	-0.064 (0.236)	0.641 (0.453)
Bankruptcy	-0.002 (0.003)	-0.009 (0.005)	0.001 (0.002)	-0.008 (0.005)
ROA	-0.112 (0.152)	0.023 (0.253)	-0.014 (0.131)	0.057 (0.252)
US Listed	0.095 (0.063)	0.374** (0.104)	0.052 (0.054)	0.358** (0.104)
Outsiders	-0.047 (0.158)	-0.032 (0.261)	0.100 (0.135)	-0.013 (0.260)
NumBoard	0.006 (0.015)	0.041 (0.025)	-0.002 (0.013)	0.038 (0.025)
Compensation	-0.813 (0.513)	-0.101 (0.851)	-1.495** (0.443)	-0.340 (0.852)
Herfindahl	-0.088 (0.210)	-0.638 (0.349)	-0.118 (0.181)	-0.648 (0.348)
Acquiror	0.002 (0.006)	0.002 (0.010)	-0.004 (0.005)	-0.000 (0.010)
Divestor	0.016 (0.014)	-0.005 (0.023)	0.014 (0.012)	-0.006 (0.023)
Inertia			-0.162** (0.012)	-0.057* (0.023)
FIRM F.E.	YES	YES	YES	YES
TIME F.E.	YES	YES	YES	YES
R^2	0.941	0.922	0.957	0.923

In Model 4.1, neither OLS regressions (for the log of the policy limit and for the log of the deductible) include a measure of corporate inertia. Model 4.2 includes such a measure. Inertia is a count variable that specifies how long the D&O insurance contract has not changed. All regressions include year and firm fixed effets. Coefficients with a * are significant at the 5 % level; ** at the 1 % level. Standard errors are in parentheses. The number of observations used in all the model specifications is 735

Table 5.
The Determinants of Policy Limit and Deductible Amounts
Structural Equation with Firm and Year Fixed Effects

Variable	Model 5.1 No measure of inertia		Model 5.2 With organizational inertia	
	Limit	Deductible	Limit	Deductible
Ln(MVE)	0.007 (0.068)	0.104 (0.127)	-0.023 (0.057)	0.066 (0.105)
Ln(Assets)	0.202* (0.094)	N/A	0.190* (0.082)	N/A
Volatility	N/A	0.278* (0.127)	N/A	0.299* (0.133)
Growth /1000	-0.187 (0.252)	-0.214 (0.472)	0.009 (0.217)	0.055 (0.415)
Debt	-0.225 (0.333)	0.585 (0.411)	-0.241 (0.286)	0.583 (0.408)
Bankruptcy	0.000 (0.003)	-0.011 (0.005)	0.003 (0.003)	-0.007 (0.005)
ROA	-0.118 (0.152)	-0.076 (0.269)	-0.030 (0.131)	0.042 (0.252)
US Listed	0.006 (0.133)	0.457** (0.143)	-0.045 (0.110)	0.413** (0.123)
Outsiders	0.054 (0.158)	-0.010 (0.262)	0.104 (0.135)	0.092 (0.271)
NumBoard	-0.004 (0.019)	0.046 (0.027)	-0.012 (0.016)	0.036 (0.025)
Compensation	0.790 (0.515)	-0.823 (1.105)	-1.403** (0.457)	-1.909 (1.677)
Herfindahl	0.064 (0.286)	-0.715* (0.358)	0.057 (0.246)	-0.773* (0.366)
Acquiror	0.001 (0.006)	0.004 (0.010)	-0.004 (0.005)	-0.004 (0.010)
Divestor	0.017 (0.013)	0.009 (0.026)	0.016 (0.012)	0.009 (0.025)
Inertia			-0.147** (0.019)	-0.227 (0.157)
Deductible (Predicted)	0.237 (0.304)		0.271 (0.258)	
Limit (Predicted)		-0.886 (0.847)		-1.049 (0.954)
FIRM F.E.	YES	YES	YES	YES
TIME F.E.	YES	YES	YES	YES
R^2	0.941	0.922	0.957	0.923

In Model 5.1, neither structural regressions (for the log of the policy limit and for the log of the deductible) in the two-step procedure include a measure of corporate inertia. Model 5.2 includes such a measure. Inertia is a count variable that specifies how long the D&O insurance contract has not changed. All regressions include year and firm fixed effets. Coefficients with a * are significant at the 5 % level; ** at the 1 % level. Standard errors are in parentheses. The number of observations used in all the model specifications is 735

Table 6.
The Determinants of D&O Insurance Purchases: Year by Year Regression
Dependant Variable is the log of the Policy Limit.

Variable	1994	1995	1996	1997	1998
Ln(MVE)	0.021	-0.051	-0.429	-0.687**	-0.475*
	(0.260)	(0.236)	(0.224)	(0.238)	(0.214)
Ln(Assets)	0.359	0.373	0.772**	1.115**	0.866**
	(0.272)	(0.247)	(0.237)	(0.252)	(0.223)
Volatility	-0.119	-0.435	-0.368	0.037	-0.538*
	(0.338)	(0.371)	(0.281)	(0.281)	(0.258)
Growth /1000	-1.004	-0.131	0.163	0.560	12.46
	(0.780)	(0.583)	(0.478)	(0.436)	(9.299)
Debt	0.176	0.346	-1.696	-2.505**	-1.814
	(1.153)	(1.121)	(0.961)	(0.952)	(0.929)
Bankruptcy	-0.010	-0.020	0.016	0.008	0.027
	(0.018)	(0.023)	(0.014)	(0.007)	(0.025)
ROA	-1.492*	0.080	-0.305	0.586	0.143
	(0.737)	(0.655)	(0.482)	(0.493)	(0.459)
US Listed	0.133	0.364	0.286	0.475**	0.200
	(0.306)	(0.279)	(0.173)	(0.162)	(0.162)
Outsiders	0.629	-0.101	-0.061	0.509	0.465
	(0.450)	(0.395)	(0.385)	(0.421)	(0.401)
NumBoard	-0.011	0.008	0.001	-0.022	0.004
	(0.032)	(0.033)	(0.027)	(0.033)	(0.035)
Compensation	0.821	0.026	0.777	-0.087	-0.478
	(0.798)	(0.792)	(0.656)	(0.604)	(0.632)
Herfindahl	0.220	0.138	0.484	0.261	0.085
	(0.322)	(0.293)	(0.273)	(0.271)	(0.297)
Acquiror	-0.010	-0.015	0.023	-0.033	-0.030
	(0.025)	(0.028)	(0.024)	(0.024)	(0.023)
Divestor	0.044	0.135	0.060	-0.010	0.210**
	(0.057)	(0.083)	(0.045)	(0.071)	(0.072)
Inertia	-0.466**	-0.311**	-0.150**	-0.200**	-0.145**
	(0.125)	(0.080)	(0.054)	(0.048)	(0.040)
Sector F.E.	YES	YES	YES	YES	YES
R^2	0.612	0.566	0.562	0.593	0.582
Obs	116	146	155	160	153

Each regression is an OLS regression with the log of the policy limit as the dependent variable. A regression is ran for each year of the sample. Every model specification uses the measure of Inertia which is a count variable that specifies how long the D&O insurance contract has not changed. All regressions include a sector fixed effet. Coefficients with a * are significant at the 5 % level; ** at the 1 % level. Standard errors are in parentheses. The number of observations used in each regression varies depending on how many firms are in existence each year.

Table 7

The Determinants of D&O Insurance Purchases: Year by Year Regression
Dependant Variable is the log of the Deductible.

Variable	1994	1995	1996	1997	1998
Ln(MVE)	-0.189	-0.099	0.297	0.290	-0.144
	(0.407)	(0.360)	(0.379)	(0.387)	(0.391)
Ln(Assets)	0.845*	0.610	0.261	0.136	0.536
	(0.424)	(0.376)	(0.402)	(0.410)	(0.406)
Volatility	1.179*	0.951	1.309**	1.084*	0.264
	(0.529)	(0.566)	(0.475)	(0.457)	(0.470)
Growth /1000	0.664	0.397	-0.727	-0.569	-17.22
	(1.218)	(0.889)	(0.810)	(0.709)	(16.93)
Debt	-1.035	-1.015	0.996	0.696	-0.724
	(1.802)	(1.710)	(1.627)	(1.547)	(1.693)
Bankruptcy	-0.022	-0.040	-0.018	-0.028*	-0.010
	(0.028)	(0.035)	(0.024)	(0.012)	(0.046)
ROA	0.362	-1.987*	0.523	-0.894	-0.552
	(1.153)	(0.999)	(0.816)	(0.802)	(0.837)
US Listed	-0.104	0.865*	0.496	0.466	0.070
	(0.478)	(0.426)	(0.293)	(0.263)	(0.295)
Outsiders	0.494	0.250	-0.065	-0.160	-0.187
	(0.703)	(0.602)	(0.652)	(0.684)	(0.731)
NumBoard	-0.043	-0.023	-0.042	0.075	0.053
	(0.050)	(0.050)	(0.047)	(0.054)	(0.063)
Compensation	-0.092	-1.236	0.203	0.529	-0.626
	(0.125)	(1.208)	(1.111)	(0.982)	(1.153)
Herfindahl	0.167	0.272	0.642	0.836	0.195
	(0.503)	(0.446)	(0.463)	(0.440)	(0.541)
Acquiror	-0.041	-0.124	-0.068	-0.041	-0.019
	(0.039)	(0.042)	(0.041)	(0.039)	(0.042)
Divestor	-0.026	0.045	0.092	0.002	0.253
	(0.089)	(0.127)	(0.076)	(0.116)	(0.131)
Inertia	-0.431*	-0.455**	-0.090	0.046	-0.113
	(0.196)	(0.122)	(0.092)	(0.078)	(0.073)
Sector F.E.	YES	YES	YES	YES	YES
R^2	0.560	0.527	0.445	0.420	0.350
Obs	116	146	155	161	153

Each regression is an OLS regression with the log of the deductible as the dependent variable. A regression is ran for each year of the sample. Every model specification uses the measure of Inertia which is a count variable that specifies how long the D&O insurance contract has not changed. All regressions include a sector fixed effet. Coefficients with a * are significant at the 5 % level; ** at the 1 % level. Standard errors are in parentheses. The number of observations used in each regression varies depending on how many firms are in existence each year.

Table 8.
The Determinants of Changes in the Policy Limit and in the Deductible Amounts
Ordinary Least Square Regressions with Year Fixed Effects.

Variable	Model 8.1 Change in Policy Limit	Model 8.2 Change in Deductible
Ln(MVE)	-0.015 (0.044)	0.078 (0.065)
Ln(Assets)	0.001 (0.046)	-0.068 (0.069)
Volatility	-0.066 (0.057)	0.056 (0.085)
Growth/1000	0.075 (0.109)	-0.114 (0.161)
Debt	-0.081 (0.185)	0.292 (0.275)
Bankruptcy	-0.002 (0.002)	-0.004 (0.004)
ROA	-0.040 (0.103)	0.360* (0.152)
US Listed	-0.091* (0.039)	-0.017 (0.057)
Outsiders	-0.147 (0.124)	0.024 (0.184)
NumBoard	-0.002 (0.006)	-0.011 (0.009)
Compensation	0.029 (0.112)	0.019 (0.166)
Herfindahl	-0.025 (0.058)	-0.048 (0.085)
Acquiror	0.011* (0.005)	-0.012 (0.007)
Divestor	-0.001 (0.012)	0.004 (0.018)
Longterm	-0.097** (0.011)	-0.061** (0.016)
FIRM Fixed Effect	No	No
TIME Fixed Effect	Included	Included
R^2	0.133	0.047

OLS regressions for the chang in the log of the policy limit and of the log of the deductible. The regressions do not include a firm fixed effect, but they include a year fixed effect. Coefficients with a * are significant at the 5 % level; ** at the 1 % level. Standard errors are in parentheses. The number of observations used in both regressions is 735.