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"Accounting and Litigation Risk"

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Abstract

Litigation risk has been hypothesized to affect managerial behavior in a number of ways. An understanding of the determinants of litigation risk is a necessary first step to analyzing managerial behavior. We examine the determinants of an *ex-ante* measure of litigation risk, namely, Directors and Officers (D&O) liability insurance premium. We find that accounting risk is priced by D&O insurers. There is only limited evidence of traditional corporate governance measures getting priced. We also find some support that certain provisions of the Private Securities Litigation Reform Act, 1995 created specific litigation risk. Additionally, we present evidence that pricing for D&O premiums is lower for companies which adopted limited liability provisions to limit directors' exposure to litigation risk. Thus, adoption of these provisions can be a useful tool to reduce litigation risk. Finally, we find that the historical rise in insurance premium from 2001 to 2002 is associated with an increase in concerns about accounting quality.

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I. Introduction

A company facing litigation experiences a significant drop in value. Bhagat et al. (1998) present large sample evidence that, on the date a lawsuit is filed, regardless of the merits of the case, corporate defendants lose nearly one percent of their value. For any filing pertaining to violation of securities laws, the losses are much higher with companies losing about 2.73% of their value, on average, at the filing date. Prior research has shown that concerns about litigation risk can change managerial behavior. For example, Skinner (1997) shows that companies voluntarily disclose news early to reduce the size of settlements from potential lawsuits. Johnson et al. (2001), in another paper, show that legislation limiting the legal liability exposure for disclosures made by high technology firms encouraged those companies to disclose more. Brown et al. (2005) study the effect of litigation risk on management earnings forecasts and find that litigation risk is positively associated with the likelihood of issuing a forecast for both good- and bad-news firms. Cao and Narayanamoorthy (2006) show that, in the presence of litigation risk, managers are more likely to disclose bad news.

Most studies analyzing managerial behavior in the face of litigation risk attempt to arrive at an *ex-ante* measure of litigation risk by estimating a first-stage regression of *ex-post* federal lawsuits on possible litigation risk determinants. Understanding the determinants of litigation risk is, thus, a necessary first step to analyzing managerial response to litigation risk. However, the use of *ex-post* lawsuits in the first-stage regression to get an *ex-ante* measure comes with several caveats. High-risk firms that, with their actions, successfully avoided litigations are erroneously treated as low-risk firms. This error can

yield spurious results in the litigation risk prediction model. Additionally, a lawsuit, being a low probability event, necessitates the use of a long estimation period. This is a no-win situation because, the longer the estimation period, the less precise is the estimation, since there have been several structural changes in the litigation environment, especially in the last decade. These structural changes span legislative changes; changes in the performance of the economy; unprecedented corporate scandals; changes in the way judges adjudicate and create precedence; and, changes in shareholder activism. Finally, studies that use actual lawsuits to estimate litigation likelihood ignore lawsuits filed in state courts. This can cause an underestimation of the actual litigation risk of a company. Grundfest and Perino (1997) report an increase in the number of lawsuits emerging in state courts after the passage of the Private Securities Litigation Reform Act, 1995. Most of the precedent-setting decisions regarding shareholder lawsuits have been taken by the judges in the state courts (especially, Delaware).[1] Besides not considering lawsuits in state courts, treating all firms that got sued as equal treats frivolous and serious claims the same, potentially leading to incorrect estimation of the litigation risk model. An example of this effect can be seen in Field et al. (2005), where their preliminary results change when all *ex-post* dismissed claims are removed from their sample.

In this paper, we investigate the determinants of *ex-ante* litigation risk viz. the Directors and Officers' (D&O)[2] Liability Insurance premium. Being an *ex-ante* measure, there are no concerns about *ex-ante* estimation. The choice of this variable, thus, bypasses

[1] Comments of Harvey Pitt, former chairman of the Securities and Exchange Commission, at the Yale Law School (November 2005).
[2]Hereafter referred to as D&O.

problems caused by the dynamic nature of the litigation environment. Finally, D&O insurance premiums, *ex-ante*, should be able to differentiate between frivolous and serious claims.

Accounting irregularities have been alleged and prosecuted in high-profile corporate scandals and bankruptcies such as Enron and WorldCom. Arthur Andersen LLP, one of the elite Big Five auditors has itself declared bankruptcy following the financial reporting scandals. The Tillinghast survey states that inadequate or inaccurate disclosure including financial reporting was responsible for 46.4% of all claims filed against U.S. participants in 2002. This compares with 19.9% in 1990. Given these facts, it is clear that accounting risks are potentially increasingly important determinants of litigation risk.

Prior researchers have tried to find a link between litigation and accounting risks.[3] However, the evidence is, at best, mixed. Lu (2003) finds a significant link between *ex-post* lawsuits and abnormal accruals calculated using an IV method. Using a specialized setting around stock offers, Ducharme et al. (2004) find a link between earnings management and shareholder lawsuits. In contrast, Jones (1998) finds no significant association between litigations risk and discretionary accruals. Lys and Watts (1994) also find no significant association between lawsuits against auditors and financial reporting for a post 1982 period. It is somewhat puzzling that accounting quality has not been

[3] Firms may themselves manage accounting risks depending on perceived litigation risk or the severity of the damages or judgments. This implies that the relation between accounting risks and premiums should be determined using a simultaneous equation system. In our study (like prior research), we have not modeled it as a simultaneous equations system since we did not have appropriate instruments. Additionally, the small sample properties of simultaneous equation system are unknown.

shown to be linked to *ex-ante* litigation risk, given the findings in previous literature that accounting quality metrics exhibit significant associations with cost of capital (Francis, et al., 2004, 2005). This study attempts to fill the gap by examining the relationship between accounting risks and D&O insurance premium, an *ex ante* litigation-risk measure.

Our study is timely, because anecdotally, at least, the Private Securities Litigation Reform Act (PSLRA), passed in the US in 1995, has significantly altered the litigation environment, especially since 1999[4]. Specifically, the new provisions regarding appointment of a lead plaintiff and moving from joint and several liability to proportionate liability appear to have changed the litigation landscape and have bolstered institutional investor activism.

Given the above developments, we include accounting and PSLRA related risks among litigation risk determinants. We find that (lack of) accounting quality variables, measured alternatively by the absolute value of abnormal accruals and the Dechow-Dichev (lack of) earnings quality measure, are priced in the insurance premium. We also find that the presence of institutional blockholders is a proxy for institutional activism in the litigation arena and gets priced in D&O insurance.

There has also been a recent historic increase in insurance premiums[5]. A number of reasons have been hypothesized for this increase, such as increased underwriting

[4] Bailey Cavalieri LLC, D&O Liability in post-Enron era, 2004.

[5] Wall Street Journal, 7/31/2003, *"It Still Costs Big to Insure Against a Boardroom Scandal – Despite the Sarbanes-Oxley Bill, 'D&O' Policy Prices Rise 30%, And Cancellation Clauses Swell"*.

concerns about accounting, new corporate governance initiatives and the events of September 11, 2001. In this study, we find that new concerns about accounting are a factor contributing to the historic increase in premiums from 2001 to 2002.

Finally, monitoring by outside directors is a governance mechanism that can potentially alleviate the agency problem between managers and shareholders. Outsiders would be reluctant to serve on the board due to adverse reputational impacts and nuisance costs arising from shareholder litigations. To attract and retain outside directors, some firms have chosen to pre-commit in the corporate charter to limit outside directors' fiduciary liabilities by adopting the "limited liability provisions" (LLP) (Cao, 2006). We find that the adoption of LLP reduces D&O premiums, and hence, by inference, litigation risk.

This study contributes to the literature by demonstrating that, in addition to factors considered in prior work, accounting plays an increasingly significant role in determining a firm's litigation risk. As discussed earlier, understanding the determinants of litigation risk is necessary to analyzing managerial behavior in the face of litigation risk. Our study also contributes to the legal literature by documenting the changing risks due to new legislation. In addition, the study highlights a specific tool that firms can use, to reduce their litigation risk, namely the adoption of limited liability provisions.

The rest of the paper is organized as follows: Section II describes D&O insurance. Section III develops the hypotheses and Section IV develops the econometric model. Section V discusses the empirical results and Section VI concludes.

II. What is D& O Liability Insurance?

In its 2002 annual executive summary on the state of the D&O insurance market, Tillinghast reports that "approximately 19% of U.S. survey respondents reported one or more claims against their directors or officers over a ten-year experience period." Most companies like to reimburse their directors and senior officers for defense costs and settlements arising from successful claims that target their actions (or inactions) with respect to the company. Besides *ex-post* protecting the directors and officers for decisions they take in good faith, from an *ex-ante* perspective, this policy is useful in attracting talented directors and officers to the company. To cover the monetary costs of the lawsuits, companies typically purchase Directors and Officers Liability Insurance. The insurance provides coverage if a claim is settled with no admission of bad faith by the director or there is no finding of bad faith by the court.

A typical D&O insurance policy combines up to three types of insurance coverage[6]:

A. Personal Coverage, which provides direct payment to directors and officers when a firm is unable or unwilling to indemnify them.[7]

B. Corporate Reimbursement Coverage, which reimburses the company when it indemnifies directors and officers for the costs of defending the lawsuits.

[6] This description of a typical D&O Insurance policy draws heavily on the Tillinghast 2002 D&O survey report and Core (2000).

[7] US law allows indemnification against most claims. However, defense costs in certain shareholder derivative lawsuits where the D&O's are sued on behalf of the firm are not indemnifiable. Additionally firms may be unable to bear the costs due to financial distress.

C. Entity Coverage, available for many years to nonprofits and in recent years to for-profit companies, encompassing at least some claims against the organization directly, including those that name no individual insured.

The annual premium paid by the company for a D&O policy covers claims made in the year of coverage up to the annual policy limit and subject to any deductible / retention. The personal and corporate coverage limits are usually the same. Entity Coverage carries a separate premium and retention. Usually the personal coverage deductible is zero and the corporate coverage portion carries a deductible of two percent of the limit.

There is reason to believe that in the U.S., D&O insurance companies and insureds have symmetric information when structuring a contract.[8] Knepper and Bailey (1998) report that, besides a detailed written application detailing past and future business activities, litigation experience and biographical data on directors and officers, the D&O insurance premium decision is made after the insurer conducts background checks on the directors and officers. If the firm withholds information at this stage, the insurance company can use the omission to deny coverage if there is a claim. These features indicate that the insurer and the insured share similar beliefs about the firm's litigation risk when the premiums are decided. When one of the D&Os intentionally misrepresents a known risk of a suit while applying for the policy, the insurer can refuse coverage to the director or officer who misrepresented. However, per the severability provisions in place, usually,

[8] Core (2000) also suggests for a sample of Canadian firms that application is structured to enable the insurer to obtain full information about the applicant's risk factors at negligible cost.

under U.S. law, the insurer must continue to extend coverage to the innocent directors and officers.

Unlike the 1980s, the current market for D&O insurance is very liquid with several underwriters. The 2002 Tillinghast annual survey identifies five underwriters with at least 8% of the D&O insurance market by premium and ten underwriters with at least 2% of the market. In 2002, Arthur J Gallagher, a leading D&O insurance broker, estimated that there were at least 47 underwriters competing in the marketplace.[9] These statistics point to the insurance pricing being reasonably efficient.

III. Hypotheses Development

Determinants of Insurance Premiums

Despite the clear advantages, due to non-availability of firm-level data, not many studies investigate litigation risk using D&O insurance. Core (2000) is the only study we know that addresses this research question. Core uses data from Canadian firms in 1993 and finds business risk and corporate governance variables to be significantly associated with D&O insurance premium. However, the litigation environment and consequently, the D&O insurance market have undergone significant changes, especially in the United States. Specifically, accounting issues have since appeared at the forefront of litigation concerns. Additionally PSLRA, 1995 has been a major piece of legislation affecting the litigation environment. We first provide reasons for including accounting and PSLRA related risks among litigation risk determinants. Then, for the sake of completeness, we

[9] The buyer's perception of D&O realities and latest trends, speech by Philip Norton, Arthur J Gallagher & Co., Tillinghast Executive Seminar 2004.

discuss the inclusion of business risk and governance risk proxies that are considered as important determinants of D&O insurance premium by the previous literature (e.g., Core, 2000; Chalmers, et al., 2002).

Accounting Risk

Several accounting irregularities have been alleged and prosecuted in the high-profile corporate scandals and bankruptcies like Enron and WorldCom. Arthur Andersen LLP, one of the elite Big Five auditors, has declared bankruptcy following the financial reporting scandals. The Tillinghast survey states that inadequate or inaccurate disclosure including financial reporting was responsible for 46.4% of all claims filed against U.S. participants in 2002. This compares with 19.9% in 1990. Not surprisingly, given the above numbers, the Tillinghast report states that "disclosures of publicly traded companies are an area of increased underwriting concern." Additionally, according to the Tillinghast report, claims pertaining to inadequate or inaccurate disclosure (such claims relate to securities trading decisions that led to financial loss) typically have a higher cost than other claims. In 2002, the settlement value of cases settling between $5 million and $50 million averaged $5.9 million for non-accounting cases, but averaged $12.4 million for accounting cases[10]. And it continues to rise. PriceWaterhouseCoopers reports that the settlement costs rose another 53% in 2003.[11] Bailey (2004) also, in his note[12], states that a larger percentage of the lawsuits focus on allegations of accounting fraud, with revenue recognition issues emerging as significant causes of litigation risk. Early and Kastelic (2004) cite revenue recognition as a common cause of underwriting concern.

[10] PriceWaterhouseCoopers, 2002 Securities Litigation Study.
[11] PriceWaterhouseCoopers, 2003 Securities Litigation Study.
[12] Bailey Cavalieri LLC, D&O Liability in post-Enron era, 2004.

Insurers tend to protect themselves by including an exception clause for intentional misrepresentation. This means that the insurer can deny coverage to the directors and officers who intentionally lied. However, even in these settings, in contrast to other countries, severability provisions usually require that the insurer continue to provide coverage to the other innocent directors and officers of the company. Francis et al. (2004, 2005) show that firms with higher accounting risk have higher implied costs-of-capital and higher realized returns. If accounting risk affects security returns, it is not a stretch to consider whether it affects litigation risk.

Given the above, it appears that a company's perceived accounting quality should be and is a significant *ex-ante* measure of litigation risk. Prior studies have also tried to find a link between litigation and accounting risks. However, the evidence is, at best, mixed. Lu (2003) finds a significant link between *ex-post* lawsuits and abnormal accruals calculated using an IV method. Using a specialized setting around stock offers, Ducharme et al. (2004) find a link between earnings management and shareholder lawsuits. In contrast, Jones (1998) finds no significant association between litigations risk and discretionary accruals. Lys and Watts (1994) also find no significant association between lawsuits against auditors and financial reporting for a post 1982 period.

In the accounting literature, a number of measures have been used to address accounting quality issues. Perhaps the most common technique is to use discretionary accruals as the measure of (lack of) accounting quality. Among the discretionary accrual measures,

perhaps the most common has been the one computed using the modified-Jones model (Dechow, et al., 1995).[13] However, there can be criticism that a one-year abnormal accrual measure is just a proxy for abnormal performance. As such, we also use a time series firm-specific model of earnings quality. The Dechow-Dichev (2002) measure (a measure of mapping of accruals to cash flows) is one such measure that is being increasingly used to proxy for (lack of) earnings quality (Francis et al., 2004, 2005). Specifically, we adopt the absolute value of the modified-Jones abnormal accrual measure (|*dacc*|) and the Dechow-Dichev measure (*sresid*) as proxies for accounting risk.[14] Appendix I discusses the detailed computation of the two measures.

We recognize that disclosure encompasses far more than just accounting. Skinner (1997) finds that more timely voluntary disclosures are associated with lower settlements. However, Field et al. (2005) argue that voluntary disclosures tend to be 'sticky', in the sense that some firms consistently offer management guidance while other firms do not. They assert that past disclosures are unlikely to influence a firm's current lawsuit probability. We include the frequency of management forecasts as a second measure of (decreased) disclosure risk over and beyond accounting risk and see whether it is related to litigation risk. We compute the forecast frequency as the annual number of earnings forecasts reported in First Call's CIG (Company Issued Guidelines) database for the year immediately preceding the effective date of an annual D&O contracts for the sample firms. Specifcally, *log.disc* is the variable that measures (lack of) disclosure risk and is

[13] For a discussion on the merits of various discretionary accrual measures, see Dechow et al. (1995).
[14] An alternative way is to view Accounting Risk as coming from two non-mutually exclusive parts: a part that stems from inherent business risk and a part that comes from the potential of management to manipulate the accounting numbers. The Dechow-Dichev measure can be thought of as a proxy for both parts and the modified-Jones abnormal accrual measure can be thought of as a proxy for the second part.

computed as the natural logarithm of (1 + forecast frequency). This measure is similar to the one used by Nagar et al. (2003).

Risks from PSLRA, 1995

The Private Securities Litigation Reform Act was passed in 1995. Its main objective was to create disincentives for frivolous and unsubstantiated lawsuits against companies and their innocent directors and officers. Although the legislation was successful in achieving *litigation* reform (by changing various procedures in how securities lawsuits are prosecuted), the legislation did not accomplish *liability* reform.[15] In this paper we highlight two specific provisions of the Act.

Prior to the passage of this Act, a plaintiff lawyer needed only a symbolic plaintiff to proceed with the case. To correct the situation where the main gainers were the plaintiff lawyers, this Act required the court to appoint a lead plaintiff and a lead counsel. The presumption was that the shareholder who lost the maximum amount of money would be the lead plaintiff. It was an attempt to get the institutional shareholders involved in securities litigation. However, the increasing involvement of institutional investors has huge implications for the D&O insurance market. While, prior to PSLRA, there was a glass ceiling in terms of lawsuit settlements (which was roughly equal to adequate compensation for the plaintiff lawyer), now institutional investors want to recoup as much of their "loss" as they can. Hence the size of the settlements has skyrocketed.

[15] D&O liability in post – Enron era, 2004, note by Dan Bailey, Bailey Cavalieri LLC.

Bailey (2004)[16] states that prior to 2000, it was difficult to identify a settlement of more than $100 million. However, since then he lists at least twenty-seven settlements that are larger than this amount. Settlements of securities cases are about 20% higher in cases involving large companies where the lead plaintiff is an institutional investor.[17] The use of lawsuits as a substitute monitoring device by blockholders has already been documented (Romano; 1991). However, the active involvement of institutional blockholders in lawsuits against large companies appears to have received a boost from PSLRA.

Another clause in PSLRA has also had a large impact on the settlement of lawsuits. Prior to the Act, all parties responsible for the alleged wrongdoing (directors, officers, lenders etc.) were jointly and severally liable. This Act changed the responsibility to a proportionate liability. While lenders have the deeper pockets, it is hard to argue that the bank has more responsibility than the directors and officers. This means that plaintiffs are unwilling to settle with the directors and officers for a smaller amount, since such settlement will reduce their payday from the lenders by creating a glass ceiling. Thus, the presence of debt can incentivize lawsuits against the company since the debt-holders can also potentially be sued. Additionally, settlement costs are much higher if there are debt-holders with deep pockets involved.

For the reasons outlined in the prior paragraphs, we identify two variables as proxies for PSLRA risk: *inst.block10*, an indicator variable for the existence of an institutional

[16] Mr. Bailey is also the lead counsel for the D&O insurance companies in the various Enron related lawsuits.
[17] NERA Economic Consulting Study cited by Early and Kastelic (2004).

blockholder holding at least 10% of the shares, and *lev*, the level of firm leverage, defined as total debt (debt in current liabilities plus long-term debt) as a percentage of total assets.[18]

Business Risk

As outlined in Knepper and Bailey (1998) and discussed by Core (2000), companies with higher management quality are expected to have lower risk. We use the company's cumulative abnormal returns (based on CRSP weighted index return) for the previous year (*cumret*) as a proxy for past stock market performance, and expect it to be negatively related to the D&O insurance premium. Larger firms are more likely to be sued than smaller firms due to their having deeper pockets (Tillinghast, 2002 survey). We use the natural logarithm of total assets (*size*) as a size proxy. Romano (1991) reports that companies that have disclosed prior litigation are expected to have higher litigation risk because of a negative reputational effect. Our *priorclaim* variable, defined as an indicator for whether a firm had D&O claims during the past 10 years, captures the risk due to prior litigation. To the industry participants we spoke to, a significant source of litigation risk is the stock price volatility of the company[19]. We include the previous fiscal year's standard deviation of daily stock returns (*vol*) as a measure of stock price volatility. We expect to see a positive relation between stock volatility and insurance premiums. We also include an indicator for risky industries including biotechnology industry (SIC 2833-2836), computer hardware industry (SIC 3570-3577), electronics industry (SIC 3600-3674), retailing industry (SIC 5200-5967) and computer software industry (SIC 7371-

[18] We also interacted these variables with size. The interactive variables were not significant.
[19] Stock return volatility is also identified as a source of risk by Grundfest and Perino (1997).

7379).[20] Finally, prior research has documented that share turnover is significantly associated with the *ex post* litigation incidence (Francis, et al. 1994; Skinner 1996; Johnson 2002). Hence, we also control for *turnover,* the average daily volume of shares traded as a percent of total shares outstanding for the previous year.

Corporate Governance Risk

Several of the recent well-publicized corporate scandals also involve corporate governance failures, including those that are not accounting related. For example, in a lawsuit filed against the directors of the Walt Disney Company, the directors have been alleged to have failed to evaluate, negotiate or approve a lucrative employment agreement with Mr. Michael Ovitz, who was a personal friend of the company's chairman Mr. Michael Eisner. Core (2000) examines whether variation in the D&O premium is associated with variation in the quality of a firm's governance structure. He characterizes the governance structure as strong (weak) if it allows shareholders to impose tight (loose) constraints on managers' actions.[21] Similar to Core (2000), *ins.value* is defined as the percentage of share values owned by inside directors. Core uses another variable *INS_VOTE,* the percentage of share votes controlled by inside directors as distinct from *ins.value* for his sample of Canadian companies. In our sample of US companies, we do not find a significant difference between these two variables since unlike firms in Canada, our sample firms typically only have one class of shares. Core argues and finds support for a negative (positive) relation between premiums and

[20] The industry definition is consistent with Core (2000).
[21] As Core (2000) argues, weak corporate governance is not necessarily bad for the shareholders. As a counter-example, shareholders can maximize share value by giving a talented manager loose constraints and sue the manager if she makes bad choices.

ins.value (*INS_VOTE*) due to incentive alignment (entrenchment). Since our variable, *ins.value* proxies for both entrenchment and incentive alignment with shareholders, *ex-ante*, we do not know which direction the empirical relation will go. The natural logarithm of the number of years the CEO has been on the board is used as a proxy for management quality (*log.ceo.exp*). As pointed out by Core, this governance proxy is net of any entrenchment (which some other governance variables are expected to control for). Corporate governance is expected to be stronger when the board is independent of the CEO (Jensen, 1993). Dechow et al. (1996) find that firms censured by the SEC for fraudulent reporting are more likely to have fewer outside directors (*dir.out*) and a CEO who also doubles as the board chair (*ceo.cob*). From our discussions with D&O insurance industry participants, it was clear that while they market D&O insurance as a prerequisite to attract outside talent to the board, they also view outsiders as more risky from the insurance carriers' perspective since the outsiders are not likely to have acted in bad faith. This assertion is also corroborated by the Black et al. (2003) survey, which shows that almost no cases of actual out-of-pocket liability ever occurred for outside directors, indicating they are not likely to be found to have acted in bad faith. Prior research[22] has also found a negative relation between the percentage of outside directors appointed by the CEO (*dir.out.app*) and governance quality.[23]

[22] See, for example, Core et al. (1999).

[23]Gompers, et al. (2003) construct a comprehensive index (*gindex*) that measures takeover deterrence and entrenchment using twenty-four parameters from *IRRC Corporate Takeover Defenses*. However, this data requirement along with data requirements for computing the Dechow-Dichev measure reduces our sample considerably. Tillinghast (2004) reports that challenges to takeover defense are a significant portion of shareholder lawsuits. However, when we used *gindex* as a measure of takeover deterrence and entrenchment for a sub-sample, we did not find the variable to be significantly related with D&O premium.

Finally, prior research also indicates a link between large stakeholders and governance: outside blockholders simultaneously increase governance quality and litigation risk since they use lawsuits as a substitute monitoring device (Romano, 1991). Of course, recent evidence (Romano, 2001) seems to conclude that institutional investor activism does not really improve corporate performance. Nevertheless, we use the existence of a blockholder as a governance variable since we do not know whether insurance carriers price this as a (lack of) risk or not. Specifically, *inst.block10* is defined as an indicator for whether there exists an institutional shareholder holding at least 10% of the stock of the company. The other stakeholders who have interest in monitoring the firm are the debt holders. We include *lev*, total debt as a percentage of total assets, as a proxy for monitoring by the bondholders. Note that both *inst.block10* and *lev* are also proxies for PSLRA risk as discussed earlier. Hence, if the two variables proxy for good governance, we expect them to be negatively associated with the D&O insurance premium. However, if they mainly proxy for increased PSLRA related risk, we expect to see a positive relationship.

Summarizing the above discussion, we have the following framework of litigation risk:

Litigation risk = f (Disclosure Risk, PSLA Risk,

Business Risk, Corporate Governance Risk)

A related point regarding directors' legal liability exposure is the adoption by many companies of charter amendments to include limited liability provisions (LLP) that limit the personal liability of directors for breach of duty of care. These laws were adopted in

response to the skyrocketing costs of D&O liability insurance in the mid-1980s. Although details vary, liability provisions generally eliminate personal financial liability for breaches of a directors' duty of care, but do not eliminate liability for breaches of the duty of loyalty (or, in other words, acts of bad faith). As such, any measure of directors' liability exposure needs to control for the existence of these limited liability provisions.[24]

Determinants of change in insurance pricing from 2001 to 2002

The 2002 Tillinghast executive summary adds "in 2002, D&O insurance purchasers faced the largest premium increases since the hard D&O market of the mid-1980s". According to Early and Kastelic (2004), the year 2002 also saw a dramatic 200% increase over 2001, in the number of civil securities cases that involved Department of Justice investigations, federal indictments and convictions (guilty pleas). The Sarbanes-Oxley provisions, which were being debated in 2002, placed additional burdens on the audit committee of boards and potentially created additional litigation exposure for board members serving on the audit committee (Early and Kastelic, 2004). The Tillinghast 2002 report also suggests the events of September 11, 2001 as a possible reason for the rise in premiums. With several insurance companies suffering huge losses, their debts have been downgraded by the rating agencies (Early and Kastelic, 2004). This means that to remain profitable, insurance companies have been forced to raise premiums across the board.

Besides the events of September 11, 2001, there could be a change in the insurers' pricing of accounting, PSLRA, business and corporate governance risk.

[24] See Cao (2005) for the determinants of the adoption of limited liability provisions.

Accounting Risk

Following the events surrounding the collapse of large corporations like Enron and WorldCom, and the bankruptcy of Arthur Andersen, there has been increased scrutiny of accounting practices by regulators and the press. If this increased scrutiny leads to additional litigation risk, insurers are likely to increase their premiums from 2001 to 2002 for the same level of disclosure risk. There is some evidence of additional accounting-related litigation risk. The 2002 Tillinghast report states that 46.4% of shareholder claims in 2002 were disclosure related. This compares with 38.8% in 2001. The report also explicitly states that "Disclosures of publicly traded companies are an increased area of underwriting concern". Discussions about extending the statute of limitations with regards to the actions of directors and officers had also been hotly debated. And the extension of statute of limitations has been with retrospective effect, i.e., past accounting statements may be used to bring future lawsuits.

PSLRA Risk

We do not see any reason why this risk increases in 2002 compared to 2001. However, Phil Norton of Arthur J Gallagher claims that insurance companies didn't wake up in time to realize the effect of institutional holding on litigation of large companies. If true, it is possible they only started recognizing the PSLRA risks in 2002. It is difficult to imagine that scenario, however, since Bailey (2004) reports that institutional shareholders

had become very active plaintiffs in early 2000 itself. Thus, it is an empirical question whether we see any effect due to PSLRA risk.

Business Risk

We do not have any *ex-ante* reason to believe the business risks outlined in the prior sub-section affect 2002 premiums any differently than 2001 premiums.

Governance Risk

While our measures of governance structure have remained the same from 2001 to 2002, there have been several recent initiatives on corporate governance following the corporate scandals. Most notably, the Sarbanes-Oxley Act has been debated and passed. While the passage of the Act was subsequent to the data period in this sample, the various provisions of the Act were being extensively debated. Most of the provisions are aimed at increasing the accountability of directors and officers. For example, the mandatory certification of financial statements by Chief Executives and Chief Financial Officers had received a lot of attention. There was also discussion regarding the potential lengthening of the statute of limitations by Sarbanes-Oxley giving plaintiffs counsel more time to file securities class action cases and potentially allowing for longer class periods, larger classes and perhaps larger alleged damages. With this increased accountability comes potentially increased litigation risk and hence it is likely that insurance premiums rise.

IV. Econometric Model

We use a two-stage model similar to Core (2000). It is pertinent to point out that this two-stage model yields consistent estimates only under the assumption that there is no information asymmetry between insurers and managers. As discussed in Section II, given the extensive scrutiny of the company and its directors and officers at every insurance renewal, it is not unreasonable to assume no asymmetry between the company and the insurance carrier. There are some obvious exceptions to this assumption. For example, Chalmers et al. (2002) report that typically there are huge increases in insurance limits (or coverage is initiated) and premiums around the time a company makes an IPO. It is possible that, at this time, there may be some information asymmetries. This discussion suggests caution in selecting the sample for study.

Determinants of Insurance Premiums

Similar to Core (2000), we write the following equations:

Premium = f (limit, deductible, litigation risk)

Premium = f (limit, deductible, Accounting risk, PSLA risk,

Business risk, Governance risk)[25]

Deductible for personal coverage is largely zero as discussed earlier. Deductible data on entity coverage is not available. However, there is some evidence that deductibles do not vary significantly in cross-section. Additionally, since the above equation without the deductible is multiplicative, we estimate it in logarithmic form.

[25] While we assume separability of accounting and corporate governance risks, there is some prior evidence indicating this is not true. For example, Dechow et al. (1996) show that firms subject to accounting enforcement actions by the SEC actually have weaknesses in their internal governance structures.

Thus, if we denote

GR = Governance Risk vector,

BR = Business Risk vector,

AR = Accounting Risk variable, and

PR = PSLRA Risk vector,

we have

$$Log(premium) = a_0 + a_1 AR + a_2 GR + a_3 BR + a_4 PR + a_5 log(limit) + a_6 LLP + err \quad (1)$$

When purchasing the D&O insurance, typically firms first choose the limit amount based on the litigation risk they face and then pay the corresponding premium agreed with the insurance company. Hence, we can rewrite (1) as follows:

$$Log(limit) = b_0 + b_1 AR + b_2 GR + b_3 BR + b_4 PR + b_5 LLP + xlimit \quad (2)$$

We have called the residual in the above regression "xlimit" to denote an "abnormal" or "excess" limit taken by the management. In other words, excess limit is the limit taken over and above that explained by risk proxies.

Substituting (2) in (1) yields:

$$Log(premium) = a_0 + b_0 a_5 + (a_1 + b_1 a_5) AR + (a_2 + b_2 a_5) GR + (a_3 + b_3 a_5) BR + (a_4 + b_4 a_5) PR + a_5 xlimit + (a_6 + b_5 a_5) LLP + err \quad (3)$$

which is estimated in its reduced form as:

$$Log(premium) = c_0 + c_1 AR + c_2 GR + c_3 BR + c_4 PR + a_5 xlimit + c_6 LLP + err \quad (4)$$

Determinants of change in insurance pricing from 2001 to 2002

For studying pricing changes, we use a similar specification – one with interactive dummy variables for year 2002. In this specification, we perform a two-stage analysis to check if the premium pricing relation has changed in 2002 compared to 2001, where the first-stage regression of D&O limit also includes the year dummy. In the equations that follow, d2002 refers to a dummy variable that is set to one for year 2002.

$$\begin{aligned} Log\ (premium) = {} & a_0 + a_1\, AR + a_2\, GR + a_3\, BR + a_4\, PR + a_5\, log\ (limit) \\ & + a_6\, d2002 + a_7\, d2002 * AR + a_8\, d2002 * GR + a_9\, d2002 * BR \\ & + a_{10}\, d2002 * PR + a_{11}\, LLP + a_{12}\, d2002 * LLP + err \end{aligned} \qquad (5)$$

The log (limit) regression is:

$$\begin{aligned} Log\ (limit) = {} & b_0 + b_1 AR + b_2\, GR + b_3\, BR + b_4\, PR \\ & + b_6\, d2002 + b_7\, d2002 * AR + b_8\, d2002 * GR + b_9\, d2002 * BR \\ & + b_{10}\, d2002 * PR + b_{11}\, LLP + b_{12}\, d2002 * LLP + xlimit \end{aligned} \qquad (6)$$

Substituting (6) in (5) and estimating the reduced form, we get:

$$\begin{aligned} Log\ (premium) = {} & c_0 + c_1\, AR + c_2\, GR + c_3\, BR + c_4\, PR \quad a_5\, xlimit \\ & + c_6\, d2002 + c_7\, d2002 * AR + c_8\, d2002 * GR + c_9\, d2002 * BR \\ & + c_{10}\, d2002 * PR + c_{11}\, LLP + c_{12}\, d2002 * LLP + err \end{aligned} \qquad (7)$$

In equation (7), a significantly positive coefficient on *d2002 (c6)* indicates the premium increasing effect of the events of September 11, 2001 or other opportunism-related unexplained effects on the insurance industry.

V. **Empirical Results**

The D&O insurance limit and premium data is from Tillinghast-Towers Perrin. The Investor Responsibility Research Center (IRRC) directors database is our source for most of the corporate governance data. We have also augmented our sample by hand collecting some corporate governance data from the proxy statements. We obtained stock return data from CRSP, institutional shareholding and management earnings forecasts data from Thomson Financial and accounting data from Compustat. Due to confidentiality reasons, Tillinghast has withheld the names of the respondents. However, since we were furnished with data on revenues, assets, number of employees, state of domicile and 2-digit SIC codes, we came up with a matching algorithm to identify respondents.[26] Tillinghast surveys 2001 and 2002 cover 3169 firms, among which 1236 are repeated respondents. Table 1 describes our sample selection. After excluding non-publicly-traded, non-US and financial firms, we get an initial sample of 552 firms. Our matching algorithm that incorporates matching criteria on assets range, revenue range, number of employees, state code, 2-digit SIC code, year in business and after-tax loss (all of which are reported by the Tillinghast survey) yielded a matched sample of 323 firms. We exclude firms that offered an IPO in the previous year. This is to reduce the incidence of any information

[26] Please contact the authors if you would like details about matching criteria. In accordance with our Data License Agreement with Tillinghast, we would like to add the following disclaimer: Tillinghast has not furnished the names of the respondents to their survey. The accuracy of the results depends on our ability to identify firms correctly.

asymmetry between the insurance carrier and the company as documented by Chalmers et al. (2002). Data availability constraints (CRSP, Compustat, IRRC directors database), especially the requirement that a firm is included in the IRRC database or its data could be hand collected further reduced the sample. Table 1 describes our sample selection. The criterion that reduced the data availability the most was the need for a long enough time-series to compute the Dechow-Dichev earnings quality measure. We had 208 firm-years (104 firms). If we only restrict ourselves to the one-year abnormal accrual measure, we have 414 firm-years (207 firms). Requiring data on limited liability provisions reduced the sample to 202 firm-years (101 firms).

Table 2 presents the variable definitions and summary statistics. Appendices 1 and 2 present the details regarding the computation of our two accounting risk measures – the absolute value of abnormal accruals (|*dacc*|) and the Dechow-Dichev measure (*sresid*), respectively. The mean (median) insurance coverage limit for the smaller sample was 55.24 million (35 million) US dollars. These are much higher than the Core (2000) sample, where, for 1993 the mean (median) limit was 26.43 million (20 million) Canadian dollars. However, our bigger sample of 414 observations has a mean (median) of 37.16 million (15 million). The mean (median) premiums were $570,000 ($390,000) for the smaller sample of 208 observations. In the Core (2000) sample, the corresponding values were 167,780 (103,477). For our bigger sample of 414 observations, the mean (median) premium was $530,000 ($400,000). The summary statistics on our accounting risk measures, including *sresid* and |*dacc*|, are comparable to previous studies. The sets

of 104 (207) final firms come from 31 (36) different 2-digit SIC industries, indicating diversity of the sample.

Determinants of log(premium)

Total Effect on Premiums from Reduced Form Regressions

Table 3 presents the results from the reduced form regression (described in section IV) of log(premium) on various risk measures and the residual from the log(limit) regression. The regression uses pooled data from 2001 and 2002. All the independent variables take values immediately preceding the effective date of the D&O insurance contracts. All the t-statistics have been computed using Huber-White standard errors allowing for firm-level clustering. From Model 1, the coefficient on *xlimit* at 0.725 is significantly positive, indicating that any excess limit (over and above that explained by risk proxies) is priced by the insurance carriers. Core (2000) reports a similar result. The coefficient on LLP in Model 6 at -0.381 is significant and negative, indicating that companies which have made charter amendments to include limited liability provisions for their directors face lower D&O premiums.[27]

Accounting Risk

From Model 1 of Table 3, the coefficient on *sresid*, the Dechow-Dichev measure on (lack of) earnings quality is positive and significant (coefficient = 4.002, t-statistic = 1. 941), indicating that D&O premium, and hence, by inference, litigation risk is increasing in

[27] We only have limited data regarding limited liability provisions. As such, we were not able to include this variable in all the models involving accounting risk since the sample becomes very small. The only model we could include it in was model 5. The inclusion of this variable doesn't change the result. Also, the variable remains negative and significant in that specification.

poor accounting quality. Since disclosure encompasses more than accounting, we also included possible measures of voluntary disclosure risk in Model 2. Besides *log.disc*, a measure of the frequency of voluntary disclosures, we also interact *log.disc* with bad news (*badnews*, an indicator for at least one bad news forecast in the preceding year). The coefficients on both *log.disc* and the interactive variable are insignificant. This result is consistent with the assertion in Field et al. (2005) that past disclosures probably do not affect current litigation risk. In models 4 and 5, the coefficient on our measure of absolute value of abnormal accruals computed using the modified-Jones model (|*dacc*|) is positive and significant, confirming the result obtained when the Dechow-Dichev measure is used.[28] These findings thus, corroborate anecdotal evidence presented in section III that, accounting related issues are significant determinants of litigation risk.

PSLRA Risk

As argued in section III, we have two variables, *lev* and *inst.block10*, to proxy for the PSLRA-related risk. The PSLRA risk theory was that firms with a significant institutional blockholder were considered more risky by insurance companies because of the threat of a lawsuit with the institutional shareholder as the lead plaintiff. Also, moving from joint and several liability to proportionate liability has made firms with high leverage riskier. Since the coefficient on *inst.block10* is positive and significant, one can argue that there is some evidence of risk induced by PSLRA. The coefficient on *lev* is insignificant, indicating that firms with high leverage are not viewed as being more risky. However, the effect on these variables is confounded by the fact that these are also

[28] In addition to absolute value of modified-Jones discretionary accruals (|*dacc*|), we also used the absolute value of total accruals (|*tacc*|) as an alternative measure. The results are unchanged with use of this alternative measure.

proxies for good governance. Thus, it is still possible that there is some PSLRA related risk induced by higher leverage, but it is negated by *lev* proxying for good governance. Also, it is possible that the coefficient on *inst.block10* primarily comes from the institutional blockholders using the threat of lawsuits as a governance device. However, it is pertinent to note that the coefficient on the presence of a blockholder was insignificant (and negative!) in Core (2000) which argues against the governance explanation.

Business Risk

Most business risk variables have the predicted sign. Consistent with the discussion in Section III and consistent with Core (2000), the significant coefficient for *size* in all six models indicates that larger companies are associated with higher litigation risk. A positive coefficient on *priorclaim* indicates that companies with prior claims against their directors and officers are viewed as riskier. The significance of the coefficient on *priorclaim* appears to depend on the inclusion / exclusion of the limited liability provision adoption (LLP) variable. The effect of inclusion of LLP on significance of business risk variables is not surprising given the Cao (2006) finding that variables proxying for business risk are significantly associated with LLP adoption. Somewhat surprisingly, stock volatility (*vol*) is negative. It appears that this is a result of the risk of stock volatility being captured by the *risk.ind* and *turnover* variables. Model 3 presents the results excluding the *risk.ind* variable. In this specification, *vol* becomes insignificant. It also appears to be a function of the specific sample used. *Vol* is insignificant and positive in Model 5, which uses a larger sample. *Cumret*, the past cumulative abnormal

stock return, is negative and significant indicating those with past bad stock market performance are viewed as riskier.

Governance Risk

While the signs of the coefficients on several governance variables are consistent with Core (2000), many of them are insignificant. The coefficient on *ceo.cob* is insignificant in all specifications indicating that the Chairman-CEO dichotomy has no implications for litigation risk incremental to business risk and accounting risk. *ins.value*, the percent of shares owned by inside directors is negative, though insignificant. In contrast, Core (2000) finds a significant negative coefficient on *ins.value*. We believe that the difference may be due to the use of another variable representing insider voting control. In his model, *ins.value* captures the incentive alignment effect, while the insider voting variable (*INS_VOTE*) captures the entrenchment effect and works in a opposite direction. In our model, *ins.value* proxies for both effects. The coefficient on percentage of outside directors (*dir.out*) is positive in some specifications indicating that the risk of outsiders to insurance carriers outweighs any possible governance benefits. Finally, the percent of outsiders appointed during the CEO's tenure (*dir.out.app*) is positive and significant in some specifications. *Log.ceo.exp* is also significant with predicted sign. The negative sign on CEO experience indicates that companies with more experienced CEOs are viewed as less risky. The coefficients on *dir.out.app* and *log.ceo.exp* are similar to the findings in Core (2000) that studies Canadian firms in an earlier period, indicating that the role

governance risk plays in D&O insurance pricing has been persistent and similar across different settings.[29]

We had two additional measures of risk under this category: *lev*, which measures the past book leverage of the company and *inst.block10*, which is an indicator variable if an institutional investor holds at least 10% of the shares of the company. As discussed in section III, *lev* is insignificant, which is consistent with no governance effect i.e. no lowering of litigation risk because of additional monitoring by the debt holders. The coefficient on the institutional blockholders dummy is significantly positive in models 1-4, showing the lack of perceived direct monitoring by the institutions (in which case a negative coefficient is expected). This result is consistent with Romano (2001).

Direct vs. Indirect Effect on Premiums

In Table 4, similar to Core (2000), we try to assess whether the source of the risk is directly felt in premiums or is felt through the company opting for increased limits. The first column in Table 4 reports regression results for the reduced form specification for log (premium) (equation (4)). We use Model 1 from Table 3. Not surprisingly, all the coefficients in the first column are the same as those in column 1 of Table 3. The second column reports the results for the log(premium) specification in equation (1) and the third column reports results for the log(limit) specification in equation (2). As expected, premium does increase in stock volatility, but surprisingly companies with higher stock volatility chose a lower limit. The effect of CEO experience on premiums is felt through lower limits (maybe long tenured CEOs feel safer). Premiums are down for higher

[29] Core calls this a business risk variable while we have categorized this under governance

leverage, but that is compensated by companies choosing higher limits. Our measure of accounting risk, *sresid,* affects premium directly. *Priorclaim, cumret, inst_block10* and *risk.ind* also affect premium directly. *Size,* in contrast, affects premiums through the higher limits chosen by management.

Changes in insurance pricing in year 2002 compared to year 2001

As discussed in section IV, we use specification (7) to examine whether the pricing equation changed in 2002 compared to 2001. The models in Table 5 correspond to the first three models in Table 3.[30] *D2002* is a dummy variable that takes on a value one if we are using year 2002 data points. The coefficient on *d2002* is positive but insignificant. Hence the evidence does not support opportunistic pricing in 2002 or lingering effect of the events of September 11, 2001 on insurance premiums. The most significant finding in this table is the positive coefficient (e.g., coefficient = 7.561, t-stat = 2.778 in model 1) on the accounting risk variable *sresid* interacted with the *d2002* dummy, i.e., *d2002*sresid*. This provides strong support for the hypothesis that accounting quality is becoming an increasingly important determinant of litigation risk. Interestingly, the coefficient on *sresid,* which captures the effect of accounting risk for 2001, is insignificant. This means that in 2001, accounting risk, as far as what *sresid* has picked up was not associated with litigation risk significantly,

[30] Given the significant increase in the number of independent variables in this model and our limited sample size, *ex-ante,* we were not hopeful of many significant coefficients. Thus, we cannot draw too many inferences based on the insignificant coefficients. However, the coefficients that are significant are relevant since the lack of power should only make significance more difficult to achieve.

The coefficient on *xlimit* is significantly positive, indicating that excess limit was priced in 2001. Over and above the pricing equation in 2001, we do not observe any changes in the pricing of the *xlimit* in 2002 (*d2002* interacted with *xlimit* is insignificant). *Size*, *priorclaim* and *cumret* are the business risk proxies significant in year 2001, but there is no significant change in the pricing of these risks in 2002. A few significant interactive variables include *d2002*turnover* and *d2002*ceo.cob,* indicating a change in pricing of risk related to *turnover* and *ceo.cob* from 2001 to 2002. The negative coefficients imply that insurance firms attach decreasing importance to *turnover* and *ceo.cob*. Insurance carriers also seem to view risky industries (*risk.ind*) as an increasingly important factor for litigation risk, since *d2002*risk.ind* is significantly positive in both model 1 and model 2. Finally, the significantly negative coefficient on *d2002*ins.value* suggests that in 2002 inside directors' shareholdings are possibly viewed as decreasing the litigation risk.

Robustness Tests

Our results survive several robustness tests. For example, we have used alternative definitions of abnormal accruals such as absolute value of total accruals and abnormal accruals (not the absolute value) from the modified-Jones model. We have also used alternative definitions of institutional blockholder using a 5% cutoff instead of 10%. The test results are unaffected by the inclusion / exclusion of audit fees and non-audit fees paid to the auditor, and growth opportunity proxies such as market-to-book and past sales growth. The results are qualitatively similar when we use alternative definitions of

industries risk dummies (such as the one defined in Core (2000)) and include dummies for merger and acquisition activities. Following Larcker et al. (2004), we also ran factor analyses on our corporate governance variables and incorporated the factors as governance risk factors. None of the factors were significant although our results regarding accounting, PSLRA and business risks remain. Dechow et al. (1996) documents that there may be a link between disclosure risk and governance risk. We addressed this issue by interacting governance variables with our disclosure variables. The inclusion of the interacted variables did not change the main results. Finally, we have also included in the regressions other proxies for business risk, such as return on equity (defined as earnings before extraordinary items divided by stock equity) and inverse of market-to-book ratio (defined as the book value of common equity divided by market value). The results remain qualitatively similar and robust.

VI. Conclusion

In this article, we document that variation in D&O insurance premiums is associated with variation in measurable *ex-ante* sources of business, governance and disclosure risks. Prior literature suggests links between governance, business risk and *ex-ante* and *ex-post* litigation risk. Besides validating some of the findings of those studies with fresh data, we document additional sources of risk. We find that accounting risk is priced by D&O insurers. Consistent with anecdotal condemnation of the unwanted consequences of the Private Securities Litigation Reform Act, 1995, our institutional blockholder proxy does indicate a significant change in litigation risk due to PSLRA. We are also the first to

document a decrease in litigation risk because of the adoption of limited liability provisions. We find that there appears to be an increased concern in the underwriting community about business risks proxied by recent accounting earnings quality in the year 2002, as opposed to 2001. Finally, we do not find significant evidence of spillover of higher premiums into D&O Insurance because of the events of September 11, 2001.

Subsequent to the period of the study (2001-2001), there have been some interesting developments. Overall, insurance premiums have come down to pre-2001 level in 2004. Thus, it appears that the hike in premiums was temporary. While we do not have access to data for the later years, we could potentially get additional insights by studying the reasons for the drop in premiums.

The insurance available (the amount of limit) to some companies is divided into a primary layer and several excess layers which are carried by some of the big re-insurers like General Reinsurance and Swiss Reinsurance. We plan to study the implications of single vs. multiple insurance carriers on premium pricing next.

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Appendix 1: Computation of abnormal accruals (dacc)

$$NDACC_{i,t} / TA_{i,t-1} = \hat{\alpha}(1/TA_{i,t-1}) + \hat{\beta}(\Delta REV_{i.t} / TA_{i,t-1}) + \hat{\gamma}(PPE_{i,t} / TA_{i,t-1})$$

$$DACC_{i,t} = DACC_{i,t} / TA_{i,t-1}$$

$$= TACC_{i,t} / TA_{i,t-1} - \hat{\alpha}(1/TA_{i,t-1}) - \hat{\beta}[(\Delta REV_{i.t} - \Delta AR) / TA_{i,t-1}] - \hat{\gamma}(PPE_{i,t} / TA_{i,t-1})$$

where,

TA =	total assets (Compustat item 12);
REV =	sales revenue;
PPE =	property, plant and equipment;
AR =	accounts receivable;
TACC =	total accruals, defined as net income before extraordinary items less operating cash flows;
NDACC =	non-discretionary accruals estimated using the Modified Jones Model.
DACC =	discretionary accruals estimated using the modified Jones Model.
Δ =	changes from previous year to current year.

The model is estimated cross-sectionally to get normal level of accruals for each year and each SIC 2-digit industry with at least 8 firms satisfying the data availability requirement. The industry- and year-specific coefficients obtained from the regression are then used to compute firm-specific abnormal accruals (as a percent of lagged total assets).

Appendix 2: Computation of *sresid* using the Dechow-Dichev model

$$\Delta WC_t / \overline{TA}_t = b_0 + b_1 CFO_{t-1} + b_2 CFO_t + b_3 CFO_{t+1} + \varepsilon_t$$

where,

ΔWC =	change in working capitals (defined as change in accounts receivable + change in inventory – change in change in accounts payable + change in other operating assets (net));
CFO =	cash flow from operations scaled by average assets;
$\overline{TA}$ =	average total assets.

The above regression is estimated for each firm and each year using observations in six consecutive years on a rolling-window basis. Sresid is defined as the standard deviation of the six residual terms obtained from the regression. To avoid any hindsight bias, for year t, the sresid measure is based on the financial information available up to year t only. For example, sresid for 2001 is estimated by a regression linking ΔWC_{2000} with $CFO_{1999,}$ $CFO_{2000,}$ and CFO_{2001}, ΔWC_{1999} with $CFO_{1998,}$ $CFO_{1999,}$ and CFO_{2000} and so on.

Table 1 Sample Selection

Initial Sample:	**# of Firms**
Non-financial firms included in the 2001 or 2002 Tillinghast Survey	552
Matched Sample	
Number of firms matched with SIC, assets, #employees, revenue and state	323
Data Availability Constraints	
less: firms without data available on corporate governance variables (IRRC director database or hand collection)	(61)
less: firms without data available on Compustat, CRSP and Thomson Financial	(40)
less: firms without data available for computation of abnormal accruals	(15)
Final Sample I	207
less: firms without data available for computation of the Dechow-Dichev Measure	(103)
Final Sample II	104
Final Sample III (with data available on limited liability provisions)	101

Note: Tillinghast surveys 2001 and 2002 cover 3169 firms, among which 1236 are repeated respondents. After excluding non-publicly-traded, non-US and financial firms, we get an initial sample of 552 firms. We then perform a matching algorithm that incorporates matching criteria on assets range, revenue range, number of employees, state code, 2-digit SIC code, year in business and after-tax loss (all of which are reported by the Tillinghast survey) and get a matched sample of 323 firms. Data availability constraints reduce the sample to (1) 207 firms (414 firm-years) with available data for computation of abnormal accruals, and (2) 104 firms (208 firm-years) with available data for computation of the Dechow-Dichev measure.

Table 2 Variable Definitions and Summary Statistics

Variables	Definition	Data Source	Small Sample (208 firm-years) Median	Mean	Stdev	Large Sample (414 firm-years) Median	Mean	Stdev
D&O Insurance								
totlim	total annual D&O insurance coverage limit ($Millions)	Tillinghast	35.00	55.24	61.21	15.00	37.16	48.57
totprem	total annual D&O insurance premium ($Millions)	Tillinghast	0.39	0.57	0.67	0.40	0.53	0.53
log.limit	logarithm of the D&O insurance limit	Tillinghast	17.37	17.20	1.22	16.52	16.83	1.07
log.prem	logarithm of the D&O insurance premium	Tillinghast	12.88	12.73	1.07	12.91	12.78	0.93
xlimit	the residual term coming from the regression of log.limit on its determinants	-	0.00	0.10	0.53	0.00	0.05	0.53
Financial Characteristics and Business Risk								
size	logarithm of the total assets in $ Millions	Compustat	6.76	6.61	2.38	5.27	5.65	2.15
turnover	average daily trading volume (in shares percentage) for the previous year	CRSP	0.00	0.01	0.01	0.01	0.01	0.01
vol	standard deviation of daily stock returns for the previous year	CRSP	0.03	0.04	0.03	0.06	0.06	0.03
cumret	cumulative abnormal returns (based on CRSP weighted index) for the previous year	CRSP	0.21	0.28	0.63	0.14	0.14	0.87
priorclaim	indicator for whether a firm had D&O claims during the past 10 years	Tillinghast	0.00	0.26	0.44	0.00	0.19	0.40
log.ceo.exp	logarithm of (the number of years the CEO has served on the board of directors + 1)	IRRC	1.95	1.91	0.88	1.95	1.84	0.83
risk.ind	indicator for risky industries including biotechnology (SIC 2833-2836), computer hardware (SIC 3570-3577), electronics (SIC 3600-3674), retailing (SIC 5200-5967) and computer software (SIC 7371-7379) industries.	Compustat	0.00	0.31	0.46	0.00	0.49	0.50
Corporate Governance Variables								
ins.value	percentage of inside directors' shareholding	IRRC	0.01	0.05	0.12	0.04	0.09	0.14
dir.out	number of outside directors as a percentage of total number of directors	IRRC	0.67	0.66	0.17	0.60	0.60	0.18
dir.out.app	percentage of outside directors that start board service after the CEO joins the board	IRRC	0.50	0.50	0.39	0.60	0.54	0.39
ceo.cob	indicator for whether the CEO is also chairman of board	IRRC	1.00	0.65	0.48	1.00	0.62	0.49
inst.block10	indicator for existence of an institutional shareholder holding at least 10% of the stocks	Thomson	0.00	0.35	0.48	0.00	0.28	0.45
lev	total debt (debt in current liabilities plus long-term debt) as a % of total assets	Compustat	0.19	0.21	0.19	0.04	0.14	0.18
Disclosure Risk Variables								
sresid	Dechow and Dichev (2002) measure using firm-level 6-year time series	Compustat	0.01	0.02	0.02			
|dacc|	discretionary accruals estimated by the cross-sectional modified Jones model	Compustat	0.08	0.28	0.53	0.18	0.50	1.04
badnews	dummy for at least one bad-news earnings forecast in the previous year	First Call	1.00	0.51	0.50	0.00	0.47	0.50
log.disc	logarithm of (earnings forecast frequency in the year preceding the effective date of D&O contract + 1)	First Call	0.69	0.83	0.81	0.69	0.73	0.77

Table 3 Regressions of the Logarithm of D&O Premium on Its Determinants

Variables	*Model 1*	*Model 2*	*Model 3*	*Model 4*	*Model 5*	*Model 6*
Intercept	**10.322*** **	**10.367*** **	**10.606*** **	**10.433*** **	**10.777*** **	**11.027*** **
	[31.634]	[31.601]	[33.306]	[31.738]	[51.998]	[28.023]
sresid	**4.002***	**3.869***	3.394			
	[1.941]	[1.896]	[1.366]			
|dacc|				**0.101***	**0.087*** **	
				[1.726]	[3.601]	
log.disc		-0.09				
		[-0.603]				
badnews		-0.078				
		[-0.536]				
log.disc * badnews		0.152				
		[0.946]				
ins.value	-0.269	-0.277	**-0.669** **	-0.194	0.225	0.201
	[-1.027]	[-0.98]	[-2.458]	[-0.662]	[0.829]	[0.634]
dir.out	**0.658** **	**0.656** **	0.369	**0.634** **	0.016	0.252
	[2.228]	[2.156]	[1.376]	[2.09]	[0.091]	[0.948]
dir.out.app	0.035	0.029	0.028	0.046	**0.732*** **	**0.324***
	[0.18]	[0.145]	[0.139]	[0.226]	[6.294]	[1.939]
ceo.cob	-0.009	-0.01	0.069	0.000	0.072	0.043
	[-0.079]	[-0.093]	[0.623]	[0.001]	[1.026]	[0.354]
log.ceo.exp	**-0.195** **	**-0.198** **	**-0.186** **	**-0.2** **	**-0.361*** **	**-0.248*** **
	[-2.446]	[-2.379]	[-2.366]	[-2.4]	[-6.908]	[-3.266]
size	**0.307*** **	**0.303*** **	**0.287*** **	**0.294*** **	**0.311*** **	**0.3*** **
	[8.907]	[8.941]	[8.974]	[8.637]	[12.478]	[6.953]
priorclaim	**0.319*** **	**0.312*** **	**0.326*** **	**0.322*** **	**0.295*** **	0.16
	[2.969]	[2.917]	[3.128]	[2.982]	[3.54]	[1.62]
vol	**-3.992** **	**-4.037** **	-1.323	**-3.742** **	1.308	1.013
	[-2.438]	[-2.355]	[-0.747]	[-2.206]	[0.901]	[0.36]
cumret	**-0.121** **	**-0.114** **	-0.154***	**-0.108** **	**-0.089*** **	**-0.131*** **
	[-2.459]	[-2.353]	[-2.855]	[-2.163]	[-3.292]	[-2.86]
inst.block10	**0.232*** **	**0.218** **	**0.255*** **	**0.213** **	0.033	-0.108
	[2.649]	[2.437]	[2.83]	[2.467]	[0.51]	[-1.154]
lev	0.226	0.234	0.065	0.226	-0.395	-0.303
	[0.823]	[0.845]	[0.226]	[0.767]	[-1.551]	[-0.9]
turnover	8.653	9.44	**21.063*** **	12.237	**10.665*** **	8.189
	[1.181]	[1.329]	[2.849]	[1.623]	[2.956]	[1.235]
risk.ind	**0.551*** **	**0.539*** **		**0.539*** **	**0.449*** **	**0.371** **
	[3.808]	[3.683]		[3.596]	[5.581]	[2.341]
llp						**-0.381*** **
						[-3.061]
xlimit	**0.725*** **	**0.733*** **	**0.740*** **	**0.729*** **	**0.715*** **	**0.665*** **
	[8.25]	[8.146]	[8.288]	[8.407]	[11.973]	[6.552]
Adj. R-squared	0.757	0.755	0.735	0.756	0.685	0.541
# of firms	104	104	104	104	207	101
# of observations	208	208	208	208	414	202

Note: T statistics are provided in the brackets below each coefficient. ***, **, * denote significance level at the 1%, 5%, and 10% levels of a two-tailed t-test based on Huber-White standard errors allowing for firm-level clustering, respectively.

Table 4 Regressions of the Logarithm of D&O Premium and the Logarithm of D&O Limit

	Dependent Variable		
variable	*log(premium)*	*log(premium)*	*log(limit)*
Intercept	**10.322*** **	-0.537	**14.971*** **
	[31.634]	[-0.43]	[42.619]
sresid	**4.002***	**4.323** **	-0.443
	[1.941]	[2.104]	[-0.235]
ins.value	-0.269	-0.35	0.111
	[-1.027]	[-1.324]	[0.207]
dir.out	**0.658** **	0.353	0.42
	[2.228]	[1.163]	[1.228]
dir.out.app	0.035	-0.007	0.058
	[0.18]	[-0.039]	[0.262]
ceo.cob	-0.009	-0.099	0.125
	[-0.079]	[-0.856]	[1.148]
log.ceo.exp	**-0.195** **	-0.024	**-0.235** **
	[-2.446]	[-0.287]	[-2.453]
size	**0.307*** **	0.04	**0.368*** **
	[8.907]	[0.766]	[10.304]
priorclaim	**0.319*** **	**0.21** **	0.15
	[2.969]	[1.986]	[1.28]
vol	**-3.992** **	1.118	**-7.046*** **
	[-2.438]	[0.71]	[-3.552]
cumret	**-0.121** **	**-0.141*** **	0.028
	[-2.459]	[-2.885]	[0.476]
inst.block10	**0.232*** **	**0.189** **	0.06
	[2.649]	[2.133]	[0.601]
lev	0.226	-0.017	0.335
	[0.823]	[-0.064]	[1.23]
turnover	8.653	7.811	1.16
	[1.181]	[1.063]	[0.177]
risk.ind	**0.551*** **	**0.494*** **	0.079
	[3.808]	[3.425]	[0.621]
xlimit	**0.725*** **		
	[8.25]		
log.limit		**0.725*** **	
		[8.25]	
Adj. R-squared	0.757	0.757	0.796
# of firms	104	104	104
# of observations	208	208	208

Note: T statistics are provided in the brackets below each coefficient. ***, **, * denote significance level at the 1%, 5%, and 10% levels of a two-tailed t-test based on Huber-White standard errors allowing for firm-level clustering, respectively.

Table 5 Regressions of Log(D&O Premium), with Interactive Dummies for Year 2002

variables	**Model 1**	**Model 2**	**Model 3**	*variables (cont'd)*	**Model 1**	**Model 2**	**Model 3**
Intercept	**10.148*** **	**10.097*** **	**10.263*** **	d2002	0.237	0.308	0.501
	[34.709]	[35.148]	[35.609]		[0.662]	[0.796]	[1.29]
sresid	-0.947	-0.991	-2.027	d2002*sresid	**7.561*** **	**8.809*** **	**8.599*** **
	[-0.338]	[-0.363]	[-0.722]		[2.778]	[2.983]	[3.238]
log.disc		0.103		d2002*log.disc		-0.113	
		[0.693]				[-0.297]	
badnews		0.199		d2002*badnews		**-0.448***	
		[1.317]				[-1.683]	
log.disc * badnews		-0.094		d2002 *log.disc*badnews		0.11	
		[-0.56]				[0.26]	
ins.value	0.163	0.305	-0.026	d2002*ins.value	**-0.929*** **	**-1.249*** **	**-1.291*** **
	[0.582]	[0.981]	[-0.105]		[-3.378]	[-3.901]	[-3.41]
dir.out	**0.565** **	**0.65** **	0.37	d2002*dir.out	0.025	-0.082	-0.066
	[2.108]	[2.393]	[1.493]		[0.098]	[-0.306]	[-0.232]
dir.out.app	-0.004	0.001	-0.037	d2002*dir.out.app	0.04	0.054	0.087
	[-0.027]	[0.005]	[-0.219]		[0.209]	[0.256]	[0.407]
ceo.cob	**0.18** **	**0.176** **	**0.242*** **	d2002*ceo.cob	**-0.329** **	**-0.324** **	**-0.338** **
	[2.244]	[2.283]	[2.921]		[-2.433]	[-2.501]	[-2.386]
log.ceo.exp	**-0.203*** **	**-0.215*** **	**-0.19*** **	d2002*log.ceo.exp	0.027	0.031	0.024
	[-2.938]	[-3.041]	[-2.764]		[0.247]	[0.283]	[0.204]
size	**0.289*** **	**0.275*** **	**0.282*** **	d2002*size	0.043	**0.076***	0.019
	[10.571]	[9.651]	[10.543]		[1.095]	[1.883]	[0.479]
priorclaim	**0.323*** **	**0.319*** **	**0.331*** **	d2002*priorclaim	-0.019	0.01	-0.021
	[3.306]	[3.266]	[3.394]		[-0.141]	[0.071]	[-0.15]
vol	-1.723	-1.209	-0.055	d2002*vol	-2.524	**-3.888***	-1.382
	[-1.11]	[-0.76]	[-0.036]		[-1.146]	[-1.751]	[-0.536]
cumret	**-0.221*** **	**-0.195*** **	**-0.238*** **	d2002*cumret	0.162	0.125	0.1
	[-3.287]	[-2.852]	[-3.272]		[1.308]	[1.076]	[0.733]
inst.block10	**0.223*** **	**0.183** **	**0.247*** **	d2002*inst.block10	-0.016	0.052	-0.03
	[2.856]	[2.294]	[2.994]		[-0.157]	[0.457]	[-0.275]
lev	0.049	-0.03	-0.048	d2002*lev	0.564	**0.705***	0.585
	[0.207]	[-0.129]	[-0.189]		[1.44]	[1.838]	[1.408]
turnover	**38.489*** **	**39.393*** **	**49.371*** **	d2002*turnover	**-41.105** **	**-42.214** **	**-42.612*** **
	[5.415]	[5.503]	[7.146]		[-2.513]	[-2.562]	[-2.757]
risk.ind	**0.329** **	**0.294** **		d2002*risk.ind	**0.268***	**0.323** **	
	[2.52]	[2.145]			[1.852]	[2.209]	
xlimit	**0.747*** **	**0.775*** **	**0.745*** **	d2002*xlimit	-0.063	-0.083	-0.039
	[10.672]	[11.282]	[10.625]		[-0.723]	[-0.917]	[-0.412]
				Adj. R-squared	0.773	0.775	0.754
				# of firms	104	104	104
				# of observations	208	208	208

Note: T statistics are provided in the brackets below each coefficient. ***, **, * denote significance level at the 1%, 5%, and 10% levels of a two-tailed t-test based on Huber-White standard errors allowing for firm-level clustering, respectively.