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On Lawsuits, Corporate Governance, and Directors' and Officers' Liability Insurance

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Abstract

We examine whether information about firms' directors' and officers' (D&O) liability insurance coverage provides insights into the likelihood of shareholder lawsuits. Using Canadian firms, we find evidence that firms with D&O insurance coverage are more likely to be sued and that the likelihood of litigation increases with increased coverage. These findings are consistent with managerial opportunism or moral hazard related to the insurance purchase decision. We also find that higher premiums are associated with the likelihood of litigation, indicating that insurers price this behavior. Taken together, the findings suggest that coverage and premium levels have the potential to convey information about lawsuit likelihood, and a firm's governance quality, to the marketplace.

The last decade and a half has seen a dramatic upsurge in shareholder litigation against firms, executives, and board members. Aggregate U.S. securities class-action settlements increased from $1 billion between 1996 and 1999 to $10.6 billion in 2006 alone (Simmons and Ryan, 2006).[1] Similarly, securities-related lawsuits, including class actions, are on the rise in Canada, with the latter increasing markedly since 2005 (Hays and Berenblut, 2011). The most significant source of litigation exposure for directors and officers (D&O) arises from shareholder suits, and such suits are

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[1]Excluding the Enron settlement of $7.6 billion.

associated with significant shareholder wealth losses for firms (Bhagat, Bizjak, and Coles, 1998).[2,3] While many firms now purchase D&O liability insurance to protect corporate officers and directors by covering expenses and damages in the event that the firm is sued, there is little work explicitly examining the link between such insurance coverage and actual litigation.

We contribute to the literature by examining whether information contained in firms' D&O insurance coverage provides insights into the likelihood of securities-related litigation. Given that insurers incur costs when a client firm is sued, they have financial incentives to assess client litigation risk and set insurance premiums accordingly. Implicit in this pricing is the insurer's assessment of how the firm's corporate governance may act to mitigate litigation risk. We provide updated evidence on the factors associated with D&O insurance coverage and on how D&O insurers price firm fundamentals and governance structures. In addition, our analysis provides further insights into the potential for managerial opportunism in the D&O purchase decision.

At a general level, our findings support the view that D&O insurance pricing and coverage information have the potential to convey information about the probability of lawsuit, and thus a firm's governance quality, to the marketplace. Using a sample of Canadian firms for which D&O insurance data are available, we find that firms carrying D&O insurance are more likely to be sued relative to uninsured firms. Further, we find that measures of "abnormal" or "excess" insurance coverage and premiums are associated with lawsuit likelihood. This finding is consistent with D&O insurers assessing firm-specific litigation risk, including excess coverage, and factoring that into the premiums they charge. Our results also suggest potential managerial opportunism (or alternatively moral hazard) in the insurance purchase decision; managers who are more likely to be sued purchase D&O coverage, and more of it. The findings are also consistent with the potential for moral hazard in that once insurance is purchased (perhaps out of habit), managers may act in a manner that leads to lawsuits (Boyer, 2003). We also find that larger firms, firms with higher free cash flows (FCFs), and those previously sued have a higher propensity to be sued. Moreover, we find that the probability of suit has increased over time and is significantly higher for firms cross-listed in the United States compared to Canadian-only listed firms.

When reexamining the association between D&O insurance premiums and firm-specific characteristics, the evidence is supportive of prior work (e.g., Core, 1997, 2000; Boyer, 2003; Boyer and Tennyson, 2008). Larger firms and firms with fewer growth opportunities (lower Tobin's *Q*) are charged higher premiums. Similarly, we observe higher premiums for firms with larger boards, severance and executive

[2] "Directors' and Officers' Liability, 2006 Survey of Insurance Purchasing and Claims Trends," Tillinghast Towers Perrin, 2006.

[3] In related work, Karpoff, Lee, and Martin (2008) report evidence that firms facing actions by federal regulators and the Department of Justice lose, on average, 41 percent of their market values.

agreements, higher incentive-based compensation for the CEO, and a U.S. cross-listing.

As with other studies in the area, endogeneity is a concern for our work. Throughout the article we discuss series of robustness tests to address this concern, but acknowledge the ongoing challenge in ascribing causality in such analyses. Nonetheless, the empirical associations that we document are informative about the links between firm characteristics, the insurance purchase decision, and lawsuit likelihood.

The first section provides background and reviews the literature on shareholder litigation and D&O insurance. The second section presents our research questions; the third section describes our data, methodology, and presents univariate analyses; and the fourth section discusses the multivariate analyses. The fifth section concludes.

BACKGROUND AND LITERATURE REVIEW

A key force behind shareholder litigation is the divergence of interests between managers and shareholders (Bhagat, Brickley, and Coles, 1987, 1994; Francis, Philbrick, and Schipper, 1994; Baker and Griffith, 2007).[4] Consistent with this view, Strahan (1998) suggests that high agency costs might both motivate shareholder litigation and impose costs on managers for self-serving behavior. That is, the direct costs of suits and the associated reputational consequences serve to ensure managerial actions are in the best interests of the shareholders. Indeed, several articles, including Becht, Bolton, and Roell (2003) and Bauer, Brown, and Moers (2009), argue that shareholder suits act as a disciplinary device for managers.[5] Strahan (1998) further contends that if shareholder litigation is important in addressing agency problems, then, *ex ante*, firms with weaker governance controls are more likely to be sued. There is evidence consistent with this view. For example, Ferris et al. (2007) report a higher incidence of derivative lawsuits for firms with increased agency conflicts, and Peng and Roell (2008) document that incentive pay in the form of options increases the likelihood of litigation (although Jayaraman and Milbourn, 2009, are unable to find a causal link in this context).

Another strand of the literature argues that insurers have financial incentives to assess client firms' litigation risk. For example, Boyer and Stern (2012) find that insurers price firms' governance risk, while Baker and Griffith (2007) interview D&O professionals and conclude that they "... in addition to performing a basic financial analysis of the company focus a large part of their efforts in understanding the corporate governance of the prospective insured...." Anecdotal evidence also supports this view. For example, when Nortel Networks settled suits in the amount of

[4]A related line of work focusing on governance in the insurance industry includes recent papers by Miller (2011), Eling and Marek (forthcoming), and Ho, Lai, and Lee (2013). Boubakri (2011) provides a detailed review of the issues.

[5]Karpoff, Lee, and Martin (2008) and Agrawal and Cooper (2009) report high executive turnover following financial reporting misstatements or government investigations.

$2.45 billion, the firm's insurers paid out $228.5 million.[6] More generally, Mayers and Smith (1982) contend that corporate insurers scrutinize client firms, thus monitoring corporate managers, while Holderness (1990) argues that this monitoring role is particularly strong for D&O insurers. Supporting the monitoring view, Bhagat, Brickley, and Coles (1987) and Netter and Poulsen (1989) report positive or zero wealth effects associated with news of firms either purchasing D&O insurance or adopting indemnification provisions.

There are also arguments that D&O insurance entrenches managers or allows them to act opportunistically. For example, Chalmers, Dann, and Harford (2002) argue that if managers take firms public when they are overvalued (based on insider information), then, *ex post*, performance will be poor and lawsuits will be more likely. As such, rational managers will protect themselves by purchasing more D&O insurance. Indeed, the authors' analyses find such an association, and they conclude that the insurance purchase decision is indicative of managerial opportunism. Boyer and Stern (2012) find similar evidence for a sample of Canadian IPOs. Similarly, Lin, Officer, and Zou (2011) report evidence of managerial opportunism in that acquirers with D&O insurance, and those with higher coverage levels, have lower returns around acquisition announcements, pay higher premiums, and acquire targets with lower synergies.

Despite the potential importance of D&O insurance, few studies have focused on the associations between D&O coverage, pricing, and suits. As noted above, Chalmers, Dann, and Harford (2002), focusing on a sample of 72 U.S. IPOs, find that abnormal levels of D&O coverage are associated with worse post-IPO performance, an outcome that is often associated with litigation. However, they do not explicitly model the link between suit likelihood and measures of D&O insurance coverage or premiums.

More recently, Boyer and Stern (2012) argue that D&O insurance provides an unbiased signal of the firm's governance risk, while Gupta and Prakash (2012) show that D&O insurance premiums reflect managers' private information about firms' riskiness. Cao and Narayanamoorthy (2013) report a link between earnings quality and insurance premiums. In contrast, Egger, Radulescu, and Rees (2011) suggest that D&O insurance affords protection to CEOs in the context of speculative environments and changing shareholder clienteles, where the original shareholders wish to encourage managers to focus on increasing short-term stock prices.

RESEARCH QUESTIONS

Our primary focus is on whether information contained in D&O insurance coverage and pricing provides insights into the likelihood of shareholder litigation. Moreover, we investigate this issue while explicitly controlling for other factors that may affect the propensity of a firm to be sued.

We first focus on whether insurance coverage itself is associated with the likelihood of a lawsuit. We then study how insurance coverage limits and insurance premiums are associated with the propensity of firms to be sued. While insurance coverage and

[6] "Judges OK $2.45 Billion Settlement in Nortel Case, " James Wood, *Reuters*, December 27, 2006.

pricing are endogenously determined, the issue at hand is if information contained in the insurance purchase decision, coverage levels, and premiums is *ex ante* informative about litigation risk. Given the informational advantages that managers possess, we argue that rational managers will purchase more liability coverage if they expect a higher probability of lawsuit. This suggests the potential for managerial opportunism in the insurance purchase decision (or moral hazard if managers become lax after purchasing D&O insurance). Of course, insurers have incentives to price the potential for opportunism (or moral hazard), especially with regard to "abnormal" coverage limits. Thus, we focus on measures of "abnormal" coverage and "abnormal" premiums (described in more detail below) and how they are associated with the likelihood of shareholder-related litigation.

Prior studies (Core, 1997, 2000; Boyer 2003, 2007) report mixed results as to what firm fundamentals and governance characteristics affect insurers' pricing decisions. Given the more recent nature of our sample, and the heightened focus on both shareholder suits and corporate governance during this period, we thus provide further insights into the factors D&O insurers view as important in D&O insurance pricing.

DATA AND UNIVARIATE ANALYSES

In this section, we describe our data and sample and report univariate results.

Data and Sample Selection

The initial data set comprises the largest 350 Canadian companies by market capitalization listed on the Toronto Stock Exchange (TSX) in the years 1995, 2000, and 2005. We choose these 3 years in order to limit the task of hand-collecting data while capturing periods during which the focus on corporate governance increased. In 1995, the total market value of the largest 350 firms was $406.7 billion, representing approximately 61 percent of the total Canadian equity market value at that time. For 2000 and 2005, the samples represent approximately 90 and 95 percent of market value, respectively, and over 95 percent of the value of firms represented on the Canadian Compustat database.

Data on board size and independence, ownership (including the percentage ownership of D&O and blockholders), CEO compensation, and D&O liability insurance (premiums, limits, and deductibles) are hand-collected from proxy statements. Independent directors are those the firm classifies as "unrelated." Under Canadian best practice recommendations this corresponds to individuals who are "... independent of management and free from any association, which could materially interfere with the director's ability to act in the best interests of the corporation."

All accounting variables are obtained from the Canadian Compustat database for the prior year (1994, 1999, and 2004, respectively). Unless specified otherwise, all dollar-denominated data items (including premium data) are reported in year 2005 Canadian dollars. We search for each company by name in the LexisNexis legal sources for the United States and Canada and the Stanford database of class-action lawsuits for instances of shareholder litigation and lawsuit settlements for the 5 years

before (prior litigation indicator) and after (post litigation indicator), each sample year. We note that class-action lawsuits in Canada are a more recent phenomenon. While our sample of lawsuits includes Canadian and U.S. securities-related suits, more than 75 percent of the suits we identify are filed in the United States. The few Canadian suits are securities-related litigations prior to 2005, and a few instances of class-action lawsuits post-2005.

We exclude any firms with missing data, along with financials, trusts, and mutual funds given that their accounting procedures and governance structures are fundamentally different from those of industrial firms. This results in a final sample comprising 330 observations in 1995, and 299 in each of 2000 and 2005.

Univariate Analyses

Table 1 reports summary statistics for insurance premiums, coverage, and deductibles for each year: 1995, 2000, and 2005. The results indicate that 61 percent (201) of the sample carried D&O insurance in 1995, 70 percent (210) in 2000, and 75 percent (223) in 2005.[7] Conditioned on having insurance data available, the median premium in 1995 was $91,190. By 2005 this had increased more than fourfold to $445,000. The median coverage during this period, however, increased by only 44 percent and deductibles increased only slightly, suggesting that higher premiums in 2005 are not driven primarily by increased coverage.

In Table 2, Panel A, we present summary statistics for each of the variables used in the study, while Panel B shows the distribution of lawsuits across industries. We next examine how D&O liability insurance premiums vary with key governance and firm characteristics. Rather than presenting a year-by-year analysis, in Table 3 we focus on results for 2000, which are representative of the findings for the other years in the sample. The first column of Table 3 reports the overall mean (median in parentheses) for each characteristic. Panel A contains the mean and median D&O insurance premium by characteristic quartile for continuous variables. In addition, we test for the equality of premiums across the quartiles and report Spearman's rank correlations between D&O premiums and each variable of interest. In Panel B, we report the mean (median in parentheses) insurance premium for each dichotomous independent variable in the study, along with tests for differences in means and medians.

The median insurance premium differs significantly across quartiles for both board size and board independence (Panel A); however, we observe no significant differences in premiums based on CEO duality (Panel B). While premiums seem to decline with block and director and officer ownership (both measured in percentage terms), and increase with board size and independence, these are not strictly monotonic. Premiums are higher, however, for dual-class firms (Panel B). When focusing on the measures of CEO compensation we see that premiums differ

[7]As indicated in Table 1, we have insurance data for 201, 210, and 218 observations for 1995, 2000, and 2005 respectively. Five of the firms in the 2005 sample report having insurance but do not disclose the details.

Table 1
Descriptive Statistics Insurance Variables

	1995				2000				2005			
Variables	Mean	Median	Min.	Max.	Mean	Median	Min.	Max.	Mean	Median	Min.	Max.
Insurance												
Premium ('000)	180.37	91.19	4.00	1,741	205.00	90.00	11.26	1,530	699.00	445.00	12.00	13,800
Coverage ('000)	46,600	24,300	1,824	626,000	65,900	28,200	5,201	520,000	56,000	35,000	4,500	357,000
Deductible ('000)	1,285	182.39	12.00	108,000	693.00	113.00	6.00	16,700	1,070	321.00	25.00	12,000
No. of obs.	201				210				218			

Note: Summary statistics for the directors' and officers' liability insurance variables: Premium, Coverage, and Deductible (all in thousands of dollars) for each of the 3 years analyzed: 1995, 2000, and 2005. We report means, medians, minimum, and maximum values for each variable for each year. The number of firms with insurance coverage is 202 in 1995, 210 in 2000, and 223 in 2005. However, not all firms disclose all of their insurance data. As reported in the last row of the table, premiums, coverage, and deductibles are available for 201 firms in 1995, 210 in 2000, and 218 in 2005.

TABLE 2
Summary Statistics and Distribution of Lawsuits Across Industries

Panel A: Summary Statistics

Variables	No. of Obs.	Mean	Median	Min.	Max.
Insurance					
Premiums ('000)	629	394.92	146.41	3.65	13,800.00
Max Coverage ('000)	629	57,400.00	30,300.00	1,823.85	626,000.00
Deductible ('000)	629	1,038.44	281.55	0.00	108,000.00
Board Structure					
Board Size	928	9.40	9.00	3.00	26.00
Board Independence	928	0.66	0.67	0.11	1.00
CEO-COB Duality	928	0.28	0.00	0.00	1.00
Classified Board	928	0.06	0.00	0.00	1.00
Ownership Structure					
Blocks (%)	928	0.27	0.20	0.20	1.00
D&O Ownership (%)	928	0.15	0.03	0.00	0.98
Dual Class	928	0.27	0.00	0.00	0.67
Compensation					
Salary (000s)	928	480.17	401.02	0.00	2,815.50
Bonus (000s)	928	422.19	155.62	0.00	15,300.00
Incentives (%)	928	0.51	0.53	0.00	1.00
Severance	928	0.36	0.00	0.00	1.00
Employment Agreement	928	0.69	1.00	0.00	1.00
Controls					
Size (millions)	928	2,980.00	742.00	0.22	232,000.00
Debt/Equity	928	1.02	0.37	0.00	73.11
FCF	928	0.03	0.05	−12.46	2.46
ROA	928	0.18	0.04	−23.71	57.54
Tobin's Q	928	0.05	0.02	0.00	7.12
Prior Litigation	928	0.37	0.00	0.00	1.00
US Listing	928	0.34	0.00	0.00	1.00

Panel B: Distribution of Lawsuits Across Industries

Industry	No. of Suits	Percentage of Total	2-Digit SIC Code
Agriculture	6	2.11	11
Mining	62	21.83	21
Utilities	8	2.82	22
Construction	4	1.41	23
Manufacturing	55	19.37	31/32
Primary metal manufacturing	55	19.37	33
Retail	37	13.03	44
Services	55	19.37	51
Health care	2	0.70	91
Total	284	100	

Table 3
Univariate Tests 2000

Panel A: Mean and Median D&O Insurance Premiums for Continuous Variables

Variables	Mean (Median)	Group 1 (Low)	Group 2	Group 3	Group 4 (High)	Kruskal–Wallis (*P*-Value)	Spearman Corr. (*P*-Value)
Board Structure							
Board Size	9.145	226,306	109,288	151,383	340,770	24.050***	0.304***
	(8.000)	(76,080)	(71,739)	(84,465)	(176,813)	(0.000)	(0.000)
Board Indep	0.663	175,178	209,112	132,293	295,578	12.746***	0.190***
(%)	(0.667)	(73,293)	(91,222)	(73,969)	(156,345)	(0.005)	(0.003)
Ownership Structure							
Blocks %	34.90	277,502	197,358	164,775	186,119	6.463*	−0.138**
	(12.70)	(159,357)	(85,851)	(79,577)	(83,536)	(0.091)	(0.045)
D&O Ownership %	0.186	320,730	179,724	110,946	206,631	26.944***	−0.264***
	(0.026)	(195,114)	(104,568)	(58,084)	(77,708)	(0.000)	(0.000)
Compensation							
Salary	494,157	139,050	154,784	203,480	354,836	10.868**	0.386***
	(412,000)	(843,465)	(82,516)	(78,271)	(156,345)	(0.012)	(0.000)
Bonus	478,046	203,321	158,670	197,045	259,576	6.196	0.218***
	(250,000)	(84,465)	(69,636)	(103,020)	(127,711)	(0.102)	(0.001)
Total	1,842,380	117,413	151,680	193,283	362,575	19.779***	0.336***
	(1,117,923)	(71,576)	(78,834)	(104,174)	(202,535)	(0.000)	(0.000)
Incentives	0.536	139,050	154,784	201,157	354,120	11.738***	0.184***
	(2.000)	(84,465)	(82,516)	(77,708)	(171,084)	(0.008)	(0.007)
Controls							
Size	1.739	101,193	118,014	211,842	385,610	27.984***	0.348***
(millions)	(2.000)	(66,770)	(78,834)	(117,026)	(212,061)	(0.000)	(0.000)
TA	2,921	133,755	119,366	171,838	395,140	43.097***	0.445***
(millions)	(768)	(59,914)	(62,818)	(135,823)	(260,377)	(0.000)	(0.000)
Debt/Equity	0.649	154,051	206,003	252,274	206,139	9.067**	0.178***
	(0.272)	(69,836)	(81,693)	(139,818)	(104,737)	(0.028)	(0.009)

(*Continued*)

TABLE 3
Continued

Panel A: Mean and Median D&O Insurance Premiums for Continuous Variables

Variables	Mean (Median)	Group 1 (Low)	Group 2	Group 3	Group 4 (High)	Kruskal–Wallis (*P*-Value)	Spearman Corr. (*P*-Value)
FCF	1.736	210,633	221,510	205,361	178,678	1.333	−0.041
	(2.000)	(86,414)	(99,374)	(104,571)	(72,233)	(0.721)	(0.549)
ROA	0.026	249,698	340,460	136,064	108,104	22.838***	−0.256***
	(0.045)	(127,711)	(175,378)	(63,067)	(76,863)	(0.000)	(0.000)
Tobin's *Q*	2.865	248,684	197,336	185,399	188,650	4.318	−0.137**
	(1.876)	(117,899)	(112,127)	(84,465)	(75,021)	(0.229)	(0.046)

Panel B: Mean (Median) Values of D&O Insurance Premiums for Dichotomous Variables

Variables	Mean (Median)	0	1	Z-Score for Difference in Populations (*P*-Value)
CEO-COB Duality	0.268	762,388	572,841	−1.210
	(0.000)	(339,500)	(216,000)	(0.226)
Dual Class	0.232	666,976	843,390	2.102**
	(0.000)	(309,452)	(445,462)	(0.035)
Classified Board	0.128	733,840	539,048	−0.141
	(1.000)	(329,675)	(564,124)	(0.887)
Severance	0.250	546,878	931,235	1.744*
	(0.000)	(290,097)	(410,800)	(0.081)
Employment Agreement	0.667	403,232	784,435	3.773***
	(0.000)	(137,750)	(388,606)	(0.000)
Post Litigation	0.222	277,232	670,743	5.437***
	(0.000)	(127,900)	(239,832)	(0.000)
US Listing	0.314	292,838	996,316	6.511***
	(0.000)	(202,500)	(601,154)	(0.000)

Note: Descriptive statistics and univariate tests for the 2000 sample. ***, **, and * represent significance at the 1 percent, 5 percent, and 10 percent levels, respectively (*p*-values in parentheses).

significantly across the four subgroups, although there is no discernible trend. In contrast, premiums are higher for firms with severance arrangements and employment agreements (Panel B).[8]

As suggested by Mayers and Smith (1982), premiums increase in monotonic fashion with firm size, and almost monotonically with the debt-to-equity ratio. We also note that firms that are subsequently sued tend to pay significantly higher premiums, and consistent with prior evidence, premiums are higher for U.S. listed firms. On balance, the univariate analyses are suggestive of premiums that vary with firm characteristics. Of course, at issue is the nature of these associations in a multivariate setting.

MULTIVARIATE ANALYSES

In this section, we present our multivariate analyses. In the "Determinants of the Likelihood of Litigation" section, we focus on the likelihood of litigation, while in the "Insurance Coverage" and "What Do Insurers Price?" sections we revisit the issue of what drives a firm's D&O insurance purchase decision and what factors insurers appear to price.

Determinants of the Likelihood of Litigation

To examine the association between D&O insurance and the likelihood of securities-related litigation we first use a probit analysis modeling the likelihood of a firm being sued in the 5 years following the sample year. Table 4 reports the marginal effects of pooled probit regressions using maximum likelihood with robust standard errors clustered at the firm level. The dependent variable, *Post Litigation*, is equal to 1 if a firm is involved in securities-related litigation within 5 years of the sample year, and 0 otherwise. Model 1 includes board characteristics, ownership structure, and compensation, along with firm fundamentals and industry indicators based on one-digit NAICS codes.[9] The variable of interest is *Insurance*, a dichotomous variable equal to 1 if the firm carries D&O liability insurance, and 0 otherwise. Models 2 and 3 include only firms for which detailed premium and coverage data are available, and incorporate measures of "abnormal" coverage and "abnormal" premiums, respectively (as discussed in detail below). The marginal effects are evaluated at the sample means for all variables, and correspond to an infinitesimal change for continuous variables and a move from 0 to 1 for indicator variables.

In Model 1 we find that, perhaps not surprisingly, insured firms are significantly more likely to be sued than noninsured firms. The coefficient of 0.118 on *Insurance* corresponds to an 11.8 percent point increase in the lawsuit likelihood for firms that carry D&O insurance. Consistent with the managerial opportunism view, this finding suggests that insiders have knowledge about the probability of future litigation, and purchasing insurance accordingly. However, it is also consistent with a moral hazard

[8]As we do not have access to the inputs required for an option pricing model, we approximate the value CEO options as (number of options × exercise price)/3).

[9]We have 10 industry classifications and thus 9 indicator variables.

TABLE 4
Determinants of the Probability of Litigation

	Model 1: Governance Controls Insurance Indicator	Model 2: Governance Controls Abnormal Coverage	Model 3: Governance Controls Abnormal Premium
Constant	−4.493	−5.184	−5.407
	(0.000)	(0.000)	(0.000)
Insurance	0.118		
	(0.001)		
Abnormal Coverage		0.038	
		(0.034)	
Abnormal Premium			0.053
			(0.008)
Board Structure			
Board Size	0.011	0.019	0.018
	(0.063)	(0.016)	(0.033)
Board Independence	0.086	0.237	0.279
	(0.465)	(0.141)	(0.078)
CEO-COB Duality	0.024	0.027	0.027
	(0.516)	(0.571)	(0.582)
Classified Board	−0.062	0.011	−0.004
	(0.292)	(0.889)	(0.963)
Ownership Structure			
Blocks (%)	0.070	0.009	−0.001
	(0.297)	(0.922)	(0.990)
D&O Ownership (%)	0.045	0.126	0.133
	(0.580)	(0.249)	(0.227)
Dual Class	−0.023	−0.032	−0.028
	(0.537)	(0.515)	(0.566)
Compensation			
Total (000s)	0.001	−0.019	−0.019
	(0.914)	(0.093)	(0.023)
Incentives (%)	0.143	0.247	0.256
	(0.068)	(0.020)	(0.017)
Severance	−0.054	−0.035	−0.031
	(0.106)	(0.438)	(0.489)
Employment Arrangement	−0.012	−0.028	−0.014
	(0.753)	(0.581)	(0.780)
	Model 1	Model 2	Model 3
Controls			
Size	0.039	0.058	0.063
	(0.002)	(0.000)	(0.000)
Tobin's *Q*	−0.144	−0.070	−0.077
	(0.318)	(0.147)	(0.116)

(*Continued*)

TABLE 4
Continued

	Model 1: Governance Controls Insurance Indicator	Model 2: Governance Controls Abnormal Coverage	Model 3: Governance Controls Abnormal Premium
FCF	0.321	0.376	0.392
	(0.003)	(0.003)	(0.002)
Debt/Equity	−0.023	−0.002	−0.002
	(0.539)	(0.720)	(0.710)
ROA	0.001	−0.007	−0.005
	(0.486)	(0.732)	(0.769)
Prior litigation	0.073	0.077	0.076
	(0.000)	(0.000)	(0.000)
US Listing	0.085	0.047	0.016
	(0.019)	(0.309)	(0.728)
Year 2000	0.138	0.127	0.130
	(0.007)	(0.063)	(0.058)
Year 2005	0.186	0.229	0.175
	(0.000)	(0.001)	(0.017)
Industry indicators	Yes	Yes	Yes
No. of obs.	928	629	629
LR chi-squared	189.48	143.46	144.55
Regression *p*-value	(0.000)	(0.000)	(0.000)
Pseudo R^2	20.35	21.89	22.28

Note: Probit specifications modeling whether or not firms are sued within 5 years of entering the sample. The dependent variable, *Post Litigation*, equals 1 if the firm is sued within 5 years, and 0 otherwise. We report the partial derivative with respect to the independent variable while all other variables are set at their mean values (*p*-values are reported in parentheses).

explanation where the presence of insurance leads to less care on the part of managers once the insurance is in place. Alternatively, this could reflect opportunistic behavior on the part of plaintiffs as they sue well-insured firms. We suggest that the latter is more likely in large firms, and firms with large cash holdings. Indeed, we find that while coverage limits average $56 million (median $29 million), Cash and Total Assets average $320 million and $5,000 million, respectively (medians of $40 and $711 million), a much higher order of magnitude. Given that we control for these variables in the multivariates, we believe that the association we find is more likely attributable to opportunism or moral hazard in the managers' actions.

Model 2 replaces the *Insurance* indicator with *Abnormal Coverage*, defined as the residuals of the regression of the natural logarithm of maximum coverage (less any deductible) on its hypothesized determinants, consistent with Core (1997, 2000):

$$\begin{aligned}\text{Ln}(\textit{Max Coverage} - \textit{Deductible}) = {} & a + b_1\,\textit{Board Size} + b_2\,\textit{Board Independence} + b_3\,\textit{CEO} \\ & - \textit{COB Duality} + b_4\,\textit{Classified Board} + b_5\textit{D\&O Own} \\ & + b_6\,\textit{Blocks}(\%) + b_7\,\textit{Dual Class} \\ & + b_8\,\textit{CEO Total Compensation} \\ & + b_9\,\textit{CEO Incentives} + b_{10}\,\textit{Size} + b_{11}\,\textit{Free Cash Flow} \\ & + b_{12}\,\textit{Debt/Equity} + b_{13}\,\textit{Return on Assets} \\ & + b_{14}\,\textit{Year 2000} + b_{15}\,\textit{Year 2005} + e. \end{aligned} \quad (1)$$

The results are indicative of potential managerial opportunism in that firms with higher abnormal coverage have a higher likelihood of future litigation. In Model 3, we replace the *Abnormal Coverage* with *Abnormal Premium* defined as the residual of the regression of the natural logarithm of the premium as a function of firm fundamentals and governance structures (also following Core, 2000):[10]

$$\begin{aligned}\text{Ln}\,(\textit{Premium}) = {} & a_0 + b_1\,\textit{Board Size} + b_2\,\textit{Board Independence} + b_3\,\textit{CEO} - \textit{COB Duality} \\ & + b_4\,\textit{Classified Board} + b_5\,\textit{Blocks}(\%) + b_6\,\textit{D\&O Own} + b_7\,\textit{Dual Class} \\ & + b_8\textit{CEO Total Compensation} + b_9\,\textit{CEO Incentives} + b_{10'}\textit{Severance} \\ & + b_{11}\,\textit{Employment Arrangement} + b_{12}\,\textit{Size} + b_{13}\textit{Tobin's Q} \\ & + b_{14}\,\textit{Free Cash Flow} + b_{15}\,\textit{Debt/Equity} + b_{16}\,\textit{Return on Assets} \\ & + b_{17}\,\textit{Prior Litigation} + b_{18}\,\textit{US Listing} + b_{19}\,\textit{Year 2000} + b_{20}\,\textit{Year 2005} \\ & + b_{21}\,\textit{Abnormal Coverage} + e. \end{aligned} \quad (2)$$

Thus, the premium regression residuals contain information about the insurer's pricing decision (given the firm's choice of coverage) after controlling for the firm's governance structure and proxies for litigation risk. As shown in Table 4, Model 3, higher abnormal premiums are also associated with higher lawsuit likelihood. This finding implies that insurers appear to have information as to the likelihood that their clients will be sued, and this is reflected in the premiums they charge.

We also note that larger boards are associated with a higher probability of litigation. In contrast, board independence, CEO duality, board classification, and the ownership structure variables are not associated with litigation likelihood. While higher total CEO compensation is negatively associated with suit likelihood (in Models 2 and 3), the positive association with the ratio of incentive to total executive compensation is consistent with prior findings that high-powered incentives are associated with agency conflicts in some firms (Burns and Kedia, 2006; Peng and Roell, 2008).

Furthermore, larger firms, and those with greater FCFs have a higher probability of litigation, again suggesting that firms with potential agency problems are likely candidates for suits. Firms that have been sued previously and those that are

[10]Specifically, we use the residuals from the regression of Ln(*Premium*) on maximum insurance coverage, firm characteristics, and other governance variables.

cross-listed in United States are also more likely to be sued.[11] Suits are also more likely during the latter years of our sample.

In terms of economic significance, in Models 2 and 3, one standard deviation changes in abnormal coverage ($\sigma = 0.827$) and abnormal premiums ($\sigma = 1.069$) are associated with a 7.8 and 6.5 percent increases in the likelihood of suit, respectively. For other covariates, focusing on Model 3, one standard deviation changes in board size ($\sigma = 3.222$), board independence ($\sigma = 0.160$), incentive pay for the CEO ($\sigma = 0.268$), natural logarithm of firm size ($\sigma = 1.538$), and FCFs ($\sigma = 0.442$) are associated with percentage increases in likelihood of 5.4, 4, 6.5, 9.5, and 19 percent, respectively. Similarly, prior litigation is associated with a 7.9 percent increased likelihood of litigation. The probability of a firm being sued is 13 percent points higher in 2000 relative the base year 1995 (and 17.5 percent points higher in 2005). Our results are robust if we focus on shorter windows when examining the incidence of lawsuits.

Overall, the findings are supportive of both managerial opportunism and moral hazard hypotheses in that firms with D&O insurance and higher coverage limits are more likely to be sued. This is consistent with the findings of Chalmers, Dann, and Harford (2002) and Lin, Officer, and Zou (2011) discussed above. At the same time, our results suggest that insurers appear to have insights into their client's litigation risk and set premiums accordingly. More generally, it appears that D&O coverage limits and premiums are informative about lawsuit likelihood, while several other commonly used proxies for potential agency conflicts are not.[12]

Insurance Coverage

In this section, we revisit the question addressed in prior work as to what firm characteristics are associated with D&O insurance coverage. This analysis also provides a basis for reexamining the insurance pricing decision in the "What Do Insurers Price?" section. We adopt an approach consistent with the prior literature (e.g., Core, 2000; O'Sullivan, 1997; Boyer, 2003, 2008), although we differ along several dimensions. Notably, (1) while much of the prior work emphasizes the amount of coverage we also examine how governance relates to the decision to purchase D&O coverage; (2) we focus on more recent periods where there has been an increase in both litigation and the attention paid to governance; (3) we also examine the role of large shareholders in the context of the insurance decision, an issue that has not been examined extensively in prior work.[13]

[11]For a more detailed analysis of D&O premiums and cross-listing, see Gillan and Panasian (2013).

[12]For 44 cases with available data, we find evidence of larger settlements for firms with larger boards, classified boards, a U.S. cross-listing, and smaller settlements for firms with higher ROA. We also find some evidence of a positive relation between settlement amounts and both abnormal coverage and premiums. We are cautious not to place too much emphasis on this analysis given the small number of observations.

[13]Boyer (2003, 2007) finds that block ownership by financial institutions is associated with lower levels of coverage.

As our sample contains firms with and without D&O liability insurance coverage, using OLS potentially biases our results. As a consequence, we jointly model the decision to purchase insurance and the determinants of the premiums employing a two-stage Heckman (1979) approach. The first stage of the Heckman, the results of which we discuss in this section, is a probit specification modeling probability of a firm purchasing D&O insurance as a function of key governance characteristics and firm fundamentals that we posit are associated with the demand for liability insurance. This allows us to gain insights as to whether firms with governance characteristics potentially indicative of agency conflicts insure themselves against shareholder litigation. One-digit NAICS codes are our exclusion restriction and are not part of the second-stage premium regression model. The rationale is that Kim and Skinner (2012) report that while litigation tends to cluster in certain industries, industry membership alone is a poor predictor of litigation. They also note that when industry is added to a model including firm-specific characteristics, the predictive power of the model is improved. Therefore, we argue that although industry membership might affect the firm's choice to buy insurance, it is unlikely that it will affect the amount of coverage purchased or the premiums charged by insurers. This makes the source of identification clear in our Heckman model.

The literature also suggests that board effectiveness depends on its size and independence (e.g., Weisbach, 1988; Byrd and Hickman, 1992; Yermack, 1996). Other studies report that firms with combined CEO and board chair positions (CEO/COB duality) have diminished performance (e.g., Yermack, 1996; Shivdasani and Yermack, 1999). However, the evidence on CEO duality is mixed as Brickley, Coles, and Jarrell (1997) find no association between firm performance and the colocation of these positions, while Palmon and Wald (2002) suggest that separating the two positions is beneficial for large firms. With regard to the presence of a classified, or staggered board Faleye (2007) finds that such structures significantly insulate management from market discipline and are indicative of entrenchment. Thus, we incorporate indicator variables to capture CEO duality and the presence of classified boards.[14] Our prior is that if these factors are important in adding to, or attenuating, agency conflicts then they will affect the likelihood that a firm purchases D&O insurance.

We also consider other governance features that potentially affect agency conflicts between managers and shareholders. As Shleifer and Vishny (1986) argue, concentrated ownership provides monitoring incentives and potentially mitigates the free-rider problem.[15] Thus, firms with high levels of block ownership might face lower litigation risk and have a lower demand for insurance. In terms of inside ownership, agency theory posits that managerial ownership can also attenuate agency problems by aligning managers' interests with those of shareholders (Jensen and Meckling, 1976). In particular, agency conflicts may be exacerbated if there is a

[14]We do not have data on other potential antitakeover measures for the full sample.

[15]Kremslehner (2012) models the demand for D&O insurance and finds that D&O insurance coverage and managerial compensation are complements.

wedge between cash flow and voting rights (e.g., Claessens et al., 2002; Lemmon and Lins, 2003; Lins, 2003). Thus we include both directors' and officers' ownership as percentage of total number of shares outstanding, and an indicator variable capturing whether firms have a dual-class ownership structure.

Prior work suggests a series of other firm-specific controls that might influence a firm's liability risk and thus the probability of purchasing insurance. Mayers and Smith (1982) contend that litigation risk increases with the firm size and the scope of operations. Furthermore, Jensen (1986) argues that high levels of FCF give managers greater discretion over the firms' financial resources, which may not be used in the best interests of the shareholders. Financial leverage is also potentially important. As noted by Mayers and Smith (1982), higher debt levels might be associated with a higher need for insurance to avoid costly financial distress. Of course, highly levered firms might also have fewer agency problems as they benefit from the additional monitoring provided by debtholders. Core (1997) highlights that D&O liability claims are often triggered by weak financial performance; thus, we include the return on assets (ROA) as a proxy for firm performance. Finally, we control for whether the firm cross-lists in the United States, as doing so results in exposure to a more litigious environment.

The general specification for the first-stage of the Heckman model is as follows:

$$\begin{aligned} P\,(Insurance) = {} & a + b_1\,Board\ Size + b_2\,Board\ Independence + b_3\,CEO/COB\ Duality \\ & + b_4\,Classified\ Board + b_5\,Block\,(Indicator) + b_6\,Blocks(\%) \\ & + b_7\,D\&O\ Own + b_8\,Dual\ Class + b_9\,Size + b_{10}\,Tobin's\ Q \\ & + b_{11}Free\ Cash\ Flow + b_{12}\,Debt/Equity + b_{13}\,Return\ on\ Assets \\ & + b_{14}\,Prior\ Litigation + b_{15}US\ List + b_{16-24}\,NAICS1. \end{aligned} \tag{3}$$

Table 5 reports the marginal effects of this analysis for several different specifications. All models include control variables (size, Tobin's Q, FCF, debt-to-equity, ROA, and U.S. listing indicator) and industry indicator variables based on the one-digit NAICS codes.[16] Models 1 and 2 incorporate board structure and ownership variables, respectively. Model 3 includes all variables of interest.[17] In all specifications, the probit models include robust standard errors clustered at the firm level. The marginal effects are evaluated at the sample means for all variables, and correspond to an infinitesimal change for continuous variables and a move from 0 to 1 for indicator variables.

In contrast to the prior literature, we find no evidence of an association between board size and the likelihood of insurance coverage. Our results also indicate a positive

[16]The industry indicators are jointly significant at the $p < 0.001$ level.

[17]We also estimated a Tobit regression (results not tabled) using the natural logarithm of the amount of insurance coverage as a dependent variable, with no coverage censored at 0. We find that the amount of coverage increases with board (and firm) size and board independence.

TABLE 5
Insurance Coverage

	Insurance 0/1		
	Model 1: Board Variables	Model 2: Ownership Variables	Model 3: All Variables
Constant	−1.245	−0.958	−1.372
	(0.090)	(0.191)	(0.071)
Board Structure			
Board Size	0.002		−0.003
	(0.968)		(0.627)
Board Independence	0.377		0.440
	(0.000)		(0.000)
CEO Duality	−0.080		−0.083
	(0.029)		(0.024)
Classified Board	−0.085		0.011
	(0.197)		(0.892)
Ownership Structure			
Block (Indicator)		−0.028	−0.064
		(0.547)	(0.323)
Blocks (%)		0.136	−0.033
		(0.107)	(0.475)
D&O Ownership (%)		−0.041	0.180
		(0.616)	(0.042)
Dual Class		0.021	0.011
		(0.585)	(0.766)
Controls			
Size	0.012	0.016	0.012
	(0.336)	(0.171)	(0.331)
Tobin's *Q*	0.036	0.006	0.018
	(0.650)	(0.920)	(0.839)
FCF	−0.153	−0.142	−0.163
	(0.127)	(0.179)	(0.119)
Debt/Equity	0.014	0.011	0.012
	(0.080)	(0.027)	(0.088)
ROA	−0.007	−0.007	−0.006
	(0.200)	(0.198)	(0.259)
Prior litigation	0.002	0.001	0.003
	(0.893)	(0.955)	(0.869)
US Listing	0.152	0.156	0.158
	(0.000)	(0.000)	(0.000)
Industry indicators	Yes	Yes	Yes
No. of obs.	927	927	927
Likelihood ratio	112.74	95.07	119.45
Regression *p*-value	(0.000)	(0.000)	(0.000)

Note: For the probit models, the dependent variable, *Insurance*, equals 1 if the firm has D&O insurance, and 0 otherwise. We report the partial derivative with respect to the independent variable, while all other variables are set at their mean values (the *p*-values are reported in parentheses).

association between board independence the purchase of insurance, consistent with prior work (e.g., O'Sullivan, 1997; Core, 2000; Boyer, 2007). With regard to CEO/COB duality, we find a negative association with the likelihood of insurance coverage.

Contrary to Romano (1991) and Core (1997), we report that prior litigation has no impact on a firm's choice to carry insurance. Discussions with industry representatives suggest that such a result is, perhaps, not surprising. Consistent with executive turnover following suits (Karpoff, Lee, and Martin, 2008; Agrawal and Cooper, 2009), it is often viewed that firms "clean house" after lawsuits and face reduced litigation risk going forward. Moreover, consistent with Boyer (2003), once firms purchase insurance they tend to maintain coverage going forward, suggesting that D&O insurance is a matter of "habit." We find that increased director and officer ownership is associated with insurance purchase (Model 3), but blockholdings are not. Finally, in all specifications we find that the likelihood of purchasing insurance is significantly higher for firms that cross-list in the United States.

Focusing on the economic interpretation of this analysis, based on the marginal effects reported in Model 3, we note that a one standard deviation change in board independence (moving from 66 to 82 percent board independence) increases the probability of buying D&O insurance by 6.5 percent points. Similarly, one standard deviation change in block ownership ($\sigma = 0.304$), D&O ownership ($\sigma = 0.240$), and the debt/equity ratio ($\sigma = 3.912$) are associated with increased likelihood of insurance purchase equal to 0.3, 5.2, and 3.6 percent points, respectively. Our results also show that firms cross-listing in the United States have approximately a 47.8 percent point higher probability of carrying D&O liability insurance. These findings suggest that the analysis of the insurance choice decision is informative.

What Do Insurers Price?

We now turn to the question of what do insurers' price? This is provided by the second-stage regression from the Heckman specification. As mentioned previously, the Heckman specification includes one-digit NAICS codes as an exclusion restriction and they are not part of the second-stage premium regression model. This makes the source of identification clear in our model setting. Through our second-stage regression, conditioned on the presence of D&O liability insurance coverage, we provide updated evidence on the factors that D&O insurers appear to price. The independent variables we employ in the second stage include those outlined in the first-stage regression along with a number of other covariates suggested in the literature. Specifically, prior work focusing on D&O insurance often includes aspects of contracting with the CEO, notably, the presence of severance agreements and employment arrangements, along with the level of CEO compensation and the proportion of compensation that is incentive based.

Some suggest that high levels of pay and the presence of employment arrangements or severance agreements are indicative of entrenchment, and thus agency problems (e.g., Core, 2000). Others argue that severance and employment arrangements are the

result of optimal contracting, and do not necessarily imply weaker governance (Gillan, Hartzell, and Parrino, 2009).[18] With regard to incentive-based pay, the evidence is also mixed. While incentive-based pay arguably aligns management and shareholder interests (e.g., Bryan, Hwang, and Lilien, 2000), high-powered incentives might contribute to agency problems (Burns and Kedia, 2006; Peng and Roell, 2008). Thus, we view the directionality of these factors as an empirical issue. Nonetheless, if they are important, then they will be priced by the D&O insurers and reflected in the premiums charged.

Finally, following the approach of Core (1997), this specification includes an additional variable "abnormal coverage," as discussed above, along with the inverse-Mills ratio from the first-stage selection model as in Equation (3):

$$\begin{aligned}\text{Ln}\,(Premium) = {} & a_0 + b_1\,Board\ Size + b_2\,Board\ Independence + b_3\,CEO/COB\ Duality \\ & + b_4\,Classified\ Board + b_5\,Block(Indicator) + b_6\,Blocks(\%) \\ & + b_7\,D\&O\ Own + b_8\,Dual\ Class + b_9 CEO\ Total\ Compensation \\ & + b_{10}\,CEO\ Incentives + b_{11'} Severance\ Agreement \\ & + b_{12}\,Employment\ Arrangement + b_{13}\,Size + b_{14}\,Tobin's\ Q \\ & + b_{15}\,Free\ Cash\ Flow + b_{16}\,Debt/Equity + b_{17} Return\ on\ Assets \\ & + b_{18}\,Prior\ Litigation + b_{19}\,US\ Listing + b_{20} Year\ 2000 + b_{21}\,Year\ 2005 \\ & + b_{22} Year\ 2000 * US\ Listing + b_{23} Year\ 2005 * US\ Listing \\ & + b_{24}\,Abnormal\ Coverage + b_{25} Inverse\ Mills\ Ratio + e \end{aligned} \tag{4}$$

The above specification adds to our basic model developed in Equation (2) by adding an indicator variable for the presence of a blockholder, and interaction terms between the U.S. listing and year indicators. The results are reported in Table 6. All specifications include firm size, FCF, debt-to-equity ratio, ROA, prior litigation, year indicator variables, an interaction between year and the U.S. listing indicator. All models employ robust standard errors clustered at the firm level.

Model 1 includes the board variables: CEO/COB duality, board size, board independence, and classified board, while Models 2 and 3 include ownership variables and compensation variables, respectively. Model 4 is the full specification as per Equation (4) above. The last column of the table reports marginal effects and significance levels, conditioned on having D&O insurance, for the specification presented in Model 4. Note that for variables that appear in both the selection and outcome equations the marginal effect on the premium is sum of the variable's indirect effect on the probability of carrying insurance and the direct effect on the

[18]It has been suggested that D&O insurance is a component of compensation for outside directors. However, studies testing this hypothesis have concluded that there is no relation between D&O insurance coverage (Core, 1997) or deductibles (Boyer, 2007) and directors' remuneration. Further, Boyer (2007) contends that liability insurance primarily benefits shareholders, as they are the ones who lose in cases of extreme agency conflicts.

TABLE 6
Heckman Second-Stage Regression of Logged D&O Premiums

	Model 1: Board Variables	Model 2: Ownership Variables	Model 3: Compensation Variables	Model 4: All Variables	Marginal Effects for Model 4
Constant	6.272	6.562	5.856	6.534	6.534
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Abnormal Coverage	0.536	0.526	0.531	0.569	0.569
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Board Structure					
Board Size	0.070			0.067	0.068
	(0.000)			(0.000)	(0.000)
Board Independence	0.152			−0.174	0.178
	(0.514)			(0.482)	(0.413)
CEO Duality	0.087			0.132	0.081
	(0.257)			(0.097)	(0.255)
Classified Board	0.082			0.050	−0.005
	(0.564)			(0.730)	(0.970)
Ownership Structure					
Blocks (indicator)		−0.043		−0.015	−0.015
		(0.663)		(0.868)	(0.868)
Blocks %		−0.245		−0.330	−0.158
		(0.193)		(0.061)	(0.335)
D&O Own.		−0.019		0.061	0.042
		(0.916)		(0.722)	(0.786)
Dual Class		0.173		0.100	0.093
		(0.046)		(0.052)	(0.210)
Heckman Second-Stage Regression of the Log of Premiums					
Compensation					
Total (000's)			0.020	−0.005	−0.005
			(0.380)	(0.837)	(0.837)
Incentives (%)			0.288	0.345	0.345
			(0.059)	(0.019)	(0.019)
Severance			0.250	0.259	0.259
			(0.000)	(0.000)	(0.000)
Executive Agreements			0.288	0.271	0.271
			(0.000)	(0.000)	(0.000)
Controls					
Size	0.214	0.254	0.249	0.208	0.225
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Tobin's *Q*	−0.302	−0.389	−0.403	−0.295	−0.295
	(0.007)	(0.002)	(0.001)	(0.006)	(0.006)
FCF	−0.003	0.024	0.015	0.036	−0.143
	(0.964)	(0.769)	(0.847)	(0.635)	(0.120)
Debt/Equity	0.015	0.015	0.017	0.015	0.031
	(0.057)	(0.087)	(0.039)	(0.062)	(0.001)
ROA	0.041	0.037	0.037	0.034	0.028
	(0.039)	(0.083)	(0.069)	(0.090)	(0.129)
Prior Litigation	0.028	0.056	0.060	0.022	0.031
	(0.405)	(0.126)	(0.088)	(0.534)	(0.326)

(*Continued*)

TABLE 6
Continued

	Model 1: Board Variables	Model 2: Ownership Variables	Model 3: Compensation Variables	Model 4: All Variables	Marginal Effects for Model 4
Regulatory Regime					
US Listing	0.661	0.614	0.574	0.575	0.575
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year_2000	0.081	0.081	0.064	0.084	0.121
	(0.449)	(0.560)	(0.564)	(0.440)	(0.227)
Year_2005	0.959	0.750	0.682	0.788	0.891
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
US Listing_2000	−0.261	−0.226	−0.241	−0.291	−0.291
	(0.117)	(0.560)	(0.564)	(0.065)	(0.065)
US Listing_2005	0.322	0.750	0.383	0.324	0.324
	(0.047)	(0.029)	(0.017)	(0.035)	(0.035)
Mills Ratio	−0.376	−0.743	−0.639	−0.611	–
	(0.065)	(0.001)	(0.002)	(0.007)	
Total no. of obs.	928	928	928	928	928
Uncensored obs.	629	629	629	629	629
Wald chi-squared	859.80	708.30	798.99	915.83	915.83
Reg. *p*-value	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)

Note: Second-stage results of a two-stage Heckman specification, where the first stage is a probit regression controlling for the insurance purchase decision, and the second stage is an OLS regression with the dependent variable as the log of D&O premiums (*p*-values in parentheses).

premium levels (Core and Guay, 1999; Vance, 2009).[19] Also, in reporting marginal effects coefficients, we are taking into account the fact that the dependent variable is logged.

For the governance variables we find that the coefficient on board size is positive and significant. One interpretation is that insurers perceive larger boards as being less effective monitors. In terms of aggregate block ownership, Model 4 suggests lower premiums. However, the lack of significance for the marginal effect suggests that the association between premiums and block ownership is largely indirect via the influence of blockholders on the insurance purchase decision. In contrast, increased insider ownership is unrelated to the premiums charged, suggesting that D&O insurers do not price this aspect of ownership structure. However, dual-class structures are associated with higher premiums, consistent with the view that the separation of voting and cash-flow rights is potentially entrenching.

We also find that higher incentive-based compensation is associated with higher premiums, implying potential agency costs in firms with such compensation

[19]For the variables that are only present in the second-stage regression, the coefficient in Model 4 is identical to the marginal effect in the last column (see Core and Guay, 1999; Vance, 2009).

structures, as found by Burns and Kedia (2006) and Peng and Roell (2008). Premiums also increase with the presence of employment and severance agreements, consistent with Core's (2000) view that such arrangements are potentially entrenching.

With regard to the other control variables, premiums are higher for firms with higher abnormal insurance coverage, but only weakly related to prior lawsuits (only the Model 3 coefficient is significant). Moreover, consistent with prior work, premiums are markedly higher for firms cross-listed in the United States. In terms of variation over time, premiums in 2000 do not differ significantly from those in the base year, 1995. However, by 2005, after the governance crisis and implementation of governance reforms in both the United States and Canada, premiums are significantly higher in all specifications.[20]

Focusing on the marginal effects in the last column of Table 6, an increase in board size by one person is associated with a 6.2 percent increase in premiums, while the marginal effect of having the CEO also serve as board chair is 0. With respect to incentive-based compensation for the CEO, we note that a 10 percent increase in the ratio of incentive to total compensation results in a premium increase of 34 percent, while the presence of severance arrangements and employment agreements are each associated with a 25–26 percent higher premium. Cross-listed firms have premiums that are approximately 57 percent higher, and premiums are 89 percent higher in 2005 compared to the 1995 base year (but lower in 2000), and about 3 percent higher if also listed in the United States during 2005, all else equal.

Given that firms appear in the sample multiple times, using firm random effects or firm fixed effects is arguably preferable—the rationale is that some aspects of the firms under study do not change over the sample period and may be unobservable to the econometrician, but not to the insurer who is underwriting the contract. However, estimating these models can be problematic, especially when the number of time periods is small and the number of individuals is large (Laisney and Lechner, 2003). As an alternative, we estimated Heckman models for each of the 3 sample years individually and the results are qualitatively similar. We also reestimate our analyses using a simple OLS model for the *Premium* regression using only observations with positive values of insurance coverage as per the prior literature (Core, 2000; Chalmers, Dann, and Harford, 2002), and separately running the probit model of insurance choice.[21] This is, in effect, a two-part model (Dow and Norton, 2003) and the results are also robust to this alternate specification.[22]

[20]Our 2005 result does not appear to be driven by cyclicality in insurance pricing. Towers Perrin Tillinghast reports that insurers had ample ability to write coverage during the sample period, and further, that D&O premiums peaked in 2003 then leveled out somewhat after that.

[21]Although the Mills ratio coefficients are all statistically significant at the 1 percent level (in Table 6), which suggests the suitability of a Heckman selection model, we do it as a robustness test.

[22]Using one-digit NAICS indicators as instrumental variables, we also reestimate our models in a 2SLS to explore potential endogeneity issues pertaining to the likelihood of insurance coverage and determinants of insurance premiums. We note that the results do not change relative to our prior models employed.

DISCUSSION AND CONCLUSIONS

We examine the association between D&O insurance and securities litigation for a sample of Canadian firms, firms for which disclosures about D&O liability coverage and pricing are available. As D&O insurers are exposed to litigation costs and settlement amounts in lawsuits, they have financial incentives to price litigation risk associated with management–shareholder conflicts. Our results indicate that firms with D&O insurance are more likely to be sued relative to uninsured firms, and that the likelihood of litigation increases for firms with higher-than-expected coverage. The latter is suggestive of potential managerial opportunism, or moral hazard, consistent with Chalmers, Dann, and Harford (2002) and Lin, Officer and Zou (2011). Insurers, however, appear to price this behavior as higher premiums (after controlling for coverage) are associated with increased litigation likelihood.

We also provide updated evidence as to the determinants of D&O insurance pricing during sample periods where the importance of corporate governance has increased. Consistent with prior evidence we find that insurance coverage and premiums charged are associated with proxies for potential agency conflicts (and the quality of the governance mechanisms in place to mitigate such conflicts). At the same time, board independence is associated with higher premiums, suggesting that D&O insurers do not view increased independence in a favorable light.

Overall, our results contribute to our understanding of securities litigation risk and its relation with firm characteristics, including governance structures. Moreover, the use of D&O liability insurance data suggests that measures of abnormal (or excess) insurance coverage, and abnormal insurance premiums, are both associated with future litigation. Taken together, our findings suggest that coverage and premium levels have the potential to convey information about lawsuit likelihood to the marketplace.

APPENDIX

Variable	Definition
Board Size	The number of directors on the board
Board Independence	The percentage of independent directors on the board
CEO-COB Duality	A binary variable equal to 1 if the CEO is also the chair of the board and, 0 otherwise
Classified Board	An indicator variable equal to 1 if the board is classified, and 0 otherwise
Block	An indicator equal to 1 if the firm has at least one blockholder with 10 percent or more ownership
Blocks (%)	The total percentage of shares held by blockholders with 10 percent ownership or more
D&O Ownership (%)	Ownership by directors and officers
Dual Class	An indicator taking a value of 1 if the firm has a dual class voting structure, and 0 otherwise
Total Compensation	The log of total CEO compensation

(*Continued*)

Continued

Variable	Definition
Incentives	The fraction of CEO incentive-based pay to total compensation
Severance	An indicator taking the value of 1 if there is a severance agreement present
Employment Agreement	An indicator taking the value of 1 if there is an employment agreement present, and 0 otherwise
Abnormal Coverage	The residuals from a regression of log of maximum coverage less deductible on their economic determinants
Abnormal Premium	The residuals from a regression of log of Premiums on the economic determinants
Size	Market value of equity
Tobin's Q	Equal to: (Market Value of Equity + Total Debt + Preferred Shares)/ Total Assets
Free Cash Flow	(Operating income before depreciation – Income Taxes – Interest Expense – Preferred Dividends – Common Dividends)/Total Assets
Debt/Equity Ratio	Ratio of firm Total Debt to Total Equity
Return on Assets	Net Income over Total Assets
Prior Litigation	An indicator taking on a value of 1 if the firm was subject to prior litigation, and 0 otherwise
US Listing	An indicator variable equal to 1 if the firm is cross-listed in the United States, and 0 otherwise
Year 2000	An indicator with a value of 1 if the sample year is 2000, and 0 otherwise
Year 2005	An indicator with a value of 1 if the sample year is 2005, and 0 otherwise
US Listing∗*2000*	Interaction term for U.S.-listed firms in 2000
US Listing∗*2005*	Interaction terms for U.S.-listed firms in 2005

TABLE A1
Probability of Litigation
(Years 1, 2, and 3 only) Replicating Table 4

	Model 1: Governance Controls	Model 2: Governance Controls Insurance Indicator	Model 3: Governance Controls Abnormal Coverage	Model 4: Governance Controls Abnormal Premium
Constant	−7.312***	−5.562***	−5.442***	−5.611***
	(0.000)	(0.000)	(0.000)	(0.000)
Insurance	–	0.524**		
		(0.001)		
Abnormal Coverage			0.188**	
			(0.026)	

(*Continued*)

TABLE A1
Continued

	Model 1: Governance Controls	Model 2: Governance Controls Insurance Indicator	Model 3: Governance Controls Abnormal Coverage	Model 4: Governance Controls Abnormal Premium
Abnormal Premium				0.247***
				(0.000)
Board Structure				
Board Size	−0.014	0.013	0.015	0.016
	(0.670)	(0.537)	(0.457)	(0.457)
Board Independence	1.265*	0.436	0.580	0.572*
	(0.047)	(0.304)	(0.158)	(0.175)
CEO Duality	0.055	−0.233	−0.269*	−0.250*
	(0.771)	(0.103)	(0.056)	(0.070)
Classified Board	−0.025	0.019	0.033	0.038
	(0.943)	(0.931)	(0.886)	(0.877)
Ownership Structure				
Blocks %	0.611*	0.442*	0.473**	0.465**
	(0.094)	(0.057)	(0.037)	(0.048)
D&O Own.	0.042	0.131	0.195	0.153
	(0.933)	(0.628)	(0.464)	(0.597)
Dual Class	−0.171	0.125	0.131	0.133
	(0.487)	(0.360)	(0.331)	(0.298)
Compensation				
Total (000's)	0.049	0.049	0.054*	0.053
	(0.397)	(0.524)	(0.456)	(0.445)
Incentives (%)	0.019	0.023	−0.028**	−0.026
	(0.953)	(0.943)	(0.929)	(0.935)
Severance	0.012	0.002	0.031	0.034
	(0.945)	(0.989)	(0.802)	(0.783)
Executive Agreements	0.014	−0.078	−0.062	−0.050
	(0.946)	(0.529)	(0.618)	(0.710)

TABLE A2
Probability of Litigation
(Years 1, 2, and 3 Only) Replicating Table 4

	Model 1: Governance Controls	Model 2: Governance Controls Insurance Indicator	Model 3: Governance Controls Abnormal Coverage	Model 4: Governance Controls Abnormal Premium
Controls				
Size	0.166**	0.115**	0.119**	0.128***
	(0.050)	(0.025)	(0.014)	(0.007)

(*Continued*)

TABLE A2
Continued

	Model 1: Governance Controls	Model 2: Governance Controls Insurance Indicator	Model 3: Governance Controls Abnormal Coverage	Model 4: Governance Controls Abnormal Premium
Tobin's *Q*	−2.495	−0.193	−0.197	−0.184
	(0.379)	(0.365)	(0.406)	(0.422)
FCF	0.284	0.740**	0.684*	0.758**
	(0.466)	(0.043)	(0.067)	(0.049)
Debt/Equity	−0.090	−0.030	−0.029	−0.028
	(0.258)	(0.141)	(0.154)	(0.200)
ROA	−0.004	−0.006	−0.010	−0.008
	(0.660)	(0.668)	(0.422)	(0.453)
Prior Litigation	0.123*	0.261***	0.251***	0.245**
	(0.085)	(0.000)	(0.000)	(0.000)
US Listing	0.619***	0.427***	0.448***	0.343***
	(0.000)	(0.001)	(0.000)	(0.007)
No. of obs.	927	927	634	614
LR chi-squared	87.67	130.76	119.91	122.98
Regression *p*-value	(0.000)	(0.000)	(0.000)	(0.000)
Pseudo R^2	18.93	20.41	19.31	20.48

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