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Directors' and officers' liability insurance and analyst forecast properties

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ABSTRACT

We examine whether Directors and Officers (D&O) Insurance purchases around equity issues is priced information. Our results support the managerial opportunism hypothesis that the purchase of insurance is a signal of increased litigation risk and agency costs. At the time of equity issues, financial analysts are less optimistic about the future earnings of firms that purchase the insurance in comparison to firms that do not purchase it. We also find that financial analysts' optimism is less pronounced for insured firms that increase their coverage. These results are robust to different measures of financial analysts' forecasts and other checks.

1. Introduction

A growing strand of the financial and accounting literature argues that financial analysts play a determinant role in the firms' information environment (Lang et al., 2004) as they help to reduce agency problems between managers and shareholders, and alleviate information asymmetry for investors relying on analysts' forecasts[1].

Studying analyst earnings forecasts (which we use as a proxy for market expectations)[2] of firms that purchase Directors and Officers Insurance (D&O, hereafter)[3] provides us with an interesting research question that revolves around two contrasting predictions. *On the one hand*, the purchase of D&O can be viewed as a signal of litigation risk and divergence between managerial conduct and shareholder welfare (e.g., Chalmers, Dann, and Harford (hereafter CDH); Baker and Griffith, 2007). Lin et al. (2013) indeed find that banks associate D&O insurance coverage with greater default risk as reflected in the loan spreads charged to firms, which implies that D&O insurance leads to more moral hazard and information asymmetry.

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[1] Dyck, Morse, and Zingales (2010) point out that the most efficient external whistleblowers for corporate fraud are analysts, while the Securities and Exchange Commission and auditors play only a secondary role in the discovery of fraud.

[2] La Porta (1996) suggests that security analysts' forecasts represent a relatively good proxy for markets expectations of future earnings.

[3] Directors and Officers Insurance is considered a key component of corporate insurance. The D&Os of corporations seek coverage in order to protect themselves against the risk of being sued. For instance, shareholders can sue managers for violating their fiduciary duty to the shareholders.

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This is the management opportunity hypothesis. Considering that market professionals are more skilled than other investors in analyzing publicly available information, Healy and Papelu (2001, p.14) posit that "*Their (analysts') earnings forecasts are more accurate than time-series models of earnings, presumably in part because they are able to incorporate more timely firm and economy news into their forecasts than time-series models (see Brown and Rozeff (1978); Brown et al. (1987)* ". Therefore, if financial analysts interpret the purchase of D&O as a negative signal, it will be reflected in their forecasts, and thus we expect analysts to show less optimism (i.e., more pessimism) about the future earnings of firms that purchase D&O.

O*n the other hand*, because the information environment about the future is more uncertain, forecasting and predicting future earnings become more complex. In this respect, Lim (2001) and Das et al. (1998) find that when earnings are difficult to predict, analyst forecasts are more optimistically biased. Since the demand for D&O insurance could be due to risk factors such as litigation, distress, earnings managements, and habit (Core, 1997; CDH, 2002; O'Sullivan, 2002; Boyer, 2003; Boubakri et al., 2011), it compounds the uncertainty of the information environment. As a consequence, analysts produce more-optimistic forecasts in exchange for the access to management private information as suggested by Lim (2001).

Our main goal in this article is to disentangle these two predictions by examining how financial analysts price the information regarding the purchase of D&O insurance, and embed it in their forecasts of the firms' prospects at the time of seasoned equity offerings (SEOs). Specifically, we investigate how analysts' earnings forecasts for firms that purchase the insurance around SEOs compare to those firms that do not. Equity issues as a testing ground is justified by the fact that SEOs (as compared to IPOs) involve less asymmetrical information since the issuing firms are already publicly traded, which allows us to mitigate this effect and isolate the type of signal sent by D&O purchases. Additionally, equity issues are highly risky corporate decisions that are shown in the literature to exhibit poor long-term performance (Jain and Kini, 1998; Loughran and Ritter, 1995). This in turn increases the litigation risk by unsatisfied shareholders, thus creating incentives for managers to want to protect themselves against such potential negative outcomes.

To assess the issues addressed in this paper, we use a sample of SEOs of Canadian firms over the period 1997 to 2010. Unlike the United States, the Canadian setting provides us with a natural laboratory to examine questions related to D&O insurance given that the latter must be publicly disclosed in Canadian companies. In addition, assuming that financial analysts' opinions represent those of investors, we use a comprehensive set of analyst forecast properties to measure investor optimism, including forecast error, long-term earnings' growth, accuracy, and revision ratio.

Our univariate and multivariate analysis show that financial analysts are optimistic about equity issuance, which is consistent with previous studies (Dechow et al., 2000; Ritter, 2003; Bradshaw et al., 2006) documenting that firms time their issuance to exploit the temporary misevaluation (overvaluation) of their securities in capital markets. Moreover, for issuing firms that purchase D&O insurance, we find that financial analysts' forecasts are relatively less optimistic. This result is consistent with the managerial opportunism hypothesis holding that the purchase of insurance is a signal of increased litigation risk and agency problems, and suggests that investors tend to be more conservative in their assessments of the earnings' prospects of D&O firms. We also find that the overoptimism in financial analysts' forecasts is less pronounced for insured firms that increase their coverage compared to those that do not. These findings are robust to different measures of financial analysts' forecasts and to other tests.

This study contributes to the literature on at least two grounds. *First*, we provide the first evidence, to the best of our knowledge, bridging the gap between the two stands of studies on D&O insurance and analyst following, respectively. By considering how the purchase of insurance is perceived and interpreted by financial analysts, we build upon the existing research on how these information intermediaries can alleviate information asymmetry between corporations and investors. *Second*, this study sheds adds insight on the mounting and ongoing debate over the role of D&O insurance in the traditional conflict of interest between shareholders and managers. It demonstrates how the purchase of the insurance affects the analyst forecasts accuracy, suggesting that D&O insurance affects the quality of information available to market participants.

The remainder of the paper is organized as follows. In Section 2, we review the literature and develop our testable hypothesis. Section 3 describes the data and methodology. Section 4 discusses the empirical results. In Section 5, we present our robustness tests followed by the conclusion in Section 6.

2. Literature review and hypothesis development

2.1. Financial analysts properties and equity issuance

Financial analysts play an important role in the valuation of firms by providing forecasts about earnings and long-term growth forecasts. In fact, investors' perceptions are highly guided by financial analysts' forecasts. Numerous studies examine the relation between corporate financing activities and financial analysts' forecasts: Using a sample of initial public offering (IPOs hereafter), Rajan and Servaes (1997) find evidence that analysts' forecasts about earnings per share tend to be overoptimistic, with forecast errors averaging 5 % of the firm's stock price. The authors also report that the long-run growth expectations decrease substantially over the following months suggesting that investors are overoptimistic about the prospects of the IPO at the time of the offering but adjust their expectations over time. Similarly, using analysts' long-term growth forecasts as a proxy for optimism, Dechow et al. (2000) document that analysts are overly optimistic about the company's future performance around the time of equity issuance. The authors find that these forecasts are most pronounced when the forecasting analyst is affiliated with the lead manager underwriting the offering. Using 2400 SEOs in U.S., Lin and McNichols (1998) include an examination of analysts' long-term growth forecasts and stock recommendations,

and observe that affiliated analysts issue more optimistic long-term growth forecasts and stock recommendations than unaffiliated analysts.

In a more comprehensive study of the relation between external financing activities and future stock returns, Bradshaw et al. (2006) observe a positive relation between external financing and overoptimism in analysts' forecasts, which holds for different measures of financial forecasts (short-term earnings per share forecasts and long-term earnings per share forecasts). This finding can be explained by the fact that management could choose to issue securities during periods in which analysts' forecasts (and hence investors' expectations) are optimistic. In addition, the authors show that analysts are overoptimistic about the future prospects of firms that are raising new capital regardless of whether the analyst has an explicit investment bank affiliation with these companies. In the same vein, and using analyst forecast errors as a proxy for optimism, Yi et al. (2008) find that investor optimism is high around equity and debt issues. They particularly find it to be higher around equity compared to debt issues, for a period of 12 months subsequent to the offering.

To conclude, existing evidence overall shows that analysts are typically overoptimistic about companies' growth projections around the time of equity issuance. The available findings also suggest that firms time their equity issuance to take advantage of this optimism, thus exploiting the informational asymmetry between insiders and outside investors regarding the true value of the firm.

2.2. D&O liability insurance and equity issuance

In recent years, D&O insurance has grown to become an important component of corporate insurance. This growth is stimulated by the fact that disgruntled investors accuse corporations and their D&O of securities' fraud whenever the stock price decreases dramatically and unexpectedly[4]. It is not surprising that as many as 95% of Fortune 500 companies maintain D&O liability insurance (Gische, 2000). Furthermore, according to the annual surveys conducted by Tillinghast TowersPerrin (1999, 2000, 2002, 2003, 2004, 2005, 2006)[5], around 20% of firms had at least one lawsuit brought against their directors in the previous ten years, and about 50% of claims made against public companies arise from shareholders.

The managerial opportunism hypothesis discussed earlier, posits that in a world of asymmetric information, managers that possess superior information about the firm's future prospects will have incentive to issue equity when the firm is overvalued. Empirical evidence on this market timing behavior is provided in Ritter (1991), Loughran and Ritter (1995), and Teoh et al., (1998), to name the classics. Yet, to date, very few studies looked at D&O insurance purchases around security issuance as a potential indicator of managerial opportunism. The pioneering study by Chalmers, Dann, and Harford (hereafter CDH) (2002) in the particular context of IPOs is the first attempt in this regard. Specifically, the authors examine the purchase of D&O insurance around 72 American IPO firms between 1992 and 1996. They find a significant negative relation between D&O purchases and the firms' long-run post-IPO performance. Using a sample of Canadian SEOs, Boubakri, et al. (2011) find that the amount of D&O coverage is inversely related to the firms' post-issue performance, which supports the argument that opportunistic managers have strong incentives to protect themselves against litigation risk around SEOs by purchasing D&O insurance or increasing its coverage. In this context, the purchase of D&O insurance can signal litigation risk, and a divergence between managerial conduct and shareholder welfare (i.e., agency problems) (Baker and Griffith 2007)[6]. Assuming that analysts indeed have this negative interpretation of D&O insurance, it should be reflected in their forecasts. Importantly, since analysts' reputations and compensations are to a large extent related to the accuracy of their forecasts, we can predict, based on the discussion above, that analysts will likely be less optimistic (i.e., more pessimistic) about the future earnings' prospects of firms that purchase D&O insurance around equity issuance. Similarly, we expect that analysts will be less optimistic for firms that increase their purchase of insurance compared to those that do not.

An alternative hypothesis, namely the information hypothesis, could however be put forward. Several studies indeed suggest that the analysts' ability to make accurate earnings' forecasts is compromised during high-uncertainty events, particularly around mergers (Haw et al., 1994), option listing (Ho et al., 1995), insider trading (Lustgarten and Mande, 1998), and equity offerings (Das, Guo, and Zhang, 2006). The general finding is that the more difficult it is to forecast earnings, the more important private information becomes, and thus the more likely it is that analysts will produce overoptimistic forecasts in exchange for the access to private information. This applies to equity issuance, around which the demand for D&O insurance increases. Among incentives to buy insurance, the literature identifies potential litigation, distress, earnings' managements, and habit. Although Boyer (2003) finds that habit is the main driver of D&O insurance decisions in Canada, Core (1997) shows that litigation[7] and distress are in fact the major determinants of insurance purchases. Thus, based on the information hypothesis, because of the excessive uncertainty of equity issues outcomes, we expect that financial

[4] D&Os most often seek protection against shareholder claims. According to Tillinghast-Towers Perrin's (2003) D&O Liability Survey, about one-half of D&O insurance claims against public companies in Canada and the U.S. are brought by shareholders. Different reasons may trigger lawsuits: illegal acts, violations of security laws, self-dealing, imprudent or negligent management, bankruptcy, executive compensation, and violations of fiduciary duty to shareholders.

[5] The Tillinghast Towers-Perrin surveys provide information about D&O claims and premiums purchasing habits for North American firms. Although these surveys could be subject to selection biases, there is no other consistent information on D&O insurance database. The research is hampered by this lack.

[6] Core (2000) finds evidence that Canadian data supports a negative association between D&O premium and governance quality.

[7] Several events may cause lawsuits: Illegal acts, self-dealing, unfair transactions, and earnings' restatements announcements.

analysts will feel more optimistic about the earnings' forecasts of insured firms compared to uninsured peers. Accordingly, we propose the following non-directional hypotheses that will be submitted to empirical testing:

H1: *Analysts' optimism is associated with the purchase of D&O*

H2: *Analyst forecast properties are associated with the increase in D&O insurance coverage*

3. Data and methodology

3.1. Data

The Canadian context is interesting mainly because the reporting of D&O insurance details is mandatory. Unlike the U.S., Canadian firms must disclose information in their proxy filings and registration statements about their D&O insurance policies, coverage limits and premiums. This mandatory provision eliminates the risk of introducing a selection bias in our sample. Among Canadian listed firms, we then need to identify those that issued equity over our sample period. The initial sample of SEOs comes from Boubakri et al. (2011) with 249 SEOs extracted from the Securities Data Corporation (SDC) from January 1997[8] to December 2003. We supplement this original sample with SEOs from 2003-2010 (95 firms). We require that all issues be Canadian ordinary common stocks; we drop all warrants, unit issues, closed-end funds, right issues, and private placements, and we exclude financial firms (e.g., Loughran and Ritter, 1995) and those not covered by COMPUSTAT at the time of the offering. We then merge the SEOs sample with our D&O insurance liability insurance data, drawn from the SEDAR online database (www.sedar.com).

We obtain analysts' information from the Institutional Brokers Estimate System (I/B/E/S) *Historical Summary File*. This selection leaves us with 192 SEOs that carry D&O insurance and 113 SEOs that do not. For each firm, we obtain the number of analysts, annual earnings per share forecasts, analyst earnings revisions, as well as actual annual earnings per share and long-term earnings' growth forecasts. The analysts' variables represent monthly consensus amounts. They are described in full details in what follows.

3.2. Methodology

To examine financial analyst behavior towards SEOs that carry D&O insurance, we conduct univariate and multivariate analysis. We estimate the following regression model to test our hypothesis:

$$FE = a_0 + a_1 SIZE + a_2 INDUSTRY\_RISK + a_3 FOLLOW + a_4 GROWTH + a_5 CFvolatility + a_6 D\&O + a_7 AGE + \varepsilon_{it}$$

FE is our measure of analyst forecast error. *SIZE* is measured as the natural log of assets. *GROWTH* is measured as the ratio of the book-value of equity at the end of the year to the market-value of equity at the end of the year (i.e., the book-to-market ratio). *CFvolatility*[9] represents the standard deviation of return on sales estimated using data from the prior five years. *INDUSTRY_RISK* and *AGE* are indicator variables to control for industry and SEO age.

a. D&O variables

We use two D&O related variables: *D&O* is a dummy variable taking the value 1 for firms with D&O insurance, and zero otherwise. In addition, *COVERAGE* is a dummy variable taking the value 1 if the insured firm increases the coverage purchased at the end of the SEO fiscal year, and zero otherwise.

b. Analyst forecast variables

We use analyst forecast errors, *FEt_m*, where *m* indicates the number of months prior to fiscal year-end (*FYE*) in which the forecast was made. Following Bradshaw et al. (2006) we select month 4 as the point at which we measure the analyst forecast errors. This point corresponds to the month in which we can be confident that the financial analyst has had access to financial statement information. Financial analysts can thus observe the total coverage limits purchased by managers at the end of the SEO fiscal year. FE_{t-8} [10]is defined as the difference between the median of the one-year-ahead annual earnings forecasts made eight months prior to the *FYE* (F_{t-8} (A_N)) month, and the actual earnings (A_N) standardized by the stock price per share at the time of the forecast (P_{t-8}).

$FE_{t-8} = [(F_{t-8}(A_N - A_N))/(P_{t-8})]$, the greater (smaller) the forecast error in earnings' expectations is, the more optimistic (pessimistic) financial analysts are. We use median values instead of means because mean values can

[8] We start in 1997 because the source of D&O insurance data (SEDAR) becomes available only starting that year. SEDAR is an online database that provides access to most public securities documents and information that are filed by public companies and investment funds with the Canadian Securities Adminstrators.

[9] We use standard deviation of revenues for the model when D&O variables represent COVERAGE over the three years preceding the SEO announcement date to increase the number of observations. We use SROS as an alternative proxy for cash flow volatility. We only report and discuss our results with standard deviation of revenues as the inferences remain the same if we use SROS.

[10] Doukas, Kim and Pantzalis (2002) and Kanagaretnam, Lobo and Mathieu (2012) also use the same measure as a proxy for analyst optimism.

Table 1
Description of Variables and Sources.

Variable	Definition	Source
Forecast variables		
FE	Measured as (median EPS forecast- actual EPS-)/the stock price at the time of the forecast	I/B/E/S summary file
REVISION_RATIO	Measured as the difference between the number of analysts making upward forecast revisions and the number of analysts making downward forecast revisions, divided by the total number of analysts following the company.	I/B/E/S summary file
ACCURACY	Measured as (-1)*abs (median EPS forecast- actual EPS)/the stock price at the time of the forecast	I/B/E/S summary file
LTG_FORECASTS	The mean analysts' forecast of the long-term EPS growth rate.	I/B/E/S summary file
FOLLOW	The number of analysts that follow the firm.	I/B/E/S summary file
D&O variables		
COVERAGE	Total coverage limits purchased at the end of the SEO fiscal year(C$millions).	SEDAR
PREMIUM	Annual premium paid by SEO firm to purchase its D&O liability insurance policy (C$millions).	SEDAR
Control variables		
SIZE	Firm size is measured as the natural log of the assets	COMPUSTAT
VOLROS	Earnings volatility is measured as the standard deviation of sales over the previous 5 years.	COMPUSTAT
GROWTH	The ratio of the book-value of equity at the end of the year to the market-value of equity at the end the year	COMPUSTAT
INDUSTRY_RISK	A dummy variable that equals 1 when the firm belongs to one of the risky industries identified in Bajaj et al. (2000) and 0 otherwise.	
AGE	Dummy variable for the timing of SEO equals to unity if recent SEO and zero otherwise	Author Calculation

This table describes the variables used in our analysis.

be influenced by outliers. In addition, following Yi et al. (2008), we measure optimism with the recommendation revision ratio, accuracy and long-term *EPS* forecast growth rate defined as follows: *REVISION_RATIO* is the difference between the number of analysts making upward forecast revisions and the number of analysts making downward forecast revisions, divided by the total number of analysts following the company; *ACCURACY*= **(-1)***abs (median EPS forecast- actual EPS)/the stock price at the time of the forecast; *LTG_FORECASTS* is the mean analysts' forecast of the long-term *EPS* growth rate. The greater the revision ratio and the long-term EPS forecast growth rates are, the lower the accuracy is, and the more optimistic financial analysts are. Finally, *FOLLOW* is the number of analysts following the firm.

c. Control variables

Bhushan (1989) finds that the number of analysts following private firms is increasing in firm size. Indeed, larger firms are more likely to have more analysts covering them and more forthcoming disclosure policies. Firm size has been found to be related to analyst following in several studies (e.g. Rajan and Servaes, 1997; Duru and Reeb, 2002; Gu and Wu, 2003). It usually captures a host of factors, including the potential for greater fees from trading and corporate finance activities (and hence greater potential analyst revenues as larger firms are more visible and more prestigious). Size is also often included as a partial control for the extent of firm disclosure through channels other than annual reports (Hope, 2002, p.13). Therefore, consistent with previous research, we measure firm size with the log of assets at the time of the issue (*LOGASSETS*).

In our analysis, we control for various factors that are identified as determinants of analyst forecasts such as past performance, growth and volatility of cash flow (Bhushan, 1989; Dechow and Sloan, 1997). Accordingly, we measure (*GROWTH*) as the ratio of the book-value of equity at the end of the year to the market-value of equity at the end the year (i.e., the book-to-market ratio). We next measure the volatility of cash flows as the standard deviation of the return on sales estimated using data from the prior five years (*VOLROS*). Finally, we control for SEO Industry risk (*INDUSTRY_RISK*) and age (*AGE*). Following Boyer and Stern (2012) [11] we identify the ten riskiest industries using the first two digit SIC codes based on the number of cases settled and the average settlement amount in each industry. The authors argue that an insured firm has a greater risk of a lawsuit if it belongs to one of these ten risky industries and will charge a higher premium accordingly.

Table 1 provides the definitions and data sources of the variables, while Table 2 reports the sample descriptive statistics and Table 3 reports correlation coefficients between the regression variables.

The mean and median forecast errors *FE* are positive for both insured and uninsured firms. For example, the mean (median) forecast error for one-year ahead annual earnings is 0.0250 (0.0077) for insured firms compared to 0.0490 (0.0224) for uninsured peers. This result indicates that analysts tend to issue optimistic forecasts for SEOs, and that they are more optimistic about uninsured firms. The standard deviations of FE are 0.0553 for insured firms and 0.0998 for uninsured peers respectively, indicating that the variation is greatest for SEOs that does not buy insurance.

[11] See Bajaj et al.(2000) for a detailed description of the ten risky industries.

Table 2
Descriptive statistics.

Insured firms						
Variables	Obs.	Mean	Median	Standard deviation	25%	75%
FE	169	0.0250	0.0077	0.0553	−0.0016	0.0351
ACCURACY	169	−0.0336	−0.0131	−0.0506	−0.0404	−0.0046
FOLLOW	185	6.2324	5.0000	5.2462	3.0000	8.0000
GROWTH	139	0.5371	0.4352	0.4551	0.2570	0.6523
SIZE	163	2.5440	2.4572	0.8019	1.8718	3.1069
VOLROS	134	9.9204	0.0429	73.8301	0.0165	0.2172
Uninsured Firms						
	Obs.	Mean	Median	Standard deviation	25%	75%
FE	94	0.0490	0.0224	0.0998	−0.0012	0.0460
ACCURACY	94	−0.0603	−0.0287	0.0934	−0.0533	−0.0141
FOLLOW	108	4.9814	4.0000	3.7863	2.0000	7.0000
GROWTH	90	0.5072	0.4347	0.3716	0.2471	0.6327
SIZE	101	2.3231	2.2065	0.6419	1.9152	2.6691
VOLROS	66	3.2013	0.0922	18.9072	0.0320	0.3311

Table 2 presents descriptive statistics of the key variables. Following Bradshaw, Richardson and Sloan (2006) we select month 4 as the point at which we measure the analyst forecast errors. The description of variables is available in Table 1.

Table 3
Pearson correlations.

Variables	FE	LOGASSET	D&O	FOLLOW	INDUSTRY_RISK	GROWTH	AGE
FE	1.0000						
LOGASSET	−0.1175	1.0000					
D&O	−0.1297	0.1319	1.0000				
FOLLOW	−0.0925	**0.6383**	0.1193	1.0000			
INDUSTRY_RISK	−0.0798	**−0.2882**	**0.2023**	**−0.2179**	1.0000		
GROWTH	**0.2086**	**0.2084**	0.0485	0.1091	**−0.2522**	1.0000	
AGE	0.0519	0.0556	**−0.1572**	−0.0268	**−0.1923**	0.0809	1.0000
VOLROS	0.1768	−0.2064	−0.0167	−0.0908	0.0327	−0.0694	0.0911

Table 3 presents Pearson pairwise correlation coefficients between the regression variables. Bold face indicates statistical significance at the 1% level. Descriptions and data sources for these variables are provided in the Table 1.

4. Empirical results

4.1. Univariate analysis

Table 4 reports the mean and median values of analysts' variables for insured and uninsured SEOs over the period 1997 to 2010. The evidence shows that analysts' mean and median forecast errors[12] are positive for both insured and uninsured firms, implying that analysts tend to issue optimistic forecasts about future earnings for all SEOs. These results are consistent with prior research on equity issuance. For example, Micahaely and Womack (1999), Dechow et al. (2000), Ritter (2003), and Bradshaw et al. (2006) find evidence that analysts are overly optimistic about a company's future prospects around the time of equity issuance. Interestingly, the results of the mean and median difference tests indicate that analysts are less optimistic (i.e., pessimistic) for insured relative to uninsured SEOs. For example, the mean (median) of *FE* for insured firms is 0.0250 (0.0077) and 0.0490 (0.0224) for uninsured companies, respectively. This finding supports the managerial opportunism hypothesis associated to the purchase of D&O insurance. In a nutshell, financial analysts perceive the purchase of insurance as a potential signal of litigation risk and agency costs.

After comparing *STD*, forecasts of long-term *EPS* growth rate and accuracy variables of insured and noninsured SEO firms, our analysis reveals higher financial analysts forecast *EPS* growth rates, higher forecast dispersion and lower accuracy (18.24; 0.0212;-0.0603) for noninsured compared to insured firms (15.41; 0.0157; -0.0336). Consistent with our finding using *FE* measure, these results confirm that analysts are more optimistic about the future earnings' growth of uninsured firms compared to insured firms.

Table 5 presents analyst forecast properties for the insured SEOs compared to uninsured SEOs made for the fiscal year of SEO. The results indicate that insured firms exhibit less forecast errors (0.0135) compared to uninsured firms (0.0202). This

[12] Note that if we use alternative deflators (absolute value of median forecasts or sales) to calculate analysts' forecast error, our results remain unchanged.

Table 4
Properties of analysts' forecasts across insured and uninsured SEO.

Measure	Insured Firms		Uninsured Firms			
	Mean	Median	Mean	Median	Mean difference	Median difference
FE	0.0250	0.0077	0.0490	0.0224	0.006***	0.0510**
STD	0.0157	0.006	0.0212	0.0120	0.0268**	0.0020***
REVISION_RATIO	−0.0397	0.0000	−0.048	0.0000	0.5810	0.0570
ACCURACY	−0.0335	−0.0131	−0.0603	−0.028	0.001***	0.000***
LTG_FORECASTS	15.4100	15.0000	18.2400	16.5000	0.0500**	0.007***

Table 3 compares analyst variables for the insured and uninsured SEOs for the period 1997-2010. The forecast represents all the forecasts made for the upcoming fiscal year immediately following the fiscal year of SEO event. Following Bradshaw, Richardson and Sloan (2006) we select month 4 as the point at which we measure the analyst forecast errors. FE is measured as (median EPS forecast- actual EPS-)/the stock price at the time of the forecast). STD is the forecast dispersion, measured as the standard deviation of analysts forecast deflated by the stock price at the forecast date. REVISION_RATIO is the difference between the number of analysts making upward forecast revisions and the number of analysts making downward forecast revisions, divided by the total number of analysts following the company. ACCURACY= (-1)*abs (median EPS forecast- actual EPS)/the stock price at the time of the forecast. LTG_FORECASTS represents the post-issue12-month mean analysts' forecast of the long-term EPS growth rate. The two last columns report the t test for difference in the mean and p-value of the Mann Whitney test. The difference is calculated as mean (median) of noninsured- mean (median) of insured.

Table 5
Comparison of pre-issue analysts' forecasts for insured and uninsured SEOs.

Measures	Insured Firms		Uninsured Firms			
	Mean	Median	Mean	Median	Mean difference	Median difference
FE	0.0135	0.0010	0.0202	0.0108	0.0400**	0.000***
STD	0.0271	0.00619	0.0174	0.0100	0.0380**	0.000***
REVISION_RATIO	−0.0294	0.0000	−0.0516	0.0000	0.0460**	0.0483**
ACCURACY	−0.0362	−0.0109	−0.0509	−0.0232	0.000***	0.000***
LTG_FORECASTS	15.5100	13.7350	20.2430	18.4300	0.0008***	0.000***

Table 4 compares analyst variables for the insured SEOs compared to uninsured SEOs for the period 1997-2010. The forecast represents all the forecast made during one year before fiscal year end of SEO for the fiscal year of SEO. FE is measured as (median EPS forecast- The actual EPS)/the stock price at the time of the forecast) .LTG_FORECASTS rate represent the pre-issue 12-month mean analysts' forecast of the long-term EPS growth rate. STD is the forecast dispersion, measured as the standard deviation of analysts forecast deflated by the stock price at the forecast date. REVISION_RATIO is the difference between the number of analysts making upward forecast revisions and the number of analysts making downward forecast revisions, divided by the total number of analysts following the company. ACCURACY= (-1)*abs (median EPS forecast- actual EPS)/the stock price at the time of the forecast. The two last columns report the t test for difference in the mean and p-value of the Mann Whitney test. The difference is calculated as mean (median) of noninsured- mean (median) of insured.

finding is consistent with the view that investors are more optimistic about uninsured firms. The same pattern is prevalent even when forecasts of long-term EPS growth rate, forecast dispersion and accuracy variables are used. These results are similar to our main findings in Table 4. The mean and median difference is statistically significant at 5% and 1%, respectively. This confirms that financial analysts are able to incorporate more timely news into their forecasts than time-series models (Healy and Papelu, 2001).

Table 6 also reports the means and medians of analysts' variables across insured SEOs split into two subsamples: one with those who increased the total coverage limits at the end of the fiscal year, and one with those who did not. The results show that financial analysts are more pessimistic about insured SEOs that increase their coverage relative to those that keep the same amount. This result suggests that the market expectation of future earnings and firm prospects are different for SEOs who increased coverage and those who did not. It also highlights that the increase of coverage is a negative signal as investors become more pessimistic about the future earnings' prospects of firms that increase the insurance coverage in comparison to those who do not.

In sum, our univariate analysis suggests that financial analysts differentiate in their forecasts about SEOs firms between those that purchase insurance and those that do not. Financial analysts are more optimistic about uninsured SEOs, which supports the managerial opportunism hypothesis that predicts that the purchase of D&O (or the increase in coverage) sends a signal of higher litigation risk and higher uncertainty. For example, Charmers et al. (2002) and Boubakri et al. (2011) find evidence that managers act opportunistically regarding the purchase of D&O insurance around the time of IPO and SEO, respectively. In the same vein, Lin et al. (2013) find that D&O Insurance coverage leads to greater probabilities of financial restatement and more risk taking.

Table 6
Properties of analysts' forecasts across insured SEOs: increase and no increase in coverage.

Measure	With increase		Without increase			
	Mean	Median	Mean	Median	Mean difference	Median difference
FE	0.0163	0.0077	0.0652	0.0098	0.0065***	0.1460
STD	0.0143	0.0063	0.0214	0.0082	0.0440**	0.1750
REVISION_RATIO	−0.0800	0.0000	−0.0124	0.0000	0.0900*	0.17200
ACCURACY	−0.028	−0.0153	−0.0730	−0.0130	0.0090***	0.5630

Table 5 reports analyst variables for the insured SEOs sorted on the basis of coverage for the period 1997-2010. The forecast represents all the forecast made for the upcoming fiscal year immediately following the fiscal year of SEO event. Following Bradshaw, Richardson and Sloan (2006) we select month 4 as the point at which we measure the analyst forecast errors. FE is measured as (median EPS forecast- The actual EPS)/the stock price at the time of the forecast). STD is the forecast dispersion, measured as the standard deviation of analysts forecast deflated by the stock price ate the forecast date. REVISION_RATIO is the difference between the number of analysts making upward forecast revisions and the number of analysts making downward forecast revisions, divided by the total number of analysts following the company. ACCURACY= (−1)*abs (median EPS forecast- actual EPS)/the stock price at the time of the forecast. The two last columns report the t test for difference in the mean and p-value of the Mann Whitney test. The difference is calculated as mean (median) of insured without increase- mean (median) of insured with increase.

Table 7
Regressions of analyst forecast error on D&O insurance variables and control variables.

Independent variables	1	2
INTERCEPT	0.0630 (0.01)***	0.0914 (0.066)*
LOGASSETS	−0.0132 (0.105)*	−0.0091 (0.492)
GROWTH	0.0578 (0.006)***	0.0093 (0.083)*
FOLLOW	−0.0011 (0.271)	−0.0035 (0.061)*
INDUSTRY_RISK	−0.0058 (0.595)	−0.0071 (0.790)
D&O	−0.0287 (0.048)**	
COVERAGE		−0.0410 (0.046)**
AGE	−0.0029 (0.823)	0.0012 (0.950)
VOLROS	0.0032 (0.022)**	−0.0000 (0.261)
PREMIUM		0.0092 (0.648)
N	146	131
F value	2.90	2.38
Adjusted R2	18.19	9.4

Table 6 reports the results of the regressions examining the impact of D&O on analysts' forecasts. Our dependent variable is Forecast Error is defined as (median EPS forecast- actual EPS)/the stock price at the time of the forecast. Following Bradshaw, Richardson and Sloan (2006) we select month 4 as the point at which to measure the analyst forecast errors. LOGASSETS is the log of total assets of the firm measured at the end of the SEO fiscal year. GROWTH is the ratio of the book value of equity at the end of the year to the market value of equity at the end the year. FOLLOW is the number of analysts following the firm. VOLROS is earnings volatility measured as the standard deviation of return on assets for the previous 5 years. D&O is a dummy variable that equals 1 when SEO buy insurance, and 0 otherwise COVERAGE is a dummy variable that equals 1 when SEOs increase their insurance coverage limits purchased at the end of the SEO fiscal year.

* significant at the 10 percent level.
** significant at the 5 percent level.
*** significant at the 1 percent level.

4.2. Multivariate analysis

In this section, we perform a multivariate analysis to investigate how the purchase of D&O affects financial analysts' errors. First, we estimate the model described in Section 3, where D&O is a dummy variable taking the value 1 for firms with D&O insurance, and zero otherwise. In addition, we estimate a model where D&O represents a dummy variable taking the value 1 for firms that increase their insurance coverage and zero for those that do not (*COVERAGE*).

Table 7 reports the estimates of the coefficients that are associated with the variables that affect analyst forecasts errors. The coefficient on D&O is negative and significant at the 5 % confidence level indicating that financial analysts make less forecast errors for companies that purchase the insurance. This result suggests that analysts tend to underestimate the future earnings of insured firms and is consistent with the managerial opportunism hypothesis that stipulates that the purchase of D&O insurance sends a signal of litigation risk, and a divergence between managerial conduct and shareholder welfare. As a consequence, financial analysts include this information in their forecasts by making pessimistic earnings growth forecasts for insured firms compared to uninsured peers.

For control variables, we find results that are generally consistent with prior literature. The coefficient on *SIZE* is negative but not statistically significant, suggesting that analysts issue optimistic forecasts for smaller firms to facilitate management

Table 8
Forecast error for different windows prior to the actual earnings announcement.

Measure	Insured Firms		Uninsured Firms		Test differences	
Panel A	$FE_{t-3}(A_N)$					
	Mean	Median	Mean	Median	Mean difference	Median difference
FE	0.0158	0.0024	0.0500	0.0114	0.0014***	0.019**
STD	0.0145	0.0057	0.0250	0.0100	0.0480**	0.0035***
REVISION_RATIO	−0.078	0.000	−0.0659	0.000	0.3796	0.8000
ACCURACY	−0.0244	−0.0078	−0.0624	−0.0167	0.0003***	0.0005***
Panel B	$FE_{t-0}(A_N)$					
	Mean	Median	Mean	Median	Mean difference	Median difference
FE	0.015	0.0007	0.0329	0.0048	0.0327**	0.038**
STD	0.0140	0.0049	0.0204	0.0086	0.0600*	0.001***
REVISION_RATIO	−0.095	0.0000	−0.097	0.0000	0.5100	0.518
ACCURACY	−0.0226	−0.0047	−0.0416	−0.0117	0.0208**	0.0017***

Table 7 compares analyst variables for the insured and uninsured SEOs for the period 1997-2010. The forecast represents all the forecasts made for the upcoming fiscal year immediately following the fiscal year of SEO event. FE is measured as (median EPS forecast- actual EPS-)/the stock price at the time of the forecast. STD is the forecast dispersion, measured as the standard deviation of analysts' forecasts deflated by the stock price at the forecast date. REVISION_RATIO is the difference between the number of analysts making upward forecast revisions and the number of analysts making downward forecast revisions, divided by the total number of analysts following the company. ACCURACY= (−1)*abs (median EPS forecast- actual EPS)/the stock price at the time of the forecast. Forecasts of long-term EPS growth rate represent the post-issue12-month mean analysts' forecasts of the long-term EPS growth rate.

communication since there is little information for small firms (Gu and Wu, 2003). *GROWTH* is significantly positively related to forecast error. Our finding indicates that investors are more optimistic about value firms (high book-to-market ratio) than growth firms (low book-to-market ratio) (Dechow and Sloan, 1997). For the earnings predictability variables, the coefficient on *VOLROS* is positive and significant at the 5% level, which is consistent with the finding of Duru and Reeb (2002). However, the coefficient on *INDUSTRY_RISK* is not statistically significant, suggesting that our results are not driven by industry effects. The coefficient on *FOLLOW* is negative but not statistically significant.[13]

Furthermore, column 2[14] of Table 7 reports results about the relation between SEOs that increase their coverage and analysts' forecasts. The coefficient on *COVERAGE* is negative and statistically significant at 5%, indicating that investors are less optimistic for firms that increase coverage.

5. Robustness checks

We conduct several additional tests to examine the robustness of our findings.

5.1. Different windows to calculate FE

Our evidence shows that analysts' expectations based on forecasts that are issued eight months prior to the fiscal year-end (*FYE*) are more optimistic about uninsured SEOs. To examine whether our result is sensitive to the choice of the forecast window, we perform additional tests using different forecast horizons. Specifically, following Doukas et al. (2002), we examine forecasts issued three months prior to *FYE* (t–3), and during the *FYE* month (t–0). Thus, at the timing of forecast, the market has an idea about the first quarter performance.

The results in Table 8 show that optimistic forecasts issued shortly after the SEO (D&O coverage are purchased at the end of SEO fiscal year) are subsequently downgraded as the annual earnings' announcement date approaches, suggesting that the length of the forecast horizon is an important determinant of the magnitude of the forecast error. This result is consistent with the findings of Clement (1999) and Doukas et al. (2002).

More interestingly, consistent with our previous results, analysts' forecasts remained more optimistic for uninsured SEO. This confirms that there is a negative relation between the purchase of D&O insurance and overoptimism in analysts' forecasts.

[13] We also control for governance values by using executive compensation variables (Baker and Griffith, 2007). The authors find evidence that D&O brokers seek to price "culture" and "character" by using variables such as executive compensation to proxy for these underlying governance values. The coefficient for executive compensation is negative but not significant.

[14] In regression 2, we control for the premium paid by SEO firms to purchase the insurance.

5.2. Control for the financial crisis

Because the above results can be influenced by the effect of the 2007 financial crisis, we perform the univariate and multivariate analysis by excluding firms that issue SEOs between 2007 and 2010. Our results are insensitive to excluding firms that issue SEOs during the financial crisis. For example (in unreported results for the sake of space), the mean (median) forecast error for one year ahead annual earnings is 0.024 (0.007) for insured firms compared to 0.055 (0.025) for uninsured peers, the mean tests and median being significant at 1% and 5% respectively.

6. Conclusion

D&O insurance is intended to protect Directors and Officers against the risk of litigation, which has brought particular awareness after the very publicized corporate scandals of the nineties. For example, Directors at Enron and WorldCom have been forced to pay $31 million out of their own pockets to settle lawsuits stemming from two of the largest corporate governance scandals in U.S. history, generating interest in how the purchase of D&O insurance is perceived by investors or financial analysts. To the extent that financial analysts play a significant role in capital markets as information providers to investors, we examine in this article whether financial analysts systematically underestimate (overestimate) the future performance of insured firms compared to uninsured peers. We use analysts' earnings forecasts as a proxy for the market expectations of future earnings.

Our univariate and multivariate analysis show that financial analysts issue more optimistic forecasts for uninsured firms around equity offerings. This finding is consistent with the managerial opportunism hypothesis that posits that the purchase of insurance sends a signal of potential shareholder litigation risk. Indeed, Baker and Griffith (2008) document that the main risk D&Os face is related to shareholder litigation risk, and that the major liability exposure is securities litigation on the basis of misrepresentation. We also find that investor optimism is less pronounced for insured firms that increase their coverage, which supports the conjecture that the behavior of analysts provides insight into the activities and beliefs of investors.

Our evidence leads to the following final remarks. First, explaining whether D&O premium proxies for the quality of corporate governance and litigation risk is a promising area of research. Second, despite the fact that D&O insurance details in Canada must be reported, any purchase of insurance is still, paradoxally, perceived as a negative signal by investors that is subsequently reflected in the pessimistic forecasts issued by financial analysts.

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