

Equity-based Executive Compensation, Managerial Legal Liability Coverage and Earnings Management

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Abstract

This study investigates how managers' compensation incentives, as measured by equity-based executive compensation and managerial legal liability coverage affect earnings management. The availability of compensation may encourage managers to adopt more aggressive accounting practices; however, the higher the legal liability managers face, the more it will reduce their willingness to engage in such risk-taking behavior. Once managers mitigate their personal legal liability through directors' and officers' (D&O) liability insurance, they may be more inclined to manipulate reported earnings. We use excess D&O liability insurance coverage as a proxy for managerial liability coverage and test a sample of listed firms in Taiwan where D&O liability insurance purchases are publicly disclosed. We find that managers whose compensation is equity-based are more likely to adopt an opportunistic accounting strategy when they are covered by relatively high levels of D&O liability insurance; this suggests that the primary determination of earnings management is the joint effect of an increase in managers' compensation incentives and a decrease in their legal liability.

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1 Introduction

This study investigates whether equity-based executive compensation and managerial legal liability coverage affect the occurrence of earnings management. The corporate world has seen an enormous increase in stock-based and option-based executive

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compensation in the last decade. Empirical studies reveal that tying managers' compensation to firm performance motivates managers to make more value-maximizing decisions and reduces the asymmetry between the managers and shareholders (Hirshleifer and Suh, 1992; Rajgopal and Shevlin, 2002; Mawani, 2003a).

Although these compensation schemes are clearly intended to align managers and shareholders' interests, several corporate scandals (e.g., Enron and World Com) have created a widespread perception that the financial and accounting disclosures in large corporations cannot be trusted. In order to benefit from selling shares of the firm's stock, equity-based compensation could encourage managers to increase the short-term stock price, thereby manipulating earnings (Cheng and Warfield, 2003; Goldman and Slezak, 2006; Crocker and Slemrod, 2007; Benmelech et al., 2008). In addition, many studies have shown that managers exercise large amounts of stock options and sell larger shares during years in which abnormal accruals make up a large part of reported earnings (Xie, 2001; Bergstresser and Philippon, 2006). Hence, as a general statement of fact, it seems undeniable that equity-based compensation leads to a higher occurrence of earnings manipulation.

Equity-based compensation may provide a financial motivation for managers to manipulate earnings, but those firms with earnings management are more likely to be targets for shareholder lawsuits. If managers accomplish their goals by using a higher level of earnings management, lawsuits will be successful and result in costly settlements (Jones and Wu, 2010). DuCharme et al. (2004) find that the incidence of lawsuits is positively related to abnormal accruals around stock offers, suggesting that firms opportunistically manipulate earnings upward rendering themselves vulnerable to litigation. Because the managers of these firms face a higher litigation risk, earnings management could be very costly (Tillinghast-Towers Perrin, 2002). However, managers may mitigate their personal legal liability through directors' and officers' (hereafter D&O) liability insurance and indemnification. D&O liability insurance is intended to protect managers against high litigation risk. Most empirical evidence supports the argument that D&O liability insurance leads to incentives for managerial opportunistic behavior (Chung and Wynn, 2008; Wynn, 2008). Therefore, we posit that managers whose compensation is more sensitive to company share price are more likely to engage in earnings management when their liability insurance coverage levels are set too high.

Because D&O liability insurance information is not disclosed in the United States, a Taiwanese sample is used to verify whether the joint effect of equity-based executive compensation and D&O liability insurance is indeed a factor that raises the occurrence of earnings management. We employ excess D&O liability insurance coverage, which has data available, as a proxy for managerial opportunistic behavior (Chalmers et al., 2002; Wynn, 2008; Chung and Wynn, 2008). Our empirical evidence shows that tying managerial incentives to stock price and reducing management's legal liability has the effect of encouraging managers to manipulate reported earnings. These results suggest that managers with more "incentivized" and low "litigation risk" tend to use more aggressive financial reporting methods relative to managers with high "litigation risk". We also conduct several sensitivity analyses to enrich our results. We control for the endogeneity problem and simultaneous-equation bias. The findings are robust and remain qualitatively unchanged after controlling for these effects. In addition, we use another measurement of equity-based compensation and earnings benchmarks and find that the results are robust.

This study differs from previous research in several ways. First, prior research finds that

equity-based compensation could provide managers with the incentive to misrepresent the firm's true value (Ke, 2003; Gao and Shrieves, 2002; Cheng and Warfield, 2005; Crocker and Slemrod, 2007). This implies that managers whose equity-based compensation is more sensitive to company share prices tend to use more aggressive discretionary components of earnings to affect their firms' reported performance. However, our findings provide evidence that although equity-based compensation yields incentives for earnings management, excess D&O liability insurance coverage is the primary factor behind a higher occurrence of earnings manipulation. That is, managers with equity-based compensation are more likely to use aggressive accounting choices when they are covered by excess D&O liability insurance. Second, our findings contribute to D&O liability insurance literature by suggesting that managers' liability coverage explains their aggressive accounting choices (i.e., managerial opportunism), especially for those who have equity-based compensation. To the best of our knowledge, this study is the first to examine the joint effect of equity-based compensation and D&O liability insurance coverage on earnings management. Third, the data of D&O liability insurance is retrieved from a sample of publicly-owned firms in Taiwan, which are required to disclose the details of their insurance policies in their proxy statements. Because only 30% of firms purchase D&O liability insurance in Taiwan (compared to over 90% for firms in the U.S. and over 80% in Canada), it is useful to test for the differences between firms with excess D&O liability insurance coverage and those without excess.

The findings have significant implications for investors and corporations. Investors are invited to learn about potential investments through a firm's D&O liability insurance policy. Disclosed D&O liability insurance details can convey an important and normally costless signal on managers' intentions to adopt opportunistic behavior. For corporations, the evidence suggests that if managers have both equity-based compensation and excess D&O liability insurance coverage, they are more likely to manipulate earnings. The clear implication is that the D&O liability insurance market enhances managerial opportunistic behavior, especially for those who have equity-based compensation. In light of this evidence, this study should be of interest to a board of directors contemplating compensation contracts and liability insurance for managers. It is highly recommended that more restrictions be imposed on the D&O liability insurance demand with regard to equity-based compensation schemes.

The remainder of this study is organized into five sections. Section 2 provides information on the background of D&O insurance in Taiwan and reviews the relevant literature. Section 3 describes the research design and data sample. Section 4 reveals the empirical results, and Section 5 presents the conclusions.

2 Institutional Background and Literature

2.1 The Legal System in Taiwan

According to the Company Law and Securities and Exchange Act, the board of directors and officers in Taiwan are responsible for their company's behavior and should fulfill their fiduciary obligations through good administration by checking the company's financial reports. If their negligence causes any loss within the company, they should act

in good faith by compensating shareholders for their losses.⁵ Pursuant to the Securities and Exchange Act, a company's board members should compensate genuine investors as victims of the company's false financial reports.⁶

Most stock investors in Taiwan are individuals who usually hesitate to take any legal action when their rights are infringed, either because they lack sufficient information or because they regard the filing of a lawsuit as too costly and time-consuming. Therefore, in order to protect the welfare of individual investors,⁷ the Taiwanese Securities and Futures Bureau (TSFB) promulgated by the Securities Investors and Futures Trader Protection Act (SIFTP Act). In 2003, the Securities and Futures Investors Protection Center (SFIPC) was established to implement the Act. The government-supported organization, SFIPC, has adopted American-style securities class actions.

Article 28 of the SIFTP Act gives power to the Government to file a class-action lawsuit in a case where 20 or more securities investors authorize the SIFPT to apply for compensation on their behalf. Since being established, the SFIPC has dealt with 57 class-action cases and more than 60,300 plaintiffs have acquired a total compensation amount of about US \$0.9 billion as of the end of 2008 (SFIPC 2008 annual report).

Under the supervision and guidance of the competent authorities, the SFIPC has made significant progress in the fulfillment of class actions and in the protection of shareholders' equity. Also, their success in winning compensation for the investors in these cases marks a significant step for Taiwanese investor protection. As a result, there has been a sharp increase in the D&O liability insurance demand for listed companies since the early 2000s.

2.2 2.2 Directors and Officers Liability Insurance in Taiwan

If the indemnification provisions are unavailable to directors and officers, D&O liability insurance provides an additional layer of protection. D&O liability insurance can cover directors' and officers' legal expenses, damages paid pursuant to judgment, and amounts paid in settlement. D&O liability insurance premiums have increased dramatically in the past few years due to the increase in securities litigation. In contrast to indemnification, neither corporate law nor securities law places limitations on the permissible scope of D&O liability coverage. Furthermore, D&O liability insurance coverage is available if the company is insolvent or contests its obligation to indemnify its directors (for example,

⁵Article 23 of the Company Law stipulates that board directors have joint liability with the company to compensate any person (e.g., a board director or officer) who suffers damages or losses resulting from an illegal act that is within the scope of the company's business.

⁶Article 20 of the Securities and Exchange Act stipulates that directors and officers who violate through the misrepresentation or nondisclosure of the provisions of financial reports, or any other relevant financial or business documents filed or publicly disclosed by an issuer, shall be held liable for damages sustained by bona fide purchasers or sellers of the said securities.

⁷The Company Law allows shareholders owning three percent of a company continuously for a year to take derivative actions by petitioning supervisors to sue directors or by bringing forward such suits if supervisors fail to do so (Article 214 of Company Law). Even so, class action litigation in Taiwan is both costly and unusual. There are several reasons. First, such action involves a serious, out-of-pocket economic disincentive to plaintiffs. Second, there is no civil discovery in Taiwan. As a result, the information cost to plaintiffs can be high. Third, securities class actions often involve some expertise without which judges may find it difficult to examine the legal and factual issues (Liu, 2001).

when a corporate meltdown has led to the appointment of a new board that is hostile to the former directors). Most D&O liability insurance policies include two basic types of coverage. First, individual-level coverage protects each individual officer or director who has committed wrongful acts against covered losses (A-Side coverage). Second, entity-level coverage protects the corporation itself from losses resulting from its indemnification obligations to individual directors and officers (B-Side coverage). Therefore, D&O liability insurance policies not only cover damages, settlements, judgments, and litigation expenses, but extensions are available on request that provide coverage for firms in securities and employment mismanagement claims. This has special relevance to publicly listed firms where securities claims could have a significant effect on a firm's finances or even threaten its existence.

D&O liability insurance first became available in Taiwan at the end of the 1990s. With the increasing number of claims against corporations and large settlements, D&O liability insurance has become an important protection for directors and officers when named as defendants. Since 1998, the TSFB has also tried its best to emphasize the importance of corporate governance to public companies. In 2002, the TSFB announced the *Corporate Governance Best-Principles for Listed Companies*. The rule stipulates that listed firms may take out liability insurance for D&Os with respect to their liabilities resulting from the exercise of their duties during their terms of occupancy so as to reduce and spread the risk of material harm to the firms and shareholders arising from the wrongdoings or negligence of a director. In addition, in order to enhance the effectiveness of corporate governance, the TSFB has required that listed firms disclose the available information on the compensation of officers and directors, including the purchase of D&O liability insurance, since it is a part of the managers' compensation package.⁸

A number of arguments explore why firms purchase D&O liability insurance. First, the efficient contract theory states that because firms cannot indemnify directors and officers in the event of a suit (Parry and Parry, 1991), risk-averse directors and officers require D&O liability insurance or an extra indemnification contract as a condition of their service. Second, the monitoring role hypothesis suggests that although the primary purpose of D&O liability insurance purchase is to spread the risk of loss from shareholder litigation, D&O liability insurance insurers, who evaluate and ultimately charge for the risks they assume, become specialists at assessing corporate governance (Holderness, 1990). As Mayers and Smith (1982) point out, company insurance (e.g., D&O liability insurance) may alleviate the agency problems between shareholders and managers. Thus, D&O liability insurance may have an important monitoring role.⁹ Third, according to the managerial entrenchment (i.e., managerial opportunism) argument, managers and directors who are covered by abnormal D&O insurance coverage may become more entrenched. For example, Chalmers et al. (2002) provides evidence that there is a negative relation between the three-year stock price performance of the firm and the amount of D&O liability insurance purchased on the IPO date. Zou et al. (2008) suggest that D&O liability insurance may be opportunistically purchased to protect company directors and

⁸The TSFB amended the *Securities Market Rules Governing Information Reporting for Listed Companies* in 2009. The ruling stipulates that the insurance enrollment of the previous year shall be reported by the 15th day from the close of each business year.

⁹There are other monitoring mechanisms to oversee the management, such as having large shareholders or higher insider stock ownership. Insurance is seen as an alternative monitoring mechanism.

executives against litigation risks arising from the expropriation of outside (minority) shareholders. Lin et al. (2011) find that the insured D&Os are prone to making poor merger and acquisition decisions.

Although the empirical evidence is mixed on this issue, recent studies support the latter argument of managerial entrenchment, which states that D&O liability insurance weakens the effectiveness of litigation as a managerial control device by reducing expected personal legal liability (Core, 1997, 2000; Chalmers et al., 2002; O'Sullivan, 2009; Wynn, 2008; Chung and Wynn, 2008; Lin et al., 2011). It indicates that more opportunistic managers use their superior information to assess the probability of exposure to legal liability, which is consistent with the managerial opportunism hypothesis.

2.3 Literature Review and Hypothesis Development

While there are several ways to mitigate the conflict of interest between managers and shareholders, many studies suggest that one way to overcome this conflict might be to implement compensation schemes (e.g. equity-based compensation). Incentive alignment effects indicate that equity-based compensation rather than cash compensation could give managers the correct incentive to act in the interests of shareholders (Jensen and Murphy, 1990a, 1990b; Core and Guay, 1999; Rajgopal and Shevlin, 2002; Mawani, 2003a). Consistent with the incentive alignment effect, prior research shows a positive association of equity-based compensation with future firm performance (Jensen and Murphy, 1990a; Mehran, 1995; Hanlon et al., 2003). Jensen and Murphy (1990a) suggest that equity-based compensation causes managers to act in a way that maximizes firm value. Mehran (1995) finds that equity-based compensation could have a positive impact on a firm's Tobin's Q and return on assets. Hanlon et al. (2003) provide evidence that every dollar of stock options granted to managers contributes \$3.71 to future operating earnings of the firm over the next five years. These findings support the incentive alignment effect that tying equity-based compensation more closely to firm performance may motivate managers to use the correct incentive to maximize firm value, and they suggest that the form of compensation is what motivates managers to align themselves with shareholders' benefits. While equity-based executive compensation is intended to align managers and shareholders' interests, some research argues that it may induce managers to inflate or exaggerate performance (Burns and Kedia, 2005; Efendi et al., 2007; Bergstresser and Philippon, 2006). Ke (2003) finds that in order to cash out equity holdings at a higher price in the future, managers who hold equity-based compensation have more incentives to engage in earnings management. Gao and Shrieves (2002) suggest that earnings management intensity increases with the amount of stock options and bonuses. Cheng and Warfield (2005) find that managers with high equity-based compensation are more likely to sell shares in the future and this motivates them to manipulate earnings. Erickson et al. (2006) provide evidence that the likelihood of accounting fraud increases with the share of manager compensation that is equity-based. Bergstresser and Philippon (2006) find that the use of abnormal accruals to manipulate reported earnings is more pronounced in firms where managers' compensation more closely aligns with the value of stock and option holdings. Although equity-based compensation induces managers to exert efforts to align their benefits with those of shareholders, it could also induce managers to manipulate reported earnings.

In addition, earnings management is not only affected by incentive compensation schemes; it is also affected by the firm's litigation environment. If managers manipulate the

market's perception of the firm value, lawsuits are more likely to be filed and result in costly settlements (Jones and Wu, 2009). Managers, like most individuals, are regarded as being risk-averse when their financial and human capital is invested in their respective firms (Jensen and Meckling, 1976). Once managers are exposed to high litigation risk due to more severe earnings manipulation (DuCharme et al., 2004), they may be less motivated to exaggerate reported earnings. Clearly, earnings management could be very costly to managers because of the higher litigation risk involved.

However, because D&O liability insurance typically covers managerial losses and mitigates managers' litigation risk¹⁰, managers who are overly covered by this insurance have more incentives to engage in risk-taking behavior and use more aggressive financial reporting (Boubakri et al., 2008; Core, 1997; Chung and Wynn, 2008). Core (1997) suggests that managers protected by a higher level of D&O liability insurance coverage may become effectively less risk averse and less likely to reject risky investment projects. Chalmers et al. (2002) find that firms with substantial D&O liability insurance coverage are, on average, more likely to be sued in the future for mispricing. Chung and Wynn (2008) provide evidence that firms with abnormal D&O liability insurance coverage tend to recognize bad news in a less timely manner and have less conservative earnings. Therefore, reducing managers' expected legal liability via excess D&O liability insurance coverage could induce an entrenchment problem and these managers may appear to be risk-neutral or even risk-loving.

As mentioned above, although an equity-based compensation scheme is tied to the firm's stock return and varies with the firm's performance, it may cause managers to manipulate earnings in order to increase their compensation at a cost to shareholders (Goldman and Slezak, 2006; Crocker and Slemrod, 2007; Benmelech et al., 2008). However, owing to the higher litigation risk of earnings manipulation, managers may mitigate their incentives to adopt an aggressive financial reporting strategy (DuCharme et al., 2004; Jones and Wu, 2010). Since D&O liability insurance coverage protects each individual director and officer against the risk of shareholder litigation, this study expects that the primary determination of earnings management for managers will be the joint effect of equity-based compensation schemes and excess D&O liability insurance coverage, rather than the specific effect of equity incentive compensation schemes. The hypothesis is as follows:

Hypothesis: Managers with equity-based compensation and who are covered by excess D&O liability insurance coverage are more likely to manipulate earnings relative to those without excess D&O liability insurance.

3 Research Design, Sample Selection, and Data Sources

In this section, the regression models are presented. There follows a detailed discussion of the measures of equity-based compensation and D&O liability insurance coverage. The section ends with a report on the data and sample employed in this study.

¹⁰D&O insurance policies cover losses including damages, judgments, awards, settlements amounts and defense fees incurred in shareholder claims.

3.1 Estimation of Discretionary Accruals

Because Kothari et al. (2005) show that using performance-matched discretionary accrual measures enhances the reliability of inferences from earnings management research, we estimate discretionary accruals using an approach proposed by Kothari et al. (2005), which adds an intercept term and lagged return on assets to the Jones (1991) model. Specifically, we compute discretionary accruals (DA) in Equation (1) as follows:

$$DA = TA_t/A_{t-1} - [\hat{\phi}_0 + \hat{\phi}_1(1/A_{t-1}) + \hat{\phi}_2(\Delta SALES_t)/A_{t-1} + \hat{\phi}_3(PPE_t/A_{t-1}) + \hat{\phi}_4 ROA_{t-1}] \quad (1)$$

where TA is total accruals (earnings before extraordinary items minus net cash flows from operations), A is total assets, $\Delta SALES$ is change in net sales, ΔAR is change in net accounts receivable, PPE is gross property, plant, and equipment, ROA is the rate of return on assets, and the subscript denotes the year. The company subscript is omitted for simplicity. The coefficients $\hat{\phi}_j$ ($j = 0, \dots, 4$) are parameters from estimating the following equation:

$$TA_t/A_{t-1} = \phi_0 + \phi_1(1/A_{t-1}) + \phi_2(\Delta SALES_t)/A_{t-1} + \phi_3(PPE_t/A_{t-1}) + \phi_4 ROA_{t-1} + \varepsilon_t \quad (2)$$

Equation (2) is calculated by industry-year, which is consistent with DeFond and Jiambalvo (1994).

3.2 Models for Discretionary Accruals Analysis

We first examine the joint effect of equity-based compensation and excess D&O liability insurance on discretionary accruals. To test our Hypothesis, we add CEO_COM (a manager's compensation incentive) and an interaction term, $EXCOV*CEO_COM$, into the regression as independent variables. The model is as follows:

$$\begin{aligned} & DA(\text{or Positive } DA \text{ or Negative } DA) \\ & = \alpha_0 + \alpha_1 CEO_COM + \alpha_2 EXCOV + \alpha_3 EXCOV*CEO_COM + \alpha_4 PURCHASE \\ & + \alpha_4 PURCHASE*CEO_COM + \alpha_4 MB + \alpha_5 LEV + \alpha_6 SIZE + \alpha_7 OCF + \alpha_8 BIG4 + \alpha_9 OUTDIRECTOR \\ & + \alpha_{10} CEO_CHAIR + \alpha_{11} VC + \alpha_{12} FOREIGN + \alpha_{13} LOSS + \alpha_{14} ACCR + \varepsilon \end{aligned} \quad (3)$$

We expect that managers with equity-based compensation tend to conduct a higher level of abnormal accruals when they are covered by D&O liability insurance; thus a positive coefficient of $EXCOV*CEO_COM$ (α_3) is anticipated.

3.2.1 Equity-based executive incentives (CEO_COM)

Following Jensen and Murphy (1990b), we measure the managerial option incentive, CEO_COM , which is the ratio of equity compensation¹¹ out of the total of the current year's compensation (the sum of salary, bonus, stock grants, option grants, long-term incentive payouts and other compensation). This measure captures the proportion of

¹¹Equity compensation is the sum of the value of the current year's stock option grants (valued using the Black-Scholes method) and the market value of restricted stock granted during the fiscal year.

manager's compensation that is sensitive to stock price. We posit that a higher *CEO_COM* indicates a higher level of managerial equity-based compensation.

3.2.2 Excess D&O liability insurance coverage (*EXCOV*)

To capture excess (unexpected) D&O liability insurance coverage, we follow prior literature (e.g., Wynn, 2008; Chung and Wynn, 2008) and define excess D&O liability insurance coverage, *EXCOV*, as the residual from the regression of D&O liability insurance coverage¹² on its determinants. The determinants of excess coverage include firm size, debt ratio, a cross-listing status, the percentage of outside directors on the board of directors, the percentage of shares held by outside block holders, the volatility of stock returns, membership in a high-tech industry, and cash holdings. *EXCOV* is a proxy to capture managerial opportunism.

3.2.3 Control variables

In line with previous studies (Dechow et al., 1995; Kothari et al., 2005), we control for several firm specific characteristics. *MB* equals market to book value of equity at year-end (a proxy for growth opportunity); *LEV* equals total liabilities divided by total assets; *SIZE* equals the natural logarithm of total assets; *OCF* equals net cash flows from operations scaled by total assets at the beginning of the year; *BIG4* equals one when the auditor is a Big 4 auditor at the end of the fiscal year, and zero otherwise; *OUTDIRECTOR* equals the percentage of outside directors on the board of directors; *CEO_CHAIR* equals one when the CEO serves as both board chairman and general manager, and equals zero otherwise; *VC* equals the divergence between control rights and cash flow rights possessed by the largest ultimate owner of the firm; *FOREIGN* equals the percentage of shares held by foreign shareholders; *LOSS* equals one if a firm reports losses in the current year, and zero otherwise; *ACCR* equals the previous year's total accrual scaled by total assets. The OLS regression is used for the analysis of *DA*. In addition, a truncated regression is used for the analysis of positive (negative) *DA*, since the dependent variable is left (right) truncated at zero.

Regarding the control variables in Equation (3), *MB* (*LEV*) is included due to its positive (negative) association with discretionary accruals (Frankel et al., 2002; Menon and Williams, 2004). *SIZE* and *OCF* are included because large firms and the firms with more cash flow are related to lower levels of discretionary accruals (Myers et al., 2003; Menon and Williams, 2004), and *BIG4* is also controlled since the clients of Big 4 auditors tend to report a lower magnitude of discretionary accruals (Becker et al., 1998; Myers et al., 2003). Furthermore, several corporate governance mechanisms (*OUTDIRECTOR*, *CEO_CHAIR*, and *FOREIGN*) are included because these variables are associated with discretionary accruals. Moreover, we add *VC* as a control variable because more divergence between control rights and cash flow rights gives controlling shareholders more power for wealth expropriation (La Porta et al., 1999; Claessens et al., 2000; Faccio and Lang, 2002). La Porta et al. (1999) and Claessens et al. (2000) suggest that the larger the deviation between control and cash flow rights, the stronger the ultimate owners'

¹²Compared to the U.S. and Canada, typically the policy declarations in Taiwan show a deductible of zero, or a very low amount, both for A-Side coverage, where the insurer indemnifies the individuals directly, and for B-Side coverage, where the insurer reimburses the corporation for indemnifying the individuals (Yang, 2009). Thus, there is no net of the deductible in Taiwan.

incentive to expropriate minority interests. Chen et al. (2010) collect data from Taiwanese listed firms and find that firms with greater deviation between control and cash flow rights are more likely to engage in earnings management. Thus, we expect a positive relation between *VC* and *DA*. We also included loss-reporting (*LOSS*) firms because these firms are more likely to have higher abnormal accruals (Kim and Yi, 2009; Choi et al., 2010). Finally, the previous year's total accrual scaled by total assets, *ACCR*, is controlled because of its negative association with the current-period accruals.

3.3 Models for Earnings Benchmark Analysis

In this section, we focus on earnings distributions, which have been used to test earnings management behavior. Because prior studies suggest that the disproportionate likelihood of just “meeting or beating” benchmarks is an important manifestation of earnings management (Burgstahler and Dichev, 1997; Degeorge et al., 1999), we use two common benchmarks: firms reporting small positive profits (*SMALL_EARNING*, e.g. avoiding earnings loss) and firms reporting small increases in previous earnings (*SMALL_INCREASE*, e.g. avoiding earnings declines), as our proxies. We also use the following probit model to investigate the impact of equity-based compensation and excess D&O liability insurance on the probability of just meeting or beating expectations:

$\text{Prob}(BENCHMARK=1) = 1/(1 + e^{-Z})$, where

$$\begin{aligned} Z = & \beta_0 + \beta_1 CEO_COM + \beta_2 EXCOV + \beta_3 EXCOV * CEO_COM + \beta_4 PURCHASE \\ & + \beta_5 PURCHASE * CEO_COM + \beta_6 MB + \beta_7 LEV + \beta_8 SIZE + \beta_9 OCF + \beta_{10} BIG4 \\ & + \beta_{11} OUTDIRECTOR + \beta_{12} CEO_CHAIR + \beta_{13} VC + \beta_{14} FOREIGN + \varepsilon, \end{aligned} \quad (4)$$

where *BENCHMARK* is coded as 1 if a firm reports small positive earnings (or a small increase in previous earnings), and 0 otherwise. The control variables are the same as those in Equation (3) except for net loss in the current year (*LOSS*) and the previous year's total accrual (*ACCR*). To test the reporting of small profits, we follow the approach recommended by Frankel et al. (2002) and Carey and Simnett (2006); a firm is classified as reporting small positive earnings (*SMALL_EARNING*) if its net income deflated by lagged total assets is between 0% and 2%. To test for a small increase in previous earnings, we follow the approach of Frankel et al. (2002), Ashbaugh et al. (2003), and Carey and Simnett (2006); a firm is classified as reporting a small increase in previous earnings (*SMALL_INCREASE*) if the change in its net income deflated by lagged total assets is between 0% and 2%. Earnings are assumed to be of higher quality (less subject to earnings management) if a firm does not systematically meet or beat benchmarks. The prediction is that managers who have both equity-based compensation and excess D&O liability insurance coverage are more likely to meet or beat benchmark targets; thus a positive coefficient on *EXCOV*CEO_COM* (α_3) is anticipated.

3.4 Data and Sample

Our sample consists of Taiwanese firms listed on the Taiwan Stock Exchange (TSE) for the period 2008-2010. The D&O liability insurance data are publicly available in proxy statements because the TSFB has required firms to disclose the existence of a D&O liability insurance policy since the end of 2007. Data for manager compensation packages

and firm level information, including financial data and governance structure data, is obtained from the Taiwan Economics Journal (TEJ) database.

4 Empirical Analysis

4.1 Sample Selection and Univariate Analyses

The initial sample consisted of 3,903 firm-year observations of first-time D&O liability insurance purchase disclosures filed in accordance with the requirements of the Taiwanese Securities and Futures Bureau (TSFB). The sample selection criteria are described as follows: firms in regulated industries such as finance, banking, and utilities were eliminated from the sample because of different financial incentives. Panel A of Table 1 describes the sample selection procedure and its effect on the sample size. 188 firm-year observations without stock price were deleted. We further eliminate 42 firm-year observations due to unavailable audit firms and 71 because of unavailable financial information. Finally, we delete 25 firm-year observations because of missing managers' compensation data. Thus, the procedure yielded a sample of 3,577 firm-year observations, including 2,234 observations without D&O liability insurance, and 1,343 observations with D&O liability insurance. We use the overall non- D&O liability insurance purchase population as the control group, rather than a matched sample, in order to eliminate choice-based sample bias (Cram et al., 2009)¹³.

Panel B of Table 1 shows the descriptive statistics for the two sub-samples when the sample is partitioned by D&O liability insurance purchase and non-D&O liability insurance purchase. Panel B also presents the t-value of t-tests and the z-value of Wilcoxon Z-tests for differences in means and medians between the two groups. Except for *BIG4* and *LOSS*, the variables are winsorized at the 1st and 99th percentiles. As shown in Panel B, the average discretionary accrual (*DA*) for firms with a D&O liability insurance purchase is greater than for those without a D&O liability insurance purchase. We also find that firms with D&O liability insurance purchase are more likely to “meet or beat” earnings benchmarks. These results indicate that when firms purchase D&O liability insurance, they have more incentives to manipulate earnings.

¹³Cram et al. (2009) suggest that the analysis of matched samples can cause technical errors, such as the use of unconditional analysis, a failure to control for the effect of imperfectly matched variables, and a non-proportional sample representative. They demonstrate with simulated data how incorrect analysis in a choice-based matched-sample setting can lead to incorrect inferences. The simulations demonstrate that incorrect analysis may (1) fail to detect significant true effects, (2) find false significant effects, and (3) find significant results that are opposite in sign to the true effects.

Table 1: Sample selection and Descriptive Statistics of variables

Panel A: Sample selection						
Number of company-years from 2008 to 2010	3,903					
Less: Stock prices unavailable	(188)					
Audit firms unavailable	(42)					
Financial data not available in TEJ	(71)					
Manager compensation unavailable	(25)					
Non purchase D&O liability insurance	(2,234)					
Number of company-years in the final sample	<u>1,343</u>					
Panel B: Sample for discretionary accruals partitioned by D&O liability insurance purchase						
Variables	<i>PURCHASE</i> = 1 (N = 1,343)		<i>PURCHASE</i> = 0 (N = 2,234)		t-value for test of diff. in mean	Wilcoxon Z-value for test of diff. in median
	Mean	Median	Mean	Median		
<i>DA</i>	-0.0044	-0.0109	-0.0166	-0.0149	3.72***	3.63***
Positive <i>DA</i>	0.0885	0.0539	0.0559	0.0375	9.13***	6.40***
Negative <i>DA</i>	-0.0705	-0.0529	-0.0693	-0.0484	- 0.43	- 2.34***
<i>SMALL_EARNING</i>	0.1978	0.0000	0.1951	0.0000	1.68*	2.21**
<i>SMALL_INCREASE</i>	0.1397	0.0000	0.1176	0.0000	1.89**	1.89**
<i>CEO_COM</i>	0.0838	0.0311	0.1016	0.0322	- 3.27***	0.25
<i>MB</i>	1.7209	1.3200	1.6402	1.2400	1.68*	1.02
<i>LEV</i>	0.3516	0.3408	0.3647	0.3522	- 2.18**	- 2.09**
<i>SIZE</i>	8.2155	8.1266	8.1626	8.0769	3.10***	2.65***
<i>OCF</i>	0.0851	0.0803	0.0689	0.0604	4.39***	5.23***
<i>BIG4</i>	0.8794	1.0000	0.8089	1.0000	5.53***	5.51***
<i>OUTDIRECTOR</i>	0.5056	0.5000	0.4218	0.4330	11.48**	11.48***
					*	
<i>CEO_CHAIR</i>	0.2897	0.0000	0.2959	0.0000	0.39	0.39
<i>VC</i>	6.4896	1.9300	5.1438	1.3800	4.04***	- 2.53***
<i>FOREIGN</i>	8.8932	3.8800	6.6363	1.7700	5.51***	4.05***
<i>LOSS</i>	0.1884	0.0000	0.1692	0.0000	1.46	1.46
<i>ACCR</i>	-0.0137	-0.0164	-0.0125	-0.0105	0.35	- 1.91**
<i>EXCOV</i>	-0.0178	-0.0447	n.a	n.a		
<i>D&O Coverage (U.S. million)</i>	9.1385	5.1250	n.a	n.a		
<i>D&O Coverage/Asset</i>	0.0857	0.0479	n.a	n.a		

Variable definitions:

<i>DA</i>	=	Discretionary accruals estimated using Jones (1991) model and controlling for company performance;
Positive <i>DA</i>	=	Positive discretionary accruals estimated using Jones (1991) model and controlling for company performance;
Negative <i>DA</i>	=	Negative discretionary accruals estimated using Jones (1991) model and controlling for company performance;
<i>SMALL_EARNING</i>	=	one if a firm reports small positive earnings (net income deflated by lagged total assets is between 0 and 2 percent), and zero otherwise;
<i>SMALL_INCREASE</i>	=	one if a firm reports small increase in earnings (change in net income deflated by lagged total assets is between 0 and 2 percent), and zero otherwise;

<i>CEO_COM</i>	=	the CEO equity-based value over total compensation;
<i>MB</i>	=	the Market-to-book value of common;
<i>LEV</i>	=	the total debt divided by total assets;
<i>SIZE</i>	=	the logarithm of the market value of the firm's common equity;
<i>OCF</i>	=	the net cash flows from operations divided by total assets;
<i>BIG 4</i>	=	one when the auditor is a Big 4 auditor at the end of the fiscal year, and 0 otherwise;
<i>OUTDIRECTOR</i>	=	the percentage of outside directors on a board of directors;
<i>CEO_CHAIR</i>	=	one when the CEO serve both as the chairman of the board and general manager and equals zero, otherwise;
<i>VC</i>	=	the divergence between control rights and cash flow rights possessed by the largest ultimate owner of the firm;
<i>FOREIGN</i>	=	the percentage of shares held by foreign shareholders;
<i>LOSS</i>	=	one if a firm reports losses in the current year, and zero otherwise;
<i>ACCR</i>	=	the lagged total accruals divided by lagged total assets;
<i>EXCOV</i>	=	the residual from the regression of adjusted D&O insurance coverage on determinants of D&O insurance;
<i>D&O Coverage</i>	=	the D&O insurance limit (U.S. million);
<i>D&O Coverage/Asset</i>	=	the D&O insurance coverage divided by lagged total assets.

Significance of the difference in mean and median is based on two-tailed test for all other variables.

*** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.

Table 2 presents the results of the Pearson correlation for the full sample. The results reveal a positive and significant association of managers' compensation incentives (*CEO_COM*) with earnings management (*DA*), suggesting that managers with equity-based compensation are more likely to have higher discretionary accruals. In addition, there is a significantly positive association between excessive D&O liability insurance coverage (*EXCOV*) and earnings management (*DA*), which indicates that excess D&O liability insurance coverage leads to incentives for earnings management.

Table 2: Correlation coefficients of variables (p-values in parentheses)

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
DA													
(2)CEO_COM	0.039 (0.021)												
(3)EXCOV	0.095 (0.000)	0.031 (0.065)											
(4)MB	0.051 (0.024)	0.255 (0.000)	-0.002 (0.921)										
(5)LEV	0.007 (0.685)	-0.118 (0.000)	0.034 (0.839)	-0.052 (0.002)									
(6)SIZE	-0.001 (0.974)	0.003 (0.868)	-0.079 (0.000)	-0.110 (0.000)	0.067 (0.000)								
(7)OCF	-0.301 (0.000)	0.029 (0.077)	-0.014 (0.419)	0.184 (0.000)	-0.231 (0.000)	0.012 (0.475)							
(8)BIG4	-0.034 (0.039)	0.047 (0.005)	0.023 (0.161)	0.063 (0.000)	-0.101 (0.000)	0.069 (0.000)	0.097 (0.000)						
(9)OUTDIRECTOR	0.000 (0.990)	0.100 (0.000)	0.010 (0.536)	0.143 (0.000)	-0.086 (0.000)	-0.405 (0.000)	0.085 (0.000)	0.051 (0.002)					
(10)CEO_CHAIR	0.008 (0.653)	0.2977 (0.000)	0.048 (0.004)	-0.005 (0.749)	-0.002 (0.900)	-0.076 (0.000)	-0.0610 (0.000)	-0.048 (0.004)	0.086 (0.000)				
(11)VC	0.011 (0.531)	-0.101 (0.000)	-0.016 (0.349)	0.055 (0.001)	-0.038 (0.027)	0.118 (0.000)	0.043 (0.009)	0.097 (0.000)	-0.142 (0.000)	-0.160 (0.000)			
(12)FOREIGN	0.023 (0.889)	0.042 (0.012)	-0.048 (0.004)	0.165 (0.000)	-0.042 (0.012)	0.419 (0.000)	0.128 (0.000)	0.115 (0.000)	-0.117 (0.000)	-0.051 (0.002)	0.066 (0.000)		
(13)LOSS	-0.007 (0.692)	-0.084 (0.000)	0.025 (0.135)	-0.105 (0.000)	0.166 (0.000)	-0.091 (0.000)	-0.269 (0.000)	-0.099 (0.000)	0.022 (0.198)	0.072 (0.000)	-0.011 (0.521)	-0.109 (0.000)	
(14)ACCR	-0.154 (0.000)	-0.029 (0.088)	0.016 (0.339)	-0.097 (0.000)	0.036 (0.033)	-0.030 (0.072)	-0.031 (0.061)	-0.017 (0.309)	-0.016 (0.343)	0.004 (0.833)	-0.020 (0.225)	-0.056 (0.001)	0.011 (0.500)

This table shows the Pearson correlation coefficients of variables. p -values are in parentheses below the coefficients. See Table 1 for variable definitions. The sample consists of 1,343 observations for years 2008-2010

4.2 Multivariate Analysis

4.2.1 Results from the regression of discretionary accruals on equity-based compensation and D&O liability insurance coverage

To investigate the joint effect of equity-based compensation and excess D&O liability insurance coverage on discretionary accruals, we add *CEO_COM* and an interaction effect between *CEO_COM* and *EXCOV* to the regressions as independent variables. The regression results are presented in Table 3. First, as shown in Column (1), the coefficient on *CEO_COM* is significantly positive, indicating that managers with a higher level of equity-based compensation are more likely to manipulate earnings, which is consistent with the findings of Bergstresser and Philippon (2006). In addition, Column (2) reports a significantly positive association between *Positive DA* and *CEO_COM*, whereas Column (3) reports an insignificant association between *Negative DA* and *CEO_COM*, suggesting that managers with high equity incentives are more willing to employ positive discretionary accruals. Columns (1) and (2) also show a significantly positive relationship between *DA* (positive *DA*) and *EXCOV*, supporting managerial opportunism hypothesis that firms with excess D&O liability insurance coverage tend to have a higher level of (positive) discretionary accruals.

Second, in Column (1), the result shows that there is a significantly positive association between *DA* and the interaction term, *EXCOV*CEO_COM*, (coef.=0.2368, t=2.58) after

controlling for the other factors related to discretionary accruals. This suggests that managers whose compensation is equity-based are more likely to have a larger magnitude of discretionary accruals when their liability insurance coverage levels are set too high. In addition, Column (2) shows that the coefficient on interaction term, *EXCOV*CEO_COM*, is significantly positive (coef.=0.7088, $z=2.47$), but Column (3) presents that the association between *Negative DA* and *EXCOV*CEO_COM* is insignificant, suggesting that because managers could benefit from positive abnormal accruals, managers who are covered by excess D&O liability insurance and have equity-based compensation tend to use income-increasing earnings manipulation.

In addition, *PURCHASE* and the interaction between *PURCHASE* and *CEO_COM* are included. For all columns of Table 3, the coefficients on *PURCHASE* and the interaction term (*PURCHASE*CEO_COM*) are insignificant, suggesting that firms with D&O liability insurance affect the incentives for earnings management and similarly for firms without D&O liability insurance. That is, excess D&O liability insurance coverage is the main factor leading to a higher likelihood of earnings management, rather than D&O liability insurance purchases. With respect to control variables: firms that have higher growth opportunity (*MB*), lower net cash flows from operating activity (*OCF*), hiring non-Big 4 auditors (*BIG4*), with a net loss in the current year (*LOSS*), and with lagged total accruals (*ACCR*) take more positive discretionary accruals.

Overall, the above analyses in Table 3 show that when the interaction between *EXCOV* and *CEO_COM* is added to the regressions, the coefficients on *EXCOV*CEO_COM* are significantly positive in Columns (1) and (2), but the coefficients on *PURCHASE* and its interaction term, *PURCHASE*CEO_COM*, are insignificant in all columns. This result indicates that the primary determination of earnings management is the joint effect of an increase in managers' equity incentives and a decrease in their litigation risk. Thus, the result supports this study's hypothesis, which states that managers whose compensation is equity-based are more likely to manipulate discretionary accruals when they have excess D&O liability insurance coverage.

Table 3: Results from the regression of discretionary accruals on equity-based compensation and excess D&O liability insurance coverage

Variable	Predicted sign	Column (1)		Column (2)		Column (3)	
		Dependent variable DA	t-value	Dependent variable Positive DA	z-value	Dependent variable Negative DA	z-value
<i>CEO_COM</i>	+,+,-	0.0397**	3.50	0.0313*	1.91	-0.1935	-1.58
<i>EXCOV</i>	+,+,-	0.0183*	1.74	0.0035*	1.80	-0.0510	-1.06
<i>EXCOV* CEO_COM</i>	+,+,-	0.2368***	2.58	0.7088**	2.47	-0.2499	-1.17
<i>MB</i>	+,+,+	0.0067***	6.03	0.0386***	4.20	0.0042	1.09
<i>LEV</i>	?,-,-	-0.0331***	-3.88	0.0880	1.40	-0.1411***	-4.15
<i>SIZE</i>	-,-,+	-0.0008	-0.21	-0.1281***	-3.41	0.0631***	4.25
<i>OCF</i>	-,-,-	-0.3985***	-20.70	-1.1944***	-5.50	-0.7767***	-10.15
<i>BIG4</i>	-,-,-	-0.0310***	-3.12	-0.0506***	-3.68	-0.0159	-1.01
<i>OUTDIRECTOR</i>	-,-,-	-0.0065	-0.86	-0.0467	-0.77	-0.0402	-1.30
<i>CEO_CHAIR</i>	+,+,-	-0.0049	-1.47	0.0174	0.68	-0.0153	-1.20
<i>VC</i>	+,+,-	-0.0000	-0.05	0.0049	1.54	-0.0007	-1.17
<i>FOREIGN</i>	-,-,-	-0.0001	-0.42	-0.0019	-1.57	-0.0009*	-1.69
<i>LOSS</i>	+,+,-	0.0315***	8.01	0.0694**	2.37	-0.1440***	-8.39
<i>ACCR</i>	-,-,-	-0.1297***	-8.69	-0.2120**	-2.07	-0.4055***	-6.42
Intercept	?,?,?	0.0356	1.18	0.6780**	2.50	-0.1806	-1.51
n		1,343		558		785	
Adj. R ²		0.1993					
Log pseudo-likelihood				2,664.46		3,654.13	

See Table 1 for variable definitions. Column (1) shows the OLS regression coefficients with t-values in parentheses. Column (2) and (3) show the truncated regression coefficients with z-values in parentheses. t-values and z-values are computed using robust standard errors adjusted for clustering on companies. Statistical significance is based on two-tailed test if there is a directional prediction for the coefficient and based on two-tailed test otherwise. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

4.2.2 Results from the regression of “meet or beat” benchmarks on equity-based compensation and D&O liability insurance coverage

In this section, we use a probit model to test two common benchmarks: firms reporting small positive earnings (*SMALL_EARNING*), and firms reporting small increases in previous earnings (*SMALL_INCREASE*). Panel A of Table 4 shows that the coefficient of *CEO_COM* is insignificant, but the coefficient on the interaction term, *EXCOV* CEO_COM*, has the predicted sign and is statistically significant (coef.=0.3276, z=1.92). Its marginal effect is 0.0798, which suggests that the probability of meeting or beating small positive earnings for the managers with equity-based executive compensation and excess D&O liability insurance coverage is 7.98 percent higher than those without equity-based executive compensation and D&O liability insurance coverage. That is, managers having both equity incentives and excess liability coverage raise the likelihood of reporting small positive earnings. Similar to the previous results, the coefficients on *PURCHASE* and its interaction term, *PURCHASE*CEO_COM*, are insignificant.

For the control variables, firms with large growth opportunity (*MB*), with a small size (*SIZE*), hiring non-Big 4 auditors (*BIG4*), with a lower percentage of outside directors (*OUTDIRECTOR*) and foreign shareholders (*FOREIGN*), and with a larger deviation

between voting and cash flow rights (*VC*) are more likely to report small positive earnings.

In addition, the findings in Panel B of Table 4 are similar to the results shown in Panel A. We find that the coefficient on the interaction term, *EXCOV* CEO_COM*, is significantly positive (coef.=0.5104, $z=4.31$) and the marginal effect equals 0.1066, which indicates that managers whose compensation is equity-based and whose legal liability is covered by D&O liability insurance tend to meet or beat small increases in earnings and the likelihood is 10.66 percent higher.

Therefore, the interactions of equity-based compensation and excess D&O liability insurance coverage with the high probability of meeting or beating earnings benchmarks have significant positive coefficients, supporting our hypothesis that earnings management is motivated by equity-based compensation and excess D&O liability insurance coverage.

Table 4: Results from Probit regression of earnings benchmark on equity-based compensation and excess D&O liability insurance coverage

Panel A: Reporting Small Positive Earnings (*SMALL_EARNING*)

<u>Variables</u>	<u>Predicted Sign</u>	<u>Coefficient</u>	<u>Marginal effect</u>	<u>z-value</u>
<i>CEO_COM</i>	+	0.1584	0.0386	0.72
<i>EXCOV</i>	+	0.2056	0.0501	0.90
<i>EXCOV* CEO_COM</i>	+	0.3276*	0.0798	1.92
<i>MB</i>	+	0.3190***	0.0777	10.13
<i>LEV</i>	-	0.1637	0.0399	1.10
<i>SIZE</i>	-	-0.1463**	-0.0356	-2.29
<i>OCF</i>	-	-0.0958	-0.3044	-1.46
<i>BIG4</i>	-	-1.2492***	-0.0241	-4.78
<i>OUTDIRECTOR</i>	-	-0.7471***	-0.1820	-5.62
<i>CEO_CHAIR</i>	+	0.0399	0.0097	0.67
<i>VC</i>	+	0.0078***	0.0019	2.61
<i>FOREIGN</i>	-	-0.0166***	-0.0041	-5.60
Intercept	?	-1.0633***	-	-1.96
N		1,343		
Pseudo-R ²		0.0996		

Panel B: Reporting Small Increase in Earnings (*SMALL_INCREASE*)

<u>Variables</u>	<u>Predicted Sign</u>	<u>Coefficient</u>	<u>Marginal effect</u>	<u>z-value</u>
<i>CEO_COM</i>	+	0.1038	0.0216	0.48
<i>EXCOV</i>	+	0.1155	0.0274	0.53
<i>EXCOV* CEO_COM</i>	+	0.5104***	0.1066	4.31
<i>MB</i>	+	-0.0397***	-0.0145	-2.91
<i>LEV</i>	-	0.0664	0.0157	0.47
<i>SIZE</i>	-	-0.0413	-0.0076	-0.55
<i>OCF</i>	-	-0.4215	-0.0651	-1.15
<i>BIG4</i>	-	0.0048	0.0012	0.08
<i>OUTDIRECTOR</i>	-	-0.5318***	-0.1075	-3.65
<i>CEO_CHAIR</i>	+	0.0813	0.0128	0.96
<i>VC</i>	+	-0.0010	-0.0003	-0.52
<i>FOREIGN</i>	-	0.022	0.0008	1.56
Intercept	?	-0.5042	-	-0.90
N		1,343		
Pseudo-R ²		0.0150		

The *BENCHMARK* is coded as 1 if a firm reports small positive earnings (or small earnings increase), and 0 otherwise; other variable definitions see Table 1. The marginal effects are computed as $f(\alpha + \beta'X)\beta$, where $\beta'X$ is computed at the mean values of the independent variables (Greene, 2003). z-values are computed using robust standard errors adjusted for clustering on companies. Statistical significance is based on two-tailed test. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.

4.3 Sensitivity Analyses

4.3.1 The two-step treatment effect model

To mitigate the endogeneity issue, we use an additional two-stage approach in the analysis of D&O liability insurance purchase. Prior research (Core, 1997; Chung and Wynn, 2008) suggests that firms with several corporate characteristics are more likely to purchase D&O liability insurance to reduce their litigation risk. Thus, we control for potential self-selection bias related to a firm's demand for D&O liability insurance purchase in the first stage.

$$P(PURCHASE=1) = \gamma_0 + \gamma_1 SIZE + \gamma_2 MB + \gamma_3 LEV + \gamma_4 EXCASH + \gamma_5 ACQUIRER + \gamma_6 DIVESTOR + \gamma_7 CROSS + \gamma_8 CEO_OWN + \gamma_9 OUTBLOCK + \gamma_{10} HIGHTECH + \varepsilon \quad (5)$$

where *PURCHASE* denotes the *ex ante* probability of a firm purchasing D&O liability insurance; the probability is coded one if a firm purchases D&O liability insurance, and zero otherwise.

In the first stage, we include the following variables in Equation (5): the firm's total assets (*SIZE*), the firm's growth opportunity (*MB*), the debt ratio (*LEV*), the excess of cash holdings (*EXCASH*), an increase in the book value of total assets (*ACQUIRER*), a decrease in the book value of total assets (*DIVESTOR*), across-listing in overseas markets (*CROSS*), the percentage of shares held by managers (*CEO_OWN*), the percentage of shares held outside shareholders (*OUTBLOCK*), and are high-tech (*HIGHTECH*). We then obtain the fitted values from the logistic regression and calculate an inverse Mills ratio, λ , (Heckman, 1979). The inverse Mills ratio (λ) is then used as an additional explanatory variable in Equations (3) and (4) to correct for potential self-selection bias.

Table 5 shows the results for an analysis of discretionary accruals and earnings benchmarks using a treatment effect model that includes an inverse Mills ratio (λ). Panel A shows the result of the first stage. We find that firms are inclined to purchase D&O liability insurance under the following conditions: when they are large firm size (*SIZE*), have more cash holdings (*EXCASH*), larger decreases in book value (*DIVESTOR*), less shares held by managers (*CEO_OWN*), more shares owned by outside shareholders (*OUTBLOCK*) and they belong to a high-tech industry (*HIGHTECH*). Panel B shows the analysis results of discretionary accruals using a treatment effect model. Columns (1) and (2) show that the coefficient on the interaction term, *EXCOV*CEO_COM*, is significant and positively associated with *DA* and positive *DA* (coef.=0.2354, z=2.56; coef.=0.6163, z=2.12), which is consistent with our expectation that managers having equity-based compensation and excess D&O liability insurance coverage are more likely to manipulate positive earnings.

Panel C shows the results, which are similar to previous findings. When the selection bias is controlled in the second stage, Columns (1) and (2) show that the coefficients of $EXCOV*CEO_COM$, are positive and significant (coef.=0.3372, $z=1.82$; coef.=0.4684, $z=3.29$, respectively), which are similar to the results in Table 4. Thus, after the selectivity bias is corrected, the interaction terms, $EXCOV$ and CEO_COM , are still significant with positive sign, indicating that managers with more equity-based compensation and abnormal D&O liability insurance coverage are more likely to meet or beat small positive earnings and small increases in earnings.

Moreover, the coefficient on λ is significant for the results, indicating that it is meaningful to control for the potential self-selection bias.

Table 5: Two-step treatment effect model for D&O liability insurance purchase and discretionary accruals

Panel A: Dependent variable = <i>PURCHASE</i> (First stage)			
Variable	Predicted sign	Coefficient	z-value
<i>SIZE</i>	+	0.3164***	5.70
<i>MB</i>	-	-0.0051	-0.30
<i>LEV</i>	+	-0.0385	-0.29
<i>EXCASH</i>	+	0.6909***	3.74
<i>ACQUIROR</i>	+	-0.0558	-0.73
<i>DIVESTOR</i>	+	0.4752***	4.50
<i>CROSS</i>	+	0.1698	1.49
<i>CEO_OWN</i>	-	-0.0301***	-3.51
<i>OUTBLOCK</i>	+	0.0064**	1.99
<i>HIGHTECH</i>	+	0.7640***	14.65
Intercept	?	-3.5234***	-7.44

Panel B: Dependent variable = Discretionary accruals (Second stage)							
Variable	Predicted sign	Column (1) Analysis of <i>DA</i>		Column (2) Analysis of positive <i>DA</i>		Column (3) Analysis of negative <i>DA</i>	
		Coefficient	z-value	Coefficient	z-value	Coefficient	z-value
<i>CEO_COM</i>	+,+,-	0.0395**	2.08	0.0290**	2.31	-0.1899	-1.49
<i>EXCOV</i>	+,+,-	0.0184*	1.91	0.0021	1.43	0.0459	0.99
<i>EXCOV*CEO_COM</i>	+,+,-	0.2354***	2.56	0.6163**	2.12	-0.2742	-0.60
<i>MB</i>	+,+,+	0.0069***	6.13	0.0033***	4.15	0.0046*	1.95
<i>LEV</i>	?,-,-	-0.0349***	-4.06	0.1206**	2.01	-	-4.38
						0.1447***	
<i>SIZE</i>	-,-,+	-0.0007	-0.20	-0.1374**	-3.91	0.0748***	5.01
<i>OCF</i>	-,-,-	-0.3960***	-27.43	-0.2602***	-5.82	-	-10.05
						0.2197***	
<i>BIG4</i>	-,-,-	-0.0023**	-2.03	-0.0164**	-2.10	0.0008	0.68
<i>OUTDIRECTOR</i>	-,-,-	-0.0029**	-2.37	-0.0210	-1.03	-0.0164	-1.41
<i>CEO_CHAIR</i>	+,+,-	0.0045	1.34	0.0015	0.83	0.0046	0.88
<i>VC</i>	+,+,-	0.0000	0.26	0.0004	0.46	-0.0001	-1.01
<i>FOREIGN</i>	-,-,-	-0.0001	-0.36	-0.0003	-1.30	-0.0008**	-2.58
<i>LOSS</i>	+,+,-	0.0305***	7.67	0.0377	0.80	-0.0311***	-8.04
<i>ACCR</i>	-,-,-	-0.1299***	-8.70	0.1695***	3.51	-	-6.42
						0.1892***	
λ	?,?,?	0.0104	1.94	-0.1641***	-3.85	0.0955***	4.27
Intercept	?,?,?	-0.0094	-0.29	0.1078***	3.63	-0.4141***	-3.25
N		1,343		558		785	
Adj R ² / wald χ^2		319.99***		142.67***		243.47***	

Panel C: Dependent variable = earnings benchmarks (Second stage)							
Variable	Predicted sign	Column (1) SMALL_EARNING			Column (2) SMALL_INCREASE		
		Coefficient	Marginal		Coefficient	Marginal	
			effect	z-value		effect	z-value
<i>CEO_COM</i>	+,+	0.1620	0.0394	0.73	0.0988	0.0206	0.45
<i>EXCOV</i>	+,+	0.2064	0.0503	0.90	0.1369	0.0285	0.55
<i>EXCOV*CEO_COM</i>	+,+	0.3372*	0.0821	1.82	0.4684***	0.1976	3.29
<i>MB</i>	+,+	0.3186***	0.0776	10.11	0.0678***	0.0142	2.82
<i>LEV</i>	+,-	0.1511	0.0368	1.01	0.0476	0.0099	0.30
<i>SIZE</i>	-,-	-0.1571***	-0.0383	-2.42	-0.0072	-0.0015	-0.11
<i>OCF</i>	-,-	-1.2237***	-0.3015	-4.73	-0.2776	-0.0578	-1.02
<i>BIG4</i>	-,-	-0.0880	-0.0221	-1.33	0.0238	0.0048	0.32
<i>OUTDIRECTOR</i>	-,-	-0.7147***	-0.1741	-5.20	-0.4362***	-0.0909	-3.00
<i>CEO_CHAIR</i>	+,+	-0.0351	-0.0085	-0.59	0.0705	0.0149	1.12
<i>VC</i>	+,+	0.0074**	-0.0018	2.46	-0.0009	-0.0001	-0.29
<i>FOREIGN</i>	-,-	-0.0166***	-0.0040	-5.57	-0.0041*	-0.0009	-1.64
<i>PURCHASE</i>	?,?	-0.0886	-0.0216	-0.94	-0.2179**	-0.0454	-2.20
Intercept	?,?	-1.2721**	-	-2.17	-1.0409*	-	-1.69
N		1,343			1,343		
Pseudo R ²		0.0998			0.0168		

PURCHASE coded one if a firm purchase D&O insurance and zero otherwise; *SIZE* is the natural log of total assets at the beginning of the fiscal year; *MB* is the ratio of market value to book value; *LEV* is total debt over total asset; *EXCASH* is the residual from the regression of cash on determinants of cash holdings; *ACQUIRER* is one if the book value of total assets at the end of the fiscal year increases by more than 25% from the beginning of the fiscal year, and zero otherwise; *DIVESTOR* is one if the book value of total assets at the end of the fiscal year decreases by more than 25% from the beginning of the fiscal year, and zero otherwise; *CROSS* is one if a firm is cross-listed in overseas, and zero otherwise; *CEO_OWN* is the percentage of shares held by the chief executive officer; *OUTBLOCK* is the percentage of an outside shareholder who owns over 10% of a firm's stock; *HIGHTECH* is one if a firm is a member in high-tech industry; other variable definitions see Table 1. Statistical significance is based on two-tailed test otherwise. Results for the dummy variables representing year and industry are not reported. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level.

4.3.2 Alternative measurement of equity-based compensation

We examine the robustness of our results with the measurement of equity-based compensation. We consider five equity incentive elements: option grants in the current period, unexercisable options, exercisable options, restricted stock grants, and stock ownership. We deflate these measures (in shares) with the total outstanding shares of a firm. Similar to previous reports, Table 6 shows that the coefficients on the interaction term, *EXCOV*CEO_COM*, are significantly and positively associated with *DA*, *SMALL_EARNINGS* and *SMALL_INCREASE*, but the coefficients on the interaction term, *PRUCHASE*CEO_COM*, are insignificant. The results of this alternative measurement are consistent with our previous findings: the joint effect of equity-based compensation and excess D&O liability insurance coverage is positively correlated with the incentives for earnings management and the probability of meeting or beating earnings benchmarks.

Table 6: Alternative measure of equity-based compensation

Variable	Predicted sign	Column (1)		Column (2)		Column (3)	
		Dependent variable DA		SMALL_EARNING		SMALL_INCREASE	
		Coefficient	t-value	Coefficient	z-value	Coefficient	z-value
<i>CEO_COM</i>	+,+,+	0.9624*	1.83	5.6465	0.23	5.5344	0.22
<i>EXCOV</i>	+,+,+	0.0021	1.10	0.0588*	1.76	0.0438*	1.81
<i>EXCOV* CEO_COM</i>	+,+,+	5.4831**	2.10	53.6363**	2.46	43.0595**	2.88
<i>MB</i>	+,+,+	0.0006***	5.83	0.0310***	10.09	-0.0067***	-2.87
<i>LEV</i>	?,-,-	-0.0033***	-3.85	-0.0151	1.02	-0.0064	-0.40
<i>SIZE</i>	-,-,-	-0.0001	-0.17	-0.0145**	-2.19	-0.0028	-0.40
<i>OCF</i>	-,-,-	-0.0398***	-27.60	-0.1253***	-4.81	-0.0311	-1.15
<i>BIG4</i>	-,-,-	-0.0004***	-2.77	-0.0090	-1.38	-0.0085	-0.12
<i>OUTDIRECTOR</i>	-,-,-	-0.0007	-0.93	-0.0745***	-5.56	-0.0512***	-3.60
<i>CEO_CHAIR</i>	+,+,+	0.0007	2.04	0.0025	0.45	0.0066	1.12
<i>VC</i>	+,+,+	0.0001	0.35	0.0008***	2.41	-0.0002	-0.76
<i>FOREIGN</i>	-,-,-	-0.0004	-0.25	-0.0016***	-5.46	-0.0004	-1.49
<i>LOSS</i>	+,+,+	0.0032***	8.09				
<i>ACCR</i>	-,-,-	-0.0127***	-8.48				
Intercept	?,?,?	0.0035	1.08	-0.1071***	-1.85	-0.0573	-0.95
n		1,343		1,343		1,343	
Adj. R ² / Pseudo R ²		0.1948		0.0972		0.0147	

See Table 1 for variable definitions. Column (1) shows the OLS regression coefficients with t-values in parentheses. Column (2) and (3) show the truncated regression coefficients with z-values in parentheses. t-values and z-values are computed using robust standard errors adjusted for clustering on companies. Statistical significance is based on two-tailed test if there is a directional prediction for the coefficient and based on two-tailed test otherwise. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

4.3.3 Classification excess D&O liability insurance with positive and negative levels

In this section, we divide the dataset into positive excess D&O liability insurance coverage (positive *EXCOV*) and negative one (negative *EXCOV*) to investigate the relation between earnings management and equity-based compensation. As shown in Panel A of Table 7, after we split the sample based on positive and negative *EXCOV*, we find that that the coefficients on *CEO_COM* are significantly related to *DA* and Positive *DA* (coef.=0.1027, t=3.48; coef.=0.5413, z=2.18) for the firms with positive excess D&O liability insurance coverage. However, in the case of firms with negative excess D&O liability insurance, we find that the coefficients on *CEO_COM* are insignificantly associated with *DA*, Positive *DA* and Negative *DA* in Panel B. The results reveal that high equity incentive managers are more likely to manipulate earnings upward when they are covered by positive excess D&O liability insurance. Overall, these findings support that managers with equity-based compensation and positive excess D&O liability insurance take more income-increasing abnormal accruals than those with negative excess D&O liability insurance.

Table 7: Classification excess D&O liability insurance with positive and negative levels

Panel A: Firms with positive EXCOV							
Variable	Predicted sign	Column (1)		Column (2)		Column (3)	
		Dependent variable DA		Dependent variable Positive DA		Dependent variable Negative DA	
		Coefficient	t-value	Coefficient	z-value	Coefficient	z-value
<i>CEO_COM</i>	+,+,+	0.1027***	3.48	0.5413**	2.18	-0.0096	-0.08
<i>MB</i>	+,+,+	0.0027***	4.82	0.0357*	1.88	-0.0112	-1.23
<i>LEV</i>	?,-,-	-0.0258	-1.03	-0.0025	1.01	-0.0439	-0.59
<i>SIZE</i>	-,-,+	-0.0085	-0.78	-0.0905	0.87	0.0345	1.17
<i>OCF</i>	-,-,-	-0.3988***	-9.02	-1.2029***	-2.92	-0.5839***	-3.92
<i>BIG4</i>	-,-,-	-0.0133***	-3.96	-0.0701***	-2.56	-0.0157	-0.39
<i>OUTDIRECTOR</i>	-,-,-	-0.0775***	-3.35	-0.4789*	-1.77	-0.0717	-0.96
<i>CEO_CHAIR</i>	+,+,-	0.0003	1.02	0.0727*	-1.77	-0.0312	-0.98
<i>VC</i>	+,+,-	0.0001	0.28	-0.0007	0.87	-0.0005	-0.36
<i>FOREIGN</i>	-,-,-	-0.0004	-1.09	-0.0016	-0.41	-0.0013	-1.30
<i>LOSS</i>	+,+,+	0.0400***	3.49	0.0666	0.77	0.1762***	4.14
<i>ACCR</i>	-,-,-	-0.1313***	-3.19	-0.5544*	-1.95	-0.2793***	-2.30
Intercept	?,?,?	0.1213	1.32	0.4226	0.53	-0.1010	-0.41
n		477		209		268	
Adj. R ²		0.2022					
Wald χ^2				65.17***		53.14***	

Panel B: Firms with negative EXCOV							
Variable	Predicted sign	Column (1)		Column (2)		Column (3)	
		Dependent variable DA		Dependent variable Positive DA		Dependent variable Negative DA	
		Coefficient	t-value	Coefficient	z-value	Coefficient	z-value
<i>CEO_COM</i>	+,+,+	-0.0417	-1.41	-0.0392	-0.37	-0.108	-1.47
<i>MB</i>	+,+,+	0.0136***	6.03	0.0242***	2.86	0.0185***	3.01
<i>LEV</i>	?,-,-	-0.0507***	-2.68	0.0057	0.08	-0.1496***	-2.87
<i>SIZE</i>	-,-,+	-0.0036	-0.51	-0.0292	-0.86	0.0545***	2.82
<i>OCF</i>	-,-,-	-0.5152***	-18.70	-1.0030***	-5.5	-0.7007***	-7.13
<i>BIG4</i>	-,-,-	-0.0081***	-2.58	-0.0282***	-2.86	-0.0160	-0.66
<i>OUTDIRECTOR</i>	-,-,-	-0.0089	-0.52	-0.1172	-1.46	-0.0694	-1.48
<i>CEO_CHAIR</i>	+,+,-	0.0024	1.35	0.0123	0.45	0.0058	0.31
<i>VC</i>	+,+,-	-0.0001	-0.17	0.0025**	2.25	-0.0014**	-2.01
<i>FOREIGN</i>	-,-,-	-0.0001	-0.41	-0.0016	-1.37	-0.0009	-1.28
<i>LOSS</i>	+,+,+	0.0292***	3.54	0.0100**	2.33	0.0920***	4.30
<i>ACCR</i>	-,-,-	-0.0744***	-2.65	-0.0788***	-2.89	-0.2455***	-3.10
Intercept	?,?,?	0.0603	0.95	0.0999	0.34	-0.2326	-1.40
n		866		298		568	
Adj. R ²		0.2940					
Wald χ^2				37.67***		69.40***	

See Table 1 for variable definitions. Column (1) shows the OLS regression coefficients with t-values in parentheses. Column (2) and (3) show the truncated regression coefficients with z-values in parentheses. t-values and z-values are computed using robust standard errors adjusted for clustering on companies. Statistical significance is based on two-tailed test if there is a directional prediction for the coefficient and based on two-tailed test otherwise. *** Significant at the 1% level; ** Significant at the 5% level; * Significant at the 10% level

4.3.4 Simultaneous-equation models

Although our findings suggest that managers with excess D&O liability insurance tend to have higher discretionary accruals, insurance companies should be aware of the potential for managerial opportunistic behavior to manipulate earnings via accruals and then price the insurance accordingly. To the extent that the two variables, *DA* and *EXCOV* might be simultaneously determined, the simultaneous-equation model is needed to control the influence with which *DA* and *EXCOV* are jointly determined. We then estimate the following two equations using simultaneous-equation estimation:

$$DA = \beta_0 + \beta_1 CEO_COM + \beta_2 EXCOV + \beta_3 EXCOV * CEO_COM + \beta_4 MB + \beta_5 LEV + \beta_6 SIZE + \beta_7 OCF + \beta_8 BIG4 + \beta_9 OUTDIRECTOR + \beta_{10} CEO_CHAIR + \beta_{11} VC + \beta_{12} FOREIGN + \beta_{13} LOSS + \beta_{14} ACCR + \varepsilon$$

$$EXCOV = \kappa_0 + \kappa_1 LEV + \kappa_2 SIZE + \kappa_3 OUTDIRECTOR + \kappa_4 CASH + \kappa_5 VOLAT + \kappa_6 CROSS + \kappa_7 OUTBLOCK + \kappa_8 HIGHTECH + \kappa_9 DA + \varepsilon \quad (6)$$

Following Wynn (2008) and Chung and Wynn (2008), the determinants of excess coverage limits include debt ratio (*LEV*), firm size (*SIZE*), the percentage of outside directors on the board of directors (*OUTDIRECTOR*), cash holdings (*CASH*), the volatility of stock returns (*VOLAT*), a cross-listing status (*CROSS*), the percentage of shares held by outside block holders (*OUTBLOCK*), membership in a high-tech industry (*HIGHTECH*), and discretionary accruals (*DA*).

Untabulated analysis shows that the result using the simultaneous-equation model is consistent with previously documented evidence concerning the impact of equity-based compensation and excess D&O liability insurance on discretionary accruals. In addition, we find that the coefficient on *DA* is positively related to *EXCOV*, indicating that excess D&O liability insurance and discretionary accruals could be jointly determined. That is, if we only use a single-equation estimation technique (e.g., ordinary least squares, OLS), simultaneous-equation bias would make coefficient estimates unreliable). Therefore, it is meaningful to use simultaneous-equation models to control for a statistical misspecification.

4.3.5 Alternative measures of meeting or beating earnings benchmarks

In Equation (4), we define a firm as reporting small positive earnings, *SMALL_EARNING*, (or reporting small increases in earnings, *SMALL_INCREASE*) if its net income (or the increases in its net income) deflated by lagged total assets is between 0% and 2%. Furthermore, we examine the robustness of the results with the measurements of *SMALL_EARNING* and *SMALL_INCREASE* in different ways. (1) *SMALL_EARNING* (or *SMALL_INCREASE*) is coded one if its net income (or the increases in its net income) deflated by lagged total assets is between 0% and 1%; and (2) between 0% and 3%. Untabulated results show that the results based on these alternative benchmark measures are similar to previous findings.

4.3.6 Results using another measurement of discretionary accruals

In this study, we only report the empirical results for discretionary accruals that are estimated using the performance-adjusted approach proposed by Kothari et al. (2005). In

unreported analyses, we estimate discretionary accruals using the cross-sectional Jones (1991) model and the current accruals model used by Ashbaugh et al. (2003). All of the empirical tests are replicated, including both single-equation models and two-stage treatment effect models, and the results are similar to those reported in the previous section. Untabulated results for these two alternative measures of discretionary accruals are also similar to previous results when ROA is included as an additional control variable in the regression of discretionary accruals.

5 Conclusion

Since 2002, the TSFB has required that listed firms disclose more information on their D&O liability insurance purchases. The publicly available data provides this study with an opportunity to examine how equity-based compensation and D&O liability insurance coverage affects the incidence of earnings management.

Prior studies of managerial incentives suggest that equity-based compensation provides financial motivation for managers to manipulate earnings (Burns and Kedia, 2005; Efendi et al., 2005; Bergstresser and Philippon, 2006). However, because of the higher lawsuit costs associated with a large amount of abnormal accruals, managers may be reluctant to adopt more aggressive accounting methods. Once managers mitigate their personal legal liability through D&O liability insurance coverage, they may engage in opportunistic behavior (for example, earnings management).

We use equity-based compensation and excess D&O liability insurance coverage to verify the joint effect of managers' liability coverage and their compensation incentives on earnings management. Using multivariate and probit regressions, we find that the interaction of equity incentives and excess D&O liability insurance coverage is positively related to earnings manipulation, such as discretionary accruals, and the strategies that "meet or beat" small positive earnings and small increases in earnings. These results show that when managers have both a higher level of equity-based compensation and a lower level of legal liability, it increases the occurrence of earnings manipulation. Thus, more "incentivized" and low "litigation risk" managers are more likely to engage in earnings management.

The overall evidence supports the management opportunism argument regarding the demand for D&O liability insurance, which suggests that earnings management is mainly driven by the joint effect of management compensation schemes and excess D&O liability insurance coverage.

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