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Effects of Directors and Officers Insurance on Earnings Management Strategies: Moderating Role of Restatement Announcements

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ABSTRACT

Purpose: The purpose of this study investigates the role of directors and officers (D&O) insurance and restatement announcements in earnings management strategies.

Design/methodology/approach:
Using data on Taiwan's capital market, we implement two-stage method regression to examine the effects of D&O insurance on the earnings management strategies of firms and the role of restatement announcements.

Findings:
The results reveal that managers prefer to adopt accrual earnings management when firms have purchased D&O insurance. Moreover, the results reveal that restatement announcements cause managers to switch their earnings management strategies from accrual to real earnings management when firms have purchased D&O insurance.

Research limitations/implications:
This study has following research limitations. (1) the Taiwanese government requires listed firms to purchase D&O insurance; thus, the results of our analysis cannot be generalized to the period following the imposition of this requirement. (2) In contrast to the United States or other countries with high levels of investor protection, Taiwan's capital market is still an emerging capital market.

Originality/value:
Our study support the moderating role of D&O insurance, which constrains managers from manipulating earnings through accrual earnings management; they also highlight the risk-taking role of D&O insurance when firms make restatement announcements.

1. Introduction

The present study investigates the association between directors and officers (D&O) insurance and relative earnings management strategies; it also examines the moderating effects of restatement announcements on this association. Restatement announcements are regarded as an indicator of poor financial reporting quality, and such announcements have become a concern among stakeholders and regulators. D&O insurance provides board members with protection from claims of misconduct related to their decisions or actions. In addition, it promotes talent retention and enhances the ability of directors and officers to implement appropriate decisions that benefit shareholders. A study indicates that D&O insurance covers defense costs and potential damages, and that it can effectively reduce shareholder litigation costs (Baker and Griffith, 2010) and increase information risk (Chen et al., 2016). Nevertheless, when insurers have direct financial involvement in paying for claims, they are incentivized to assess firm status and to price financial reporting risk, particularly in situations in which firm directors and officers are involved in surface lawsuits (Boyer and Stern, 2012; Cao and Narayanamoorthy, 2014) or restatement announcements (Cao and Narayanamoorthy, 2014).

Accounting studies focus on the trade-offs among earnings management strategies or the choice of behaviors related to earnings management strategies (Cohen et al., 2008; Cohen and Zarowin, 2010; Badertscher, 2011; Zang, 2012; Braam et al., 2015; Zhu et al., 2015; Kothari et al., 2016). These studies indicate that real earnings management is more difficult to assess than accrual earnings management. The manipulation of real activities does not involve roles related to compliance with Generally Accepted Accounting Principles (GAAP; Kothari et al., 2016), resulting in less scrutiny from external stakeholders. Although research indicates that firms with D&O insurance coverage implement accrual earnings management to a high degree (Khan and Wald, 2015; Chen et al., 2016), the relevant

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studies neglect the role of negative events. Jarrell and Peltzman (1985) report that capital markets penalize firms when these firms make announcements involving negative information. Dechow et al. (2010) assert that manager/director layoffs, capital market penalties, and litigation lawsuits are the three major consequences faced by firms making restatement announcements. A study indicates that when they make restatement announcements, firms have negative abnormal returns (Palmrose et al., 2004), higher litigation risk (Palmrose and Scholz, 2004), and higher equity capital cost (Hribar and Jenkins, 2004). Cao and Narayanamoorthy (2014) stated that insurers charge higher insurance premiums when firms have lower earnings quality or make restatement announcements. The aforementioned studies provide evidence that restatement announcements attract the attention of stakeholders (e.g., D&O insurers) and are costly for firms.

Cao and Narayanamoorthy (2014) argue that insurers can price potential litigation risks when firms make negative event announcements *ex ante*, and they are charged higher D&O insurance risk premiums after making such announcements. Insurance risk premiums represent a type of agency cost. If a firm has a higher risk premium than its peer, the firm is driven to reduce its potential litigation risk. Thus, when firms do not make negative event announcements, we predict that D&O insurance plays a risk-taking role that induces managers to manipulate earnings through accrual earnings manipulation. By contrast, when firms make negative event announcements, we predict that D&O insurance plays a monitoring role that may constrain managers from manipulating earnings by switching from accrual earnings manipulation to real earnings manipulation. However, this switch results in insurers absorbing the risk related to real earnings management.

We collect data from the Market Observation Post System (MOPS) and the Taiwan Economic Journal (TEJ) database. The results reveal that purchasing D&O insurance is positively associated with accrual earnings management but negatively associated with real earnings management. We also obtain evidence that managers prefer not to implement accrual or real earnings management after their firms make restatement announcements. In addition, we reveal that firms that have purchased D&O insurance switch their earnings management strategy from accrual to real earnings management when they make restatement announcements. This finding is robust after controlling for earnings management selection bias, use of D&O insurance premium as a measure, and use of change in earnings management regression. Finally, the present study compares various real earnings manipulation strategies and reveals that, when firms have purchased D&O insurance, managers are more committed to increasing earnings through price discounts or generous credit terms after their firms make restatement announcements.

The present study makes several contributions to the D&O insurance and accounting literature. (1) It is the first study to examine the role of D&O insurance purchase on earnings management strategies and to demonstrate that D&O insurance plays a risk-taking role that induces managers to prefer the implementation of accrual earnings manipulation. This finding is similar to that of Chen et al. (2016). However, in contrast to their research, we discover that managers switch their earnings management strategies from accrual to real earnings management when their firms make restatement announcements; this finding supports the monitoring role of D&O insurance in accrual earnings management. Kothari et al. (2016) state that, relative to real earnings management, accrual earnings management requires compliance with rules and can be more easily scrutinized by external stakeholders. High scrutiny from external stakeholders results in managers switching their earnings management strategies from accrual to real earnings management.

(2) Based on D&O insurance and restatements research, we provide evidence that managers switch earnings management strategies when they are scrutinized by D&O insurers after their firms make restatement announcements. Our study differs from other earnings management studies that examine capital market incentives in relation to earnings management strategies.

(3) The present study also contributes to accounting research. We reveal that managers are willing to manipulate earnings through real earnings manipulation when firms are scrutinized by D&O insurers after these firms make restatement announcements. The rest of the paper is organized into four sections. Section 2 provides a literature review, Section 3 describes the research methodology and sample selection process, Section 4 provides a description of the research results and findings, and Section 5 provides the conclusion and implications of the present study.

2. Literature Review and Hypothesis Development

2.1 D&O Insurance and Earnings Management

Increasing D&O insurance research has been recently conducted. Two competing hypotheses exist in D&O insurance research, namely the monitoring and opportunism hypotheses. According to the monitoring hypothesis, insurers can scrutinize the insured and provide limited coverage (Holderness, 1990; O'Sullivan, 1997). Researchers report that D&O insurance involves the payment of claims arising from matters pertaining to directors and officers; therefore, insurers must develop appropriate technologies for converting the observable characteristics of policyholders into risk

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measurements, such that reasonable insurance coverage can be achieved (Boyer and Stern, 2012; 2014). Cao and Narayanamoorthy (2014) also contend that insurers are incentivized to price financial reporting risks to compensate for potential litigation related to financial reporting. Yuan et al. (2016) investigate the relationship between D&O insurance and stock-price-crash risk, and they indicate that purchasing D&O insurance can reduce stock-price-crash risk; notably, their analyses reveal that the effect of D&O insurance on crash risk is more pronounced in firms with a weaker corporate governance environment (e.g., low board independence, engagement of non-Big Four auditors [i.e., Deloitte, Ernst & Young, KPMG, and PwC], reduced institutional shareholdings, and reduced investor protection). Liao et al. (2022) examine the effect of D&O insurance on the pricing of seasoned equity offerings, and their results reveal that SEO firms with D&O insurance coverage or higher levels of insurance coverage experience less negative announcement-related effects, indicating the monitoring role of D&O insurance.

According to the opportunism hypothesis, D&O insurance partially covers the litigation risk related to directors and officers; consequently, directors and officers do not act in a manner that promotes stakeholders' interests. Studies argue that low levels of information transparency and risk-taking (among managers) are evidence of opportunism (Chung and Wynn, 2008; Wynn, 2008; Lin et al., 2011; Lin et al., 2013; Li and Liao, 2014; Khan and Wald, 2015; Chen et al., 2016). For example, Chen et al. (2016) report that D&O insurance reduces the disciplining effect of shareholder litigation, which increases the cost of equity. Similarly, Weng et al. (2017) demonstrate that firms are more likely to restate their financial reports when managers are covered by higher levels of D&O insurance.

The literature on extensive earnings management focuses on the trade-offs or management choice behaviors pertaining to accrual and real earnings management (Cohen et al., 2008; Cohen and Zarowin, 2010; Badertscher, 2011; Zang, 2012; Shen et al., 2015; Braam et al., 2015; Enomoto et al., 2015; Kothari et al., 2016). Cohen et al. (2008) are the first researchers to examine this change in earnings management strategy, and they discover that firms switched from accrual to real earnings management after the Sarbanes–Oxley Act was passed. Zang (2012) report alternate evidence regarding the earnings management choices of firms; she verifies that managers evaluate the trade-offs between real and accrual earnings management on the basis of their relative manipulation costs. Braam et al. (2015) also point out that a switch from accrual to real earnings management occurs because of not only relative manipulation costs but also political connections.

Therefore, D&O insurance can be regarded as a mechanism for mitigating the litigation risk of directors and officers, and this mechanism increases the tendency to overinvest and reduces financial reporting quality. Studies also state that managers tend to engage in accrual earnings manipulation, which reduces conservatism (Chung and Wynn, 2008; Chen et al., 2016). Therefore, we infer that firms with D&O insurance prefer to manipulate earnings through an accrual earnings management strategy and propose the following hypothesis:

H1: Managers prefer to manipulate earnings through accrual earnings management than through real earnings management when their firms have purchased D&O insurance.

2.2 Reporting Restatements and Earnings Management

Research demonstrates that after announcing financial reporting restatements, firms may encounter adverse consequences, including deceases in the stock price (Palmrose et al., 2004), increases in equity capital costs (Hribar and Jenkins, 2004), and increases in debt capital costs (Graham et al., 2008; Park and Wu, 2009). Furthermore, outside directors face labor market penalties (Srinivasan, 2005; Desai et al., 2006) and shareholder lawsuits (Palmrose and Scholz, 2004). Hribar and Jenkins (2004) reveal that restatement announcements increase the average cost of equity capital by 7% to 19%. Kravet and Shevlin (2010) assert that firms that announce restatements are exposed to higher discretionary information risk relative to firms that do not make restatement announcements.

Jarrell and Peltzman (1985) note that capital markets penalize firms with that make negative information announcements; thus, after their firm make restatement announcements, managers must quickly restore investor confidence (Wilson, 2008). Studies also indicate that firm managers become more conservative, become less inclined to issue earnings forecasts, and exhibit risk-adverse behavior after their firms make restatement announcements (Ettredge et al., 2012; Ettredge et al., 2013). Wiedman and Hendricks (2013) propose the compliance[1] and signaling views[2] to demonstrate the effect of restatement announcements on financial reporting quality. These aforementioned results reveal that firm managers can improve financial reporting quality and adopt the signaling view. Therefore, we infer that managers prefer to not manipulate earnings through accrual or real earnings management after their firms make restatement announcements.

H2: Managers prefer to not manipulate earnings through accrual or real earnings management when firms make restatement announcements.

[1] The compliance view posits that restatement announcements compel managers to correct errors to comply with regulatory requirements.
[2] The signaling view posits that that restatement announcements induce managers to improve financial reporting quality, which reduces information uncertainty.

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2.3 D&O Insurance and Earnings Management: Moderating Role of Restatement Announcements

Kothari et al. (2016) note that accrual earnings management involves managers exercising their discretion and judgment to misreport underlying operating performance under GAAP. By contrast, real earnings management involves managers acting with the intention of misleading stakeholders by manipulating earnings to deviate from normal business practices (Roychowdhury, 2006). For decision-making, managers have an information and processing capacity that is superior to those of external stakeholders; thus, external stakeholders are willing to delegate the responsibility of making investment and operating decisions to managers. Thus, real earnings management is more difficult to assess than accrual earnings management (Cohen et al., 2008; Zang, 2012; Braam et al., 2015).

When corporations announce financial reporting restatements, they receive considerable scrutiny from external stakeholders, and their managers immediately attempt to restore investor confidence (Wilson, 2008). On the basis of the aforementioned findings, we infer that when D&O insurance plays a monitoring role, restatement announcements induce D&O insurers to constrain managers from manipulating earnings through accrual earnings management. We also predict that restatement announcements induce managers to seek opportunities to manipulate earnings through real earnings management (Wiedman and Hendricks, 2013). Lin et al. (2019) also indicate that managers' opportunistic behavior and the monitoring role of D&O insurance are dependent on the negative event announcements of firms; notably, their study reveals that purchasing D&O insurance is positively associated with idiosyncratic risk, and that negative event announcements moderate the correlation between D&O insurance and idiosyncratic risk. Thus, D&O insurers absorb risk from the manipulation of real activities. On the basis of the aforementioned inference, we proposed the following hypothesis:

H3: Managers prefer to manipulate earnings through real earnings management than through accrual earnings management when their firms have purchased D&O insurance after making restatement announcements.

3. Research Design and Sample Selection

3.1 Data and Sample Selection

For sample collection, we first manually collect D&O insurance data from 2008 to 2014 from the MOPS. We then collect data from the TEJ database, a source of financial and corporate governance data, excluding the data of financial and insurance institutions; the test variables are constructed using the collected data. An earnings management variable is constructed that requires eight complete observations for each industry and for each year before data merging is performed. After the earnings management data are obtained, they are merged with the manually collected financial and corporate governance data. Table 1 presents the sample selection process. The final sample used in the analysis comprises 8,483 firm–year observations that cover the years from 2009 to 2014[3]. To mitigate the potential problems caused by extreme outliers, the financial variable data at the top and bottom 1% of the observations are winsorized.

Table 1 Sample Selection and Sample Character

Panel A: Sample Selection	
Initial data with earnings management, financial, corporate governance, and directors and officers	9,741
Exclude firm with missing corporate governance and financial data	(273)
Exclude firm with missing corporate governance and financial data at $t-1$	(985)
Use of sample in analysis	8,483

3.2 Model Specification

The present study mainly examines the effect of D&O insurance on the earnings management strategy and investigates the moderating role of restatement announcements. Studies report that the disclosure of D&O insurance is voluntary, and that purchase decisions are made on the basis of firm characteristics (Core, 1997; Chung and Wynn, 2008). To address the problem of endogeneity, we use the two-stage method in the present study (Chung and Wynn, 2008). In the first stage, a probit model is employed to examine D&O insurance purchase decisions. The dependent variable is the purchase decision of a firm. The independent variables are the determinants of the firm's decision to purchase D&O insurance, which include the board director's ownership, board size, the ratio of independent directors on the board, the blockholders' ownership, whether the firm has a net loss, financial leverage, firm size, firm performance, firm growth, and whether the firm is in a high-tech industry (Core, 1997; 2000; Chung and Wynn, 2008). The first stage regression is expressed through the following equation:

[3] The research period is 2008–2014, but the analysis period is set as 2009–2014 to obtain the testable variable at $t-1$.

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$$P(Purchase_{it} = 1) = \alpha_0 + \beta_1 BH_{it} + \beta_2 BSIZE_{it} + \beta_3 INDR_{it} + \beta_4 BLKH_{it} + \beta_5 LOSS_{it} + \beta_6 LEV_{it} + \beta_7 SIZE_{it} + \beta_8 ROA_{it} + \beta_9 MTB_{it} + \beta_{10} HTECH_{it} + \varepsilon_t \quad (1)$$

where BH_{it} is the ownership of the board director of firm i at the beginning of the fiscal year t; $BSIZE_{it}$ is the number of board directors that firm i has at the beginning of the fiscal year t; $INDR_{it}$ is the ratio of independent directors on the board of directors of firm i at the beginning of the fiscal year t; $BLKH_{it}$ is the ownership of the blockholders of firm i at the beginning of the fiscal year t; $LOSS_{it}$ is assigned a value of 1 if firm i reported a net loss in the previous year; LEV_{it} is the debt ratio of firm i at the beginning of the fiscal year t; $SIZE_{it}$ is the natural log of the market value of firm i at the beginning of the fiscal year t; ROA_{it} is the return on assets of firm i at the beginning of the fiscal year t; MTB_{it} is the market to book ratio of firm i at the beginning of the fiscal year t. *HITECH* is assigned a value of 1 if the firm is in the electronics industry.

In the second stage, probit regression is applied (including an inverse Mills ratio obtained from the first stage of estimation) to examine the effects of D&O insurance and restatement announcements on the earnings management strategy. The dependent variable in Model (2) is the relative earnings management strategy (REMS), which is dependent on the relative strength of accrual or real earnings management. Therefore, the present study uses two diametric combinations of high/low levels of accrual or real earnings management strategies (AEM_HRM_L and AEM_LRM_H; Braam et al., 2015)[4]. We use a dummy variable to proxy this preference measurement. The main independent variables are D&O insurance, restatement announcement, and the interaction term of restatement and D&O insurance purchase. We control for the factors that incentivize managers to adopt earnings management; these factors include financial leverage (Chen and Huang, 2013; Braam et al., 2015), firm size (Badertscher, 2011; Braam et al., 2015), whether a firm has a net loss (Ali and Zhang 2015), ownership of institutional holdings (Cornett et al., 2008; Huang et al., 2013), the ownership of the board director (Leuz et al., 2003; Haw, 2004), board size (Xie et al., 2003), the ratio of independent directors on the board (Peasnell et al., 2005; Cornett et al., 2008; Hazarika et al., 2012; Huang et al., 2013), and the presence of Big Four auditors (Huang et al., 2013; Zhu et al., 2015).

On the basis of H1, the present study predicts the direction of coefficient β_9 to be positive when the dependent variable is measured and determined to exhibit high levels of accrual-based earnings management but low levels of real earnings management in the empirical model. However, on the basis of H2, the present study does not predict the direction of coefficient β_{10}. Finally, on the basis of H3, we predict the direction of coefficient β_{11} to be positive when the dependent variable is measured and determined to exhibit high levels of real earnings management but low levels of accrual-based earnings management. The equation for measuring REMS is as follows:

$$P(REMS = 1) = \alpha_0 + \beta_1 LEV_{it} + \beta_2 SIZE_{it} + \beta_3 LOSS_{it} + \beta_4 INST_{it} + \beta_5 BH_{it} + \beta_6 BSIZE_{it} + \beta_7 INDR_{it} + \beta_8 BIG4_{it} + \beta_9 REST_{it} + \beta_{10} D\&O_{it} + \beta_{11} RD\&O_{it} + IMR + IND + YEAR + \varepsilon_{it} \quad (2)$$

where LEV_{it} is the debt ratio of firm i at the end of the fiscal year t; $SIZE_{it}$ is the natural log of the total assets of firm i at the end of the fiscal year t; $LOSS_{it}$ is assigned a value of 1 if firm i reported a net loss in the previous year; $INST_{it}$ is the institutional holdings of firm i at the end of the fiscal year t; BH_{it} is the ownership of the board director of firm i at the end of the fiscal year t; $BSIZE_{it}$ is the number of board directors that firm i has at the beginning of the fiscal year t; $INDR_{it}$ is the ratio of independent directors on the board of directors of firm i at the end of the fiscal year t; $BIG4_{it}$ is assigned a value of 1 if firm i is audited by a Big Four auditor for the fiscal year t; $D\&O_{it}$ is assigned a value of 1 if firm i purchased D&O insurance for the fiscal year t; $REST_{it-1}$ is assigned a value of 1 if firm i made a restatement announcement or multiple restatement announcements in the previous year. *RD&O* is the interaction term of restatement and D&O insurance purchase.

3.3 Earnings Management Measurement

3.3.1 Accrual Earnings Management

This study adopts the modified Jones model developed by Kothari et al. (2005) and includes additional control for return on assets to calculate discretionary accruals (the cross-section for each year and for each industry is estimated on the basis of at least eight firm–year observations). The residual from the modified Jones model is the proxy of accrual earnings management; the modified Jones model is expressed through the equation as follows:

$$TA_{it}/A_{it-1} = a_0 + \beta_1 \left(1/A_{it-1}\right) + \beta_2 (\Delta SALE_{it} - \Delta AR_{it})/A_{it-1} + \beta_3 PPE_{it}/A_{it\text{-}1} + \beta_4 ROA_{it-1} + \varepsilon_{it} \quad (3)$$

[4] For the construction of earnings management strategy preference, the accrual earnings management strategy preference (AEMP) is the dummy variable if accrual earnings management is greater than the industry–year median by a value of 1. A similar method is used for real earnings management preference (REMP). We use combinations of high/low levels of real and accrual earnings management strategies and divide them into two earnings management preference categories.

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where TA_{it} is the total accrual of firm i at the end of the fiscal year t (i.e., the difference between the earnings before extraordinary items and discontinued operations and operating cash flow); A_{it-1} is the total assets at the beginning of the fiscal year t; $\Delta SALE_{it}$ is the change in revenue from year $t-1$ to t; ΔAR_{it} is the change in accounting receivables from year $t-1$ to t; PPE_{it} is the gross value of the property, plant, and equipment of firm i at the end of the fiscal year t; ROA_{it-1} is the return on assets of firm i for the previous year; and the residuals ε_{it} are the proxy of accrual earnings management[5].

3.3.2 Real Earnings Management

In the present study, real earnings management is measured using the framework provided by other studies (Roychowdhury, 2006; Cohen et al., 2008; Cohen and Zarowin, 2010; Zang, 2012; Chang et al., 2015; Kothari et al., 2016). Roychowdhury (2006) indicates that managers avoid losses by establishing a preference for managing earnings through three types of real activity manipulation: (1) sales manipulation (RM_CFO)[6], (2) overproduction (RM_PROD)[7], and (3) reduction of discretionary expenditure (RM_DISX)[8]. In accordance with the model proposed by Roychowdhury (2006), we use three metrics to proxy sales manipulation (RM_CFO), overproduction (RM_PROD), and reduction of discretionary expenditure (RM_DISX). The relevant equations are as follows:

$$CFO_{it}/A_{it\text{-}1} = \alpha_0+\alpha_1(1/A_{it\text{-}1})+\beta_1 (Sale_{it}/A_{it\text{-}1})+\beta_2 (\Delta Sale_{it}/A_{it\text{-}1})+\varepsilon_t \quad (4)$$

$$PROD_{it}/A_{it\text{-}1} = \alpha_0+\alpha_1(1/A_{it\text{-}1}) + \beta_1 (Sale_{it}/A_{it\text{-}1})+\beta_2 (\Delta Sale_{it}/A_{it\text{-}1})+\beta_3 (\Delta Sale_{it\text{-}1}/A_{it\text{-}1})+\varepsilon_t \quad (5)$$

$$DISEXP_{it}/A_{it\text{-}1} = \alpha_0+\alpha_1(1/A_{it\text{-}1})+\beta_1 (\Delta Sale_{it\text{-}1}/A_{it\text{-}1})+\varepsilon_t \quad (6)$$

where CFO_{it} is the operating cash flow of firm i at the end of the fiscal year t; $SALE_{it}$ is the sales revenue of firm i at the end of the fiscal year t; $\Delta SALE_{it}$ is the change in the revenue of firm i from the year $t-1$ to t at the end of the fiscal year t; A_{it-1} is the total assets at the beginning of the fiscal year t; $PROD$ is the production cost measure as the sum of COGS and the change in the inventory of firm i from the year $t-1$ to t at the end of the fiscal year t; $\Delta SALE_{it-1}$ is the change in revenue of firm i from the year $t-1$ to t at the end of the fiscal year $t-1$; $DISEXP_{it}$ is discretionary expense, which is defined as the sum of the advertising expenses, research and development expenses, and selling, general, and administrative expenses of firm i at the end of the fiscal year t. Sales manipulation (RM_CFO), overproduction (RM_PROD), and reduction of discretionary expenditure (RM_DISX) are computed as the residuals (ε_{it}) from Eq. (4), (5), and (6).

To determine the aggregate effects of real earnings management, we utilize the method developed by Cohen and Zarowin (2010), which combines three variables to acquire two comprehensive metrics of real earnings management. The first measure is RM1, which is defined as expense reduction pertaining to real activity manipulation[9]. The second measure is RM2, which is defined as operation cash flow generation pertaining to real activity manipulation[10]. We also adopt the model proposed by Braam et al. (2015), which aggregates these three measures of real earnings management into a comprehensive measurement (RM)[11].

4. Empirical Results

4.1 Descriptive Statistics and Correlations

Tables 2 and 3 present the descriptive statistics and Pearson correlation results. Table 2 provides a summary of the examined statistics; it reveals that the mean and median values of accrual earnings management are −0.008 and −0.010, respectively. The mean and median values of the comprehensive indicator of real earnings management are

[5] To establish a consistent measurement standard for real earnings management, we use a standardized variable of accrual earnings management when we construct the high/low levels of real and accrual earnings management strategies.

[6] Sales manipulation (RM_CFO) is defined as the efforts of a manager to increase sales volume temporarily through price discounts or generous credit terms that accelerate the timing of sales.

[7] Overproduction (RM_PROD) is defined the efforts of a manager to reduce their fixed cost per unit sold through the overproduction of inventory; provided the fixed cost per unit sold is not compensated by an increase in marginal cost per unit, such efforts lead to a reduction in the cost of goods sold.

[8] Reduction of discretionary expenditure (RM_DISX) results from reductions in discretionary expenditure (e.g., research and development expense and selling, general, and administrative expenses).

[9] RM1 is calculated by multiplying the standardized variable of abnormal discretionary expenses by −1 and adding the result to the standardized variable of abnormal production costs.

[10] RM2 is calculated by multiplying the standardized variable of abnormal cash flow from operations and the standardized variable of abnormal discretionary expenses by −1 and aggregating them into one measurement.

[11] RM is calculated by multiplying the standardized variable of abnormal cash flow from operations and the standardized variable of abnormal discretionary expenses by −1 and adding them to the standardized variable of abnormal production costs

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0.140 and 0.289, respectively. Furthermore, the mean value of the debt ratio is 35% (i.e., in our analysis sample, debt financing accounts for 35% of external financing, whereas the remaining 65% is obtained through equity financing). We also reveal that the mean values of institutional holdings and the board size are 0.355 and 6.8, respectively (i.e., institutions hold almost 36% of external stock on average, and the board of directors have an average of seven board directors). Finally, the mean values of BIG4, D&O purchases, and restatement announcements are 0.857, 0.563, and 0.019, indicating that approximately 85.7% of our sample are audited by Big Four auditors, approximately half of our sample have purchased D&O insurance, and 1.9% of our sample have made restatement announcements, respectively.

Table 2 Descriptive Statistics of Sample Firms

	Mean	S.D	P25	P50	P75
DA	-0.008	0.839	-0.451	-0.010	0.394
RM	0.140	1.776	-0.774	0.289	1.239
RM1	0.080	0.844	-0.212	0.201	0.589
RM2	0.103	1.151	-0.492	0.204	0.804
LEV	0.356	0.172	0.222	0.341	0.466
SIZE	15.146	1.338	14.231	14.963	15.896
LOSS	0.238	0.426	0.000	0.000	0.000
INST	0.355	0.221	0.175	0.318	0.513
BH	0.201	0.133	0.106	0.161	0.257
BSIZE	6.845	2.042	5.000	7.000	7.000
INDR	0.178	0.174	0.000	0.222	0.333
BIG4	0.857	0.350	1.000	1.000	1.000
REST	0.019	0.135	0.000	0.000	0.000
D&O	0.563	0.496	0.000	1.000	1.000
Obs.	8483				

Note: Variable definition: DA, accrual earnings management; RM, real earnings management (computed by multiplying standardized variable of abnormal cash flow from operations and standardized variable of abnormal discretionary expenses by −1 and adding them to standardized variable of abnormal production costs); RM1, real earnings management (computed by multiplying standardized variable of abnormal discretionary expenses by −1 and adding it to standardized variable of abnormal production costs; RM2, real earnings management (calculating by multiplying standardized variable of abnormal cash flow from operations and standardized variable of abnormal discretionary expenses by −1 and aggregating them into one measurement; LEV_{it}, debt ratio of firm i at end of fiscal year t; $SIZE_{it}$, natural log of total assets of firm i at end of fiscal year t; $LOSS_{it}$ is assigned a value of 1 if firm i had a net loss in previous year; $INST_{it}$, institutional holdings of firm i at end of fiscal year t; BH_{it}, ownership of board director of firm i at end of fiscal year t; $BSIZE_{it}$, number of board directors that firm i has at beginning of fiscal year t; $INDR_{it}$, ratio of independent directors on board of directors of firm i at end of fiscal year t; $BIG4_{it}$ is assigned a value of 1 if firm i is audited by Big Four auditor for fiscal year t; $D\&O_{it}$ is assigned a value of 1 if firm i has purchased D&O insurance for fiscal year t; $REST_{it-1}$ is assigned a value of 1 if firm i made a restatement announcement or multiple restatement announcements in previous year.

Table 3 presents the Pearson correlation results, which reveal that the original value of earnings management (both accrual and real) is negatively and significantly associated with D&O insurance purchases. This finding suggests that firms implement downward earnings management when they have purchased D&O insurance. We also find that the ratio of independent directors on a board is negatively and significantly associated with accrual and real earnings management, suggesting that firms with higher proportions of independent directors on their board of directors can constrain the implementation of upward earnings management by managers. Finally, the results also reveal that the restatement announcement proxy is positively and significantly associated with real earnings management. Therefore, managers prefer to implement upward earnings management through real earnings management.

Table 3 Pearson Correlation

	DA	RM	RM1	RM2	LEV	SIZE	LOSS	INST	BH	BSIZE	INDR	BIG4	REST	D&O
LEV	0.022*	0.234***	0.105***	0.203***	1.000									
	(0.043)	(0.000)	(0.000)	(0.000)										
SIZE	0.025*	0.126***	0.302***	0.104***	0.183***	1.000								

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	(0.020)	(0.000)	(0.000)	(0.000)	(0.000)								
LOSS	-0.207***	0.206***	0.001	0.190***	0.134***	-0.224***	1.000						
	(0.000)	(0.000)	(0.938)	(0.000)	(0.000)	(0.000)							
INST	0.015	-0.028**	0.079***	-0.042***	0.057***	0.444***	-0.173***	1.000					
	(0.159)	(0.009)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
BH	0.022*	-0.013	-0.026*	-0.016	0.013	-0.130***	-0.034**	0.392***	1.000				
	(0.039)	(0.218)	(0.015)	(0.146)	(0.215)	(0.000)	(0.002)	(0.000)					
BSIZE	-0.025*	-0.007	0.042***	-0.021*	-0.023*	0.326***	-0.076***	0.213***	0.114***	1.000			
	(0.021)	(0.517)	(0.000)	(0.050)	(0.033)	(0.000)	(0.000)	(0.000)	(0.000)				
INDR	-0.028*	-0.075***	-0.079***	-0.081***	-0.079***	-0.134***	0.022*	-0.039***	-0.001	-0.006	1.000		
	(0.010)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.043)	(0.000)	(0.915)	(0.589)			
BIG4	-0.019	-0.053***	0.006	-0.055***	-0.061***	0.152***	-0.072***	0.135***	0.019	0.081***	0.092***	1.000	
	(0.074)	(0.000)	(0.584)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.074)	(0.000)	(0.000)		
REST	0.004	0.041***	0.031**	0.042***	0.040***	0.026*	0.024*	0.004	-0.017	-0.001	-0.039***	-0.029**	1.000
	(0.727)	(0.000)	(0.004)	(0.000)	(0.000)	(0.017)	(0.028)	(0.708)	(0.113)	(0.917)	(0.000)	(0.008)	
D&O	-0.022*	-0.034**	-0.056***	-0.046***	-0.047***	0.110***	0.005	0.059***	-0.048***	0.075***	0.329***	0.167***	-0.020	1.000
	(0.047)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.664)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.063)	

a. Variable definitions are provided in Table 2.

b. *p*-values in parentheses. $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$.

4.2 Regression Results

In this subsection, regression analysis is conducted to examine the effect of D&O insurance combined with restatement announcements on earnings management strategies. We use Heckman's (1979) two-stage regression to mitigate the problem of endogeneity. The results are presented in Table 4[12], which reveal that the ratio of independent directors on a board (INDR), firm size (SIZE), and being a firm in the high-tech industry (HITECH) are positively and significantly associated with D&O insurance purchases. By contrast, blockholders' ownership (BLKH), firm performance (ROA), and firm growth (MTB) are negatively associated with D&O insurance purchases. Our results are consistent with those of Chung and Wynn (2008), who demonstrate that larger firms and those in the high-tech industry tend to purchase D&O insurance, whereas growth firms are not willing to do so.

12 For the marginal effect of Table 4 please refer to Table A1 in the Appendix.

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Table 4 Probit Analysis of Determinants of Directors and Officers Insurance Purchase

	Coef.	P-Value
BH	-0.244	0.355
BSIZE	0.020	0.257
INDR	2.241***	0.000
BLKH	-0.898***	0.001
LOSS	0.077	0.263
LEV	-0.306	0.120
SIZE	0.199***	0.000
ROA	-0.631*	0.073
MTB	-0.188***	0.000
HITECH	0.574***	0.000
Constant	-3.149***	0.000
Obs.	8483	
Chi^2	288.821	
Pse. R^2	0.146	

a. Variable definition: BH_{it}, ownership of board director of firm i at beginning of fiscal year t; $BSIZE_{it}$, number of board directors that firm i has at beginning of fiscal year t; $INDR_{it}$, ratio of independent directors on board of directors of firm i at beginning of fiscal year t; $BLKH_{it}$, ownership of blockholders of firm i at beginning of fiscal year t; $LOSS_{it}$ is assigned a value of 1 if firm i had a net loss in previous year; LEV_{it}, debt ratio of firm i at beginning of fiscal year t; $SIZE_{it}$, natural log of market value of firm i at beginning of fiscal year t; ROA_{it}, return on assets of firm i at beginning of fiscal year t; MTB_{it}, market to book ratio of firm i at beginning of fiscal year t; HITECH is assigned a value of 1 if firm is in electronic industry.
b. p-values are estimated by fixed year and fixed industry, corrected for firm-level clustering, and reported in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 5 presents the regression results obtained through Eq. (2)[13]. Panel A of Table 5 presents the results of the effect of D&O insurance purchases on earnings management strategies. The results of Model A presented in Panel A reveal significant and positive coefficients for firms that have purchased D&O insurance. The marginal effect of D&O insurance purchases on accrual earnings management strategy is 0.023. Moreover, the results of Models B–D in Panel A indicate that relative to firms that have not purchased D&O insurance, those that have purchased D&O insurance are significantly less likely to use a combination of high-level real earnings management and low-level accrual earnings management strategies. The marginal effects of D&O insurance purchases on real earnings management strategy are −0.020, −0.041, and −0.022. This finding suggests that firms that have purchased D&O insurance prefer to implement an accrual earnings management strategy over a real earnings management strategy. This evidence supports H1.

Table 5 Probit Analysis of Directors and Officers (D&O) Insurance and Relative Earnings Management Strategies

Panel A. Effect of D&O insurance on earnings management strategy								
	$A(AEM_HRM_L)$		$B(AEM_LRM_H)$		$C(AEM_LRM1_H)$		$D(AEM_LRM2_H)$	
	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-0.798***	0.000	0.483***	0.000	-0.127	0.347	0.377***	0.005
SIZE	-0.171***	0.000	0.211***	0.000	0.292***	0.000	0.202***	0.000
LOSS	-0.927***	0.000	1.104***	0.000	0.655***	0.000	1.105***	0.000
INST	0.255*	0.056	-0.476***	0.000	-0.289**	0.032	-0.461***	0.000
BH	-0.003	0.989	0.425**	0.021	0.412**	0.034	0.400**	0.035
BSIZE	-0.004	0.778	0.005	0.664	-0.005	0.644	0.002	0.841
INDR	-0.311	0.224	0.217	0.351	0.465*	0.051	0.413*	0.075
BIG4	-0.044	0.530	-0.055	0.417	-0.037	0.578	-0.052	0.453
D&O	**0.097***	**0.059**	**-0.090***	**0.066**	**-0.145*****	**0.004**	**-0.102****	**0.040**
IMR	-0.346*	0.054	0.305*	0.076	0.391**	0.023	0.466***	0.007
Cons	2.486***	0.000	-4.712***	0.000	-5.538***	0.000	-4.655***	0.000
Year	included		included		included		included	
Ind	included		included		included		included	
Obs.	8483		8483		8483		8483	
Chi^2	385.876		750.856		343.213		708.716	
Pse. R^2	0.073		0.132		0.061		0.131	
Panel B. Effect of restatement announcements on earnings management strategy								
	$A(AEM_HRM_L)$		$B(AEM_LRM_H)$		$C(AEM_LRM1_H)$		$D(AEM_LRM2_H)$	

13 For the marginal effect of Table 5 please refer to Table A2 in the Appendix.

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	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-0.798***	0.000	0.479***	0.000	-0.133	0.326	0.370***	0.006
SIZE	-0.171***	0.000	0.210***	0.000	0.290***	0.000	0.201***	0.000
LOSS	-0.926***	0.000	1.102***	0.000	0.652***	0.000	1.101***	0.000
INST	0.272**	0.042	-0.489***	0.000	-0.307**	0.024	-0.478***	0.000
BH	-0.020	0.919	0.438**	0.018	0.433**	0.028	0.417**	0.029
BSIZE	-0.003	0.813	0.004	0.680	-0.006	0.606	0.002	0.856
INDR	-0.295	0.249	0.191	0.412	0.429*	0.071	0.387*	0.095
BIG4	-0.029	0.673	-0.065	0.334	-0.054	0.410	-0.061	0.371
REST	0.120	0.673	-0.032	0.787	-0.061	0.597	0.070	0.533
IMR	-0.387**	0.030	0.336**	0.049	0.445***	0.009	0.504***	0.003
Cons	2.552***	0.030	-4.738***	0.000	-5.594***	0.000	-4.694***	0.000
Year	included		included		included		included	
Ind	included		included		included		included	
Obs.	8483		8483		8483		8483	
Chi^2	388.813		746.366		335.267		706.118	
Pse. R^2	0.072		0.131		0.059		0.130	

Panel C. Effects of D&O insurance combined with restatements on earnings management strategy

	A(AEM_HRM_L)		B(AEM_LRM_H)		C(AEM_LRM1_H)		D(AEM_LRM2_H)	
	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-0.802***	0.000	0.491***	0.000	-0.123	0.365	0.382***	0.004
SIZE	-0.171***	0.000	0.211***	0.000	0.292***	0.000	0.202***	0.000
LOSS	-0.929***	0.000	1.105***	0.000	0.656***	0.000	1.104***	0.000
INST	0.254*	0.057	-0.473***	0.000	-0.287**	0.033	-0.460***	0.000
BH	-0.002	0.994	0.419**	0.023	0.410**	0.035	0.396**	0.037
BSIZE	-0.004	0.782	0.005	0.643	-0.005	0.655	0.003	0.824
INDR	-0.313	0.221	0.229	0.326	0.474**	0.047	0.427*	0.065
BIG4	-0.043	0.536	-0.051	0.445	-0.035	0.595	-0.047	0.492
REST	0.235	0.201	**-0.389****	**0.029**	-0.295	0.110	-0.243	0.179
D&O	0.102*	0.050	**-0.102****	**0.036**	**-0.153*****	**0.002**	**-0.114****	**0.022**
RD&O	-0.237	0.367	**0.662*****	**0.004**	**0.452****	**0.050**	**0.594*****	**0.009**
IMR	-0.349*	0.051	0.313*	0.068	0.397**	0.021	0.475***	0.006
Cons	2.492***	0.000	-4.721***	0.000	-5.546***	0.000	-4.666***	0.000
Year	included		included		included		included	
Ind	included		included		included		included	
Obs.	8483		8483		8483		8483	
Chi^2	390.311		752.279		347.886		710.292	
Pse. R^2	0.073		0.133		0.061		0.132	

a. Variable definitions are provided in Table 2.

b. *p*-values are estimated by fixed year and fixed industry, corrected for firm-level clustering, and reported in parentheses. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Panel B of Table 5 presents the effects of restatement announcements on earnings management strategies. The results indicates that restatement announcements can have positive or negative effects on earnings management strategies; however, these effects are nonsignificant. The marginal effect of restatement announcements (REST) on accrual earnings management strategy is 0.029. Similarly, the marginal effects of restatement announcements (REST) on real earnings management strategy are −0.007, −0.017, and 0.015. This result is consistent with our inference that managers prefer not to manipulate earnings through accrual or real earnings management when their firms make restatement announcements (Ettredge et al., 2012; Ettredge et al., 2013). Therefore, H2 is supported.

Panel C of Table 5 presents the regression results obtained by using the interaction term to determine the effects of restatement announcements combined with D&O insurance on earnings management strategies. The results of Model A presented in Panel C reveal significant and positive coefficients and margins[14] for the firms that have purchased D&O insurance (D&O). However, these significant and positive coefficients and margins[15] become nonsignificant and negative after adjustment for restatement announcements. Further, the results of Models B–D indicate that firms that have purchased D&O insurance are less likely to implement real earnings management strategies[16]; however, these results are reversed after adjustment for restatement announcements[17].

[14] The marginal effect of purchasing D&O insurance is 0.024.

[15] The marginal effect of the interaction terms is −0.057.

[16] The marginal effects of purchasing D&O insurance are −0.023, −0.044, and −0.024.

[17] The marginal effects of the interaction term are 0.147, 0.129, and 0.127.

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The aforementioned result reveal that after restatement announcements are made, D&O insurers play a monitoring role to constrain managers from manipulating earnings through accrual earnings management. Furthermore, because of the risk-taking role of D&O insurance, restatement announcements also induce managers to adopt real activity manipulation as their earnings management strategy. This result supports H3.

4.3 Additional Tests

4.3.1 D&O coverage measure

Researchers assert that a dummy variable is a coarse measure (Lin et al., 2011; Lin et al., 2013); therefore, we use D&O insurance coverage to measure the level of D&O insurance, which is then used as a variable for verifying our inference. D&O insurance coverage is defined as the natural logarithm of the D&O insurance coverage of a firm in a fiscal year[18]. Table 6 presents the analysis results[19]; Panel A presents the D&O insurance premium and the corresponding earnings management strategy; the marginal effect of the D&O insurance premium on accrual earnings management strategy is 0.002 and significant. However, we also discover that the marginal effect on real earnings management strategy is negative and significant. The marginal effects of the D&O insurance premium on real earnings management strategy are −0.002, −0.003, and −0.002. Panel B presents the results of the effects of the D&O insurance premium combined with restatement announcements on earnings management strategy; the results reveal that the marginal effects of the D&O insurance premium and the interaction term on accrual earnings management strategy are 0.002 and −0.005. Furthermore, we discover an association between D&O insurance coverage and REMS; this finding is similar to that presented in Table 5. The marginal effects of the D&O insurance premium on real earnings management strategy are −0.002, −0.003, and −0.002. However, based on the marginal effects, the interaction term of the D&O insurance premium and restatement announcements is positively and significantly associated with the real earnings management strategy[20].

Table 6 Probit Analysis of Directors and Officers (D&O) Insurance Premium and Relative Earnings Management Strategies

Panel A. Effect of D&O insurance premium on earnings management strategy								
	$A(AEM_HRM_L)$		$B(AEM_LRM_H)$		$C(AEM_LRM1_H)$		$D(AEM_LRM2_H)$	
	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-0.797***	0.000	0.482***	0.000	-0.129	0.341	0.376***	0.005
SIZE	-0.173***	0.000	0.213***	0.000	0.295***	0.000	0.204***	0.000
LOSS	-0.928***	0.000	1.104***	0.000	0.656***	0.000	1.105***	0.000
INST	0.256*	0.055	-0.477***	0.000	-0.290**	0.032	-0.462***	0.000
BH	-0.004	0.982	0.427**	0.021	0.417**	0.033	0.402**	0.034
BSIZE	-0.004	0.773	0.005	0.663	-0.005	0.646	0.002	0.839
INDR	-0.31	0.224	0.215	0.357	0.463*	0.052	0.411*	0.076
BIG4	-0.044	0.531	-0.055	0.413	-0.038	0.571	-0.052	0.450
D&OA	**0.008***	**0.070**	**-0.007***	**0.093**	**-0.011*****	**0.007**	**-0.008***	**0.055**
IMR	-0.350*	0.051	0.309*	0.072	0.398**	0.021	0.470***	0.007
Cons	2.523***	0.000	-4.743***	0.000	-5.592***	0.000	-4.691***	0.000
Year	included		included		included		included	
Ind	included		included		included		included	
Obs.	8483		8483		8483		8483	
Chi^2	386.846		750.523		341.311		709.642	
Pse. R^2	0.073		0.132		0.060		0.131	
Panel B. Effect of D&O insurance premium on earnings management strategy								
	$A(AEM_HRM_L)$		$B(AEM_LRM_H)$		$C(AEM_LRM1_H)$		$D(AEM_LRM2_H)$	
	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-0.802***	0.000	0.490***	0.000	-0.124	0.360	0.381***	0.005
SIZE	-0.173***	0.000	0.213***	0.000	0.295***	0.000	0.204***	0.000
LOSS	-0.930***	0.000	1.105***	0.000	0.657***	0.000	1.105***	0.000
INST	0.254*	0.057	-0.474***	0.000	-0.289**	0.033	-0.461***	0.000
BH	-0.003	0.987	0.422**	0.022	0.414**	0.034	0.399**	0.036
BSIZE	-0.004	0.776	0.005	0.639	-0.005	0.658	0.003	0.820
INDR	-0.313	0.220	0.227	0.330	0.471**	0.048	0.426*	0.066
BIG4	-0.043	0.536	-0.052	0.441	-0.036	0.588	-0.048	0.489

[18] For firms without D&O insurance, we set this variable to zero.

[19] For the marginal effect of Table 6 please refer to Table A3 in the Appendix.

[20] The margin effects of the interaction term of D&O insurance amount and restatement announcement are 0.012, 0.010, and 0.010.

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REST	0.244	0.181	**-0.385****	**0.030**	-0.283	0.123	-0.233	0.193
D&OA	**0.008***	**0.058**	**-0.008***	**0.053**	**-0.012*****	**0.005**	**-0.009****	**0.032**
RD&OA	-0.021	0.324	**0.054*****	**0.004**	**0.036***	**0.061**	**0.048****	**0.010**
IMR	-0.353**	0.049	0.317*	0.065	0.403**	0.019	0.479***	0.006
Cons	2.531***	0.000	-4.754***	0.000	-5.601***	0.000	-4.704***	0.000
Year	included		included		included		included	
Ind	included		included		included		included	
Obs.	8483		8483		8483		8483	
Chi^2	391.525		751.917		345.5		711.253	
Pse. R^2	0.073		0.133		0.061		0.132	

a. Variable definitions are provided in Table 2.

b. *p*-values are estimated by fixed year and fixed industry, corrected for firm-level clustering, and reported in parentheses. *$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

4.3.2 Self-selection problem in earnings management

Self-selection is a major problem that affects firms' decisions regarding earnings management (Cohen and Zarowin, 2010; Zang, 2012). Therefore, the present study uses a selection model to control the self-selection problem. In the first stage, a firm's decision to engage in earnings management is modeled as a function of capital market incentives (Cohen and Zarowin, 2010); the relevant factors include the degree of analyst coverage (ANALYST; Cohen and Zarowin, 2010), the frequency with which the earnings forecasts of analysts are met or exceeded (HAB_BEAT; Kasznik and McNichols, 2002; Koh et al., 2008), and the number of outstanding shares (SHARES; Zang, 2012). We control for several factors that affect the earnings management strategy; these factors include firm size (SIZE), performance (ROA), leverage (LEV), and growth opportunities (MTB; Healy and Wahlen, 1999; Cohen and Zarowin, 2010).

Table 7 Probit Analysis of Earnings Management Selection Bias

Panel A. First stage of Heckman's two-stage regression		
	Coef.	P-Value
Analyst	-0.016**	0.043
Hab_Beatr	-0.118*	0.055
Share	0.157***	0.003
SIZE	0.073	0.117
ROA	0.269	0.290
LEV	0.946***	0.000
MTB	0.618***	0.000
Constant	-2.888***	0.000
Year	included	
Ind	included	
Obs.	8434	
Chi^2	277.851	
Pse. R^2	0.061	

Panel B. Second stage of Heckman's two-stage regression								
	A(AEM_HRM_L)		B(AEM_LRM_H)		C(AEM_LRM1_H)		D(AEM_LRM2_H)	
	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-0.311**	0.034	0.1	0.477	-0.516***	0.000	-0.046	0.742
SIZE	0.02	0.610	-0.001	0.979	0.101***	0.001	-0.003	0.919
LOSS	-0.797***	0.000	0.985***	0.000	0.519***	0.000	0.969***	0.000
INST	-0.082	0.551	-0.046	0.742	0.11	0.424	-0.103	0.461
BH	0.149	0.445	0.233	0.217	0.215	0.276	0.278	0.154
BSIZE	-0.002	0.856	0.001	0.926	-0.009	0.459	-0.003	0.803
INDR	-0.305	0.218	0.046	0.840	0.379	0.101	0.297	0.193
BIG4	-0.061	0.383	-0.049	0.472	-0.031	0.634	-0.044	0.509
REST	0.215	0.242	**-0.412****	**0.031**	**-0.312***	**0.094**	-0.263	0.150
D&O	**0.108****	**0.036**	**-0.116****	**0.017**	**-0.154*****	**0.002**	**-0.121****	**0.014**
RD&O	-0.185	0.488	**0.612****	**0.010**	**0.450***	**0.054**	**0.584****	**0.011**
DOIMR	-0.124	0.474	-0.02	0.904	0.092	0.584	0.142	0.404
EMIMR	1.965***	0.000	-2.122***	0.000	-1.885***	0.000	-2.177***	0.000
Constant	-1.621**	0.042	-0.186	0.786	-1.436**	0.030	-0.207	0.767
Year	included		included		included		included	
Ind	included		included		included		included	

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Obs.	8434	8434	8434	8434
Chi^2	456.755	859.864	420.307	807.362
Pse. R^2	0.094	0.155	0.077	0.152

a. Variable definitions are provided in Table 2. Additional variable definitions: Analyst, degree of analyst coverage; Hab_Beat, frequency with which earnings forecasts of analysts are met or exceeded; Share, natural logarithm of number of shares outstanding; Size, firm size; ROA, return on assets; LEV, firm leverage; MTB, market to book ratio.

b. *p*-values are estimated by fixed year and fixed industry, corrected for firm-level clustering, and reported in parentheses. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Panel A of Table 7 presents the results of the selection model[21]. Other than firm size and performance, the coefficient estimates for all the other factors are significant. Cohen and Zarowin (2010) assert that the coverage of financial analysts (ANALYST) involves scrutinizing and monitoring the activities of firms; thus, their managers are less incentivized to implement earnings management; this finding is consistent with our inference. However, the frequency with which the earnings forecasts of analysts are met or exceeded (HAB_BEAT) is negatively and significantly associated with firms' decisions to engage in earnings management. Koh et al. (2008) argue that after the occurrence of a scandal, meeting or exceeding analyst expectations is more positively correlated with future cash flow. Finally, we discover that the number of outstanding shares (SHARE) is positively and significantly associated with firms' decisions to engage in earnings management. Zang (2012) indicates that a higher number of outstanding shares provides managers with more incentives to actively engage in earnings management to achieve per-earnings targets, and our results correspond with Zang's inference.

Panel B of Table 7 presents the results of the effects of D&O insurance purchases and restatement announcements on REMS after controlling for the selection bias pertaining to D&O insurance purchases and earnings management strategies. The interaction term has a positive and significant coefficient and margin value[22] when real earnings management is implemented as the earnings management strategy. This finding suggests that managers prefer to apply the real activity manipulation method to manipulate earnings when their firms make restatement announcements, which supports H3.

4.3.3 Three types of real earnings management preferences

The present study further investigates the types of real earnings management strategies that managers are more likely to adopt when their firms have purchased D&O insurance after making restatement announcements. We use three diametric combinations of high/low levels of real earnings management strategies to detect one of three types of real earnings management preferences. This method is based on the low-level accrual earnings management strategy (REM_{1H}, REM_{2H}, and REM_{3H})[23]. Table 8 presents the results of the effect of D&O insurance purchases on the selection of earnings management strategies after firms have made restatement announcements[24]. We discover that the interaction term is positive and significant in the sales manipulation model (Model A) and reduction-of-discretionary-expenditure-manipulation model (Model C) but insignificant in the overproduction model (Models B)[25]. This finding suggests that in firms with D&O insurance, top managers prefer to manipulate earnings through the following real earnings management strategies after their firm have made earnings restatements: (1) implementation of price discounts or generous credit terms that accelerate the timing of sales and (2) reduction of discretionary expenditure.

Few studies explore the aforementioned three types of real earnings management manipulation, particularly those that examine D&O insurance. Although Chen et al. (2016) use accrual earnings management to investigate the relationship between D&O insurance purchases and reporting quality, they neglect the effect of real earnings management. By contrast, our study is the first to demonstrate that managers are more committed to increasing earnings through price discounts or generous credit terms and the reduction of discretionary expenditure when their firms have purchased D&O insurance and made restatement announcements.

[21] For the marginal effect of Table 7 please refer to Table A4 in the Appendix.

[22] The margin values for interaction terms are 0.135, 0.118 and 0.164.

[23] REM_{1H} is defined as having lower discretionary accruals, and the sales manipulation (RM_CFO) is high, but overproduction (RM_PROD) and the reduction of discretionary expenditures (RM_DISX) are low. REM_{2H} is defined as having lower discretionary accrual, high overproduction (RM_PROD), and low sales manipulation (RM_CFO) and reduction of discretionary expenditures (RM_DISX). REM_{3H} is defined as having lower discretionary accrual, high reduction of discretionary expenditures (RM_DISX), but low overproduction (RM_PROD) and sales manipulation (RM_CFO).

[24] For the marginal effect of Table 8 please refer to Table A5 in the Appendix.

[25] The margin values for interaction terms are 0.158, 0.093, and 0.120.

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Table 8 Probit Analysis of Directors and Officers Insurance (D&O) and Relative Real Earnings Management Strategy

	$REM1_H$	$REM2_H$	$REM3_H$
LEV	0.484***	0.653***	-0.256*
	(0.000)	(0.000)	(0.061)
SIZE	-0.077***	0.195***	0.283***
	(0.005)	(0.000)	(0.000)
LOSS	1.350***	0.961***	0.594***
	(0.000)	(0.000)	(0.000)
INST	-0.220*	-0.290**	-0.201
	(0.088)	(0.017)	(0.129)
BH	-0.305	0.376**	0.334*
	(0.137)	(0.039)	(0.082)
BSIZE	0.015	0.008	-0.007
	(0.245)	(0.489)	(0.542)
INDR	-0.256	0.303	0.437*
	(0.312)	(0.179)	(0.057)
BIG4	0.039	-0.108*	-0.039
	(0.551)	(0.084)	(0.552)
REST	-0.665***	-0.239	-0.239
	(0.001)	(0.170)	(0.169)
D&O	0.002	-0.048	-0.151***
	(0.962)	(0.292)	(0.003)
RD&O	0.892***	0.364	0.408*
	(0.001)	(0.116)	(0.064)
DOIMR	-0.164	0.379**	0.323*
	(0.374)	(0.020)	(0.055)
Constant	-0.192	-4.575***	-5.271***
	(0.748)	(0.000)	(0.000)
Year	included	included	included
Ind	included	included	included
Obs.	8483	8483	8483
Chi^2	0.213	0.105	0.054
Pse. R^2	1247.519	694.579	305.026

a. Variable definitions are provided in Table 2.

b. *p*-values are estimated by fixed year and fixed industry, corrected for firm-level clustering, and reported in parentheses. $^*p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

4.3.4 Effects of D&O insurance and restatement announcements on changes in earnings management

Based on the aforementioned results, we can verify how D&O insurance purchases and restatement announcements affect the preferences of managers for specific earnings management strategies. However, an unaddressed question is how D&O insurance purchases and restatement announcements affect the adoption of earnings management. Therefore, we perform multiple regressions to examine the effect of purchasing D&O insurance and making restatement announcements on the adoption of earnings management. The dependent variable in Model (7) is the change in earnings management (ΔEM); using this variable for period t+1 enables the examination of the effects of either restatements or D&O insurance on increments pertaining to earnings management. The independent variable in Model (7) is a dummy variable, which serves to acquire the effects of both D&O insurance purchases and restatement announcements. The regressions are performed using the following equation:

$$\Delta EM_{it+1} = \alpha_0 + \beta_1 REST_{it} + \beta_2 D\&O_{it} + \beta_3 RD\&O_{it} + \beta_4 CFO_{it} + \beta_5 SIZE_{it} + \beta_6 LEV_{it} + \beta_7 INST_{it} + \beta_8 INDR_{it} + \beta_9 BH_{it} + \beta_{10} BIG4_{it} + IMR + Ind + Year + \varepsilon_{it} \quad (7)$$

where ΔEM is the change of earnings management of firm i at the end of fiscal year t+1; $REST_{it}$ is assigned a value of 1 if firm i made a restatement announcement or multiple restatement announcements in the fiscal year t; $D\&O_{it+1}$ is assigned a value of 1 if firm i has purchased D&O insurance for the fiscal year t+1; $RD\&O_{it}$ is the interaction term of restatement and D&O insurance; CFO_{it} is the operating cash flow scaled by the average total assets of firm i at the end of fiscal year t; $SIZE_{it}$ is the natural log of the total assets of firm i at the end of fiscal year t; LEV_{it} is the debt ratio of firm i at the end of fiscal year t; $INST_{it}$ is the institutional holdings of firm i at the end of fiscal year t; $INDR_{it}$ is the ratio of independent directors on the board of directors of firm i at the end of fiscal year t; BH_{it} is the

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ownership of the board director of firm i at the end of fiscal year t; $BIG4_{it}$ is assigned a value of 1 if firm i was audited by a Big Four auditor for the fiscal year t; and *IMR* is the inverse Mills ratio extracted from Eq. (1). The results are presented in Table 9.

Table 9 Effects of Restatements and Directors and Officers (D&O) Insurance on Earnings Management

	ΔDA	ΔRM
D&O	**0.042***	**0.092*****
	(0.092)	**(0.006)**
REST	**0.457*****	**0.353***
	(0.002)	**(0.075)**
REST_DO	**-0.475****	-0.019
	(0.023)	(0.937)
CFO	5.502***	7.181***
	(0.000)	(0.000)
SIZE	-0.163***	-0.092***
	(0.000)	(0.000)
LEV	0.844***	0.130
	(0.000)	(0.231)
INST	-0.062	-0.044
	(0.388)	(0.628)
INDR	-0.370***	-0.275***
	(0.000)	(0.003)
BH	-0.264**	-0.127
	(0.013)	(0.355)
BIG4	-0.082***	-0.114***
	(0.009)	(0.005)
Mills	-0.601***	0.229
	(0.000)	(0.167)
Cons	2.350***	0.722*
	(0.000)	(0.096)
Year	included	included
Ind	included	included
Observations	7351	7351
F	50.654	35.597
R^2	0.211	0.224
Adjusted R^2	0.207	0.220

a. Variable definition: $D\&O_{it+1}$ is assigned a value of 1 if firm i has purchased D&O insurance for fiscal year t+1; $REST_{it}$ is assigned a value of 1 if firm i has made a restatement announcement or multiple restatement announcements in fiscal year t; $REST_DO_{it}$, interaction term of restatement and D&O insurance; CFO_{it}, operating cash flow scaled by average total assets of firm i at end of fiscal year t; $SIZE_{it}$, natural log of total assets of firm i at end of fiscal year t; LEV_{it}, debt ratio of firm i at end of fiscal year t; $INST_{it}$, institutional holdings of firm i at end of fiscal year t; $INDR_{it}$, ratio of independent directors on board of directors of firm i at end of fiscal year t; BH_{it}, ownership of board director of firm i at end of fiscal year t; $BIG4_{it}$ is assigned a value of 1 if firm i was audited by Big Four auditor at end of fiscal year t; IMR, inverse Mills ratio extracted from Eq. (1)
b. p-values are estimated by fixed year and fixed industry, corrected for firm-level clustering, and reported in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 9 presents the results of the effects of D&O insurance in changing the earnings management strategies of firms after adjustment for restatement announcements. They reveal that D&O insurance is positively and significantly associated with earnings management for both accrual and real economic activities. After adjusting for restatement announcements, we discover that the interaction term is negatively and significantly associated with accrual earnings management. This result suggests that insurers are more focused on restatement announcements and constrains managers from implementing accrual earnings management. However, we also discover that insurers cannot constrain managers from engaging in real activity manipulation. This result may be due to the lack of regulations for real earnings; that is, managers are not required to comply with regulations related to real earnings; thus, real earnings management is difficult to detect (Kothari et al., 2016). The result supports our inference.

4.3.5 Extension of Research Period

As shown in Table 10, we extend the study period of our research sample from 2014 to 2018. In 2018, the Taiwanese government amended the Company Act and imposed the mandatory requirement that listed firms in Taiwan's capital market must purchase D&O insurance. Thus, to mitigate the effect of this mandatory purchase requirement, we exclude data from the years 2019 and 2020. Table 10 presents the results of the effects of D&O insurance and

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restatement announcements on the earnings management strategy[26]. Similar to our main results, the results for the extended research period (2014–2018) also indicate that firms that have purchased D&O insurance prefer an accrual earnings management strategy over a real earnings management strategy[27]. Furthermore, given the effects of restatement announcements combined with D&O insurance on earnings management strategies, we demonstrate that the interaction term is positively but non significantly associated with real earnings management manipulation[28]. That is, restatement announcements moderate the effect of D&O insurance on real earnings management manipulation.

Table 10 Regression Results for Extended Research Period

Panel A. Effect of D&O insurance on earnings management strategy								
	$A(AEM_HRM_L)$		$B(AEM_LRM_H)$		$C(AEM_LRM1_H)$		$D(AEM_LRM2_H)$	
	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-1.077***	0.000	0.685***	0.000	0.006	0.956	0.616***	0.000
SIZE	-0.088***	0.000	0.133***	0.000	0.200***	0.000	0.123***	0.000
LOSS	-0.817***	0.000	0.982***	0.000	0.484***	0.000	0.964***	0.000
INST	0.255**	0.026	-0.319***	0.005	-0.185	0.107	-0.341***	0.003
BH	-0.171	0.314	0.470***	0.003	0.519***	0.002	0.471***	0.003
BSIZE	0.004	0.729	0.001	0.922	-0.006	0.536	-0.002	0.841
INDR	0.107	0.488	-0.128	0.382	0.059	0.673	0.008	0.955
BIG4	-0.002	0.975	-0.043	0.480	-0.079	0.179	-0.045	0.447
D&O	0.075	0.101	**-0.081***	**0.059**	**-0.123*****	**0.004**	**-0.085****	**0.048**
IMR	-0.069	0.442	0.073	0.410	0.062	0.457	0.166*	0.058
Cons	1.178**	0.024	-3.065***	0.000	-3.788***	0.000	-3.056***	0.000
Year	included		included		included		included	
Ind	included		included		included		included	
Obs.	12710		12710		12710		12710	
Chi²	0.069		0.112		0.038		0.108	
Pse. R^2	533.337		895.960		302.715		849.063	
Panel B. Effect of restatement announcements on earnings management strategy								
	$A(AEM_HRM_L)$		$B(AEM_LRM_H)$		$C(AEM_LRM1_H)$		$D(AEM_LRM2_H)$	
	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-1.077***	0.000	0.682***	0.000	0.004	0.972	0.614***	0.000
SIZE	-0.089***	0.000	0.131***	0.000	0.200***	0.000	0.122***	0.000
LOSS	-0.816***	0.000	0.979***	0.000	0.482***	0.000	0.961***	0.000
INST	0.263**	0.021	-0.326***	0.004	-0.196*	0.090	-0.349***	0.002
BH	-0.175	0.303	0.474***	0.003	0.524***	0.002	0.475***	0.003
BSIZE	0.004	0.705	0.001	0.947	-0.006	0.509	-0.002	0.831
INDR	0.113	0.461	-0.148	0.310	0.039	0.780	-0.009	0.951
BIG4	0.009	0.888	-0.052	0.385	-0.095	0.104	-0.055	0.348
REST	0.097	0.278	0.000	0.998	**-0.166***	**0.057**	-0.069	0.453
IMR	-0.103	0.245	0.101	0.251	0.114	0.166	0.199**	0.021
Cons	1.235**	0.017	-3.077***	0.000	-3.862***	0.000	-3.090***	0.000
Year	included		included		included		included	
Ind	included		included		included		included	
Obs.	12710		12710		12710		12710	
Chi²	0.069		0.111		0.037		0.107	
Pse. R^2	535.333		888.531		298.299		846.511	
Panel C. Effect of D&O insurance combined with restatements on earnings management strategy								
	$A(AEM_HRM_L)$		$B(AEM_LRM_H)$		$C(AEM_LRM1_H)$		$D(AEM_LRM2_H)$	
	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value	Coef.	P-Value
LEV	-1.077***	0.000	0.685***	0.000	0.007	0.950	0.618***	0.000
SIZE	-0.090***	0.000	0.133***	0.000	0.202***	0.000	0.123***	0.000
LOSS	-0.819***	0.000	0.982***	0.000	0.486***	0.000	0.965***	0.000
INST	0.254**	0.026	-0.318***	0.005	-0.185	0.107	-0.339***	0.003
BH	-0.171	0.314	0.470***	0.003	0.518***	0.002	0.470***	0.003

[26] For the marginal effect of Table 10 please refer to Table A6 in the Appendix.

[27] The marginal effect of D&O insurance on accrual earnings management is 0.019, and the marginal effects are −0.019, −0.037, and −0.019 under the real earnings management scenario.

[28] The marginal effects of the interaction term are −0.003, 0.033, 0.052, and 0.073 for Models A–D.

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BSIZE	0.004	0.727	0.001	0.922	-0.006	0.545	-0.002	0.851
INDR	0.101	0.511	-0.127	0.386	0.069	0.625	0.015	0.919
BIG4	-0.002	0.980	-0.042	0.486	-0.079	0.178	-0.044	0.457
REST	0.106	0.481	-0.092	0.541	**-0.281***	**0.054**	**-0.283***	**0.075**
D&O	**0.075***	**0.100**	**-0.084***	**0.051**	**-0.127*****	**0.003**	**-0.092****	**0.034**
RD&O	-0.011	0.953	0.140	0.456	0.174	0.334	0.321	0.103
IMR	-0.075	0.405	0.073	0.411	0.071	0.396	0.170*	0.051
Cons	1.210**	0.405	-3.062***	0.000	-3.834***	0.000	-3.070***	0.000
Year	included		included		included		included	
Ind	included		included		included		included	
Obs.	12710		12710		12710		12710	
Chi^2	0.069		0.112		0.038		0.108	
Pse. R^2	537.185		896.139		308.525		848.514	

a. Variable definitions are provided in Table 2.

b. *p*-values are estimated by fixed year and fixed industry, corrected for firm-level clustering, and reported in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$

5. Conclusion

The Taiwanese government has implemented a series of disclosure policies to enhance information transparency and enhance corporate governance. Taiwan's Securities and Futures Bureau requires listed companies to disclose their D&O insurance purchases beginning in 2008. This public policy allows us to investigate the role of D&O insurance in Taiwan's capital market. A recent D&O insurance study suggests that D&O insurance purchases are opportunistic, but it ignores the ability of insurers to price the potential litigation risks of firms.

We use data on Taiwan's capital market to reveal a positive association between D&O insurance and accrual earnings management and a negative association between D&O insurance and real earnings management. However, restatement announcements moderate the association between D&O insurance and earnings management strategies. Moreover, through a comparison of three real earnings management factors, we discover that managers prefer to engage in sales manipulations to influence earnings when their firms have purchased D&O insurance after making restatement announcements.

The present study has several practical and academic implications: (1) It provides evidence that D&O insurance constrains managers from implementing accrual earnings management in practice, and it reveals that D&O insurance providers cannot avoid the risks related to managers' manipulation of earnings through real activities. Notably, we discover that managers prefer to engage in sales manipulation to increase earnings when their firms have made restatements. Roychowdhury (2006) argues that sales manipulation by managers increases sales volume and helps them met their short-term sales targets but also reduces their future margins. Thus, D&O insurers should focus on the risks associated with measures for increasing profitability.

(2) We address a gap in D&O insurance research by providing evidence that D&O insurance has a monitoring effect. We also verify the risk-taking hypothesis. Our results indicate that D&O insurers constrain managers from engaging in earnings manipulations, and that managers switch their earnings manipulation strategy from accrual to real earnings management after their firms make restatement announcements. The results indicate that D&O insurers absorb the risks that managers generate through the switch from accrual earnings manipulation to real earnings manipulation. Overall, our results support the D&O insurance opportunism hypothesis and partially supports the D&O monitoring hypothesis. Notably, we discover that the opportunism and monitoring hypotheses are dependent on negative event signals.

(3) We address the gap in real earnings management research by providing alternative evidence that managers are committed to increasing earnings through various real earnings manipulation methods. Notably, we reveal that in firms that have made restatement announcements, managers prefer to engage in sale manipulation and reduction of discretionary expenditure to reduce external scrutiny.

The present study has several research limitations. (1) the Taiwanese government requires listed firms to purchase D&O insurance; thus, the results of our analysis cannot be generalized to the period following the imposition of this requirement. (2) In contrast to the United States or other countries with high levels of investor protection, Taiwan's capital market is still an emerging capital market. Thus, our empirical results cannot be generalized to the mature capital market; however, they can serve as a reference for policymakers in an emerging market.

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References

Ali, A., and W. Zhang. 2015. CEO Tenure and Earnings Management. *Journal of Accounting and Economics* 59 (1):60-79.

Badertscher, B. A. 2011. Overvaluation and the Choice of Alternative Earnings Management Mechanisms. *Accounting Review* 86 (5):1491-1518.

Baker, T., and S. J. Griffith. 2010. *Ensuring corporate misconduct: How liability insurance undermines shareholder litigation?* Chicago: The University of Chicago Press.

Boyer, M. M., and L. H. Stern. 2012. Is Corporate Governance Risk Valued? Evidence from Directors' and Officers' Insurance. *Journal of Corporate Finance* 18 (2):349-372.

Boyer, M. M., and L. H. Stern. 2014. D&O Insurance and IPO Performance: What Can We Learn from Insurers? *Journal of Financial Intermediation* 23 (4):504-540.

Braam, G., M. Nandy, U. Weitzel, and S. Lodhc. 2015. Accrual-based and real earnings management and political connections. *The International Journal of Accounting* 50 (2):111-141.

Cao, Z. Y., and G. S. Narayanamoorthy. 2014. Accounting and litigation risk: evidence from Directors' and Officers' insurance pricing. *Review of Accounting Studies* 19 (1):1-42.

Chang, S.-H., T.-S. Wang, A. A. Chiu, and S. Y. Huang. 2015. Earnings Management and Idiosyncratic Risk-Evidence from the Post-Sarbanes-Oxley Act Period. *Investment Management and Financial Innovations* 12 (2):117-126.

Chen, S.-S., and C.-W. Huang. 2013. The Sarbanes-Oxley Act, Earnings Management, and Post-buyback Performance of Open-Market Repurchasing Firms. *Journal of Financial and Quantitative Analysis* 48 (6):1847-1876.

Chen, Z. H., O. Z. Li, and H. Zou. 2016. Directors' and officers' liability insurance and the cost of equity. *Journal of Accounting & Economics* 61 (1):100-120.

Chung, H. H., and J. R. Wynn. 2008. Managerial legal liability coverage and earnings conservatism. *Journal of Accounting & Economics* 46 (1):135-153.

Cohen, D. A., A. Dey, and T. Z. Lys. 2008. Real and Accrual-Based Earnings Management in the Pre- and Post-Sarbanes-Oxley Periods. *Accounting Review* 83 (3):757-787.

Cohen, D. A., and P. Zarowin. 2010. Accrual-based and real earnings management activities around seasoned equity offerings. *Journal of Accounting & Economics* 50 (1):2-19.

Core, J. E. 1997. On the corporate demand for directors' and officers' insurance. *Journal of Risk and Insurance* 64 (1):63-87.

Core, J. E. 2000. The Directors' and Officers' Insurance Premium: An Outside Assessment of the Quality of Corporate Governance. *Journal of Law, Economics, and Organization* 16 (2):449-477.

Cornett, M. M., A. J. Marcus, and H. Tehranian. 2008. Corporate governance and pay-for-performance: The impact of earnings management. *Journal of Financial Economics* 87 (2):357-373.

Dechow, P., W. Ge, and C. Schrand. 2010. Understanding Earnings Quality: A Review of the Proxies, Their Determinants and Their Consequences. *Journal of Accounting and Economics* 50 (2-3):344-401.

Desai, H., C. E. Hogan, and M. S. Wilkins. 2006. The reputational penalty for aggressive accounting: Earnings restatements and management turnover. *Accounting Review* 81 (1):83-112.

Enomoto, M., F. Kimura, and T. Yamaguchi. 2015. Accrual-based and real earnings management: An international comparison for investor protection. *Journal of Contemporary Accounting & Economics* 11 (3):183-198.

Ettredge, M., Y. Huang, and W. Zhang. 2012. Earnings Restatements and Differential Timeliness of Accounting Conservatism. *Journal of Accounting and Economics* 53 (3):489-503.

Ettredge, M., Y. Huang, and W. N. Zhang. 2013. Restatement Disclosures and Management Earnings Forecasts. *Accounting Horizons* 27 (2):347-369.

Graham, J. R., S. Li, and J. P. Qiu. 2008. Corporate misreporting and bank loan contracting. *Journal of Financial Economics* 89 (1):44-61.

Haw, I.-M. 2004. Ultimate Ownership, Income Management, and Legal and Extra-legal Institutions. *Journal of Accounting Research* 42 (2):423-462.

Hazarika, S., J. M. Karpoff, and R. Nahata. 2012. Internal corporate governance, CEO turnover, and earnings management. *Journal of Financial Economics* 104 (1):44-69.

Healy, P. M., and J. M. Wahlen. 1999. A Review of the Earnings Management Literature and Its Implications for Standard Setting. *Accounting Horizons* 13 (4):365-383.

Heckman, J. J. 1979. Sample Selection Bias as a Specification Error. *Econometrica* 47 (1):153-161.

Holderness, C. G. 1990. Liability Insurers as Corporate Monitors. *International Review of Law and Economics* 10 (2):115-129.

Hribar, P., and N. T. Jenkins. 2004. The effect of accounting restatements on earnings revisions and the estimated cost of capital. *Review of Accounting Studies* 9 (2-3):337-356.

Huang, H. H., W. M. Wang, and J. Zhou. 2013. Shareholder Rights, Insider Ownership and Earnings Management. *Abacus-a Journal of Accounting Finance and Business Studies* 49 (1):46-73.

Jarrell, G., and S. Peltzman. 1985. The Impact of Product Recalls on the Wealth of Sellers. *Journal of Political Economy* 93 (3):512-536.

DOI: 10.25103/ijbesar.151.06

Kasznik, R., and M. F. McNichols. 2002. Does Meeting Earnings Expectations Matter? Evidence from Analyst Forecast Revisions and Share Prices. *Journal of Accounting Research* 40 (3):727-759.

Khan, S., and J. K. Wald. 2015. Director Liability Protection, Earnings Management, and Audit Pricing. *Journal of Empirical Legal Studies* 12 (4):781-814.

Koh, K., D. A. Matsumoto, and S. Rajgopal. 2008. Meeting or Beating Analyst Expectations in the Post-scandals World: Changes in Stock Market Rewards and Managerial Actions. *Contemporary Accounting Research/Recherche Comptable Contemporaine* 25 (4):1067-1098.

Kothari, S. P., A. J. Leone, and C. E. Wasley. 2005. Performance matched discretionary accrual measures. *Journal of Accounting & Economics* 39 (1):163-197.

Kothari, S. P., N. Mizik, and S. Roychowdhury. 2016. Managing for the Moment: The Role of Earnings Management via Real Activities versus Accruals in SEO Valuation. *Accounting Review* 91 (2):559-586.

Kravet, T., and T. Shevlin. 2010. Accounting Restatements and Information Risk. *Review of Accounting Studies* 15 (2):264-294.

Leuz, C., D. Nanda, and P. D. Wysocki. 2003. Earnings management and investor protection: an international comparison. *Journal of Financial Economics* 69 (3):505-527.

Li, K. F., and Y. P. Liao. 2014. Directors' and officers' liability insurance and investment efficiency: Evidence from Taiwan. *Pacific-Basin Finance Journal* 29:18-34.

Liao, T.-L., H.-L. Chuang, and J.-Y. Wang. 2022. Directors' and officers' liability insurance and the pricing of seasoned equity offerings. *International Review of Economics & Finance* 80:12-26.

Lin, C., M. S. Officer, R. Wang, and H. Zou. 2013. Directors' and officers' liability insurance and loan spreads. *Journal of Financial Economics* 110 (1):37-60.

Lin, C., M. S. Officer, and H. Zou. 2011. Directors' and officers' liability insurance and acquisition outcomes. *Journal of Financial Economics* 102 (3):507-525.

Lin, F., T.-S. Wang, S.-Y. Huang, and S.-H. Chang. 2019. Investigate the Role of Directors and Officers Liability Insurance from Fat Cat Company Announcement. *Review of Securities and Futures Markets* 31 (3):79-124.

O'Sullivan, N. 1997. Insuring the Agents: The Role of Directors' and Officers' Insurance in Corporate Governance. *Journal of Risk and Insurance* 64 (3):545-556.

Palmrose, Z. V., V. J. Richardson, and S. Scholz. 2004. Determinants of market reactions to restatement announcements. *Journal of Accounting & Economics* 37 (1):59-89.

Palmrose, Z. V., and S. Scholz. 2004. The circumstances and legal consequences of non-GAAP reporting: Evidence from restatements. *Contemporary Accounting Research* 21 (1):139-180.

Park, J. C., and Q. Wu. 2009. Financial Restatements, Cost of Debt and Information Spillover: Evidence From the Secondary Loan Market. *Journal of Business Finance & Accounting* 36 (9-10):1117-1147.

Peasnell, K. V., R. F. Pope, and S. Young. 2005. Board monitoring and earnings management: Do outside directors influence abnormal accruals? *Journal of Business Finance & Accounting* 32 (7-8):1311-1346.

Roychowdhury, S. 2006. Earnings Management through Real Activities Manipulation. *Journal of Accounting and Economics* 42 (3):335-370.

Shen, C.-H., F. Luo, and D. Huang. 2015. Analysis of earnings management influence on the investment efficiency of listed Chinese companies. *Journal of Empirical Finance* 34:60-78.

Srinivasan, S. 2005. Consequences of financial reporting failure for outside directors: Evidence from accounting restatements and audit committee members. *Journal of Accounting Research* 43 (2):291-334.

Weng, T. C., G. Z. Chen, and H. Y. Chi. 2017. Effects of directors and officers liability insurance on accounting restatements. *International Review of Economics & Finance* 49:437-452.

Wiedman, C. I., and K. B. Hendricks. 2013. Firm Accrual Quality Following Restatements: A Signaling View. *Journal of Business Finance and Accounting* 40 (9-10):1095-1125.

Wilson, W. M. 2008. An Empirical Analysis of the Decline in the Information Content of Earnings following Restatements. *Accounting Review* 83 (2):519-548.

Wynn, J. P. 2008. Legal Liability Coverage and Voluntary Disclosure. *Accounting Review* 83 (6):1639-1669.

Xie, B., W. N. Davidson, and P. J. DaDalt. 2003. Earnings management and corporate governance: the role of the board and the audit committee. *Journal of Corporate Finance* 9 (3):295-316.

Yuan, R. L., J. Sun, and F. Cao. 2016. Directors' and officers' liability insurance and stock price crash risk. *Journal of Corporate Finance* 37:173-192.

Zang, A. Y. 2012. Evidence on the Trade-Off between Real Activities Manipulation and Accrual-Based Earnings Management. *Accounting Review* 87 (2):675-703.

Zhu, T. T., M. T. Lu, Y. W. Shan, and Y. L. Zhang. 2015. Accrual-based and real activity earnings management at the back door: Evidence from Chinese reverse mergers. *Pacific-Basin Finance Journal* 35:317-339.

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Appendix

Table A1 The Marginal Effect of Table 4

	Marginal Effect
BH	-0.081
BSIZE	0.007
INDR	0.745
BLKH	-0.299
LOSS	0.025
LEV	-0.102
SIZE	0.066
ROA	-0.210
MTB	-0.063
HITECH	0.191

a. Variable definition: BH_{it}, ownership of board director of firm i at beginning of fiscal year t; $BSIZE_{it}$, number of board directors that firm i has at beginning of fiscal year t; $INDR_{it}$, ratio of independent directors on board of directors of firm i at beginning of fiscal year t; $BLKH_{it}$, ownership of blockholders of firm i at beginning of fiscal year t; $LOSS_{it}$ is assigned a value of 1 if firm i had a net loss in previous year; LEV_{it}, debt ratio of firm i at beginning of fiscal year t; $SIZE_{it}$, natural log of market value of firm i at beginning of fiscal year t; ROA_{it}, return on assets of firm i at beginning of fiscal year t; MTB_{it}, market to book ratio of firm i at beginning of fiscal year t; HITECH is assigned a value of 1 if firm is in electronic industry.

Table A2 The Marginal Effect of Table 5

Panel A. Effect of D&O insurance on earnings management strategy				
	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	-0.191	0.108	-0.036	0.081
SIZE	-0.041	0.047	0.083	0.043
LOSS	-0.222	0.246	0.187	0.237
INST	0.061	-0.106	-0.082	-0.099
BH	-0.001	0.095	0.118	0.086
BSIZE	-0.001	0.001	-0.002	0.000
INDR	-0.074	0.048	0.133	0.088
BIG4	-0.011	-0.012	-0.011	-0.011
D&O	0.023	-0.020	-0.041	-0.022
IMR	-0.083	0.068	0.112	0.100
Panel B. Effect of restatement announcements on earnings management strategy				
	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	-0.191	0.107	-0.038	0.079
SIZE	-0.041	0.047	0.083	0.043
LOSS	-0.222	0.246	0.186	0.236
INST	0.065	-0.109	-0.088	-0.103
BH	-0.005	0.098	0.124	0.089
BSIZE	-0.001	0.001	-0.002	0.000
INDR	-0.071	0.043	0.123	0.083
BIG4	-0.007	-0.014	-0.016	-0.013
REST	0.029	-0.007	-0.017	0.015
IMR	-0.093	0.075	0.127	0.108
Panel C. Effects of D&O insurance combined with restatements on earnings management strategy				
	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	-0.192	0.109	-0.035	0.082
SIZE	-0.041	0.047	0.083	0.043
LOSS	-0.223	0.246	0.187	0.236
INST	0.061	-0.105	-0.082	-0.098
BH	-0.000	0.093	0.117	0.085
BSIZE	-0.001	0.001	-0.002	0.001

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INDR	-0.075	0.051	0.135	0.091
BIG4	-0.010	-0.011	-0.010	-0.010
REST	0.056	-0.087	-0.084	-0.052
D&O	0.024	-0.023	-0.044	-0.024
RD&O	-0.057	0.147	0.129	0.127
IMR	-0.084	0.070	0.113	0.102

a. Variable definitions are provided in Table 2.

Table A3 The Marginal Effect of Table 6

	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	-0.191	0.108	-0.037	0.081
SIZE	-0.041	0.047	0.084	0.044
LOSS	-0.222	0.246	0.187	0.237
INST	0.061	-0.106	-0.083	-0.099
BH	-0.001	0.095	0.119	0.086
BSIZE	-0.001	0.001	-0.002	0.001
INDR	-0.074	0.048	0.132	0.088
BIG4	-0.011	-0.012	-0.011	-0.011
D&OA	0.002	-0.002	-0.003	-0.002
IMR	-0.084	0.069	0.114	0.101
	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	-0.192	0.109	-0.035	0.082
SIZE	-0.042	0.047	0.084	0.044
LOSS	-0.223	0.246	0.187	0.237
INST	0.061	-0.106	-0.082	-0.099
BH	-0.001	0.094	0.118	0.085
BSIZE	-0.001	0.001	-0.001	0.001
INDR	-0.075	0.051	0.134	0.091
BIG4	-0.010	-0.012	-0.010	-0.010
REST	0.058	-0.086	-0.081	-0.050
D&OA	0.002	-0.002	-0.003	-0.002
RD&OA	-0.005	0.012	0.010	0.010
IMR	-0.085	0.071	0.115	0.103

a. Variable definitions are provided in Table 2.

Table A4 The Marginal Effect of Table 7

Panel A. First stage of Heckman's two-stage regression	
	Marginal Effect
Analyst	-0.005
Hab_Beatr	-0.035
Share	0.046
SIZE	0.021
ROA	0.079
LEV	0.278
MTB	0.181

Panel B. Second stage of Heckman's two-stage regression				
	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	0.122	0.198	-0.155	0.112
SIZE	0.011	0.008	0.093	0.010
LOSS	-0.225	0.200	0.073	0.176
INST	-0.030	-0.018	0.023	-0.033
BH	0.101	0.119	0.139	0.124
BSIZE	-0.004	-0.004	-0.006	-0.005
INDR	0.010	0.097	0.308	0.162
BIG4	-0.047	-0.042	-0.055	-0.053
REST	0.099	-0.039	-0.031	-0.015

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D&O	-0.006	-0.055	-0.081	-0.055
RD&O	-0.056	0.135	0.118	0.164
DOIMR	0.107	0.130	0.220	0.196
EMIMR	-0.077	-0.980	-0.927	-0.962

a. Variable definitions are provided in Table 2. Additional variable definitions: Analyst, degree of analyst coverage; Hab_Beat, frequency with which earnings forecasts of analysts are met or exceeded; Share, natural logarithm of number of shares outstanding; Size, firm size; ROA, return on assets; LEV, firm leverage; MTB, market to book ratio.

Table A5 The Marginal Effect of Table 8

	$REM1_H$ Marginal Effect	$REM2_H$ Marginal Effect	$REM3_H$ Marginal Effect
LEV	0.086	0.167	-0.075
SIZE	-0.014	0.050	0.083
LOSS	0.240	0.246	0.175
INST	-0.039	-0.074	-0.059
BH	-0.054	0.096	0.098
BSIZE	0.003	0.002	-0.002
INDR	-0.046	0.078	0.129
BIG4	0.007	-0.028	-0.011
REST	-0.118	-0.061	-0.070
D&OA	0.000	-0.012	-0.044
RD&OA	0.158	0.093	0.120
IMR	-0.029	0.097	0.095

a. Variable definitions are provided in Table 2.

Table A6 The Marginal Effect of Table 10

Panel A. Effect of D&O insurance on earnings management strategy				
	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	-0.268	0.161	0.002	0.140
SIZE	-0.022	0.031	0.060	0.028
LOSS	-0.203	0.232	0.144	0.219
INST	0.063	-0.075	-0.055	-0.077
BH	-0.043	0.111	0.154	0.107
BSIZE	0.001	0.000	-0.002	-0.000
INDR	0.026	-0.030	0.018	0.002
BIG4	-0.000	-0.010	-0.023	-0.010
D&O	0.019	-0.019	-0.037	-0.019
IMR	-0.017	0.017	0.019	0.038*
Panel B. Effect of restatement announcements on earnings management strategy				
	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	-0.268	0.161	0.001	0.139
SIZE	-0.022	0.031	0.060	0.028
LOSS	-0.203	0.231	0.144	0.218
INST	0.065	-0.077	-0.058	-0.079
BH	-0.044	0.112	0.156	0.108
BSIZE	0.001	0.000	-0.002	-0.000
INDR	0.028	-0.035	0.012	-0.002
BIG4	0.002	-0.012	-0.028	-0.012
REST	0.024	0.000	-0.049	-0.016
IMR	-0.026	0.024	0.034	0.045
Panel C. Effects of D&O insurance combined with restatements on earnings management strategy				
	$A(AEM_HRM_L)$ Marginal Effect	$B(AEM_LRM_H)$ Marginal Effect	$C(AEM_LRM1_H)$ Marginal Effect	$D(AEM_LRM2_H)$ Marginal Effect
LEV	-0.268	0.162	0.002	0.140
SIZE	-0.022	0.031	0.060	0.028
LOSS	-0.203	0.232	0.145	0.219
INST	0.063	-0.075	-0.055	-0.077
BH	-0.043	0.111	0.154	0.107
BSIZE	0.001	0.000	-0.002	-0.000

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INDR	0.025	-0.030	0.020	0.003
BIG4	-0.000	-0.010	-0.023	-0.010
REST	0.026	-0.022	-0.084	-0.064
D&O	0.019	-0.020	-0.038	-0.021
RD&O	-0.003	0.033	0.052	0.073
IMR	-0.019	0.017	0.021	0.039

a. Variable definitions are provided in Table 2

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