The relationship between external financing activities and earnings management: Evidence from enterprise risk management

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ABSTRACT

This study examines the impact of external financing activities on earnings management decisions and further explores the role of enterprise risk management (ERM) as a potential moderating factor in this association. We find that managers use both real-activities and accrual-based earnings management when engaging in equity financing activities. Moreover, when firms have weaker ERM systems, we find that managers are less likely to use real-activities earnings management in their equity financing efforts. Therefore, our policy-relevant findings suggest that weaker ERM systems can signal poor control mechanisms and attract additional investor scrutiny, thus constraining managers' use of real-activities earnings manipulation to harm long-term firm value.

1. Introduction

This paper examines the relationship between external financing activities and earnings management within the setting of a firm's internal control environment as measured by Enterprise Risk Management (hereafter, ERM).[2] Firms can obtain external financing through equity or debt offerings, and capital structure theory emphasizes the importance of distinguishing between equity and debt financing.[3] From a capital cost perspective, debt financing necessitates the payment of interest and matured principal, but there is no

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such payment pressure in equity financing. However, firms employing equity financing face performance pressures because poor operational performance will result in a reduced stock price. From an agency theory perspective incorporating control rights, debt financing maintains the current proportion of control rights whereas equity financing reduces the monitoring ability of creditors.[4]

Prior studies find that the use of external financing can drive firm managers to engage in earnings management (DuCharme, Malatesta, & Sefcik, 2004; Shivakumar, 2000; Shu and Chiang, 2014; Teoh et al., 1998; Yang et al., 2016). These studies focus on accrual-based earnings management and its consequences for post-financing firm performance. For example, Yang et al. (2016) show that firms with higher levels of earnings management and distress risk perform poorly after SEOs. Recent research also documents external financing anomalies, which manifest as negative effects on future stock returns and profitability from a firm's external financing activities (Bradshaw, Richardson, & Sloan, 2006; Papanastasopoulos et al., 2011). Most studies that attempt to detect such external anomalies are based on direct inferences of possible phenomena or hypotheses from the perspective of the impact of outside investors on the change in expected returns. The earnings management hypothesis contributes significantly to the explanation of external anomalies. It argues that managers will manipulate earnings upward before implementing financing policies, and external investors will mistakenly believe that the firm has better operating performance as a consequence. Once the financing policies are in place, the firm's performance may deteriorate due to the reversal of earnings management accruals, thus forcing investors to reevaluate the true value of the firm. This effect ultimately yields negative investment returns (Papanastasopoulos et al., 2011).

After the Enron scandal, the perception of more effective corporate governance as an important mechanism for controlling and monitoring managerial behavior increased in prominence in the U.S. and globally, particularly as it relates to ERM in achieving organizational goals.[5] This is because a firm's level of risk affects the prediction accuracy of future performance as well as the quality of decision-making. While ERM can identify, measure, and control such risk levels, it is difficult to observe its operational outcome in practice.[6] Further, existing theories that directly explain the role of ERM in the relationship between external financing activities and earnings management remain scarce. Therefore, we follow Gordon, Loeb, and Tseng (2009) and build an ERM index based on their contingency perspective using data from Taiwanese capital markets. We use the ERM index to investigate whether ERM plays a monitoring role or signals corporate control mechanism quality in managers' strategic earnings manipulation decisions when implementing external financing policies.

In recent years, the approach to managing risk has changed from the traditional perspective that considers a single aspect of risk to one that focuses on the overall performance of the firm. An overall perspective on managing organizational risk is generally known as ERM.[7] Compared to a more traditional risk management approach, ERM provides the firm with an integrated method that combines risk management and value creation by considering the impact of individual and overall risk on the firm's operational objectives.[8] Prior studies find that the adoption of ERM concepts can improve operating performance and increase firm value (Beasley, Pagach, & Warr, 2008; Hoyt & Liebenberg, 2011; Liebenberg & Hoyt, 2003; Nocco and Stulz, 2006). Firms facing high risk, due to increased environmental uncertainty, should prevent and control the unfavorable effects of risk and increase beneficial outcomes by minimizing negative risk (Williams et al., 1998). Hoyt and Liebenberg (2011) suggest that ERM is an important control mechanism that improves firm value for two reasons. First, relative to single risk management, ERM provides an integrated framework for identifying and preventing mutually dependent risk sources, which can reduce earnings fluctuations. Second, with respect to information improvement, ERM enhances the information-related combinations of firm risks.

According to the 2004 Committee of Sponsoring Organizations of the Treadway Commission (COSO) framework, ERM practice has four key objectives: strategy, operations, reporting, and compliance. Based on these stated objectives, firms with more reliable and accurate financial statements and/or firms that are more compliant with auditing standards likely employ superior ERM systems. Therefore, a comprehensive ERM index can indicate the degree of a firm's internal control and financial reporting quality. Prior studies have found that firms with higher quality financial reporting exhibit less earnings manipulation behavior, and that firms with a larger market share or better operating performance have less incentive to manage earnings (Bergstresser & Philippon, 2006; Chan, Farrell, & Lee, 2008; Datta, Iskandar-Datta, & Singh, 2013; Ge & McVay, 2005; Lo et al., 2017).

Despite the growth in and importance of external financing activities, earnings management (manipulation), and ERM, no study to date has identified which forms of earnings management are employed when a firm engages in external financing activities and what moderating effect, if any, ERM has when discussing the relationship between external financing activities and earnings management. Therefore, we fill this gap in the literature. The major purpose of this study is to investigate the effect of ERM on the relationship between external financing activities and earnings management decisions.

This paper adopts both accruals-based and real-activities earnings manipulation methods as earnings management decision options.

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[4] Jensen (1986) indicates that, from a free cash flow perspective, debt financing can restrain overinvestment by a self-interested manager.

[5] Enterprise risk management is a core area in the Committee of Sponsoring Organization of the Treadway Commission (COSO), which emphasizes that enterprises should pay attention to relevant risk management in the evaluation of various opportunities to help enterprises manage risks more effectively.

[6] Arena et al. (2010) indicate that critical contributions exploring how ERM works in practice are few, and that research addressing how organizational dynamics evolve and shape risk management style is lacking.

[7] Nair et al. (2014) indicate that prior articles on ERM have adopted non-integrated measures such as debt/equity ratios or appointment of chief risk officers (CROs) as proxies for ERM; however, they further include a new variable, namely, the Standard & Poor's (S&P) ERM rating on firms. Bromiley, McShane, Nair, and Rustambekov (2015) indicate that ERM proposes that firms address all their risks comprehensively and coherently, instead of managing them individually. That is, ERM proposes the integrated management of all the risks a firm faces, which requires alignment of risk management with corporate governance and strategy. Hence, our paper uses a comprehensive index to measure ERM.

[8] Beasley, Clune, and Hermanson (2005) define ERM as a process subject to the influence of the board of directors, managers and other members of the enterprise. It is applied to the strategic environment surrounding the entire enterprise and is designed to identify and manage the impact of potential events on the enterprise, considering its risk preferences, to provide a reasonable guarantee that the firm's objectives will be achieved.

Many studies indicate that managers use an accrual-based earnings manipulation method. For example, using Taiwanese data, Shu and Chiang (2014) argue that larger firms prefer using discretionary accruals to increase their external financing proceeds. However, the requirements of Section 404 of the Sarbanes-Oxley Act of 2002 that external auditors provide an internal controls effectiveness assessment and disclose material control weaknesses may constrain the ability of managers to use discretionary accruals to manage earnings. Therefore, given the focus of auditors and regulators on accrual-based earnings management, firms tend to use real-activities earnings management or to adopt some combination of accruals and real activities concurrently to manage earnings (Cohen & Zarowin, 2010; Zang, 2012).[9] Thus, it is important to consider both methods of earnings management behavior when investigating the complex relationships among them, external financing, and ERM.

Our findings indicate that firms engaging in external equity financing activities use both real activities and accruals to manage earnings, but we do not find that firms engaging in external debt financing activities use earnings management in securing financing terms. Moreover, we find that weaker ERM performance is positively associated with real-activities earnings management, which indicates that poor ERM performance likely enables managers to engage in real-activities earnings management. When considering external financing activities within the context of ERM, we observe that firms engaging in external equity financing activities do not employ real-activities earnings management. Therefore, our results imply that weaker ERM attracts more attention from external shareholders and constrains mangers from manipulating earnings using real activities when firms seek equity financing. Overall, consistent with Zang (2012) who indicates that managers use both real-activities and accrual-based earnings manipulation, we find that the type of earnings management utilized depends on the financing activities employed and that ERM also plays an important role when earnings management is used to secure different types of external financing.

Our study differs from prior research (DuCharme et al., 2004; Shivakumar, 2000; Shu and Chiang, 2014; Teoh et al., 1998) investigating the relationship between earnings management and equity financing activities by considering debt financing activities as well. While Crabtree, Maher, and Wan (2014) study the relationship between debt cost and earnings management, and find a positive association, they do not explore or indicate an earnings management method preference for securing external debt financing. Our study also differs from Kothari, Mizik, and Roychowdhury (2016), which explores the role of earnings management on firm valuation at the time of external equity financing. While they show that post-SEO overvaluation is driven by managing real activities, they do not attempt to discover an earnings management strategy preference for external equity financing. Accordingly, we fill a gap after considering previous research exploring the relationship between earnings manipulation strategies and external financing activities. That is, this study considers potential preferences for both real-activities and accrual-based earnings management strategies, along with both equity and debt external financing activities.

Additionally, we consider the potentially moderating role of ERM on the relationship between earnings management strategy and external financing activities. Specifically, we follow Gordon et al. (2009) to capture the spirit of the COSO framework (2004) which set the purpose of ERM to assist managers in evaluating existing and potential risks. Similar to reactions in the U.S. to the financial crisis and corporate scandals, the Taiwanese government began to emphasize larger roles for corporate governance and ERM after the Asian financial crisis and a series of its own corporate scandals. In doing so, they attempted to stabilize capital markets and to set the tone as a capital market leader in Asia. As a result, ERM has become an important mechanism to assist managers in monitoring and controlling risk. In fact, the Regulations Governing Establishment of Internal Control Systems by Public Companies requires that public companies in Taiwan establish effective risk management mechanisms to assess and monitor their risk-bearing capacity and current risk incurred.[10] Considering the challenge of increasing the ability to monitor and control external risk in a timely manner, current public policy dictates that firms must integrate risk assessment into their daily control decisions and develop appropriate risk management policies to improve the effectiveness of their ERM control environments.

Moreover, external financing is very important in an emerging market like Taiwan where amplified information asymmetry enhances the ability of managers with incentive to obscure information regarding true economic performance and hampers control mechanisms that restrict self-serving behavior. Therefore, Taiwan is an appropriate setting for examining the association between external financing activities, earnings manipulation, and ERM, especially with public policy in mind. Analyzing Taiwanese data, we find that ERM quality affects earnings management preferences when firms seek external financing. Therefore, our results have important implications for regulators concerned about the quality of earnings and managerial opportunism.

The remainder of this paper is organized as follows: Section 2 presents the literature review and development of hypotheses. Section 3 describes the research design including sample selection, variable definitions, and empirical models. Section 4 discusses the empirical findings. Section 5 provides the conclusion and suggestions for further research.

2. Literature review and hypotheses development

2.1. Earnings management methods and external financing

Papanastasopoulos et al. (2011) summarize the perspectives on the external financing activities anomaly as the managerial market timing hypothesis, the earnings management hypothesis, the overinvestment hypothesis, and the risk-based hypothesis. The managerial market timing hypothesis suggests that the firm will issue (repurchase) stocks to exploit market mispricing when the firm's perceived

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[9] Most studies provide three types of real-activities earnings management, such as accelerating sales, decreasing R&D and advertising expenses, and overproduction of inventory.
[10] Refer to "Regulations Governing Establishment of Internal Control Systems Article 43-1".

value is high (low) relative to its actual value, and then future earnings performance will drive investor reevaluation of the firm (Ritter, 2003). The earnings management hypothesis suggests that managers will mislead investors by using accounting accruals to increase earnings and firm value during the fund-raising process. The subsequent reversal of manipulated accruals will result in investors reducing their misinformed evaluations of the basic value of the firm (Heron & Lie, 2004; Rangan, 1998; Teoh et al., 1998). The overinvestment hypothesis argues that self-serving managers will invest the net cash flows from external financing activities in investment plans with zero or negative net realizable value. For instance, Bradshaw et al. (2006) show that a financing firm with negative returns primarily reflects the reduction in value caused by such overinvestment. The risk-based hypothesis suggests that firms will generally reduce bankruptcy risk by seeking financing, and such firms are generally considered to have lower than expected returns (Eckbo, Masulis, & Norli, 2000) or fewer investments converting future investment opportunities into real assets. Therefore, current assets will have lower risk than when asset choices are made, and the resulting stock returns will be lower (Berk, Green, & Naik, 1999).

Previous equity financing studies focusing on the earnings management hypothesis find that managers improve performance via earnings management, but that the reversal effects of the manipulated accounting accruals after the equity financing drive investors to reevaluate the firm (Cohen & Zarowin, 2010; DuCharme et al., 2004). However, the methods managers employ to manipulate earnings are not limited to accrual-based earnings management. Prior research indicates that some methods involving real activities, such as accelerating sales or delaying research and development, can allow managers to meet earnings targets (Dechow & Skinner, 2000; Healy & Wahlen, 1999). Moreover, Graham, Harvey, and Rajgopal (2005) find that managers are willing to manipulate real activities, such as decreasing R&D and advertising expenses, to meet earnings targets even though such manipulations may reduce firm value. Additionally, Cohen and Zarowin (2010) find that, similar to the reversal of manipulated accruals, managing earnings via real activities results in the deterioration of business performance and investor reevaluation as well. Collectively, these results suggest that the earnings management hypothesis explanation for the external financing anomaly can include both real-activities and accrual-based earnings management. With respect to debt financing, Liu et al. (2010) show that managers manipulate earnings upward surrounding new debt issues, which is consistent with evidence provided by studies investigating the external financing anomaly around equity financing. However, their paper does not consider real-activities earnings management.

Whether real-activities or accrual-based earnings management dominates in explaining the external financing anomaly is an empirical question that has received limited attention. Roychowdhury (2006) argues that managers prefer real-activities to accrual-based earnings management because real activities are less likely to attract the attention of the auditors and government regulators and less likely to produce additional risk. Zang (2012) finds that managers concurrently employ both types of earnings management and that they shift from managing accruals to real activities as litigation risk increases. These findings imply that real-activities and accrual-based earnings management methods are substitutive and depend upon the relative costs and benefits of each method. Relevant costs for using accrual-based earnings management include the detailed investigations of regulatory authorities and litigation risk, and major costs related to real-activities earnings management comprise the deviation costs of real economic activities from the optimal operating results and the firm's loss of competitive advantages. Crabtree et al. (2014) also examine the effects of real-activities earnings management on the bond rating and market price of new debt offerings. They find that real-activities earnings management is negatively associated with perceived credit risk and that managers use real-activities earnings management to influence analysts' earnings forecasts. Kothari et al. (2016) investigate the role of real-activities and accrual-based earnings management surrounding seasoned equity offerings and find that managers are more likely to manipulate earnings through real activities when issuing SEOs. Given the existing evidence found in the literature, we infer that external financing activities affect the method of earnings management employed by managers and, thus, propose the following hypothesis:

H1. A firm's external financing activities affect a manager's choice between real-activities and accrual-based earnings management methods.

2.2. The role of ERM

In the contemporary dynamic global environment, risk management has gradually been receiving greater attention from enterprises since the mid-1990s. In particular, in the wake of the Enron scandal, ERM has been considered a mechanism to improve the reliability of financial statements. Bowling and Rieger (2005) argue that, in the post-Enron era, due to financial disclosures, improved corporate governance and relevant increases in compliance costs, as well as managers' efforts to rethink the impact of risk management on improving corporate value, managers regard ERM development as the trend after the implementation of SOX. Gordon et al. (2009) note that the four major goals of ERM established by COSO (2004) have gone beyond the traditional focus of internal control; instead, ERM underlies an organization's strategic goals.[11]

The impact of ERM on an enterprise can be divided into the framework dimension and organizational value effects. COSO (2004) notes that the risk management framework varies across different organizational patterns. In other words, an organization should consider the industrial environment and risks borne by managers when it develops its risk management framework. Gordon et al. (2009)

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[11] COSO (2004) defines ERM as a process subject to the influence of the board of directors, managers and other members of an enterprise. It is applied to the strategic environment and the entire enterprise and is designed to identify events that have the potential to affect the enterprise, internal risk management and the enterprise's risk preferences to provide a reasonable guarantee that the firm's objectives will be achieved. Moreover, the ERM framework consists of four major goals and eight elements. The goals include organizational strategy, business operational efficiency and effectiveness, report reliability, and compliance with relevant laws. The eight elements include the internal environment, organizational objective setting, event identification, risk assessment, risk response, control activities, information, communication and monitoring.

indicate that there is no generalized ERM system in practice, and the ERM system is a contingent concept. With respect to organizational value, ERM should have no impact on the value of the firm. However, maximizing shareholder value is the most fundamental goal of ERM for shareholders (Meulbroek, 2002).[12] Hoyt and Liebenberg (2011) also indicate that ERM can increase firm value. On the other hand, the direct cost of developing the ERM system and the dispersion of managerial attention may result in negative net realizable value for the firm.

The growing complexity of firm operations has made risk management increasingly difficult. More complex business environments have necessitated the development of ERM as a tool to help managers understand the sources of risk and what types of strategies are required to address them. In this paper, we argue that implementing ERM can go beyond risk management to represent a control system that assists external investors in evaluating the current operational status of the firm, thus potentially mitigating the risk of anomalies, particularly the external financing anomaly as explained by the earnings management hypothesis. Following Healy and Wahlen (1999), we define earnings management as behavior by managers that misleads investors regarding the actual economic performance of the firm or that affects the results of the individual contracting parties through professional assessments of financial reports and transaction construction. Consider, for instance, how the COSO (2004) objective relating to operational effectiveness in particular may relate to developing stronger foundations for constraining real activities manipulations in the financial reports. Roychowdhury (2006) indicates that real activities manipulations depart from normal operational practices and do not necessarily contribute to firm value (e.g., reducing R&D and inventory overproduction). A high-quality ERM system can potentially limit the ability of management to use real activities or accruals to manipulate earnings, further reducing information risk to financial statement users.

Section 404 of SOX requires that public firms maintain adequate internal controls and that external auditors provide an internal controls effectiveness assessment disclosing material control weaknesses. The main objective of SOX is to improve the accuracy and reliability of corporate disclosure, and Chan et al. (2008) test this theory in the context of whether firms reporting material internal control weaknesses under Section 404 of SOX engage in significantly more earnings management relative to other firms. They find evidence that firms reporting material internal control weaknesses have more positive and absolute discretionary accruals. Additionally, Lenard, Petruska, Alam, and Yu (2016) undertake a similar investigation relating to real-activities earnings management and find that firms with internal control weaknesses under Section 404 of SOX are more likely than other firms to use real activities, in addition to accruals, to manage earnings. Feng, Li, McVay, and Skaife (2015) show that firms with greater internal control material weakness disclosures manage their inventory, a real activity, less effectively. Similarly, Jarvinen and Myllymaki (2016) also find that firms display higher levels of real activities manipulation when disclosing material weaknesses in their internal controls. The notion that an effective ERM system is similar in function to an effective internal control structure with respect to financial reporting and compliance outcomes is straightforward. Therefore, if external investors regard earnings management as a tool used by managers to manipulate information in financial reports in instances of asymmetric information, then ERM can potentially reduce managers' use of earnings management. Hence, we specify the following hypotheses.

H2a. Enterprise risk management mitigates the use of real-activities earnings management.

H2b. Enterprise risk management mitigates the use of accrual-based earnings management.

There are numerous academic interpretations of the possible causes of anomalies resulting from external financing activities. From the perspective of earnings management, managers theoretically use an asymmetric information environment to manipulate earnings prior to obtaining financing with the objective of misleading investors to overvalue the firm. Once the financing activity is complete, the reversal of earnings management or the display of the firm's actual performance will lead to the belief by investors that business performance is deteriorating and to the re-evaluation of the firm value. Hoyt and Liebenberg (2011) argue that ERM can be regarded as a tool with which external investors can reduce information asymmetries. ERM broadly encompasses a firm's internal control system, which, when relatively ineffective, has been linked to increased levels of earnings management (Chan et al., 2008). Therefore, by analogy, we posit that ERM can potentially reduce earnings management during external financing activities and thus propose the following hypotheses:

H3a. Enterprise risk management mitigates the use of real-activities earnings management when a firm engages in external financing.

H3b. Enterprise risk management mitigates the use of accrual-based earnings management when a firm engages in external financing.

In addition, given that ERM broadly encompasses a firm's internal control system, in subsequent empirical analyses, we also consider the role of corporate governance as an alternative variable to ERM.

3. Research design

3.1. Data and sample

Our initial sample includes all publicly-listed firms on the Taiwan Stock Exchange Corporation (hereafter TWSE) from the Taiwan Economic Journal (TEJ) database during the 2004–2015 period, excluding firms from the financial and insurance industries. We gather additional data from 2003 to calculate a complete sample of change variables (sales revenue, accounts receivable, and financing

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[12] The Casualty Actuarial Society Committee on Enterprise Risk Management (2003, p. 8) notes that ERM can improve long-term or short-term value obtained by the company's shareholders.

Table 1
Sample selection.

Initial sample of external financing data (2004–2015)	14,746
(1) Delete missing or invalid values to estimate accrual-based earnings management	(211)
(2) Delete missing or invalid values to estimate real-activities earnings management	(13)
Before deleting missing or invalid values to calculate abnormal ERM	14,522
(3) Delete missing or invalid values to calculate abnormal ERM	(7855)
Final sample	6667

activities). Table 1 describes our sample selection process. The initial external financing sample contains 14,746 observations, including 211, 13, and 7855 missing observations for the accrual-based earnings management variable, real-activities earnings management variable and abnormal ERM index, respectively. Therefore, our final sample includes 1119 firms and consists of 6667 firm-year observations.

3.2. Empirical models

To examine the association between earnings management and external financing activities, as well as the restraining role that ERM potentially undertakes in moderating earnings management when firms implement external financing, we employ the two-stage model proposed by Heckman (1979). The first stage illustrates factors that influence earnings management decisions by managers via a parsimonious selection model. The second stage analyzes factors affecting external financing decisions and the impact of external financing activities on the use of real-activities or accrual-based earnings management methods, particularly once risk management is taken into account.

In the first stage of the model, we consider the three earnings management hypotheses proposed by Watts and Zimmerman (1986) in positive accounting theory (i.e., the bonus plan hypothesis, the debt covenant hypothesis, and the political cost hypothesis) to estimate the inverse Mills ratio via the following Probit model:

$$TEMAR_{it} = a_0 + a_1 ROA_{it} + a_2 DEBR_{it} + a_3 SIZE_{it} + a_4 MBR_{it} + Year + Ind + e_{it} \tag{1}$$

where *TEMAR* is the use of earnings management. If a firm's real-activities or accrual-based earnings management is above the annual median value in a given industry, *TEMAR* takes a value of 1, and 0 otherwise.[13]

According to Scott (2006), the bonus plan hypothesis suggests that managers increase current accounting earnings by recognizing future earnings early when their bonus plan is based on current earnings. The debt covenants hypothesis suggests that managers automatically convert future earnings to current earnings once a critical point is reached to reduce default risk. The political cost hypothesis suggests that when firms face higher political costs, which are common in larger firms, managers defer current earnings to a future period. Hence, we use a commonly employed accrual-based performance variable, return on assets (*ROA*), to proxy for the bonus plan hypothesis, the debt ratio (*DEBR*) to proxy for the debt covenants hypothesis, and the natural logarithm of total assets (*SIZE*) to proxy for political costs. Since previous research investigating earnings management suggests that firms' growth opportunities affect managers' engagement in earnings management (Dechow & Skinner, 2000; Kothari, Leone, & Wasley, 2005; Menon and Williams, 2004), we also use the market-to-book ratio (*MBR*) to control for growth prospects. Moreover, *Year* represents year fixed effect and *Ind* represents industry fixed effect.

We test our hypotheses in the second stage of the two-stage model. The three major issues that our hypotheses propose to explain are: (1) whether firms primarily employ real-activities or accrual-based earnings management strategies during external financing activities; (2) whether the implementation of ERM reduces the use of real-activities or accrual-based earnings management strategies; and (3) whether ERM reduces the use of real-activities or accrual-based management strategies during external financing activities.

We first examine the relationship between external financing activities and real-activities or accrual-based earnings management strategies by using the following Probit model:

$$TEM_{jit} = \beta_0 + \beta_1 XFIN_{it} + \beta_2 IMR_{it} + Year + Ind + e_{it} \tag{2}$$

where TEM_{jit} denotes firm *i's* earnings management in year *t*. The subscript *j* (*j* = 1,2) denotes real-activities earnings management when *j* = 1, represented by *TEMR*, and accruals-based earnings management when *j* = 2, represented by *TEMA*. If the level of real-activities earnings management is greater than the annual median within the industry, *TEMR* takes a value of 1, and 0 otherwise. If the level of accrual-based earnings management is greater than the annual median within the industry, *TEMA* takes a value of 1, and 0 otherwise. *XFIN* represents external financing activities. The inverse Mills ratio (*IMR*) is extracted from the first stage regression. Following Bradshaw et al. (2006), we disaggregate external financing activities (*XFIN*) into equity and debt components in each of our models.

Next, we employ the following model to examine the impact of ERM implementation effectiveness on real-activities or accrual-based

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[13] To distinguish whether firms prefer using accrual-based or real activities manipulation, we standardize each earnings management variable before comparing it to the annual median value in a given industry.

earnings management strategies.

$$TEM_{jit} = \beta_0 + \beta_1 ABERM_{it} + \beta_2 IMR_{it} + Year + Ind + e_{it} \qquad (3)$$

where *ABERM* is the abnormal ERM index which measures the extent of deviations from optimal ERM. A larger value of *ABERM* represents a weaker ERM system. Other variables are as described previously.

Finally, we examine whether the presence of an ERM system affects the relationship between external financing activities and real-activities or accrual-based earnings management strategies by using the following Probit model.

$$TEM_{jit} = \beta_0 + \beta_1 XFIN_{it} + \beta_2 ABERM_{it} + \beta_3 EFERM_{it} + \beta_4 IMR_{it} + Year + Ind + e_{it} \qquad (4)$$

where *EFERM* is the interaction between external financing activities (*XFIN*) and the abnormal ERM index (*ABERM*). Other variables are as described previously.

3.3. Variable definitions

3.3.1. External financing activities

We follow Bradshaw et al. (2006) and measure the net amount of cash flows generated by external financing activities (*XFIN*) as follows:

$$XFIN = EQUIF + DEBF \qquad (5)$$

where *EQUIF* is defined as the net cash flow received from the sale (or purchase) of common stock and preferred stock less any dividend payout, and *DEBF* is defined as the net cash flow received from the issuance (or repayment) of debt.

3.3.2. Accrual-based earnings management

This paper use discretionary accruals to proxy for accrual-based earnings management. We adopt the method developed by Kothari et al. (2005) to estimate discretionary accruals incorporating adjustments using the return on assets measure and other industry characteristics to alleviate extreme performance effects on the estimation of discretionary accruals. Thus, we use the following model to estimate performance-control discretionary accruals:

$$TA_{it}/A_{it-1} = \alpha_1(1/A_{it-1}) + \beta_1((\Delta REV_{it} - \Delta REC_{it})/A_{it-1}) + \beta_2(PPE_{it}/A_{it-1}) + \beta_3 ROA_{it} + \varepsilon_{it} \qquad (6)$$

where TA_{it} = the total accruals of firm *i* at period t, A_{it-1} = the total assets of firm *i* at period t-1, ΔREV_{it} = the change in sales revenue of firm *i* at period t, ΔREC_{it} = the change in account receivable of firm *i* at period t, PPE_{it} = the total gross amount of property, plant, and equipment assets of firm *i* at period t, and ROA_{it} = the return on assets of firm *i* at period t. We use the results from estimating Equation (6) based on industry cross-sectional analysis to calculate non-discretionary accruals (NDA):

$$NDA_{it} = \widehat{\alpha}_1(1/A_{it-1}) + \widehat{\beta}_1((\Delta REV_{it} - \Delta REC_{it})/A_{it-1}) + \widehat{\beta}_2(PPE_{it}/A_{it-1}) + \widehat{\beta}_3 ROA_{it} \qquad (7)$$

The difference between total accruals (*TA*) and non-discretionary accruals (*NDA*) is an estimate for discretionary accruals. We use the estimated discretionary accruals to proxy for accrual-based earnings management, *TEMA*.

3.3.3. Real-activities earnings management

We follow Roychowdhury (2006), utilizing a cross-sectional regression analysis for each industry and year to measure the level of real transaction manipulations using abnormal cash flows from operations (*TEMOCF*), abnormal discretionary expenses (*TEMDISX*) and abnormal production costs (*TEMPROD*). To estimate the respective abnormal measures, we first generate expected normal measures for operating cash flows, discretionary expenses, and production costs. The normal measure of operating cash flows, a linear function of sales and the change in sales, is estimated using the following cross-sectional regression for each industry and year:

$$CFO_{it}/A_{it-1} = \alpha_0 + \alpha_1(1/A_{it-1}) + \beta_1(Sale_{it}/A_{it-1}) + \beta_2(\Delta Sale_{it}/A_{it-1}) + \varepsilon_{it} \qquad (8)$$

where CFO_{it} = the operating cash flows of firm *i* at period *t*; $Sale_{it}$ = the sales revenue of firm *i* at period *t*; $\Delta Sale_{it}$ = the change in sales revenue of firm *i* at period *t*; A_{it-1} = the total assets of firm *i* at period *t*-1. We calculate the measure for abnormal cash flows from operations (*TEMOCF*) as the actual cash flows from operations less the normal cash flows from operations.

Regarding discretionary expenses, Roychowdhury (2006) indicates that modeling discretionary expenses as a linear function of contemporaneous sales creates a mapping problem.[14] To avoid this problem we model discretionary expenses as a linear function of lagged sales using the following cross-sectional regression equation for each industry and year:

$$DISEXP_{it}/A_{it-1} = \alpha_0 + \alpha_1(1/A_{it-1}) + \beta_1(\Delta Sale_{it-1}/A_{it-1}) + \varepsilon_{it} \qquad (9)$$

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[14] Roychowdhury (2006) asserts that "if firms manage sales upward to increase reported earnings in any year, they can exhibit unusually low residuals from the above regression in that year, even when they do not reduce discretionary expenses."

where $DISEXP_{it}$ = the discretionary expenses of firm i at period t, and $\Delta Sale_{it-1}$ = the change in sales revenue of firm i at period t-1. The abnormal discretionary expenses measure ($TEMDISX$) is equal to actual discretionary expenses minus the normal level of discretionary expenses as estimated in Equation (9).

Similarly, following Roychowdhury (2006), we first model normal cost of goods sold as a linear function of contemporaneous sales on cost of goods sold:

$$COGS_{it}/A_{it-1} = \alpha_0 + \alpha_1(1/A_{it-1}) + \beta_1(Sale_{it}/A_{it-1}) + \varepsilon_{it} \tag{10}$$

where $COGS_{it}$ = the cost of goods sold of firm i at period t, and other variables are as defined previously. Next, we estimate the model of normal inventory growth as a linear function of contemporaneous sales and lagged change in sales:

$$\Delta INV_{it}/A_{it-1} = \alpha_0 + \alpha_1(1/A_{it-1}) + \beta_1(\Delta Sale_{it}/A_{it-1}) + \beta_2(\Delta Sale_{it-1}/A_{it-1}) + \varepsilon_{it} \tag{11}$$

where ΔINV_{it} = the change in inventory of firm i at period t; and other variables are as defined previously. Because production costs are the sum of cost of goods sold and inventory growth, the normal production costs function can be estimated by the following industry-year regression:

$$PROD_{it}/A_{it-1} = \alpha_0 + \alpha_1(1/A_{it-1}) + \beta_1(Sale_{it}/A_{it-1}) + \beta_2(\Delta Sale_{it}/A_{it-1}) + \beta_3(\Delta Sale_{it-1}/A_{it-1}) + \varepsilon_{it} \tag{12}$$

where $PROD$ is the sum of cost of goods sold and inventory growth of firm i at period t; and other variables are as defined previously. The abnormal production costs ($TEMPROD$) are the difference between actual production costs and normal production costs.

Finally, we calculate real-activities earnings management, $TEMR$, by multiplying the sum of $TEMOCF$ and $TEMDISX$ by -1, and then adding $TEMPROD$. Larger $TEMR$ values relate to greater magnitudes of real-activities earnings management.

3.3.4. Abnormal ERM index

Hoyt and Liebenberg (2011) indicate that the firm should identify its risk when performing business activities and modify ERM based on the firm's industrial environment. We adopt a two-stage regression to measure the abnormal ERM index ($ABERM$), which proxies for ERM effectiveness. The first stage estimates the coefficients of the following model:

$$ERMind_{it} = a_0 + a_1EUn_{it} + a_2ICompe_{it} + a_3SIZE_{it} + a_4FCom_{it} + a_5BDM_{it} + e_{it} \tag{13}$$

where $ERMind_{it}$ denotes the comprehensive index of ERM,[15] EUn_{it} denotes environmental uncertainty,[16] $ICompe_{it}$ is industry competition,[17] $SIZE_{it}$ is firm size,[18] $FCom_{it}$ denotes firm's complexity,[19] BDM_{it} denotes board monitoring,[20] and subscripts i and t represent the firm and time period, respectively. We estimate the coefficients by applying the Gordon et al. (2009) method that controls for the five contingency variables based on best-practice firms (i.e., firms with excess market return).

In the second stage, we estimate the following regression using the coefficients obtained from the first stage in Equation (14):

$$PERMind_{it} = \hat{a}_0 + \hat{a}_1EUn_{it} + \hat{a}_2ICompe_{it} + \hat{a}_3SIZE_{it} + \hat{a}_4FCom_{it} + \hat{a}_5BDM_{it} \tag{14}$$

where $PERMind_{it}$ measures the proposed best ERM fit determined by normal levels, and other variables are as defined previously. We generate the absolute value of abnormal enterprise risk management ($ABERM$) using the coefficient estimates derived from the best practice firm estimation as follows in Equation (15). Larger $ABERM$ values imply poor ERM characteristics.

$$ABERM_{it} = |ERMind_{it} - PERMind_{it}| \tag{15}$$

3.3.5. ERM index

We incorporate the four objectives (strategy, operations, reporting, and compliance) as stated by COSO (2004) and defined by Gordon et al. (2009) to estimate an ERM index ($ERMind$). The model is specified as follows:

$$ERMind = \sum_{k=1}^{2} Strat_k + \sum_{k=1}^{2} Opera_k + \sum_{k=1}^{2} Rport_k + \sum_{k=1}^{2} Compl_k \tag{16}$$

where $Strat$ represents competitive advantage, $Opera$ represents operation efficiency, $Rport$ represents report reliability, and $Compl$ represents compliance with auditing standards. We utilize two proxies to measure each of the four objectives, and we standardize each

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[15] We define the comprehensive ERM measure as the sum of variables representing competitive advantage, operational efficiency, report reliability, and compliance with auditing standards.

[16] The measurement of environmental uncertainty follows Kren (1992) and is based on market, technological, and profit factors.

[17] We measure industry competition using market share. Higher industry concentration implies that firms within that industry face higher competition.

[18] Firm size is represented by the natural logarithm of total assets. This study does not select market value as the proxy for firm size since we measure firm performance using stock price information.

[19] We measure firm complexity based on Markarian and Parbonetti (2007), using the invested capital to assets ratio as our proxy for the intricacy of firm operations.

[20] We use the number of directors for each firm divided by the natural logarithm of sales to measure board monitoring following Gordon et al. (2009).

of the eight proxies prior to aggregating them into our ERM index.[21] We describe the four objectives as well as our eight proxy measures in more detail below.

3.3.6. Competitive advantage (Strat)

When executing corporate strategy, firms attempt to develop a competitive advantage over participants in the same industry (Porter, 2008). All firms in a given industry compete for sales opportunities in the same market. Therefore, greater sales for firm i relative to the industry's average sales indicates that firm i outperforms its average competitors, which implies that firm i has strategically achieved a competitive advantage. We adopt two measures to proxy for whether a firm has developed a successful corporate strategy. The first measure is: $Strat_1=(Sales_i\text{-}IndSA_t)\div\sigma_{SALEt}$, where $Sales_i$ denotes the sales of firm i, $IndSA_t$ denotes average sales in the same industry, and σ_{SALEt} denotes the standard deviation of the sales for all firms in the same industry. The second measure is $Strat_2=(\Delta\beta_i\text{-}\mu_{\Delta\beta})\div\sigma_{\Delta\beta}$, where β_i denotes the beta of firm i, $\mu_{\Delta\beta}$ denotes average change of beta for all firms in the same industry, and $\sigma_{\Delta\beta}$ denotes the standard deviation of the change of beta for the industry.

3.3.7. Operation efficiency (Opera)

Operating efficiency improves when greater output results from a given amount of input or when the same level of output results using less input. Greater operating efficiency can mitigate a firm's overall risk of failure and increase operating performance. Our first proxy for operation efficiency is asset turnover, defined as earnings before interest and tax ($EBIT_{it}$) divided by the year-end total assets (TA_{it}). Our second proxy is an input–output ratio from operations, defined as earnings before interest and tax ($EBIT_{it}$) divided by the number of employees.

3.3.8. Report reliability (Rport)

We use two measures to proxy for report quality. Following Johnson, Khurana, and Reynolds (2002), we use the absolute value of abnormal accruals as our first proxy for financial reporting quality.[22] This measure is the absolute value of normal accruals divided by the sum of the absolute value of normal and abnormal accruals. That is, $Rport = |NormaAccr_{it}|/(|NormaAccr_{it}| + |AbnorAccr_{it}|)$, which suggests that higher values for $Rport$ indicate better financial reporting quality. We employ the modified cross-sectional Jones model (Jones, 1991) to measure abnormal accruals for the first proxy. Following Gordon et al. (2009), our second proxy for financial reporting quality is the aggregation of the following three readily observed variables: internal control material weaknesses, reporting restatements, and qualified auditor opinions. When firms have announced internal control material weaknesses, reporting restatements, and/or qualified auditor opinions, we set this measure as −1, and 0 otherwise. Therefore, the range for our second reporting quality proxy is from −3 to 0.

3.3.9. Compliance with auditing standards (Compl)

Prior studies indicate that industry-specialist auditors are associated with higher quality audit performance and lower discretionary accruals, the implication of which is better compliance with auditing standards. Therefore, we use the degree to which industry-specialist auditors participate in the firm's auditing process, measured by the market share of auditors in the industry, as our first compliance proxy. Following Hogan and Jeter (1999), we calculate the market share as follows: $MS_{ik} = \sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}/\sum_{i=1}^{K_i} \sum_{j=1}^{J_{ik}} \sqrt{A_{ijk}}$, where MS_{ik} is the market share of the kth accounting firm in industry i, i represents the industry of the audited firm, j represents the audited firm, k represents the accounting firm, K_i = the number of accounting firms in industry i, and A_{ijk} = the total assets of firm j audited by the kth accounting firm in industry i. Additionally, we use a second proxy for compliance with auditing standards. Our second measure of compliance is the settlement net gain (loss) scaled by total assets.

4. Empirical results

4.1. Descriptive statistics and correlation

Table 2 summarizes descriptive statistics for the 6667 firm-year observations listed on the TWSE with available data. The respective means of *DEBF*, *EQUIF* and *XFIN* for these sample firms are −0.006, −0.030 and −0.036, respectively. The negative mean of all financing variables indicates that our sample displays net cash outflows in financing activities during the sample period. Means for the firm characteristic variables *SIZE*, *ROA*, *MBR*, and *DEBR* are 15.750, 0.043, 1.651, and 0.415, respectively. Statistically, *DEBR* shows that the capital structure breakdown between debt and equity financing on average for our sample firms is approximately 40% debt and 60% equity. This is the most common business model in the Taiwanese capital market. In addition, the distributions of *TEMAR* show that approximately 66.30% of the sample firms manage earnings using real activities, accruals, or both earnings management methods simultaneously. Finally, the mean of our abnormal ERM measure is 1.976, which indicates the average adjustment according to

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[21] Cohen, Krishnamoorthy, and Wright (2004) indicate that illegal earnings management, financial restatements, and financial fraud are the evidence of poor financial reporting quality. Gordon et al. (2009) also argue that poor financial reporting quality should increase a firm's overall risk of failure, and thus decrease its performance and value. Meanwhile, regulation compliance implies increased compliance with applicable laws and regulations lower firm's overall risk of failure (COSO, 2004) or risk of lawsuit (Shavell, 1982). Therefore, our paper includes these two concepts in the construction of the ERM index.

[22] Johnson et al. (2002) note that the use of absolute values for reporting reliability depends on whether there is an a priori expectation regarding the direction of managerial incentives.

Table 2
Descriptive statistics.

Panel A: Sample for regression analysis					
	25%	50%	75%	Mean	Stan. Deviation
DEBF	−0.059	−0.006	0.042	−0.006	0.122
EQUIF	−0.051	−0.024	−0.005	−0.030	0.066
XFIN	−0.104	−0.041	0.019	−0.036	0.142
SIZE	14.722	15.551	16.562	15.750	1.466
ROA	0.015	0.045	0.079	0.043	0.153
MBR	0.890	1.270	1.900	1.651	1.608
DEBR	0.284	0.419	0.538	0.415	0.173
TEMR	0.000	0.000	1.000	0.493	0.500
TEMA	0.000	0.000	1.000	0.493	0.500
TEMAR	0.000	1.000	1.000	0.663	0.473
ABERM	0.703	1.476	2.518	1.976	2.445
Panel B: Sample for 8 indicators of ERM index					
	25%	50%	75%	Mean	Stan. Deviation
Strat1	−0.243	−0.143	−0.039	0.126	1.261
Strat2	−0.591	−0.029	0.540	−0.012	0.900
Opera1	−0.584	−0.180	0.362	0.015	1.003
Opera2	−0.363	−0.254	0.010	0.031	1.148
Rport1	0.226	0.226	0.226	0.007	0.957
Rport2	0.028	0.036	0.042	0.017	0.205
Compl1	−0.635	−0.635	1.575	0.042	1.019
Compl2	−0.023	−0.023	−0.023	−0.009	0.852

Note:
1. Variable definitions:DEBF: net cash flows from debt financing activities. EQUIF: net cash flows from equity financing activities. XFIN: net cash flows from external financing activities. SIZE: firm size (taking log of total assets). ROA: returns on assets; MBR: market to book ratio. DEBR: debt/total assets. TEMR: an indicator variable that is equal to 1 if firm's real-activities earnings management is larger than median of industry and 0 otherwise. TEMA: an indicator variable that is equal to 1 if firm's accrual-based earnings management is larger than firms' median of industry and 0 otherwise. TEMAR: an indicator variable that is equal to 1 if firm's real-activities earnings management is larger than median of industry or accrual-based earnings management is larger than firms' median of industry and 0 otherwise. ABERM: abnormal ERM index, which is absolute value of abnormal ERM. Strat1: successful strategy 1 measure based on sales opportunities in the same market. Strat2: successful strategy 2 measure based on firm's ability to reduce systematic risk. Opera1: the turnover of assets. Opera2: input–output ratio from operations. Rport1: the combination of internal control material weakness, qualified auditor opinion, and restatement. Rport2: the relative proportion of the absolute value of normal accruals divided by the absolute value of total accrual. Compl1: the industry expert of auditor. Compl2: the settlement net gains (losses) over total assets.
2. From Panel B, we find that Strat1, based on sales opportunities in the same market, has a higher variation and mean in constructing the ERM index.

contingence factors for this measure.

Table 3 reports the correlations among our main external financial policy, firm characteristic, earnings management method, and enterprise risk management variables. There is a significant negative correlation between external financial policy and ROA, regardless of whether a firm seeks debt or equity financing. Further, there is a significant positive relationship between the external equity financing variable and TEMAR. This relationship suggests that firms manage earnings using both real activities and accruals when implementing their external equity financial policy. Finally, TEMR is positively related to TEMA, implying that firms simultaneously engage in real-activities and accrual-based earnings management, which is consistent with the inference made by Cohen and Zarowin (2010).

In summary, the univariate analysis indicates that firms simultaneously engage in accrual-based earnings management and real-activities earnings management when conducting external equity financing activities. Given that managers have an incentive to manage earnings upward when raising external financing in the equity market, this evidence is consistent with the earnings management hypothesis. Next, we investigate which types of earnings management are chosen by managers when a firm implements external debt and equity financing activities, as well as the potential mediating role of ERM in this relationship, in a multivariate regression setting.

4.2. Regression results

As described previously, we use a two-stage model to investigate whether firms choose real-activities or accrual-based earnings management when engaging in external financing activities as well as implementing ERM. In the first stage, we estimate a parsimonious selection model to clarify a firm's earnings management decision. Using estimated results from the first stage, we investigate whether a firm's external financing activities and the existence of an ERM system affect the choice of earnings management methods in the second stage of the analysis.

We present the results from the two-stage model in Tables 4 and 5. Table 4 Panel A depicts the selection model that clarifies the earnings management decision. As mentioned above, we include incentives that drive managers to engage in earnings management in the model. Panel B of Table 4 portrays results relating to firms' earnings management method preferences when engaging in external financing activities. We find that external financing activities generally are not significantly associated with increased engagement in real-activities earnings management, but they are negatively and significantly associated with accrual-based earnings management.

Table 3
Pearson correlation coefficients.

	DEBF	EQUIF	XFIN	SIZE	ROA	MBR	DEBR	TEMR	TEMA	TEMAR	ABERM
DEBF	1.000										
EQUIF	0.060	1.000									
	(0.000)										
XFIN	0.887	0.513	1.000								
	(0.000)	(0.000)									
SIZE	−0.087	−0.073	−0.109	1.000							
	(0.000)	(0.000)	(0.000)								
ROA	−0.074	−0.327	−0.215	0.121	1.000						
	(0.000)	(0.000)	(0.000)	(0.000)							
MBR	−0.054	−0.006	−0.050	−0.001	−0.139	1.000					
	(0.000)	(0.624)	(0.000)	(0.956)	(0.000)						
DEBR	−0.118	0.203	−0.007	0.362	−0.150	0.042	1.000				
	(0.000)	(0.000)	(0.563)	(0.000)	(0.000)	(0.001)					
TEMR	−0.052	0.184	0.040	0.081	−0.139	−0.146	0.276	1.000			
	(0.000)	(0.000)	(0.001)	(0.000)	(0.000)	(0.000)	(0.000)				
TEMA	−0.082	0.095	−0.027	−0.036	−0.005	−0.067	0.052	0.319	1.000		
	(0.000)	(0.000)	(0.027)	(0.003)	(0.675)	(0.000)	(0.000)	(0.000)			
TEMAR	−0.048	0.157	0.031	0.020	−0.094	−0.110	0.155	0.703	0.703	1.000	
	(0.000)	(0.000)	(0.011)	(0.106)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)		
ABERM	0.045	0.087	0.079	0.148	−0.086	0.076	0.152	0.090	0.012	0.061	1.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.332)	(0.000)	

Note:
1. Variable definitions:DEBF: net cash flows from debt financing activities. EQUIF: net cash flows from equity financing activities. XFIN: net cash flows from external financing activities. SIZE: firm size (taking log of total assets). ROA: returns on assets. MBR: market to book ratio. DEBR: debt/total assets. TEMR: an indicator variable that is equal to 1 if firm's real-activities earnings management is larger than median of industry, and 0 otherwise. TEMA: an indicator variable that is equal to 1 if firm's accrual-based earnings management is larger than median of industry and 0 otherwise. TEMAR: an indicator variable that is equal to 1 if firm's real-activities earnings management is larger than median of industry or accrual-based earnings management is larger than median of industry, and 0 otherwise. ABERM: abnormal ERM index, which is absolute value of abnormal ERM.
2. Values in parentheses are p values.

However, when disaggregating external financing activities into equity and debt components, our findings indicate that firms manage earnings using both real activities and accruals when implementing external equity financing. Moreover, our results also suggest that managers prefer to use less real-activities and accrual-based earnings management when firms engage in external debt financing activities. A possible explanation for these findings is that firm attributes that affect external financing decisions also affect earnings management decisions. For instance, firms with riskier operations that have higher costs of capital may prefer equity to debt financing and thus manage earnings by any means necessary. This evidence implies that external financing activities are strongly associated with earnings management decisions, which supports our first hypothesis.

Cohen and Zarowin (2010) indicate that using an aggregate measure of real-activities earnings management can dilute results that would be observed by using separate components of earnings management. Therefore, we disaggregate real-activities earnings management into three component activities: sales manipulation (*TEMOCF*), reduction of discretionary expenditures (*TEMDISX*), and overproduction of inventory to report lower COGS (*TEMPROD*). Compared to Panel B in Table 4, Table 5 shows the results for the association between external financing activities and the three components of real-activities earnings management. The results indicate that firms engaging in external financing activities generally prefer to manipulate sales, while firms seeking external equity financing in particular use both sales and overproduction of inventory to manipulate earnings. The evidence also shows that firms engaging in external debt financing activities prefer to manipulate earnings by reducing discretionary expenditures. In summary, evidence in Table 5 is consistent with that reported in Table 4 and supports our first hypothesis, indicating that external financing activities affect earnings management preferences, particularly those related to specific real-activities manipulations.

Panel A in Table 6 reports the results of estimating Equation (3). We find that the absolute abnormal ERM measurement (*ABERM*) is positively associated with *TEMR*, suggesting that managers increase their use of real-activities earnings management when the ERM system in place is relatively weak. Roychowdhury (2006) indicates that real-activities earnings manipulations depart from normal operational practices, and these departures do not necessarily contribute to firm value. Accordingly, our evidence is consistent with the notion that a weaker ERM environment, which implies a poor control system, allows managers the flexibility to adopt real-activities earnings management schemes, potentially reducing firm value as a consequence. These results support hypothesis H2a that ERM mitigates the use of real-activities earnings management. However, there is no association between *ABERM* and *TEMA*, implying that ERM cannot effectively restrain accrual-based earnings manipulations. Therefore, our results do not support hypothesis H2b.

Panel B of Table 6 shows the results of estimating Equation (4). Findings with respect to the external financing variables are consistent with those from Panel B of Table 4. Additionally, *ABERM* is significantly and positively associated with *TEMR*, suggesting that a weaker ERM control environment is more likely to induce managers to utilize real activities to manage earnings. Further, the interaction term (*XFIN* × *ABERM*) has a significantly negative coefficient for earnings management using real-activities. This evidence indicates that firms with weaker ERM systems reduce real-activities earnings management when engaging in external financing activities generally. Disaggregating external financing activities, we find that the interaction term (*EQUIF* × *ABERM*) is significantly

Table 4
Two-stage regression for earnings management preference and external financing.

Panel A: First Stage, Dependent variable = TEMAR

	Coef.	z	P
ROA	−1.403	−4.01	0.000
DEBR	1.428	8.67	0.000
SIZE	−0.010	−0.43	0.668
MBR	−0.100	−5.49	0.000
CONS	0.116	0.28	0.781
Year	include		
Ind	include		
LR $\chi2$	193.76		
Pseudo R^2	0.053		

Panel B: Second Stage – Earnings Management and External Financing

	TEMR				TEMA			
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
XFIN	0.049				−0.334			
	(0.34)				(−2.54)			
EQUIF		2.161		2.224		1.632		1.822
		(4.48)		(4.71)		(4.54)		(5.51)
DEBF			−0.471	−0.547			−0.846	−0.928
			(−3.37)	(−3.82)			(−5.23)	(−5.57)
IMR	−2.914	−2.726	−2.907	−2.708	−0.666	−0.446	−0.620	−0.407
	(−13.00)	(−12.16)	(−13.04)	(−12.06)	(−5.88)	(−3.97)	(−5.54)	(−3.58)
CONS	1.580	1.524	1.562	1.502	0.269	0.197	0.239	0.158
	(6.73)	(6.52)	(6.67)	(6.45)	(1.22)	(0.89)	(1.09)	(0.72)
Year	include	include	include	included	include	included	include	included
Ind	include	include	include	included	include	included	include	included
LR $\chi2$	193.119	220.597	192.216	232.445	45.518	56.165	68.609	101.437
Pseudo R^2	0.100	0.106	0.101	0.108	0.007	0.010	0.011	0.016

Note:
1. Variable definitions: TEMAR: an indicator variable that is equal to 1 if firm's real-activities earnings management is larger than median of industry or accrual-based earnings management is larger than median of industry and 0 otherwise. ROA: returns on assets. DEBR: debt/ total assets. SIZE: firm size (taking log of total assets). MBR: market to book ratio. TEMR: an indicator variable that is equal to 1 if firm's real-activities earnings management is larger than median of industry and 0 otherwise. TEMA: an indicator variable that is equal to 1 if firm's accrual-based earnings management is larger than median of industry and 0 otherwise; XFIN: net cash flows from external financing activities; EQUIF: net cash flows from equity financing activities; DEBF: net cash flows from debt financing activities.
2. Values in parentheses are z values. The significance level is 10% when absolute value of z is larger than 1.65, the significance level is 5% when absolute value of z is larger than 1.96, and the significance level is 1% when absolute value of z is larger than 2.58.

Table 5
The second stage regression for real earnings management components and external financing.

	TEMOCF				TEMDISX				TEMPROD			
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
XFIN	0.252				−0.001				−0.373			
	(1.73)				(−0.01)				(−2.87)			
EQUIF		4.401		4.452		−1.310		−1.371		1.935		2.072
		(8.61)		(8.61)		(−2.59)		(−2.71)		(4.11)		(4.57)
DEBF			−0.507	−0.608			0.333	0.398			−0.966	−1.052
			(−3.24)	(−3.76)			(2.88)	(3.52)			(−6.65)	(−6.96)
IMR	−2.695	−2.339	−2.693	−2.315	−0.889	−1.042	−0.897	−1.060	−2.959	−2.734	−2.916	−2.712
	(−13.58)	(−11.84)	(−13.56)	(−11.67)	(−5.01)	(−5.59)	(−5.01)	(−5.65)	(−13.24)	(−12.64)	(−13.30)	(−12.48)
Cons.	1.464	1.352	1.439	1.325	0.413	0.469	0.425	0.487	1.583	1.521	1.553	1.486
	(4.45)	(4.20)	(4.38)	(4.12)	(1.07)	(1.22)	(1.10)	(1.26)	(6.21)	(5.99)	(6.14)	(5.90)
Year	include	include	include	include	include	include	include	include	include	include	include	include
Ind	include	include	include	include	include	include	include	include	include	include	include	include
LR $\chi2$	220.979	350.955	211.030	357.274	27.336	35.148	33.070	45.826	188.391	216.687	209.019	244.917
Pseudo R^2	0.089	0.108	0.090	0.110	0.011	0.014	0.012	0.015	0.102	0.106	0.106	0.112

Note:
1. Variable definitions: TEMOCF: an indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal CFO is larger than median of industry and 0 otherwise. TEMDISX: an indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal discretionary expenses is larger than median of industry and 0 otherwise. TEMPROD: an indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal production costs is larger than median of industry, and 0 otherwise; XFIN: net cash flows from external financing activities; EQUIF: net cash flows from equity financing activities; DEBF net cash flows from debt financing activities.
2. Values in parentheses are z values. The significance level is 10% when absolute value of z is larger than 1.65, the significance level is 5% when absolute value of z is larger than 1.96, and the significance level is 1% when absolute value of z is larger than 2.58.

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Table 6
The second stage regressions earnings management preference and ERM.

Panel A: Earnings Management and ERM

	TEMR			TEMA		
	Coef.	z	P	Coef.	z	P
ABERM	**0.039**	**3.29**	**0.001**	0.003	0.44	0.657
IMR	**−2.881**	**−13.04**	**0.000**	**−0.632**	**−5.65**	**0.000**
CONS	**1.471**	**6.21**	**0.000**	0.258	1.16	0.246
Year	include			include		
Ind	include			include		
LR χ2	198.52			39.43		
Pseudo R^2	0.103			0.006		

Panel B: Earnings Management and External Financing Interacted with ERM

	TEMR				TEMA			
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
XFIN	0.130				**−0.379**			
	(0.78)				(−2.52)			
EQUIF		**2.708**		**2.856**		**1.596**		**1.762**
		(5.25)		(5.57)		(3.89)		(4.56)
DEBF			**−0.444**	**−0.641**			**−0.925**	**−0.978**
			(−2.86)	(−3.92)			(−5.08)	(−5.24)
ABERM	**0.042**	**0.040**	**0.042**	**0.040**	0.003	0.001	0.003	0.001
	(3.20)	(3.08)	(3.20)	(3.15)	(0.39)	(0.08)	(0.36)	(0.13)
XFIN × ABERM	**−0.040**				0.012			
	(−1.66)				(0.63)			
EQUIF × ABERM		**−0.242**		**−0.287**		0.015		0.019
		(−2.09)		(−2.28)		(0.25)		(0.26)
DEBF × ABERM			−0.020	0.044			0.023	0.014
			(−0.94)	(1.45)			(0.97)	(0.55)
IMR	**−2.869**	**−2.675**	**−2.864**	**−2.658**	**−0.667**	**−0.447**	**−0.619**	**−0.411**
	(−12.86)	(−11.96)	(−12.92)	(−11.88)	(−5.87)	(−3.95)	(−5.53)	(−3.59)
CONS	**1.459**	**1.409**	**1.443**	**1.389**	0.262	0.196	0.232	0.157
	(6.13)	(5.93)	(6.09)	(5.89)	(1.18)	(0.88)	(1.05)	(0.71)
Year	include	include	include	include	include	include	include	include
Ind	include	include	include	include	include	include	include	include
LR χ2	206.504	251.017	206.519	268.406	46.353	58.172	71.235	106.533
Pseudo R^2	0.103	0.111	0.105	0.113	0.007	0.010	0.011	0.016

Note:
1. Variable definitions: TEMR: an indicator variable that is equal to 1 if firm's real-activities earnings management is larger than median of industry and 0 otherwise. TEMA: an indicator variable that is 1 if firm's accrual-based earnings management is larger than median of industry and 0 otherwise. ABERM: abnormal ERM index, which is absolute value of abnormal ERM. XFIN: net cash flows from external financing activities. EQUIF: net cash flows from equity financing activities. DEBF: net cash flows from debt financing activities.
2. Values in parentheses are z values. The significance level is 10% when absolute value of z is larger than 1.65, the significance level is 5% when absolute value of z is larger than 1.96, and the significance level is 1% when absolute value of z is larger than 2.58.

negative for earnings management using real-activities. This suggests that weaker ERM environments have an impact on earnings management preferences when firms engage in external equity financing activities. However, the result is contrary to our expectation, implying that, when firms seek external equity financing, investors compensate by scrutinizing more rigorously to constrain managers from manipulating earnings using real activities when they perceive that the ERM system is weaker. Moreover, we find that the interaction term (*DEBF × ABERM*) is not significant in our model. This implies that a weaker ERM environment does not moderate earnings management, using real activities or accruals, when firms engage in external debt financing activities.

Panel A in Table 7 shows the results from testing the relationship between ERM and the three components of real-activities earnings management. Our findings indicate that firms with poor ERM performance have a preference for manipulating earnings using all three components of real-activities earnings management. This evidence is consistent with evidence in Table 6 and supports our hypothesis H2a. Moreover, Panel B in Table 7 shows the results for testing the association between the interaction of external financing activities and ERM and the three real-activities earnings management activities. Results are consistent with those in Panel B of Table 6. Specifically, for firms with weaker ERM mechanisms that engage in external equity financing activities, the significant negative association with *TEMR* is driven by manipulating discretionary expense (*TEMDISX*) and inventory overproduction (*TEMPROD*).

4.3. Supplemental analyses

Corporate governance is not only a useful monitoring system for improving firm performance but also valuable as a control mechanism between principals and agents (Gompers, Ishii, & Metrick, 2003). Therefore, we include a corporate governance control

Table 7
The second stage regressions for real earnings management preference and ERM.

Panel A: Real Earnings Management Components and ERM

	TEMOCF			TEMDISX			TEMPROD		
	Coef.	z	p value	Coef.	z	p value	Coef.	z	p value
ABERM	0.034	3.45	0.001	0.037	3.22	0.000	0.057	4.87	0.000
IMR	−2.682	−13.55	0.000	−0.855	−4.81	0.000	−2.883	−13.33	0.000
CONS	1.369	4.16	0.000	0.312	0.80	0.000	1.433	5.52	0.000
Year	include			include			include		
Ind	include			include			include		
LR χ2	209.977			37.189			213.757		
Pseudo R^2	0.091			0.014			0.107		

Panel B: Real Earnings Management Components and External Financing Interacted with ERM

	TEMOCF				TEMDISX				TEMPROD			
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
XFIN	0.200				0.137				−0.308			
	(1.26)				(1.09)				(−2.10)			
EQUIF		4.475		4.642		−0.441		−0.469		2.570		2.823
		(7.93)		(7.74)		(−0.70)		(−0.75)		(5.11)		(5.51)
DEBF			−0.643	−0.748			0.497	0.525			−0.948	−1.204
			(−3.75)	(−3.86)			(3.95)	(4.10)			(−5.91)	(−6.86)
ABERM	0.033	0.030	0.033	0.029	0.044	0.041	0.043	0.041	0.064	0.061	0.063	0.059
	(3.17)	(2.97)	(3.20)	(2.92)	(3.72)	(3.57)	(3.61)	(3.68)	(5.17)	(4.94)	(5.04)	(5.07)
XFIN × ABERM	0.006				−0.059				−0.041			
	(0.36)				(−3.22)				(−1.88)			
EQUIF × ABERM		−0.073		−0.143		−0.499		−0.521		−0.296		−0.361
		(−0.88)		(−1.29)		(−2.91)		(−3.02)		(−2.51)		(−2.72)
DEBF × ABERM			0.036	0.048			−0.063	−0.054			−0.025	0.066
			(1.68)	(1.39)			(−2.77)	(−1.96)			(−1.00)	(2.03)
IMR	−2.674	−2.316	−2.675	−2.295	−0.835	−0.996	−0.849	−1.016	−2.906	−2.680	−2.864	−2.662
	(−13.44)	(−11.65)	(−13.45)	(−11.49)	(−4.74)	(−5.43)	(−4.76)	(−5.51)	(−13.07)	(−12.47)	(−13.13)	(−12.33)
CONS.	1.377	1.271	1.354	1.247	0.285	0.352	0.302	0.373	1.410	1.360	1.384	1.331
	(4.19)	(3.94)	(4.12)	(3.87)	(0.73)	(0.90)	(0.77)	(0.95)	(5.40)	(5.23)	(5.34)	(5.17)
Year	include	include	include									
Ind	include	include	include									
LR χ2	222.257	355.724	219.577	367.218	42.939	61.232	50.206	75.740	223.803	266.889	243.219	295.081
Pseudo R^2	0.091	0.110	0.093	0.113	0.016	0.020	0.016	0.021	0.109	0.114	0.113	0.120

Note:
1. Variable definitions: TEMOCF: an indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal CFO is larger than median of industry and 0 otherwise. TEMDISX: an indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal discretionary expenses is larger than median of industry and 0 otherwise. TEMPROD: an indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal production costs is larger than median of industry and 0 otherwise. ABERM: abnormal ERM index is absolute value of abnormal ERM.
2. Values in parentheses are z values. The significanc level is 10% when absolute value of z is larger than 1.65, the significance level is 5% when absolute value of z is larger than 1.96, and the significance level is 1% when absolute value of z is larger than 2.58.

variable in our regression analyses as an alternative test to examine the impact of corporate governance on external financing and earnings management preferences. We measure corporate governance effectiveness using *GI*, a composite corporate governance index variable. To construct our measure, we adopt a principal component analysis (PCA) methodology to extract the first principal component. We estimate PCA coefficients and compute *GI* using the following equation, multiplied by −1, which implies that lower index values indicate stronger corporate governance performance:

$$GI = (0.4790 \times boardsize - 0.3078 \times managerialshareholdings + 0.1848 \times blockshareholders'holdings - 0.2767 \times boardindependence$$
$$+ 0.6946 \times institutionalshareholdings + 0.7274 \times pyramidstructure + 0.7063 \times cross-holdingstructure + 0.1654 \times CEOduality)$$
$$\times (-1)$$

(17)

where board size is the number of seats on the board of directors, managerial shareholdings is the shareholdings ratio of managers, block shareholders' holdings is the shareholdings ratio of block shareholders, board independence is the number of independent directors divided by the number of board seats, and institutional shareholdings is the shareholdings ratio of institutional shareholders. In addition, pyramid structure is set to 1 if the firm has a pyramid structure, cross-holding structure is set to 1 if the firm has cross-holdings, and CEO duality is set to 1 if the CEO is also the chairman of the board of directors. Otherwise, these indicator

Table 8

The second stage regressions for earnings management preference and GI.

Panel A: Earnings Management and GI

	TEMR			TEMA		
	Coef.	z	P	Coef.	z	P > z
GI	−0.063	−2.76	0.006	0.033	2.18	0.029
IMR	−2.937	−13.11	0.000	−0.631	−5.69	0.000
CONS	1.207	4.36	0.000	0.469	1.95	0.051
Year	include			include		
Ind	include			include		
LR χ2	193.32			44.86		
Pseudo R^2	0.1025			0.007		

Panel B: Earnings Management and External Financing Interacted with GI

	TEMR				TEMA			
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
XFIN	0.026				−0.866*			
	(0.05)				(−1.90)			
EQUIF		1.264		1.234		0.250		0.714
		(0.70)		(1.26)		(0.22)		(0.67)
DEBF			−0.707	−1.033			−1.658	−1.873
			(−1.47)	(−2.14)			(−3.18)	(−3.55)
GI	−0.063	−0.077	−0.062	−0.074	0.030	0.018	0.034	0.021
	(−2.74)	(−2.89)	(−2.74)	(−5.28)	(1.87)	(1.04)	(2.21)	(1.17)
XFIN × GI	−0.013				−0.137			
	(−0.10)				(−1.23)			
EQUIF × GI		−0.272		−0.388		−0.364		−0.297
		(−0.58)		(−1.52)		(−1.23)		(−1.05)
DEBF × GI			−0.064	−0.118			−0.206	−0.242
			(−0.54)	(−0.98)			(−1.64)	(−1.91)
IMR	−2.932	−2.724	−2.928	−2.405	−0.658	−0.430	−0.617	−0.392
	(−13.01)	(−12.18)	(−13.09)	(−24.37)	(−5.85)	(−3.84)	(−5.55)	(−3.45)
CONS	1.205	1.075	1.196	1.074	0.461	0.329	0.451	0.307
	(4.34)	(3.80)	(4.34)	(13.65)	(1.92)	(1.35)	(1.90)	(1.28)
Year	include	include	include	include	include	include	include	include
Ind	include	include	include	include	include	include	include	include
LR χ2	200.292	231.577	200.384	963.992	52.578	66.398	77.482	113.585
Pseudo R^2	0.103	0.110	0.104	0.104	0.008	0.011	0.012	0.017

Note:

1. Variable definitions: TEMR: an indicator variable that is equal to 1 if firm's real-activities earnings management is larger than median of industry and 0 otherwise. TEMA: an indicator variable that is 1 if firm's accrual-based earnings management is larger than median of industry and 0 otherwise. XFIN: net cash flows from external financing activities. EQUIF: net cash flows from equity financing activities. DEBF: net cash flows from debt financing activities. GI: composite corporate governance index.
2. Values in parentheses are z values. The significanc level is 10% when absolute value of z is larger than 1.65, the significance level is 5% when absolute value of z is larger than 1.96, and the significance level is 1% when absolute value of z is larger than 2.58.

variables are set to 0.

Panel A in Table 8 shows that GI is positively (negatively) associated with TEMA (TEMR). This indicates that a relatively poor corporate governance system significantly increases the ability of managers to manipulate earnings through discretionary accruals, which is consistent with our main variable inferences. Further, Panel B in Table 8 shows results indicating that, when firms engage in external financing activities, *GI* is not significantly related to real-activities earnings management preferences. However, *GI* does discourage managers from adopting accrual-based earnings management techniques when engaging in external debt financing activities.

Panel A of Table 9 reports results from testing the association between the corporate governance index measure and the three components of real-activities earnings management. We find that firms with weaker corporate governance environments, while using less real-activities manipulations generally, tend toward manipulating sales when they do choose to manage earnings using real activities. Further, results in Panel B indicate that the corporate governance effectiveness of firms that are engaged in external financing activities does not significantly moderate the choice to manipulate earnings using any of the three real activity techniques in our models.

Overall, our testing of ERM performance indicates that relatively weak ERM mechanisms encourage managers to deviate from conventional practice by undertaking real-activities earnings management, a potential consequence of which is the reduction in firm value. This evidence is highly relevant for monitoring agents of the firm, such as internal auditors, the Chief Risk Officer (CRO), and external auditors. Deviations from normal operating circumstances lead to higher probabilities of deficits, firm failures, and bankruptcies. Particularly after the Enron scandal and the global financial crisis, a healthy ERM can also be a strong mechanism for reforming fraudulent organizational activities. Furthermore, our results also suggest that an effective ERM control mechanism takes on the role of an important control mechanism with respect to earnings management decisions when firms exercise external financing activities. Given that external financing decisions are made in an asymmetric information context, investors and creditors are conceivably at less of an

Table 9
The second stage regressions for real earnings management preference and GI.

Panel A: Real Earnings Management Components and GI

	TEMOCF			TEMDISX			TEMPROD		
	Coef.	z	p value	Coef.	z	p value	Coef.	z	p value
GI	0.064	3.27	0.001	−0.158	−5.67	0.000	−0.098	−4.45	0.000
IMR	−2.704	−13.64	0.000	−0.925	−5.12	0.000	−2.960	−13.37	0.000
CONS	1.848	5.91	0.000	−0.540	−1.42	0.156	0.998	3.39	0.001
Year	include			include			include		
Ind	include			include			include		
LR χ2	217.04			62.91			200.70		
Pseudo R^2	0.091			0.030			0.108		

Panel B: Real Earnings Management Components and External Financing Interacted with GI

	TEMOCF				TEMDISX				TEMPROD			
	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.	Coef.
XFIN	0.290				0.063				−0.271			
	(0.61)				(0.13)				(−0.59)			
EQUIF		4.343		4.411		0.205		0.085		0.239		0.530
		(2.72)		(2.74)		(0.12)		(0.05)		(0.14)		(0.33)
DEBF			−0.707	−0.965			0.286	0.428			−0.806	−1.010
			(−1.38)	(−1.85)			(0.68)	(1.02)			(−1.64)	(−1.98)
GI	0.064	0.057	0.065	0.058	−0.159	−0.144	−0.159	−0.145	−0.096	−0.119	−0.097	−0.117
	(3.20)	(2.58)	(3.31)	(2.61)	(−5.61)	(−4.83)	(−5.68)	(−4.84)	(−4.30)	(−4.54)	(−4.40)	(−4.53)
XFIN × GI	0.016				0.001				0.017			
	(0.14)				(0.01)				(0.15)			
EQUIF × GI		0.002		0.006		0.375		0.361		−0.504		−0.461
		(0.00)		(0.02)		(0.88)		(0.85)		(−1.13)		(−1.06)
DEBF × GI			−0.048	−0.089			−0.023	−0.001			0.037	0.006
			(−0.38)	(−0.69)			(−0.22)	(−0.01)			(0.29)	(0.05)
IMR	−2.694	−2.342	−2.691	−2.318	−0.919	−1.083	−0.934	−1.102	−2.992	−2.731	−2.952	−2.710
	(−13.55)	(−11.85)	(−13.58)	(−11.71)	(−5.13)	(−5.84)	(−5.16)	(−5.91)	(−13.21)	(−12.44)	(−13.29)	(−12.30)
CONS	1.850	1.699	1.833	1.677	−0.542	−0.418	−0.532	−0.406	1.010	0.830	0.979	0.807
	(5.88)	(5.43)	(5.89)	(5.40)	(−1.43)	(−1.11)	(−1.40)	(−1.08)	(3.43)	(2.76)	(3.34)	(2.70)
Year	include				include				include			
Ind	include				include				include			
LR χ2	234.041	365.346	225.970	381.763	63.305	72.618	70.050	83.756	200.688	235.052	222.564	266.964
Pseudo R^2	0.092	0.110	0.093	0.113	0.030	0.033	0.031	0.034	0.109	0.114	0.113	0.120

Note:
1. Variable definitions: TEMOCF: an indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal CFO is larger than median of industry and 0 otherwise. TEMDISX: an indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal discretionary expenses is larger than median of industry and 0 otherwise. TEMPROD: indicator variable that is equal to 1 if firm's real-activities earnings management of abnormal production costs is larger than median of industry and 0 otherwise. GI: composite corporate governance index.
2. Values in parentheses are z values. The significance level is 10% when absolute value of z is larger than 1.65, the significance level is 5% when absolute value of z is larger than 1.96, and the significance level is 1% when absolute value of z is larger than 2.58.

information disadvantage with a strong ERM environment in place to restrict managers from manipulating earnings opportunistically to mislead external financial statement users. Therefore, our results are consistent with a vigorous ERM mechanism not only benefiting the firm's ability to monitor behavior and abnormal business performance internally, but also enhancing the reporting quality of the firm's economic condition to investors and creditors.

5. Conclusion

According to the earnings management hypothesis, managers manipulate earnings upwards to mislead investors into believing that the firm has better operational performance and a higher value than it actually does by engaging in earnings management prior to implementing financing policies. Once the earnings management is reversed, the firm's deteriorating operational performance forces investors to reconsider the value of the firm, thus imposing negative investment returns on investors. This study explores whether such external financing anomalies are associated with the managers' use of earnings management strategies and whether the choice of an earnings management strategy is affected by the presence and effectiveness of an ERM structure.

In 2004, the Committee of Sponsoring Organizations of the Treadway Commission (COSO) issued its integrated framework for ERM, which depicts key concepts for managing organizational risk and connects this structure with business strategy and objective setting such that it stresses the importance of daily managerial decision making, control, and accountability (Arena, Arnaboldi, & Azzone, 2010). The innovative ERM system concept incorporates not only internal controls but also risk management. Under such a framework, ERM is expected to improve performance and create firm value by reducing overall risk that deviates from normal operating conditions

or is likely to result in firm failure. Although COSO's ERM framework has been popular in the U.S. since its issuance, it is a relatively new development in the Taiwanese capital market. Therefore, our research provides a pertinent investigation by constructing an ERM index using Taiwanese data and a contingency perspective, and by applying this measure in the context of managerial decision making and business practice.

Our findings provide vital implications for regulators and are also valuable to researchers, managers, and other financial statement users. The results show that with respect to external equity financing activities, managers prefer to simultaneously employ real-activities and accrual-based earnings management techniques. However, when engaging in external debt financing activities, managers reduce their use of earnings manipulations using real activities or accruals. Regarding the effect of the external equity financing activities, our findings echo the results from previous studies investigating earnings management around SEOs in that managers use both accrual-based and real-activities earnings management strategies prior to SEO issuances. However, we are the first study to find that managers reduce earnings manipulations using both real activities and accruals when firms engage in external debt financing. In addition, we find that firms with weaker ERM environments prefer to use real-activities earnings management. That is, less effective ERM can drive managers to engage in speculative earnings management based in real activities. Finally, when simultaneously considering external financing activities and ERM, this paper finds that managers prefer to use less real-activities earnings management when firms engage in external equity financing. This contrasts with the result that managers prefer to manipulate real activities (along with accruals) while engaged in equity financing activities when ERM is not considered. Therefore, interestingly, with respect to external equity financing activities when an ERM system is in place, our findings indicate that managers are driven to change their earnings management decision-making preferences.

This paper also investigates the decomposition of real-activities earnings management strategies into three distinct activities (Cohen & Zarowin, 2010). We find that managers prefer to increase sales and overproduce inventory when engaged in equity financing, while they tend to manipulate discretionary expenses when engaged in debt financing activities. Hence, combined with evidence indicating that ERM performance affects real-activities earnings management preferences, we also find that ERM effectiveness affects such strategy preferences when firms are engaged in equity and debt financing activities, which is consistent with and enhances our main findings.

In supplemental analyses, we consider corporate governance as an alternative moderating mechanism in the relationship between earnings management and external financing activities. The paper expectedly finds that weaker corporate governance systems increase the manipulation of earnings by accrual-based means. In addition, our corporate governance effectiveness measure does not significantly moderate the relationship between real-activities earnings management preferences and external financing activities. While considering that the corporate governance index variable does not completely replicate our main, ERM-based, results, our findings when considering both variables as alternative moderating structures are consistent in that the relative strength of both frameworks can significantly affect the relationship between earnings management preferences and external financing activities.

Our evidence does come with some qualifications. Primarily, ERM factors are used in firm's decision making on a regular basis, and this study can only assume that firms in the same industry should have similar ERM policies. Another limitation is that this study cannot necessarily clearly determine the success or failure of the implementation of an ERM system. Additionally, as in previous research, measurement errors inherent to estimating the earnings management measures we use in this study suggest that we use caution in interpreting our results.

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