The Effects of Earnings Quality and Leverage Deficit on Financing Policy

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Abstract

The paper examines the relationship between earnings quality and leverage deficit, as well as the impact of earnings quality on equity financing choice for under- and over-leveraged firms. Considering external financing and its components, equity and debt, and both accrual-based and real earnings management, we further examine the effect of earnings quality and leverage deficit on financing choice and activities.

The results show that the firm with leverage deficits has a higher earnings quality. The under-leveraged firm with worse earnings quality and the over-leveraged firm with better earnings quality tend to choose equity financing. Moreover, the firm prefers to engage in real earnings management before external financing or debt financing, but the firm tends to conduct accrual-based earnings management before choosing equity financing. Compared with the under-leveraged firm, the over-leveraged firm has more difficulty engaging in real earnings management before debt financing choice and activities; however, the over-leveraged firm has more difficulty engaging in accrual-based earnings management before choosing equity financing.

Keywords: Debt financing, Earnings management, Earnings quality, Equity financing, Leverage deficit

1. Introduction

A firm tends to move toward a target debt ratio that is based on tradeoffs between the costs and benefits of debt, and its actual debt ratio often deviates from the target debt ratio (hereinafter referred to as leverage deficit) when making a financing decision. These deviations may affect the ability of the firm to reissue debts or equities. Korajczyk and Levy (2003) found that the actual leverage of a firm being higher than the target leverage level will result in higher operating risks, and the firm will tend to raise capital by equity financing. DeAngelo, DeAngelo, and Whited (2011) suggested that with high investment, firms that are currently above their target leverage often issue substantial debt (and sometimes issue small amounts of equity), thereby deviating further from target, whereas with low investment, these firms typically pay down debt and thus replenish future borrowing capacity. (Note 1) In this paper, we reexamine the financing decisions of over- and under-leveraged firms. (Note 2)

Ghosh and Moon (2010) indicated that debt can have a 'positive influence' on earnings quality because the manager is likely to use accounting discretion to provide private information about the firm's future prospects to lower financing costs; however, for high debt, it can also have a 'negative influence' on earnings quality as managers aggressively use accruals to manage earnings to avoid violating covenants. Because the study on the relationship between leverage deficit and earnings quality is limited, we expect that a firm whose actual leverage is higher than its target leverage possibly takes equity financing to avoid covenant violations and, therefore, examines the impacts of earnings quality and leverage deficits on the financing policy, in which leverage deficits means the firm is over- or under-leveraged.

The level of information asymmetry between management and investors will be higher in a firm with poorer earnings quality (Bhattacharya, Desai, & Venkataraman, 2013; O. Kim & Verrecchia, 1994; Diamond & Verrecchia, 1991). Therefore, managers are motivated to engage in earnings management when the firm makes initial public offerings

(IPOs) (DuCharme, Malatesta, & Sefcik, 2001; Cotten, 2008), seasoned equity offerings (SEOs) (Zhou & Elder, 2004; Y. Kim & Park, 2005; Cohen & Zarowin, 2010), convertible bonds (Chou, Wang, Chen, & Tsai, 2009), and debt financing (Jelinek, 2007; Liu, Ning, & Davidson III, 2010) and is experiencing financial distress (Jaggi & Lee, 2002). The main purpose of earnings management is to affect share price and to conduct debt financing with a lower cost or avoid violating the provisions of debt covenants. Graham, Harvey, and Rajgopal (2005) and Roychowdhury (2006) indicated that real activities' earnings management affects future cash flows. Kim and Park (2006) found that an SEO firm may aggressively engage in earnings management to push its offer prices up and then obtain more capital from offerings. In practice, the costs and benefits of various earnings management tools are different. When the firm wants to engage in earnings management, it will consider the characteristics of various earnings management tools or even simultaneously use two different types of earnings management. This paper considers both accrual-based and real earnings management and tests whether an over-leveraged firm (actual leverage is higher than target leverage) or an under-leveraged firm uses different earnings management tools due to differences in financing types from the choice of debt or equity financing.

Both market timing and investment-based theories of firm financing predict underperformance after firms raise capital. However, market timing theory predicts that the composition of financing (i.e., equity and debt) may forecast returns. (Note 3) Butler, Cornaggia, Grullon, and Weston (2011) found that relative to equity financing, the changes in net financing activities (i.e., sum of change in debts and change in equities) provide greater explanatory power for future stock returns. That is, the level of net financing is more important for explaining future returns than the composition of external financing. Therefore, with considerations for real and accrual-based earnings management, in addition to the discussion on the effects of earnings quality and leverage deficit on net financing activities, this study further analyzes the explanatory power of the composition of external financing, i.e., equity and debt.

Korajczyk and Levy (2003) and DeAngelo et al. (2011) found that firms are more likely to issue equity following an abnormal increase in stock price. Chang, Dasgupta, and Hilary (2009) indicated that when accounting quality is higher, the tendency is to raise funds by equity financing. Much of the previous literature discusses the impact of accounting quality on the financing choice. The first contribution of this paper is to further examine the role of capital structure in the above relationship. In addition, previous studies on the measure of earnings quality prefer discretionary or abnormal accruals and focus less on real activities. The second contribution is to consider the relationship between leverage deficit and both accrual-based and real earnings management, as well as to analyze their roles in financing activities and choice for over-leveraged and under-leveraged firms. Finally, we divide the external net financing activities into debt and equity financing. The third contribution in this study is to examine the explanatory power of both earnings quality and leverage deficit on the level of net external financing and its composition.

The remainder of this paper is organized as follows: Section 2 presents the literature review and hypotheses. Section 3 explains the research design, research periods, sampling criteria and variable definitions and proposes the empirical models. Section 4 summarizes the empirical findings. Finally, the conclusion and suggestions are provided in Section 5.

2. Hypothesis and Literature Review

Traditional capital structure theory suggests that the selection of optimal capital structures is achieved by balancing costs and benefits associated with varying degrees of financial leverage (Hovakimian, Opler, & Titman, 2001; DeAngelo et al., 2011). However, firms usually deviate from the target capital structure (Leary & Roberts, 2005; Frank & Goyal, 2008)), which affects their ability to reissue securities. The difference between actual debt ratio and target debt ratio, namely, leverage deficit, influences future decisions for a firm. Much of the previous literature focuses on the effect of the leverage deficit on the financing choice (Hovakimian et al., 2001; Fama & French, 2002; Flannery & Rangan, 2006), but the less related literature discusses the relationship between leverage deficit and earnings quality.

Firms tend to adopt equity issuance to finance capital when the firm's actual leverage is higher than the target level (Korajczyk & Levy, 2003) and when the firm has a higher audit quality (Chang et al., 2009). Gatchev, Spindt, and Tarhan (2009) found that equity is the predominant source of finance in situations such as profit shortfalls, investment in intangible assets, and internally generated growth opportunities, in which information asymmetries and agency costs are likely to be high. In financing fixed assets, firms with high potential agency problems use significantly more equity and less long-term debt.

Prior studies suggest that the firm with poor earnings quality has higher information asymmetry between managers and investors (Bhattacharya et al., 2013; O. Kim & Verrecchia, 1994; Diamond & Verrecchia, 1991). This paper

expects that the over-leveraged firm with better earnings quality tends to raise capital by equity issuance to avoid debt covenant violations. (Note 4) Meanwhile, the under-leveraged firm with poor earnings quality is more unlikely to choose debt financing to adjust capital structure as a way to maintain its financial flexibility and to avoid future bankruptcy. Therefore, the firm still tends to raise funds from equity financing rather than adopting debt financing to adjust its capital structure. The following hypotheses are proposed:

H1: Firms with a higher leverage deficit are positively associated with poor earnings quality.

H2a: Over-leveraged firms with better earnings quality are positively associated with financing by equity.

H2b: Under-leveraged firms with poorer earnings quality are positively associated with financing by equity.

For the purposes of influencing stock price, issuing shares at higher prices, financing capital at lower costs, or avoiding violations of debt covenants, managers have incentives to engage in earnings management. DuCharme, Malatesta, and Sefcik (2004) found that compared with un-offering firms, offering firms have higher abnormal accruals around stock offerings. Cotten (2008) indicated that earnings management contributes to the underperformance of a firm after IPOs. Zhou and Elder (2004) argued that SEO firms have incentives to engage in earnings management in the SEO year to increase reported income. Kim and Park (2005) indicated that there is a negative relation between the underpricing of an SEO firm and its discretionary accruals, which suggests that seasoned equity issuers who adopt aggressive earnings management practices push offer prices up to obtain more capital. For debt financing, Jelinek (2007) indicated that a leveraged firm engages in earnings management to avoid defaulting on the debt covenant. Moreover, Liu et al. (2010) found that there is a significant income-increasing earnings management practice prior to bond issuance, which makes it possible to issue debt at a lower cost after the upward adjustment of earnings.

Most previous work on earnings management focuses on discretionary or abnormal accruals, but fewer studies concentrate on real activity manipulation (Cohen & Zarowin, 2010; DuCharme et al., 2004; Gunny, 2005; Roychowdhury, 2006). In practice, the costs and benefits for a variety of earnings management tools are not the same. Before choosing a more appropriate one or even using both earnings management tools, the firm considers the characteristics of different tools. As a result of the U.S. Sarbanes-Oxley Act, the requirements for corporate governance are to contribute to the improvement of domestic corporate governance systems and, therefore, to shift to real earnings management, which is less likely to be scrutinized. (Note 5) Graham et al. (2005) argued that real earnings management directly affects cash flows, whereas accrual-based earnings management has no effect on cash flows. Roychowdhury (2006) found that real earnings management increases current earnings but reduces future cash flows and, therefore, damages firm value. Cohen and Zarowin (2010) indicated that the decline in performance after issuing due to real earnings management is more severe than that in accrual-based manipulation. However, Barton (2001) and Lin, Radhakrishnan, and Su (2006) indicated that a firm simultaneously uses two or more tools to manage its earnings. Hence, this study considers both accrual-based earnings management and real activities earnings management.

DeAngelo, DeAngelo, and Whited (2011) also noted that over-leveraged firms tend to issue equity to reduce leverage deficit and will be quicker to adjust their capital structure and to replenish future borrowing capacity for supporting future investment opportunities. This paper infers that the over-leveraged firm often has a crunched credit line, so its financing decision will tend to avoid violating debt covenants; therefore, we further expect that relative to under-leveraged firms, over-leveraged firms have more difficulty adopting earnings management to carry out its debt financing needs because all creditors, investors and analysts may pay more attention to these firms. The following hypothesis is formed:

H3: When engaging in debt financing, an over-leveraged firm has more difficulty adopting earnings management than an under-leveraged firm.

3. Research Design

3.1 Data and Sample

Our initial sample includes all publicly listed firms on the Taiwan Stock Exchange from the Taiwan Economic Journal (TEJ) database during the 2005-2011 period, excluding firms from the financial and insurance industries. In addition, the earnings quality will be measured by standard deviations of abnormal accruals, it is calculated over the current year and the previous two years (total three years). Therefore, our actual research period is from 2003 to 2011.

3.2 Empirical Model

To examine the role of leverage deficit in financing, this study applies a two-step estimation procedure, which is similar to that used by Hovakimian et al. (2001). In the first step, we estimate the target leverage ratio by regressing debt ratios on the major determinants of capital structure used in earlier studies (Frank & Goyal, 2003; Lemmon, Roberts, & Zender, 2008). In the second step, we conduct a regression to test whether deviation from the expected target capital structure will affect the firm's financing decisions. Using the following model, this study will verify whether the firms with leverage deficit will have poor earnings quality:

$$EQ_{it} = a_0 + a_1 LevDe_{it} + a_2 LevDe_{it-1} + a_3 SIZE_{it} + a_4 MB_{it} + \Sigma Year + e_{it} \quad (1)$$

There are two ways to measure *EQ, VTCARit* and *AbACit*, where *VTCARit* refers to the standard deviation of the residuals of the current year and the two previous years, as proposed by Rajgopal and Venkatachalam (2011), and *AbACit* refers to the absolute value of the current year's residual as estimated by Kothari, Leone, and Wasley (2005). A higher *VTCAR* implies poor earnings quality. In the robustness test, we use *ABAC* as a proxy for earnings quality. *LevDeit* and *LevDeit-1* are the current and prior leverage deficits of firm *i*, *SIZE* is firm size, *MB* is the market-to-book ratio used to measure the growth opportunities of a firm, and *Year* is year dummy variable.

In addition, for Eq. (1), this study intends to further group the sample by leverage deficit if the actual leverage ratio is greater than the target leverage ratio with regard to an over-leveraged firm and if the actual leverage ratio is below the target with regard to an under-leveraged firm. Then, based on the two samples used to establish the dummy variable *LevDeD* to replace *LevDe*, when the sample is an over-leveraged firm, it equals 1, and 0 otherwise; it is necessary to analyze whether the over-leveraged firm has poor earnings quality.

To test hypotheses 2a and 2b, i.e., whether over-leveraged firms with poorer earnings quality and under-leveraged firms with better earnings quality are likely to finance by equity, the following Probit regression model is established and regressed on the samples of the over-leveraged firm and under-leveraged firm, respectively.

$$\begin{aligned} EquiD_{it} = {} & b_0 + b_1 EQ_{it} + b_2 EQ_{it-1} + b_3 MB_{it} + b_4 DRisk_{it} + b_5 Beta_{it} + b_6 StoR_{it} \\ & + b_7 SIZE_{it} + \sum Year + e_{it} \end{aligned} \quad (2)$$

where *EquiD* is a dummy variable for firms financing by equity, *EQ* is earnings quality (*VTCAR* and *AbAC*), *MB* is the market-to-book ratio, *DRisk* is default risk, *Beta* is systematic risks, *StoR* is stock return, *SIZE* is the natural log of total assets at the end of the fiscal year, and *Year* is a dummy variable for the year. To capture the information based on accounting ratios, this study uses Altman's z-score to measure the default risk.

Next is the examination of H3, i.e., relative to under-leveraged firms, whether an over-leveraged firm is more likely to adopt accrual-based earnings management or real earnings management to carry out its financing activities. This verification applies the Heckman selection models. First, the first stage of the Probit regression based on whether the firm conducts earnings management as the selection variable is presented:

$$EMD_{it} = a_0 + a_1 LevDe_{it} + a_2 LevDe_{it-1} + a_3 SIZE_{it} + a_4 Beta_{it} + a_4 MB_{it} + e_{it} \quad (3)$$

where *EMD* is a dummy variable equal to 1 for firms that engaged in accrual-based or real earnings management to a greater degree than the median of the industry, and 0 otherwise. Second, the inverse Mill's ratio (IMR) is generated at the first stage as an extra independent variable in the second-stage regression model:

$$\begin{aligned} NFina_{it} = {} & b_0 + b_1 LevDeD_{it-1} + b_2 VTCAR_{it-1} + b_3 LevDeD_{it-1} VTCAR_{it-1} + + b_4 LevDeD_{it-1} REM_{it-1} \\ & + b_5 REM_{it-1} + b_6 DRisk_{it} + b_7 StoR_{it} + b_8 IMR_i + \sum Year + e_{it} \end{aligned} \quad (4a)$$

$$\begin{aligned} EquiD_{it} = {} & b_0 + b_1 LevDeD_{it-1} + b_2 VTCAR_{it-1} + b_3 LevDeD_{it-1} VTCAR_{it-1} + + b_4 LevDeD_{it-1} REM_{it-1} \\ & + b_5 REM_{it-1} + b_6 DRisk_{it} + b_7 StoR_{it} + b_8 IMR_i + \sum Year + e_{it} \end{aligned} \quad (4b)$$

$$\begin{aligned} DebtD_{it} = {} & b_0 + b_1 LevDeD_{it-1} + b_2 VTCAR_{it-1} + b_3 LevDeD_{it-1} VTCAR_{it-1} + + b_4 LevDeD_{it-1} REM_{it-1} \\ & + b_5 REM_{it-1} + b_6 DRisk_{it} + b_7 StoR_{it} + b_8 IMR_i + \sum Year + e_{it} \end{aligned} \quad (4c)$$

where *NFina* is net financing amount, *EquiD* is a dummy variable if the firm is in SEO, *DebtD* is a dummy variable if the firm is in long-term borrowings or issuing bonds. $LevDeD_{t-1}$ is a dummy variable of prior over-leverage deficit. Earnings management (*EM*) is measured by *VTCAR* and *REM* (RM1 and RM2), as indicated by accrual-based and

real earnings management, respectively. This study will extend Cohen and Zarowin (2010), both taking into account the accrual-based and real earnings management types to explore whether the adoption of different earnings management tools affects the finance behavior. Moreover, we also use net equity financing amount (NEquity) to proxy for *EquiD* and net debt financing amount (NDebt) to proxy for *DebtD*.

3.3 Variable Definitions

Earnings quality ($VTCAR_{it}$): Rajgopal and Venkatachalam (2011) indicated that the basic implication of Dechow and Dichev's (2002) method is that earnings quality is primarily determined by the quality of accruals because accounting earnings can be represented as the sum of operating cash flows and accruals. The intuition is that accounting accruals either anticipate future operating cash flows or reflect current cash flows or reversals of past cash flows. In determining accruals, measurement error in determining accruals may distort the ability of accruals to anticipate future cash flows or to reflect past and current cash flows. Rajgopal and Venkatachalam (2011) also indicated that such measurement error may be the result of either unintentional errors arising from business uncertainty and management lapses or intentional estimation errors arising from managerial incentives to manipulate earnings. Dechow and Dichev (2002) argued that to determine the extent of this measurement error in the mapping of accruals and cash flows, the variance of this measurement error can be viewed as an inverse measure of earnings quality. Therefore, modeling the relation between accruals and cash flows is as follows:

$$TCA_{it} = d_0 + d_1 CFO_{it-1} + d_2 CFO_{it} + d_3 CFO_{it+1} + e_{it} \quad \text{(a)}$$

where *TCAit* is the total current accruals calculated as $\Delta CAit - \Delta CLit - \Delta Cashit + \Delta STDEBTit$, ΔCA is the change in current assets, ΔCL is the change in current liabilities, $\Delta Cash$ is the change in cash, $\Delta STDEBT$ is the change in debt in current liabilities, and *CFO* is the cash flow from operations. In addition, all of the variables and intercept term in Eq. (a) are deflated by average assets. Francis, LaFond, Olsson, and Schipper (2005) and Kasznik and McNichols (2002) suggested that the earnings quality measure derived from (a) can be improved by controlling for two important determinants of accruals, that is, growth in revenues and the level of property, plant and equipment. Hence, following Rajgopal and Venkatachalam (2011), we augment Eq. (a) as follows:

$$TCA_{it} = d_0 + d_1 CFO_{it-1} + d_2 CFO_{it} + d_3 CFO_{it+1} + d_4 \Delta REV_{it} + d_5 PPE_{it} + e_{it} \quad \text{(b)}$$

where ΔREV is the change in revenues, PPE is the gross value of property, plant and equipment. The residual of Eq. (b) is the abnormal accruals. We estimate Eq. (b) for every firm-year and intend to include at least 20 firms in year *t* for every industry (Fama & French, 1997); using the firm-specific residual from Eq. (b) forms the basis of the measurement of the earnings quality, and utilizing standard deviations of residuals, calculated over the current year and the previous two years (for a total of three years), is an indicator of poorer accruals and earnings quality (*VTCAR*).

Moreover, in the robustness check, an alternative measure of earnings quality (***AbACit***) is based on the performance-matched discretionary accruals model proposed by Kothari et al. (2005). It indicates that using performance adjusted by ROA and industry to correct the estimation of discretionary accruals can solve the mis-specified problem of the modified Jones model (Dechow, Sloan, & Sweeney, 1995) applied to firms experiencing extreme performance. This study treats discretionary accruals (*DAC*), actual total accruals minus nondiscretionary accruals, as abnormal accruals and uses the absolute value of *DAC* as the second measure of earnings quality (*AbAC*). (Note 6) Preceding the two indicators to measure earnings quality, the first indicator (*VTCAR*) is the standard deviation of three years on a three-year basis; the second indicator (*AbAC*) is calculated annually on a one-year basis. The choice of the latter reflects Rajgopal and Venkatachalam's (2011) belief that an annual basis for earnings quality indicator is better.

Real earnings management (*REM*): The measure of REM is based on the approach proposed by Dechow, Kothari, and L. Watts (1998) and Cohen and Zarowin (2010). REM is measured by two proxies of *RM1* and *RM2*. *RM1* is first calculated by multiplying the abnormal discretionary expense (*ADISX*) by -1 and then adding abnormal production costs (*APROD*); *RM2* is primarily calculated by multiplying the sum of abnormal discretionary expense and abnormal cash flow from operations (*ACFO*) by -1. The higher the value, the greater the magnitude of real earnings management. The proxy variables of these three compositions of real earnings management are as follows:

(1) Abnormal cash flow from operations *ACFO* that are from the error term in Eq. (c).

$$\frac{CFO_{it}}{Assets_{it-1}} = r_1 \frac{1}{Assets_{it-1}} + r_2 \frac{SALES_{it}}{Assets_{it-1}} + r_3 \frac{\Delta SALES_{it}}{Assets_{it-1}} + \kappa_{it} \quad \text{(c)}$$

where CFO_{it} is cash flow from operations, $Assets_{it-1}$ is total assets at the beginning of the year, $SALES_{it}$ is net sales, and $\Delta SALES_{it}$ is the change in net sales.

(2) Abnormal production costs *APROD* that are from the error term in Eq. (d).

$$\frac{PROD_{it}}{Assets_{it-1}} = r_1 \frac{1}{Assets_{it-1}} + r_2 \frac{SALES_{it}}{Assets_{it-1}} + r_3 \frac{\Delta SALES_{it}}{Assets_{it-1}} + r_4 \frac{\Delta SALES_{it-1}}{Assets_{it-1}} + \kappa_{it} \quad \text{(d)}$$

where $COGS_{it}$ is cost of goods sold and ΔINV_{it} is the change in inventory. $PROD_{it}$ is production costs, defined as the sum of cost of goods sold and the changes in inventory.

(3) Abnormal discretionary expenses *ADISX* that are from the error term in Eq. (e).

$$\frac{DISX_{it}}{Assets_{it-1}} = r_1 \frac{1}{Assets_{it-1}} + r_2 \frac{SALES_{it-1}}{Assets_{it-1}} + \kappa_{it} \quad \text{(e)}$$

where *DISX* is discretionary expenses, defined as the sum of advertising expenses, R&D expenses, and administrative expenses.

Net financing (*NFina*): Net financing amount is the net increase in capital to the initial total assets ratio, i.e., the sum of net equity $NEquity_t$ and net debt $NDebt_t$ divided by beginning total assets, that is:

$$NFian_t = \frac{NetEquity_t + NetDebt_t}{Assets_{t-1}} \quad \text{(f)}$$

where *Assets* is the book value of total assets. In addition, net equity amount ($NEquity_t$) and net debt amount ($NDebt_t$) are defined as the issuance and repurchase or repayment. Net equity is the net of equity issuance and repurchase, and net debt is the ending total long-term liabilities minus the initial total long-term liabilities, in which equity issuance is the total capital from the issue of common or preferred stocks, and equity repurchase is the total capital paid for common or preferred stocks. Finally, for each firm-year, we build an equity ratio variable, which is the ratio of the net equity to the net increase in capital:

$$NR_t = \frac{NetEquity_t}{NetEquity_t + NetDebt_t} \quad \text{(g)}$$

Leverage deficit (*LevDe*): Capital structure theory suggests that the optimum amount of debt varies across firms. The identification of overleveraged and underleveraged firms should depend on the deviation from the firm's target capital structure. This study follows Kayhan and Titman (2007) and Uysal (2011). First, in Eq. (h), to estimate each firm's target leverage ratio by running yearly regressions of market leverage (MLever) on the determinants of capital structure, the fitted value of this regression is defined as the target leverage ratio. In the second step, the leverage deficit is defined as the actual leverage ratio minus the estimated target leverage ratio from the first step. Meanwhile, if the actual leverage ratio is higher than the target leverage ratio, we deem the firm to be over-leveraged; if the firm's actual leverage ratio is lower than the target leverage ratio, the firm is under-leveraged. By definition, the target leverage ratio should be between 0 and 1. To obtain a consistent estimation, this study adopts a Tobit regression with double censoring:

$$\begin{aligned} MLever_{it} = {} & \alpha_0 + \alpha_1 MB_{it-1} + \alpha_2 StoR_{it-1} + \alpha_3 RDD_{it-1} + \alpha_4 RD_{it-1} + \alpha_5 Sell_{it-1} + \alpha_6 TAss_{it-1} \\ & + \alpha_7 EBIT_{it-1} + + \alpha_8 TaAsset_{it-1} + \alpha_9 MLever_{it-1} + \Sigma Industry + e_{it} \end{aligned} \quad \text{(h)}$$

where the market leverage ratio (*MLever*) is defined as the book value of debt divided by the sum of the book value of debt and the market value of equity. (Note 7) Because the target leverage ratio varies inversely with growth opportunities, both market-to-book ratio (*MB*) and stock returns (*StoR*) proxy for the effect of growth opportunities on the target capital structure. Large firms are usually more diversified, have less volatile cash flows and also enter into capital markets more easily, so their target debt ratios are higher.

Adding the natural log of total assets (*TAss*) to Eq. (*h*) is to capture the influence of firm size on the target leverage structure. The product uniqueness will increase the cost of the financial distress and reduce the target leverage ratio, so both the ratio of selling expenses to net sales (*Sell*) and the ratio of R&D expenses to total assets (*RD*) proxy for the product uniqueness. Relative to the fixed assets, current or liquid assets are readily realizable, and bankruptcy costs are lower, resulting in a higher target leverage ratio, so we consider the ratio of net fixed assets to total assets

(tangibility of assets), i.e., *TaAsset*. *RDD* is a dummy variable for whether the firm has R&D expense. Finally, incorporating the lagged market leverage is to avoid the endogeneity problem, and the industry variable is to control industry effects.

Environmental uncertainty (*Unce*): Environmental uncertainty is defined as the variability in the firm's external environment. Following Kren (1992) and Gordon, Loeb, and Tseng (2009), it is measured based on the following three metrics: (1) Market—variation of net sales; (2) Technological—variation of the sum of R&D expense and capital expenditures divided by total assets; and (3) Income—variation of net income before taxes. The computation is:

$$Unce = \log(\Sigma_{k=1}^{3} VX_k), \quad VX_k = \sqrt{\sum_{t=1}^{7} \frac{(U_{kt} - \overline{U_k})^2}{7}} / \left|\overline{U_k}\right| \tag{i}$$

where *Unce* is environmental uncertainty, VX_k is the variance of uncertainty factor X_k over 7 years, in which k = 1, 2, 3 represent market, technological and income uncertainty, respectively, and t = 1, 2, 3, . . . ,7, represent years 2005 ~ 2011. In addition, $U_{kt} = (X_{k,t} - X_{k,t-1})$, and $\overline{U_k}$ is the absolute value of mean of U_{kt} over 7 years. Therefore, this study measures the uncertainty during the 2005-2011 period and, after calculating the uncertainty of the firm-years, sorts by percentage, dividing the total into high (below 50%) and low (above 50%) uncertainty groups.

4. The Results

4.1 Sample Analysis

Table 1 presents our samples divided into 35 categories by industry, and 12,940 samples are selected. The electronics industry and other electronic appliances provide the most samples, at 1,668, and these accounted for 12.89% of the total. The number of samples from the business service industry is the second largest, with 1,605 samples selected, accounting for 12.40% of the total. The number of samples from the optics industry is the third largest, with 1,176 samples selected, accounting for 9.09% of the total. Table 1 indicates that the majority of publicly listed companies in Taiwan are electronic equipment manufacturing, machinery manufacturing, optics, and chemical industries, followed by the business service industry. This indicates that the industrial structure of Taiwan has not significantly changed over time.

Table 1. Industry groups in the sample

Industry code	No. of samples	Percentage	Cumulative Percentage
10	162	0.0125	0.0125
13	601	0.0464	0.0590
20	435	0.0336	0.0926
23	174	0.0134	0.1060
25	153	0.0118	0.1179
26	168	0.0130	0.1308
27	165	0.0128	0.1436
28	1093	0.0845	0.2281
29	111	0.0086	0.2366
30	148	0.0114	0.2481
32	60	0.0046	0.2527
33	218	0.0168	0.2696
34	298	0.0230	0.2926
35	1134	0.0876	0.3802
36	1668	0.1289	0.5091
37	367	0.0284	0.5375
38	1176	0.0909	0.6284
39	173	0.0134	0.6417
44	128	0.0099	0.6516
45	89	0.0069	0.6585
48	503	0.0389	0.6974
49	122	0.0094	0.7068
50	384	0.0297	0.7365
51	198	0.0153	0.7518
53	112	0.0087	0.7604
55	27	0.0021	0.7625
56	226	0.0175	0.7800
58	249	0.0192	0.7992
59	283	0.0219	0.8211
73	1605	0.1240	0.9451
79	139	0.0107	0.9559
80	203	0.0157	0.9716
82	34	0.0026	0.9742
87	286	0.0221	0.9963
99	48	0.0037	1.0000
Total	12,940	1	

Note on industries:
10 Metal mining, 13 Oil exploration, 20 Food products, 23 Textile, 25 Furniture and fixtures, 26 Paper-making, 27 Printing, 28 Chemical-related manufacturing, 29 Petroleum refineries, 30 Rubber and plastic products manufacturing, 32 Glass, 33 Major metal, 34 Assembly of metal and transport equipment, 35 Business machine and computer facilities, 36 Electronics and other electronic appliances, 37 Manufacture of transport equipment, 38 Optics, 39 Other manufacturing, 44 Marine transport, 45 Freight transport, 48 Telecommunication, 49 Electrical wiring and fitting, 50 Warehousing and trading—Durable goods, 51 Warehousing and trading—Non-durable goods, 53 Warehousing of general merchandise, 55 Transport equipment retail, 56 Clothing and accessories retail, 58 Catering retail, 59 Other retail, 73 Business services, 79 Leisure and entertainment, 80 Health care, 82 Education services, 87 Engineering, accounting, research, management and related services, 99 Other.

4.2 Descriptive Statistics

Table 2 illustrates the descriptive statistics of the variables. *VTCAR* is the earnings quality proxy variable, and its mean is located in the top 25%, indicating there is a large number above the third quartile to result in this outcome. *AbAC* is a proxy variable for earnings quality with a mean of 2.292, which is greater than the median. Table 2 indicates that *RM1* is the first proxy of real earnings management, which is multiplied by the abnormal discretionary expense by -1 and plus the abnormal production cost; and *RM2* is an additional proxy of real earnings management, which is the multiplication of the addition of the abnormal discretionary expense and abnormal cash flow by -1. The mean value of *RM1* is 2.688, and the mean value of *RM2* is 2.528, both of which are far greater than the median and greater than the third quartile. This suggests that real earnings management is polarized and implies that the level of real earnings management is high in certain cases. *LevDe* is a leverage deficit proxy variable. The calculation is the subtraction of actual leverage ratio by the target leverage ratio, and its mean is 0.043, which indicates that the actual leverage ratio of the sample is greater than the target leverage ratio, which indicates that the majority of firms use higher leverage levels than their target leverage. Moreover, *Equity* is a proxy for the firm with net equity financing, and its mean is negative. *Debt* is a proxy for a firm that uses net debt financing. *NFina* is a proxy for a firm's net financing policies. Both variables are positive and suggest that a firm prefers debt financing compared with seasoned equity offers in financing behavior choices.

Table 2. Descriptive Statistics

	p25	p50	p75	mean	St.d
VTCAR	0.059	0.130	0.301	0.316	0.827
AbAC	0.002	0.020	0.165	2.292	34.640
RM1	0.053	0.615	2.389	2.688	10.730
RM2	-0.047	0.378	2.006	2.528	10.956
LevDe	-0.015	0.028	0.092	0.043	0.111
SIZE	4.652	6.157	7.649	6.207	2.141
MB	1.197	2.034	3.425	2.660	27.708
DRisk	2.088	3.513	5.791	4.656	8.145
Beta	0.568	1.209	2.009	1.394	1.515
StoR	-0.210	0.086	0.420	0.225	0.921
NEquity	-0.032	-0.001	0.006	-0.005	0.139
NDebt	-0.022	0.000	0.013	0.008	0.108
NFina	-0.059	-0.012	0.023	0.003	0.169
Unce	-0.091	0.129	0.373	0.185	0.429

Variable definitions: *VTCAR* = proxy variable of earnings quality, which is primarily a three-year standard deviation of residuals that is calculated over the current year and the previous two years; *AbAC* = proxy variable of earnings quality, which is primarily calculated by a performance-matched modified Jones model; *RM1* = real earnings management, which is primarily calculated by multiplying the abnormal discretionary expense with -1 and then adding abnormal production costs; *RM2* = real earnings management, which is primarily calculated by multiplying the sum of abnormal discretionary expense and abnormal cash flow from operations with -1; *LevDe* = leverage deficit; *SIZE* = firm size; *MB* = market-to-book ratio; *DRisk* = default risk; *Beta* = systematic risks; *StoR* = stock returns; *NEquity* = net equity financing amount; *NDebt* = net debt financing amount; *NFina* = net financing amount; *Unce* = environmental uncertainty of the firm, which is primarily composed of market uncertainty (variation of net sales), technological uncertainty (variation of the sum of R&D and capital expenditures divided by total assets), and profit uncertainty (variation of net income before taxes).

4.3 Pearson Correlation Analysis

Table 3 displays the Pearson correlation analysis and the correlation coefficients in between two proxies of earnings quality, *VTCAR* and *AbAC*, and various variables are lower than 0.7, suggesting that there will be no collinearity problems between the two proxies and other variables. Regarding the real earnings management variables, *RM1* is measured by multiplying the abnormal discretionary expense by -1 and then adding abnormal production costs, and *RM2* is measured by multiplying the sum of abnormal discretionary expense and abnormal cash flow from operations with -1. The correlations of both variables and other variables are lower than 0.7; therefore, there is no collinearity problem. Next, a negative association between leverage deficit *LevDe* and equity financing suggests that the cause of the leverage deficit is debt financing. Regarding the correlations of the financing variable and other variables, with the exception of the correlation of equity financing and net financing, they are below 0.7; thus, the collinearity is insignificant.

Table 3. Pearson Correlation Analysis

	VTCAR	*AbAC*	*RM1*	*RM 2*	*LevDe*	*NEquity*	*NDebt*	*NFina*	*Unce*
VTCAR	1								
AbAC	0.134	1							
	(0.000)								
RM1	0.045	0.022	1						
	(0.000)	(0.013)							
RM 2	0.038	0.022	0.962	1					
	(0.000)	(0.012)	(0.000)						
LevDe	-0.030	-0.007	0.006	-0.003	1				
	(0.001)	(0.422)	(0.509)	(0.734)					
NEquity	0.111	0.014	-0.010	-0.009	-0.106	1			
	(0.000)	(0.100)	(0.258)	(0.317)	(0.000)				
NDebt	-0.008	0.019	0.008	0.015	0.348	-0.088	1		
	(0.344)	(0.029)	(0.345)	(0.083)	(0.000)	(0.000)			
NFina	0.087	0.024	-0.003	0.003	0.136	0.768	0.571	1	
	(0.000)	(0.006)	(0.745)	(0.771)	(0.000)	(0.000)	(0.000)		
Unce	0.013	0.001	-0.005	-0.004	-0.002	-0.002	-0.001	-0.002	1
	(0.146)	(0.908)	(0.606)	(0.668)	(0.855)	(0.861)	(0.886)	(0.813)	

Notes:

1. Variable definitions: *VTCAR* = proxy of earnings quality, which is primarily a three-year standard deviation of residuals that is calculated over the current year and the previous two years; *AbAC* = proxy of earnings quality, which is primarily calculated by a performance-matched modified Jones model; *RM1* = real earnings management, which is calculated by multiplying abnormal discretionary expense with -1 and then adding abnormal production costs; *RM2* = real earnings management, which is calculated by multiplying the sum of abnormal discretionary expense and abnormal cash flow from operations with -1; *LevDe* = leverage deficit; *NEquity* = net equity financing amount; *NDebt* = net debt financing amount; *NFina* = net financing amount; *Unce* = environmental uncertainty of the firm, which is composed of market uncertainty (variation of net sales), technological uncertainty (variation of the sum of R&D and capital expenditures divided by total assets), and profit uncertainty (variation of net income before taxes).
2. P values are in parentheses.

4.4 The Relation between Leverage Deficit and Earnings Quality

We use the leverage ratio as the major determinant of the capital structure considered from previous studies to estimate the target leverage ratio to verify the role of the leverage deficit in financing. Second, we verify whether the deviation from the expected target capital structure will affect financing activities. This paper use *VTCARit* as a proxy for earnings quality (*EQ*), which is the standard deviation of the residuals of the current year and two previous years (Rajgopal and Venkatachalam, 2011), and a higher *VTCAR* implies lower earnings quality. Table 4 indicates that the earnings quality measure *VTCAR* is significantly negatively correlated with both the current leverage deficit *LevDe* and the previous leverage deficit $LevDe_{t-1}$, implying that the firm with a higher leverage deficit has better earnings quality; therefore, H1 is rejected. (Note 8) In Section 4.5, the samples are divided into over-leveraged and under-leveraged firms based on leverage deficit.

Table 4. Leverage Deficit and Earnings Quality

	VTCAR		
	Coef.	t value	p value
LevDe	-0.181	-2.76	0.006
*LevDe*t-1	-0.157	-2.20	0.028
SIZE	-0.025	-7.23	0.000
MB	0.000	1.01	0.311
Cons	0.566	19.65	0.000
Year	include		
R^2	0.009		
Adj R^2	0.008		
F-Value	10.070		
p value	0.000		

Variable definitions: *VTCAR* = proxy variable of earnings quality, which is primarily a three-year standard deviation of residuals that is calculated over the current year and the previous two years; *LevDe* = current leverage deficit; *SIZE* = firm size; *MB* = proxy variable of growth opportunities of firm, which is measured by market-to-book ratio.

4.5 Earnings Quality and Equity Financing for over- and under-leveraged Firms

For the two groups of samples, if the actual leverage ratio is greater than the target leverage ratio, a firm is considered over-leveraged, and if the actual leverage ratio is lower than the target leverage ratio, a firm is regarded as an under-leveraged firm. We apply the Probit regression to test whether an over-leveraged firm with better earnings quality uses equity financing (H2a) and whether an under-leveraged firm with worse earnings quality tends to use equity financing (H2b).

Table 5 indicates that when the firms are categorized by leverage deficit into over- and under-leveraged, for the under-leveraged firms, the choice of equity financing is positively related to the earnings quality proxy *VTCAR*. This means that under actual leverage, that is, the ratio is lower than its target leverage, the firm with poorer earnings quality would adopt equity financing because it would want to maintain sufficient leverage space. For an under-leveraged firm with worse earnings quality, which has poorer profitability but a lower default risk, it still tends to maintain operations by equity financing. Conversely, when a firm is over-leveraged, the choice of equity financing is negatively correlated with the earnings quality measure *VTCAR*, implying that if the over-leveraged firm has better earnings quality, it should rely on equity financing. Overall, under-leveraged firms with worse earnings quality and over-leveraged firms with better earnings quality should use equity financing to meet capital needs; therefore, H2a and H2b are supported.

Table 5. Earnings Quality and Equity Financing of Leveraged Firms

	Under-leveraged firm		Over-leveraged firm	
EquiD	Coef.	p value	Coef.	p value
VTCAR	1.422	0.003	-0.028	0.098
$VTCAR_{t-1}$	0.076	0.076	-0.022	0.246
MB	0.002	0.080	0.002	0.062
DRisk	-0.007	0.009	-0.004	0.039
Beta	0.108	0.000	0.092	0.000
StoR	0.205	0.000	0.121	0.000
SIZE	-0.155	0.000	-0.170	0.000
Cons	0.343	0.000	0.804	0.000
Year	include		include	
χ^2	601.220		644.230	
p value	0.000		0.000	
Pseudo R^2	0.069		0.074	

Variable definitions: *EquiD* is a dummy variable equal to 1 if the firm adopts equity financing, 0 otherwise; *VTCAR* = current earnings quality, which is primarily a three-year standard deviation of residuals that is calculated over the current year and the previous two years; $VTCAR_{t-1}$ = prior earnings quality; *MB* = market-to-book ratio; *DRisk* = default risk; *Beta* = systematic risks; *StoR* = yearly stock returns; *SIZE* = firm size.

4.6 Leverage Firm's Earnings Management Methods and External Financing

To examine whether an over-leveraged firm is more likely to adopt earnings management to engage in equity financing or more activities, this paper first uses the Heckman selection models to verify H3. In a probit regression of the first stage, we use the conduct of earnings management by the firm as the choice variable. Comparing under-leveraged firms with over-leveraged firms, we try to find that over-leveraged firms adopt accrual-based or real earnings management to conduct financing activities. Second, the inverse Mill's ratio (*IMR*) generated in the first-stage probit regression is the input for the second-stage OLS regression as the explanatory variable. Panels A, B, and C in Table 6 present the results. Regarding the measure of earnings management, we use *VTCAR* and *RM* (*RM1*, *RM2*) to proxy for accrual-based and real activities earnings managements, respectively. For the two groups of samples, we establish a dummy variable *LevDeD* to replace *LevDe*; when the sample is an over-leveraged firm, the variable is set as 1, and when the firm is an under-leveraged firm, the value is set to 0.

Panel A in Table 6 indicates that the net financing activities of a firm are positively correlated with prior accrual-based earnings management $VTCAR_{t-1}$ and real earnings management RM_{t-1} and $RM2_{t-1}$, meaning that an external financing firm is more likely to use both discretionary accruals and real earnings management before financing. (Note 9) However, the net financing activities are negatively correlated with both interaction terms between the over-leveraged firm dummy variable and real earnings management, $LevDeD_{t-1}RM1_{t-1}$ and $LevDeD_{t-1}RM2_{t-1}$. This finding indicates that when an over-leveraged firm engages in external financing activities, it

does not tend to use real earnings management. As for the interaction terms between the over-leveraged firm dummy variable and accrual-based earnings management, $LevDeD_{t-1}VTCAR_{t-1}$, it is unrelated to net financing activities. Overall, the over-leveraged firm is more unlikely to engage in real activities earnings management when making external financing activities.

Panel B in Table 6 indicates that the adoption of equity financing by a firm is positively related to prior accrual-based earnings management $VTCAR_{t-1}$ but unrelated to prior real earnings management $RM1_{t-1}$ and $RM2_{t-1}$. The results indicate that firms using equity financing tend to engage in accrual-based rather than real earnings management. Moreover, the equity financing choice is negatively correlated with the interaction term between the over-leveraged firm dummy variable and the accrual method, $LevDeD_{t-1}VTCAR_{t-1}$, but is unrelated to both interaction terms between the over-leveraged firm dummy variable and real earnings management, $LevDeD_{t-1}RM1_{t-1}$ and $LevDeD_{t-1}RM2_{t-1}$. These findings show that before choosing equity financing, the over-leveraged firm is more unlikely to engage in accrual-based earnings management.

Panel C in Table 6 indicates that the debt financing activities and choice are unrelated to accrual-based earnings management *VTCAR* but are positively related to real earnings management *RM*. The results indicate that the firms tend to engage in real earnings management to carry out debt financing rather than the accrual method. We also find that the debt financing activities and choice are negatively correlated with both interaction terms between the over-leveraged firm dummy variable and real earnings management but are unrelated to the interaction terms between the over-leveraged firm dummy variable and the accrual method. These results imply that before choosing debt financing and conducting debt activities, the over-leveraged firm is more unlikely to engage in real earnings management.

In summary, the firm with external financing or debt financing tends to engage in real earnings management, but the firm with equity financing tends to engage in the accrual-based method. Compared with the under-leveraged firm, the over-leveraged firm is more unlikely to use real earnings management when conducting external financing and debt financing but is more unlikely to engage in accrual-based method when conducting equity financing.

Table 6. Leveraged Firms' Earnings Management Methods and Financing

	Panel A: Net financing		**Panel B: Equity financing**				**Panel C: Debt financing**			
	NFina.[a]	NFina[a]	NEquity[a]	EquiD[b]	NEquity[a]	EquiD[b]	NDebt.[a]	DebtD[b]	NDebt.[a]	DebtD[b]
$LevDeD_{t-1}$	0.00095	0.00085	0.00107	0.05763	0.00110	0.05697	-0.00012	-0.01705		-0.01614
	(0.800)	(0.819)	(0.728)	(0.042)	(0.721)	(0.044)	(0.960)	(0.565)		(0.585)
$VTCAR_{t-1}$	0.00786	0.00797	0.00462	0.05240	0.00464	0.05279	0.00325	0.03203	0.00333	0.03212
	(0.026)	(0.024)	(0.112)	(0.052)	(0.110)	(0.050)	(0.153)	(0.243)	(0.142)	(0.242)
$LevDeD_{t-1}VTCAR_{t-1}$	-0.00357	-0.00364	-0.00319	-0.06250	-0.00320	-0.06281	-0.00037	-0.03922	-0.00044	-0.03930
	(0.401)	(0.391)	(0.361)	(0.057)	(0.360)	(0.056)	(0.892)	(0.238)	(0.871)	(0.237)
$RM1_{t-1}$	0.00081		0.00021	0.00324			0.00060	0.00474		
	(0.002)		(0.337)	(0.106)			(0.001)	(0.019)		
$RM2_{t-1}$		0.00075			0.00020	0.00308			0.00055	0.00498
		(0.003)			(0.325)	(0.103)			(0.001)	(0.009)
$LevDeD_{t-1}RM1_{t-1}$	-0.00055		-0.00008	-0.00223			-0.00047	-0.00525		
	(0.080)		(0.753)	(0.350)			(0.021)	(0.032)		
$LevDeD_{t-1}RM2_{t-1}$		-0.00053			-0.00009	-0.00200			-0.00043	-0.00566
		(0.081)			(0.704)	(0.381)			(0.026)	(0.016)
DRisk	-0.00150	-0.00150	-0.00054	-0.00232	-0.00054	-0.00232	-0.00096	-0.04360	-0.00096	-0.04361
	(0.000)	(0.000)	(0.000)	(0.096)	(0.000)	(0.095)	(0.000)	(0.000)	(0.000)	(0.000)
StoR	0.01300	0.01301	0.01827	0.16658	0.01827	0.16661	-0.00526	-0.08228	-0.00526	-0.08228
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IMR	0.01271	0.01273	0.00715	0.04211	0.00715	0.04217	0.00556	0.04900	0.00558	0.04899
	(0.000)	(0.000)	(0.000)	(0.007)	(0.000)	(0.007)	(0.000)	(0.003)	(0.000)	(0.003)
Cons	0.00617	0.00633	-0.00795	-0.23954	-0.00793	-0.23880	0.01412	-0.29575	0.01427	-0.29629
	(0.305)	(0.292)	(0.108)	(0.000)	(0.109)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year	include	include	include	include	include	include	include	include	include	include
R^2	0.014	0.014	0.017		0.017		0.011		0.011	
F-value (p value)	11.23(0.00)	11.19(0.00)	13.83(0.00)		13.82(0.00)		9.03(0.00)		8.99(0.00)	
χ^2 (p value)				203.15(0.00)		203.28(0.00)		511.82(0.00)		513.31(0.00)
Pseudo R^2				0.012		0.012		0.032		0.032

Notes:

1. "a" and "b" indicate that the dependent variable is amount (level) of financing and dummy variable, respectively.
2. Variable definitions: *NFina* = net financing activities; *NEquity* = equity financing activities; *EquiD* is a dummy variable that is 1 if the firm adopts equity financing and 0 otherwise; *NDebt* = debt financing amount; *DebtD* is a dummy variable that is set to 1 if the firm adopts debt financing and 0 otherwise; $LevDeD_{t-1}$ = a dummy variable of prior over-leverage deficit; $VTCAR_{t-1}$= prior earnings quality; $LevDeD_{t-1}VTCAR_{t-1}$ = the interaction term of the prior over-leveraged firm dummy variable and earnings quality; $RM1_{t-1}$ = prior real earnings management, which is calculated by multiplying the abnormal discretionary expense with -1 and then adding abnormal production costs; $RM2_{t-1}$ = prior real earnings management, which is calculated by multiplying the sum of abnormal discretionary expense and abnormal cash flow from operations with -1; $LevDeD_{t-1}RM1_{t-1}$ = interaction term of prior over-leveraged firm and real earnings management; $LevDeD_{t-1}RM2_{t-1}$ = the interaction term of the prior over-leveraged firm dummy variable and real earnings management; *DRisk* = default risk; *StoR* = stock returns.
3. P values are in parentheses.

4.7 Robustness Check

Gryglewicz (2011) studied the impact of both liquidity and solvency concerns on corporate finance in a tractable model. The paper proposes two sources of uncertainty, earnings volatility and profitability uncertainty; the former is related to short-term liquidity risk, whereas the latter is related to long-term solvency risk. Ghosh and Olsen (2009) considered that the flexibility accorded by generally accepted accounting principles (GAAP) provides managers the means to use discretionary accruals to reduce the variability in reported earnings when firms operate under high uncertainty. In the robustness check, this study defines environmental uncertainty as the degree of change in the organization's external environment and then examines whether environmental uncertainty affects the relationship between real earnings management and financing behavior. We incorporate the environmental uncertainty variable *Unce* into Eqs. (4a), (4b) and (4c) and use the Heckman selection models to reexamine the relationship between real earnings management and financing behavior.

In Table 7, net external financing activities and equity or debt financing activities are unrelated to accrual-based earnings management *AbAC*. Based on the coefficients of environmental uncertainty *Unce*, the financing activities have no difference in higher and lower environmental uncertainty. Moreover, the net financing activities and debt financing activities are positively correlated with real earnings management, *RM1* and *RM2*, but equity financing activities are unrelated to *RM1* and *RM2*. Prior studies also indicate that the firm with a greater leverage deficit will have poorer earnings quality, and if investors recognize that a firm has poor earnings quality, they discount stock prices as compensation for greater uncertainty of financial reporting quality (Easley & O'hara, 2004; Lambert, Leuz, & Verrecchia, 2007; Ecker, Francis, Kim, Olsson, & Schipper, 2006); therefore, the firm experiences a higher equity cost of capital.

Table 7 also indicates that after controlling for environmental uncertainty, net external financing activities and their components are unrelated to the interaction terms of the overleveraged firm and accruals earnings management $LevDeD_{t-1}AbAC_{t-1}HUnce$, but debt financing activities are negatively related to both interaction terms of the over-leveraged firm and real earnings management, $LevDeD_{t-1}RM1_{t-1}HUnce$ and $LevDeD_{t-1}RM2_{t-1}HUnce$. Overall, we document that an over-leveraged firm is more unlikely to engage in real earnings management under considerations of environmental uncertainty.

Table 7. Leveraged Firms' Earnings Management and Financing under Environmental Uncertainty

	Net financing		**Equity financing**		**Debt financing**	
	RM1	RM2	RM1	RM2	RM1	RM2
	NFina[a]	NFina[a]	NEquity[a]	NEquity[a]	NDebt[a]	NDebt[a]
$LevDeD_{t-1}$	0.01136	0.01128	0.00298	0.00329	0.00838	0.00799
	(0.442)	(0.444)	(0.806)	(0.786)	(0.379)	(0.400)
$AbAC_{t-1}$	0.00011	0.00011	0.00004	0.00004	0.00007	0.00006
	(0.518)	(0.547)	(0.760)	(0.769)	(0.539)	(0.576)
HUnce	-0.00247	-0.00244	-0.00208	-0.00205	-0.00039	-0.00039
	(0.405)	(0.410)	(0.394)	(0.400)	(0.838)	(0.838)
$LevDeD_{t-1}AbAC_{t-1}HUnce$	-0.00033	-0.00027	0.00009	0.00010	-0.00042	-0.00037
	(0.848)	(0.875)	(0.949)	(0.944)	(0.703)	(0.738)
$RM1_{t-1}$	0.00049		0.00013		0.00036	
	(0.002)		(0.321)		(0.001)	
$RM2_{t-1}$		0.00045		0.00012		0.00033
		(0.004)		(0.342)		(0.001)
$LevDeD_{t-1}RM1_{t-1}HUnce$	-0.00101		0.00071		-0.00171	
	(0.462)		(0.528)		(0.051)	
$LevDeD_{t-1}RM2_{t-1}HUnce$		-0.00099		0.00066		-0.00165
		(0.482)		(0.570)		(0.069)
DRisk	-0.00148	-0.00148	-0.00053	-0.00053	-0.00095	-0.00095
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
StoR	0.01309	0.01309	0.01830	0.01830	-0.00521	-0.00521
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
IMR	0.01276	0.01278	0.00715	0.00716	0.00561	0.00562
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cons	0.00805	0.00816	-0.00600	-0.00600	0.01406	0.01415
	(0.145)	(0.140)	(0.187)	(0.187)	(0.000)	(0.000)
Year	include	include	include	include	include	include
R^2	0.013	0.013	0.017	0.017	0.011	0.010
Adj R^2	0.012	0.012	0.015	0.015	0.009	0.009
F-value	10.00	9.94	12.92	12.90	8.08	8.02
p value	0.000	0.000	0.000	0.000	0.000	0.000

Notes:

1. "a" and "b" indicate that the dependent variable is amount (level) of financing and dummy variable, respectively.
2. Variable definitions: *NFina* = net financing activities; *NEquity* = equity financing amount; *NDebt* = debt financing amount; $LevDeD_{t-1}$ = a dummy variable of prior over-leverage deficit; $AbAC_{t-1}$ = prior earnings quality; *HUnce* is a dummy variable that is 1 if firm is in high environmental uncertainty group, 0 otherwise; $LevDeD_{t-1}AbAC_{t-1}HUnce$ = interaction term of prior over-leveraged firm, earnings quality and environmental uncertainty; $RM1_{t-1}$ = prior real earnings management, is calculated by multiplying the abnormal discretionary expense with -1 and then adding abnormal production costs; $RM2_{t-1}$ = prior real earnings management, which is calculated by multiplying the sum of abnormal discretionary expense and abnormal cash flow from operations with -1; $LevDeD_{t-1}RM1_{t-1}HUnce$ = interaction term of prior over-leveraged firm, real earnings management and environmental uncertainty; $LevDeD_{t-1}RM2_{t-1}HUnce$ = interaction term of prior over-leveraged firm, real earnings management and environmental uncertainty; *DRisk* = default risk; *StoR* = stock returns.
3. P values are in parentheses.

5. Conclusion

The capital structure theory indicates that the security reissuing ability of the firm decreases as the firm's actual capital structure deviates from the target capital structure and that over-leveraged firms tend to issue equity to reduce the leverage deficit and then finance the needs of investment opportunities. The firm with higher accounting quality tends to adopt equity financing. Although some studies investigate the effect of the leverage deficit on the financing choice, the related literature focusing on the relationship between the leverage deficit and earnings quality is scarce. This study aims to investigate the impact of the relationship between the firm's accounting quality and leverage deficit on the financing activities of the firm.

The results indicate that if the firm has a leverage deficit, regardless of whether it is over-leveraged or under-leveraged, the earnings quality will be better. The under-leveraged firm with poorer earnings quality and the over-leveraged firm with better earnings quality tend to adopt equity financing. Moreover, because previous studies on earnings management largely focus on discretionary or abnormal accruals, this study considers both accrual-based and real earnings management to verify the role of earnings management in the financing choice or activities of over- and under-leveraged firms. We find that the firm tends to use both accrual-based and real earnings management before external financing activities. The firm tends to use the accrual-based method before choosing equity financing, but the firm tends to engage in real earnings management before choosing debt financing and conducting debt activities. Compared with the under-leveraged firm, the over-leveraged firm will be more unlikely to engage in real earnings management when making the debt financing choice and activities, as well as conducting external financing activities; however, the over-leveraged firm will be more unlikely to engage in the accrual-based earnings management when making the equity financing choice.

The organization's external competition possibly affects the operating performance of the firm, providing incentives to the managers to implement earnings management to reduce reported earnings fluctuations. The measurement of the integrated risk of the firm covers the diversified and nondiversified risks. The higher default risk of the overleveraged firm will affect the integrated risk. When the integrated risk management is worse, the management has the potential incentive to implement real earnings management practices that are difficult for auditors and authorities to perceive. Future studies may explore the effects of both product competition and abnormal enterprise risk management on earnings quality.

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Notes

Note 1. Firms aggressively rebalance leverage toward the target in some but not all states of the world, however.

Note 2. An overleveraged firm (underleveraged firm) is one whose actual debt ratio is higher (lower) than its target debt ratio.

Note 3. Two major theories of firm financing decisions—the market timing and the investment-based theories—expect that stock returns will be lower after issuing securities. However, the two theories differ in terms of the explanation. The market timing theory argues that the manager successfully issues securities by mispricing; hence, abnormal negative returns tend to follow equity issues because managers issue equity when equity is overpriced. Alternatively, the real investment-based theory argues that the stock price effectively responds to changes in risk when a firm raises external capital and thus results in negative returns after issuing securities because the manager converts growth options into real assets or responds to changes in the cost of capital.

Note 4. Using accruals quality as a proxy for earnings quality, Ghosh and Moon (2010) documented a non-monotonic relation between debt and earnings quality and suggest that firms that rely heavily on debt financing may be willing to bear higher costs of borrowing from lower earnings quality because the benefits from avoiding potential debt covenant violations exceed the higher borrowing costs.

Note 5. Gunny (2005) myopically exploited investing in R&D, price discounts to temporarily boost sales, and disposal of long-lived assets as a real earnings management tool and finds that real earnings management negatively affects subsequent earnings and operating cash flows. Graham, Harvey, and Rajgopal (2005)) suggested that managers prefer real earnings management activities to accrual-based earnings management. This is the case for real management activities because they have a greater probability of going undetected, although the consequences of such activities can be economically significant to the firm.

Note 6. Rajgopal and Venkatachalam (2011) indicated that the basis of this method is that if a firm's accruals deviate significantly from the level determined by firm fundamentals, such deviations are deemed abnormal, and such abnormal accruals are assumed to reduce the quality of accruals and earnings.

Note 7. For the preceding explanatory variables, we reference Hovakimian, Opler, and Titman (2001) and Goyal, Lehn, and Racic (2002).

Note 8. Untabulated results show that earnings quality *AbAC* is unrelated to both the current and previous leverage deficits.

Note 9. Untabulated results also indicate that when we use the net external financing dummy variable as the dependent variable rather than net financing activities, the evidence is consistent with those in net external financing activities.