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External financing and earnings management: Evidence from international data

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ABSTRACT

Corporate financing conditions in the external capital market are significantly affected by information asymmetry, while internal financing is not. Given that earnings information influences market perceptions regarding firms' quality, firms relying on external financing should have incentives to manage earnings to improve their financing conditions. This study investigates the effect of corporate external financing behavior on earnings management. Using a sample comprising 75,790 observations of 12,874 firms in 43 countries, we find that accrual-based and real earnings management are positively associated with firms' reliance on external financing. This positive relationship holds especially true for firms that rely on equity rather than debt financing. We argue that reliance on external financing (especially equity financing), which is subject to problems arising from information asymmetry, generates a motive for earnings management.

1. Introduction

A noble survey by Dechow et al. (2010) suggests recent literature has devoted increasing attention to cross-country variation in earnings management. Among the various factors potentially associated with earnings management, corporate financing patterns reveal wide variation in international data settings. The development of financial markets, which differs significantly across countries, affects the availability of external financing considerably. Meanwhile, internal financing comprises a significant portion of mature companies' financing (DeAngelo et al., 2006). Business or family groups that exert predominant economic power in emerging markets may also rely on the internal capital market. Nevertheless, previous international studies have not intensively examined the relationship between corporate financing and earnings management, although numerous single-country analyses have suggested firms manage earnings when they issue equity (Teoh et al., 1998a, b; Rangan, 1998; Nagata, 2013; Gao et al., 2017; Chang and Lin, 2018). This research attempts to fill this void.

It is well-documented that financing conditions in the external capital market are highly susceptible to information asymmetry, while internal financing is not. Given that earnings information influences market perceptions of firms' quality, firms that rely on external financing should have incentives to manage earnings to improve their financing conditions. Firms also make accounting information-based contracts with bond holders (debt covenants) when they issue public debt, and those issuing bonds are likely to manage their reported earnings to avoid violating debt covenants (Zmijewski and Hagerman, 1981; Tran and Ashraf, 2018). These facts naturally give rise to the prediction that firms turning to external capital markets engage in earnings management.

Our study addresses this issue by analyzing 75,790 observations of 12,874 firms from 43 countries. One possible reason little

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research has been conducted on this topic is the difficulty encountered in collecting announcements of corporate external financing across many countries. We address this issue by implementing firm-fixed effects model estimations of earnings management that adopt external-to-internal capital ratios as a key independent variable. The external-to-internal capital ratio should increase when a firm raises its debt or equity capital. If external financing motivates earnings management, firms manage earnings more closely when their external-to-internal capital ratio increases. Consistent with this hypothesis, we find that earnings management is positively related to external-to-internal capital ratios. When we decompose external capital into debt and equity, we find that only the equity-to-internal capital ratio has a significantly positive relationship with earnings management. Shareholders are residual claimers, and their returns are more sensitive to firm performance than those of creditors, who are fixed claimers. Stated differently, equity issues are more vulnerable to information asymmetry than debt-related issues (Myers and Majluf, 1984; Holderness, 2018). Thus, accounting information likely plays an important role, especially in firms' equity issues; therefore, equity issuers have a strong incentive to engage in earnings management.

This research makes a distinctive contribution to the literature by showing that firms' reliance on external financing (especially equity financing) is associated with earnings management. To address this issue, we create new variables (external-to-internal capital ratios) and provide robust evidence that the variables are significantly related to earnings management in an international data setting. Importantly, this relationship is more evident for the equity-to-internal capital ratio than for that of debt-to-internal funds. We argue that evidence from international data is particularly important, since reliance on external financing varies widely between countries, and a significant portion of this variation is likely attributable to exogenous factors such as economic conditions and capital market developments. Overall, our analyses present evidence of the information asymmetry-based explanation of corporate earnings management; accounting information plays an important role in a capital market with serious information asymmetry, and this fact motivates firms to manage their earnings. Meanwhile, our work provides cross-country evidence regarding the adverse consequences of corporate external financing behaviors; the tendency to acquire external capital engenders opportunistic corporate motivations that decrease the efficiency of capital allocation and hinder the sustainable development of the capital market. Countries with high external financing ratios must strengthen their level of transparency regarding disclosure.

The remainder of this paper is organized as follows. Section 2 proposes the research hypotheses. Section 3 presents the methodology of this study. Section 4 describes the sample selection and presents descriptive statistics. The empirical results are reported in Section 5. Section 6 concludes the paper.

2. Hypotheses development

Pecking order theory suggests that firms prefer internal funds to finance their investment opportunities rather than external financing (Myers and Majluf, 1984). This theory implies that market imperfection (information asymmetry) imposes higher costs of capital on firms that rely on external financing. However, firms must look to external capital markets when they cannot finance profitable growth opportunities through internal funds. Frank and Goyal (2007) examined the cash flow statements of U.S. non-farm and non-financial companies and found that net equity and debt issues accounted for 0.9 percent of total assets during the period 2000–2002, while total internal funds occupied 5.5 percent of total assets.¹

In capital markets suffering from information asymmetry, earnings information will influence investors' perception of firms' fundamental performance. As a result, firms issuing new equity are likely to manage reported earnings to improve their financing conditions and increase their proceeds (Teoh et al., 1998a, b; Rangan, 1998; Nagata, 2013; Gao et al., 2017). In a similar vein, firms issuing debt will manage their earnings to decrease interest rates. Trueman and Titman (1988) demonstrate that firms issuing debt smoothen their earnings. Contracts between creditors and firms also incentivize insiders to engage in earnings management. It is well known that firms make debt covenants when issuing bonds to mitigate the agency costs of debt (Jensen and Meckling, 1976; Myers, 1977; Guay, 2008). Debt covenants are commonly designed based on accounting measures, and firms violating their covenants are penalized (e.g., immediate repayment). This fact motivates bond issuers to manage their reported earnings (Zmijewski and Hagerman, 1981; Rhodes, 2016). These discussions give rise to the following hypothesis:

Hypothesis 1. Firms that rely relatively more on external financing are more likely to engage in earnings management than those that rely relatively more on internal financing.

Based on pecking order theory, firms with external financing needs prefer the debt market over seasoned equity offerings because bond issuance incurs relatively low costs in terms of information asymmetry. These external financing patterns are associated with varying levels of severity regarding information asymmetry, and thus presumably exhibit different effects on corporate earnings management. Thus, our research decomposes the overarching concept of external financing into debt and equity financing to examine whether debt and equity have different effects on earnings management.

Based on this idea, we hypothesize that equity financing has stronger impacts on earnings management than debt financing. The returns of shareholders, who have residual claims on firms' cash flow, are more sensitive to firm performance than those of creditors, who have fixed claims. Therefore, the conditions of equity financing are more vulnerable to problems arising from information asymmetry (e.g., adverse selection) than those of debt financing (Myers and Majluf, 1984; Holderness, 2018). Furthermore, debt financing has several characteristics that decrease the importance of accounting information. Firms can issue debt at low interest

¹ External financing also provides firms with various benefits. Almeida and Wolfenzon (2005) show evidence that the use of external financing improves the efficiency of capital allocation. Chen et al. (2010) suggest external financing improves issuers' corporate governance.

rates by providing collateral. Banks are typically viewed as informed investors that can closely monitor borrowers via more inexpensive means (Jensen, 1986; Diamond, 1991; Rauh and Sufi, 2010; Huang et al., 2018). Thus, we present the following hypothesis regarding the impacts of different patterns of external financing on corporate earnings management.

Hypothesis 2. External equity financing is more likely to be associated with earnings management than external debt financing.

3. Methodology

3.1. Measures of earnings management

3.1.1. Accrual-based earnings management

This research adopts accrual-based and real earnings management measures to test the hypotheses. For the accrual-based measure, we adopt discretionary accruals, which have been commonly used in previous research (Dechow et al., 2010). Discretionary accruals are suitable for our research because they compute the level of earnings management without any a priori assumptions concerning the goal of earnings management.² Following previous studies (Dechow et al., 1995; Kothari et al., 2005; Harakeh et al., 2019; Campa, 2019), we use the Modified Jones Model to estimate non-discretionary accruals (the predicted value of Eq. (1)), and then compute the discretionary accruals by deducting them from the total accruals.

$$\frac{TA_{i,t}}{Assets_{i,t-1}} = \beta_0 + \beta_1 \left(\frac{1}{Assets_{i,t-1}} \right) + \beta_2 \left(\frac{\Delta Sales_{i,t} - \Delta AR_{i,t}}{Assets_{i,t-1}} \right) + \beta_3 \left(\frac{PPE_{i,t}}{Assets_{i,t-1}} \right) + \beta_4 (ROA_{i,t-1}) + \varepsilon_{i,t} \quad (1)$$

where subscript i and t represent firm and year, respectively. Δ denotes the change from the previous year. *Assets* is total assets; *Sales* is annual sales; *AR* refers to net accounts receivable; *PPE* represents total fixed assets; *ROA* is return on assets, which is included in the model as suggested by Kothari et al. (2005); and *TA* is total accruals, which are calculated using Eq. (2), according to Dechow et al. (1995) and Pavlopoulos et al. (2019).³

$$TA = (\Delta Total\ current\ assets - \Delta Cash\ and\ cash\ equivalents) - (\Delta Total\ current\ liabilities - \Delta Short - term\ debt - \Delta Income\ taxes\ payable) - Depreciation\ expenses \quad (2)$$

We follow Francis et al. (2013) and estimate Eq. (1) with country, year, and industry fixed effects for the entire sample. Thus, discretionary accruals (*AEM*) are measured based on the difference between the *TA* (scaled by assets) and the non-discretionary accruals, which are calculated using the estimated coefficients of Eq. (1).

3.1.2. Real earnings management

Recent earnings management research uses both real earnings management and discretionary accruals. Following Roychowdhury (2006), we compute real earnings management measures in three dimensions: sales manipulation, overproduction, and reduction of discretionary expenditures. First, firms could increase their sale revenues by providing price discounts or more lenient credit terms. Excessive production provides firms with a means of lowering the fixed costs per unit, thus boosting earnings. Finally, firms can report high current earnings by reducing their discretionary expenses, such as those incurred in R&D, advertising, and SG&A. Accordingly, we adopt the following models to estimate real earnings management, as shown in Eq.s (3) to (5).

$$\frac{CFO_{i,t}}{Assets_{i,t-1}} = \beta_0 + \beta_1 \left(\frac{1}{Assets_{i,t-1}} \right) + \beta_2 \left(\frac{Sales_{i,t}}{Assets_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t} \quad (3)$$

$$\frac{PROD_{i,t}}{Assets_{i,t-1}} = \beta_0 + \beta_1 \left(\frac{1}{Assets_{i,t-1}} \right) + \beta_2 \left(\frac{Sales_{i,t}}{Assets_{i,t-1}} \right) + \beta_3 \left(\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} \right) + \beta_4 \left(\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t} \quad (4)$$

$$\frac{DISEXP_{i,t}}{Assets_{i,t-1}} = \beta_0 + \beta_1 \left(\frac{1}{Assets_{i,t-1}} \right) + \beta_2 \left(\frac{Sales_{i,t-1}}{Assets_{i,t-1}} \right) + \varepsilon_{i,t} \quad (5)$$

where *CFO* represents the cash flow from operations; *PROD* is the production costs, including the costs of goods and changes in inventory; and *DISEXP* denotes discretionary expenses, such as those required for R&D. We follow Siriviriyakul (2015) and Haga et al. (2019) to estimate these models with year and firm-fixed effects for the entire sample. This method is advantageous in mitigating omitted variable bias in original real earnings management measures. The residuals from Eq.s (3) to (5) represent the abnormal level of cash flow from operations (Ab_CFO), production costs (Ab_PROD), and discretionary expenses (Ab_DISEXP). To obtain a unified direction and capture the total measure of real earnings management (*REM*), we follow prior literature (Cohen et al., 2008; Cohen

² For instance, earnings persistence as a measure of earnings management requires the assumption that firms can improve conditions of their external financing by reporting less persistent earnings (earnings that are not related to previous earnings). If we use earnings smoothness, we have to assume that less volatile earnings can increase the offering price of new security issues.

³ If an observation does not report information on some items (such as *Cash and cash equivalents*, *Short-term debt* or *Income taxes payable*), the changes in these variables are assumed to be zero (Leuz et al., 2003; Burgstahler et al., 2006).

Table 1
Definitions of the variables.

Variables	Definitions
Dependent variables	
<i>AEM</i>	The signed value of accrual-based earnings management
<i>REM</i>	The signed value of real earnings management
Independent variables	
<i>EX_FIN_1</i>	Total long-term interest-bearing debt and capital from common stocks divided by retained earnings
<i>EX_FIN_2</i>	Total long-term interest-bearing debt, current long-term debt, other short-term debt, and capital from common stocks divided by retained earnings
<i>DEBT_FIN_1</i>	Total long-term interest-bearing debt divided by retained earnings
<i>DEBT_FIN_2</i>	Total long-term interest-bearing debt, current long-term debt, and other short-term debt divided by retained earnings
<i>EQUITY_FIN</i>	Capital from common stocks scaled by retained earnings
Independent variables (for robustness test)	
<i>EX_ASSET_1</i>	Total long-term interest-bearing debt and capital from common stocks divided by total assets
<i>EX_ASSET_2</i>	Total long-term interest-bearing debt, current long-term debt, other short-term debt, and capital from common stocks divided by total assets
<i>DEBT_ASSET_1</i>	Total long-term interest-bearing debt divided by total assets
<i>DEBT_ASSET_2</i>	Total long-term interest-bearing debt, current long-term debt, and other short-term debt divided by total assets
<i>EQUITY_ASSET</i>	Capital from common stocks scaled by total assets
Firm-level controlling variables	
<i>SIZE</i>	Natural logarithm of the firm's total assets
<i>REV_GROWTH</i>	Percentage growth in sales from the previous year
<i>LOSS</i>	A dummy variable that equals one if the firm's net income is negative, and zero otherwise
Country-level controlling variables	
<i>WGI</i>	Country's worldwide governance indicators from the World Bank
<i>MIP</i>	Country's strength of minority shareholder protections from the World Bank
<i>ADRI</i>	Country's measure of anti-director rights index from Djankov et al. (2008)
<i>CRI</i>	Country's measure of creditor rights index from Djankov et al. (2007)
<i>MCAP</i>	Country's aggregate stock market capitalization scaled by GDP from the World Bank
Instrumental variables	
<i>DIVIDEND</i>	Dividend payments scaled by net income
<i>ASSET_GROWTH</i>	Percentage growth of total assets from the previous year
<i>m_EX_FIN_1</i>	Mean <i>EX_FIN_1</i> for other companies in the same country and industry
<i>m_EX_FIN_2</i>	Mean <i>EX_FIN_2</i> for other companies in the same country and industry

and Zarowin, 2010; Zang, 2012; Lo et al., 2017) and aggregate *Ab_PROD*, *Ab_CFO* (multiplied by -1), and *Ab_DISEXP* (multiplied by -1).

Many previous studies use the absolute value of the earnings management measure, since firms may conduct both upward and downward earnings management for different purposes (Warfield et al., 1995; Firth et al., 2007). Meanwhile, the signed value of earnings management measures will increase the reliability of empirical analyses when we can identify a specific incentive for earnings management (Haga et al., 2019; Huang et al., 2019). Firms are likely to engage in income-increasing earnings management when they issue securities (Teoh et al., 1998a, b; Rangan, 1998). Accordingly, we use the signed value of our proxy for accrual-based and real earnings management (*AEM* and *REM*, respectively). Higher values indicate more aggressive income-increasing earnings management. Definitions of the variables are presented in Table 1.

3.2. Research design

To test Hypothesis 1, we conduct firm-level regression analyses of *AEM* and *REM*. Specifically, we estimate Eq.s (6) and (7) as follows:

$$AEM_{i,t} = \alpha_1 \times EX_FIN_n_{i,t} + \alpha_2 \times SIZE_{i,t} + \alpha_3 \times REV_GROWTH_{i,t} + \alpha_4 \times LOSS_{i,t-1} + \eta_i + \lambda_t + \mu_{i,t} \quad (6)$$

$$REM_{i,t} = \alpha_1 \times EX_FIN_n_{i,t} + \alpha_2 \times SIZE_{i,t} + \alpha_3 \times REV_GROWTH_{i,t} + \alpha_4 \times LOSS_{i,t-1} + \eta_i + \lambda_t + \mu_{i,t} \quad (7)$$

where subscripts *i* and *t* indicate the firm and year, respectively. η and λ are the firm and year fixed effects.

Since Hypothesis 1 highlights the difference between external and internal financing, the key independent variable measures firms' relative reliance on external financing to internal financing (*EX_FIN_n*, $n = 1, 2$): *EX_FIN_1* = (total long-term interest-bearing debt + capital from common stocks) / retained earnings; *EX_FIN_2* = (total long-term interest-bearing debt + current long-term debt + other short-term debt + capital from common stocks) / retained earnings. *EX_FIN_1* represents the ratio of long-term external capital to internal funds, whereas *EX_FIN_2* captures the ratio of total external capital to internal funds. We compute the ratios annually for each sample company. Time-series changes in these measures are likely to capture firms' financing behaviors. For example, these measures should decline if the firm retained earnings without raising any external capital. We estimate these models mainly using firm-fixed effects (η_i) to capture how earnings management changes when a given firm increases or decreases its external financing. The firm-fixed effects model is also advantageous in controlling for time-invariant firm, industry, and country characteristics, such as corporate or national culture, legal regime, accounting rules, and so on.⁴ Given that institutional

characteristics likely affect corporate earnings management, we also implement Ordinary Least Squares (OLS) estimations that explicitly control for country-level characteristics such as governance indicators (*WGI*), minority shareholder protection (*MIP*), the development of the stock market (*MCAP*), and so on.

We include several typical control variables commonly employed in the previous literature. Large firms are subject to intensive external monitoring and have strict internal control mechanisms. As a result, large firms tend to report fewer managed earnings (Dechow and Dichev, 2002; Holland and Jackson, 2004). In contrast, Watts and Zimmerman (1978) suggest large firms have a significant impact on public welfare, and therefore confront significant political intervention. This fact gives large companies an incentive to decrease their reported earnings to reduce their social and political visibility. We include the natural logarithm of total assets (*SIZE*) as a proxy for firm size. Further, percentage growth in sales from the previous year (*REV_GROWTH*) is adopted to control for the effect of a firm's revenue growth on earnings management (Francis and Wang, 2008). Finally, firms with high risk of financial distress are likely to inflate their reported earnings. Thus, we include a dummy variable that takes a value of one for firms with negative net incomes in the previous year, and zero otherwise (*LOSS*), as suggested by Hayn (1995) and Vafeas (2000).

Hypothesis 2 predicts that earnings management is more pronounced for equity financing than for debt financing. To address this issue, we execute regression analyses for Eq.s (8) and (9) as follows.

$$AEM_{i,t} = \alpha_1 \times DEBT_FIN_n_{i,t} + \alpha_2 \times EQUITY_FIN_{i,t} + \alpha_3 \times SIZE_{i,t} + \alpha_4 \times REV_GROWTH_{i,t} + \alpha_5 \times LOSS_{i,t-1} + \eta_i + \lambda_t + \mu_{i,t} \quad (8)$$

$$REM_{i,t} = \alpha_1 \times DEBT_FIN_n_{i,t} + \alpha_2 \times EQUITY_FIN_{i,t} + \alpha_3 \times SIZE_{i,t} + \alpha_4 \times REV_GROWTH_{i,t} + \alpha_5 \times LOSS_{i,t-1} + \eta_i + \lambda_t + \mu_{i,t} \quad (9)$$

These models employ the ratio of debt capital to internal financing (*DEBT_FIN_n*, $n = 1, 2$) and the reliance on equity financing relative to internal funding (*EQUITY_FIN*): *DEBT_FIN_1* = total long-term interest-bearing debt / retained earnings; *DEBT_FIN_2* = (total long-term interest-bearing debt + current long-term debt + other short-term debt) / retained earnings; *EQUITY_FIN* = capital from common stocks / retained earnings.

4. Sample selection and descriptive statistics

We collect sample observations from the Osiris database produced by Bureau van Dijk Electronic Publishing. Our data cover the period from 2002 to 2014. We delete observations with negative external-to-internal capital ratios since these firms have negative values for capital from common stocks and retained earnings. In addition, observations with unavailable necessary data are excluded. Following Leuz et al. (2003) and Francis et al. (2013), companies from the financial and utility sectors are also deleted. Following these procedures, the final sample comprises 75,790 observations of 12,874 distinct companies from 43 countries.⁵ We winsorize continuous variables at the 1st and 99th percentiles.

Figs. 1 and 2 exhibit the mean values of external-to-internal capital ratios by country, which we adopt as measures of corporate reliance on external financing. They clearly indicate that the external-to-internal capital ratios differ considerably across countries. Developed countries, such as Japan, the United Kingdom, and the United States, have relatively low external-to-internal capital ratios, likely because companies in these countries are relatively mature and have accumulated large retained earnings. Conversely, emerging markets, such as Hong Kong, Mexico, and South Africa have low external-to-internal capital ratios, possibly because family business groups with internal capital markets prevail in those areas. Finally, some developing economies, such as those found in Brazil, India, and Taiwan show relatively high reliance on external financing. Firms in those economies likely look to the external capital market to finance their growth opportunities. The wide variation in the external-to-internal capital ratio, of which a significant portion is likely attributable to exogenous factors, positions the international nature of our data as particularly advantageous in testing our hypotheses.

Table 2 shows the descriptive statistics used for the key dependent and independent variables by country. Observations in some developing economies, such as Brazil, Taiwan, and Greece, show relatively high levels of earnings management (especially for *REM*). As mentioned in the discussion on Figs. 1 and 2, these countries present a comparatively strong reliance on external capital. In contrast, some developed countries with a weak tendency for external financing as shown in Figs. 1 and 2 (e.g., Ireland, the United States, and Finland) have a low magnitude of earnings management. Broadly, the country-level data engender a positive correlation between proxies for earnings management and external-to-internal capital ratios (not reported), which provides preliminary support for Hypothesis 1. However, the country-level correlation does not sufficiently control for differences in various characteristics (both in country and firm levels). We conduct firm-fixed effects model estimations to address this concern. Table 2 also indicates that the United States and Japan dominate in their numbers of both observations and firms, while only a few observations are available from Ecuador and Uruguay. The latter portion of this paper will validate the robustness of the sample. Countries such as Argentina, New Zealand, and Uruguay show extremely high *REM* in absolute value, suggesting abnormal values still exist. The same problem also

⁴ Therefore, our main analyses do not include country-level indices such as anti-director rights index (*ADRI*), disclosure requirements, and other measures of institutional characteristics, which are commonly adopted in international research (Francis et al., 2013; Haga et al., 2019).

⁵ The number of countries to be analyzed is even more than that of Leuz et al.'s (2003); Haw et al.'s (2004), and Francis et al.'s (2013) sample (31, 22, and 42 countries).

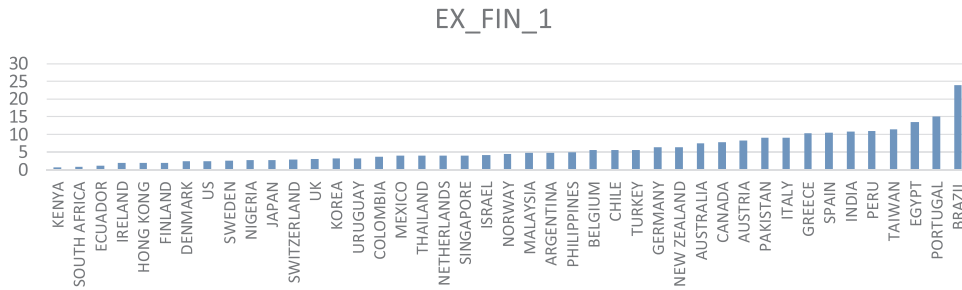


Fig. 1. Mean external-to-internal capital ratio (*EX_FIN_1*) by country.
Notes: The sample comprises 75,790 observations of 12,874 companies from 43 countries.

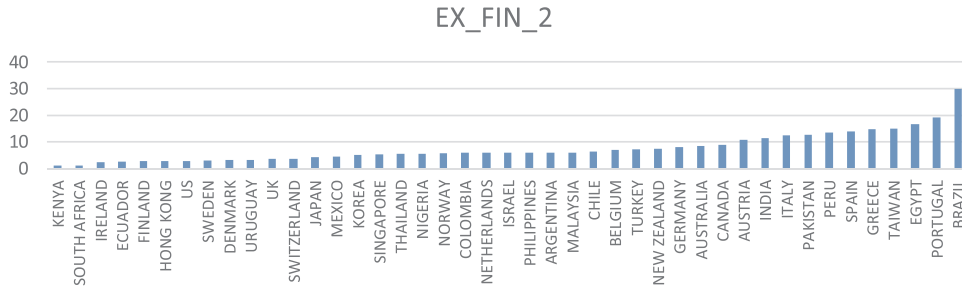


Fig. 2. Mean external-to-internal capital ratio (*EX_FIN_2*) by country.
Notes: The sample comprises 75,790 observations of 12,874 companies from 43 countries.

exists for *AEM* from Ecuador. Additional analyses will be implemented by removing observations that have abnormally high/low earnings management variables.

Table 3 presents firm-level correlations among the key variables. Consistent with Hypotheses 1 and 2, firms’ external-to-internal capital ratios are positively and significantly related to the measures for earnings management. The correlations among the other variables are generally low (not reported), and serious multi-collinearity problems are less likely to exist.

5. Empirical results

5.1. Effect of external financing on earnings management

Table 4 reports the regression results for the entire sample (firm-fixed effects model). Throughout the following analyses, the regression tables present the standardized coefficients. Models (1) and (2) adopt *AEM* as a proxy for accrual-based earnings management, whereas Models (3) and (4) use *REM* to examine firms’ real earnings management.

In Table 4, we find that the external-to-internal capital ratio is positively associated with accrual-based and real earnings management. For all models, the estimated coefficients on *EX_FIN_1* and *EX_FIN_2* are statistically significant at the 1% level. The results support Hypothesis 1, suggesting that firms raising external capital have an incentive to manage reported earnings. In contrast to internal financing, external financing is subject to problems with information asymmetry. Accounting information will affect firms’ external financing conditions by providing investors with relevant information regarding issuing companies. This fact is likely to incentivize firms conducting external financing to simultaneously conduct accrual-based and real earnings management. The coefficients presented suggest that a one standard deviation increase in external financing raises earnings management measures by 2–4 % of their standard deviation. Although the marginal effect is not as large as that of *SIZE* and *LOSS*, external financing variables have a larger impact on accruals than *REV_GROWTH*. We argue that external financing is an important factor associated with earnings management.

Table 4 also indicates that the magnitude of standardized coefficients on external financing variables is greater for regressions of *AEM* than for those of *REM*.⁶ This finding suggests that firms’ external financing activities trigger more accrual-based earnings management relative to real earnings management. Accrual-based management uses discretion over accounting recognition (Gunny, 2010). In contrast, real earnings management may cause long-term negative consequences because it alters the timing and structuring of any underlying activities (Cohen and Zarowin, 2010; Kothari et al., 2016). Accordingly, firms raising external capital, which are also likely to have investment plans, rely on accrual-based earnings management.

Regarding the control variables, *LOSS* has a positive and significant impact on corporate earnings management in all models. Poor

⁶ In a robustness test (not reported), we keep the number of sample observations balanced between *AEM* regressions (69,784) and *REM* regressions (69,784). The direction and magnitude of the key variables are not qualitatively changed.

Table 2
Descriptive statistics for key variables (country-level mean value).

Country	Num_obs	Num_firm	AEM	REM	EX_FIN_1	EX_FIN_2	DEBT_FIN_1	DEBT_FIN_2	EQUITY_FIN
ARGENTINA	144	25	-0.006	0.465	4.806	6.131	1.421	2.746	3.251
AUSTRALIA	2023	381	-0.149	-0.294	7.443	8.460	2.263	3.206	4.814
AUSTRIA	358	58	0.007	0.054	8.301	10.766	4.219	6.948	2.552
BELGIUM	387	77	-0.015	0.039	5.496	7.058	2.732	4.660	2.190
BRAZIL	133	59	-0.046	0.356	23.968	30.013	10.190	15.538	11.788
CANADA	2086	410	0.007	0.249	7.753	8.801	2.180	3.058	4.686
CHILE	530	77	0.022	0.254	5.545	6.458	2.205	3.093	3.257
COLOMBIA	61	9	0.066	0.345	3.565	5.842	2.146	4.483	1.226
DENMARK	639	93	0.027	0.005	2.437	3.210	1.123	1.880	1.199
ECUADOR	6	1	-0.727	-0.816	1.150	2.476	0.629	1.955	0.521
EGYPT	475	82	-0.090	0.084	13.480	16.831	2.499	5.794	7.570
FINLAND	739	96	-0.051	-0.140	2.030	2.631	1.206	1.812	0.672
GERMANY	2240	413	-0.024	0.039	6.255	8.137	3.030	4.746	2.603
GREECE	726	157	0.045	0.302	10.296	14.748	5.057	9.438	4.509
HONG KONG	708	97	-0.018	0.256	2.029	2.839	0.794	1.532	0.994
INDIA	6943	1452	0.009	-0.080	10.689	11.499	7.255	8.116	2.472
IRELAND	196	30	-0.090	-0.024	1.995	2.356	1.618	1.980	0.377
ISRAEL	905	202	-0.014	0.254	4.234	5.950	3.245	5.010	0.811
ITALY	726	146	-0.036	0.259	8.965	12.448	4.748	8.110	3.695
JAPAN	17,140	2405	0.043	0.241	2.770	4.231	1.390	2.799	1.285
KENYA	74	16	-0.223	-0.281	0.653	1.110	0.279	0.735	0.374
KOREA	1285	217	0.060	0.366	3.205	5.089	1.957	3.778	1.140
MALAYSIA	3843	643	0.032	0.214	4.771	6.151	1.120	2.507	3.405
MEXICO	386	62	-0.045	0.189	3.846	4.487	1.366	1.874	2.255
NETHERLANDS	497	96	-0.058	-0.094	4.056	5.940	2.819	4.663	1.002
NEW ZEALAND	404	62	-0.113	-0.539	6.263	7.504	2.282	3.617	3.456
NIGERIA	97	25	-0.103	0.393	2.756	5.511	0.894	3.740	1.688
NORWAY	355	80	0.017	0.020	4.580	5.755	3.299	4.325	1.240
PAKISTAN	625	139	-0.083	0.207	8.929	12.814	3.621	7.373	4.080
PERU	413	74	-0.038	0.069	10.884	13.604	2.716	5.255	7.309
PHILIPPINES	531	96	0.021	0.250	4.898	6.118	1.323	2.510	3.176
PORTUGAL	151	26	-0.002	0.098	15.030	19.213	8.895	12.846	5.659
SINGAPORE	2385	442	-0.015	0.151	4.109	5.266	0.848	2.014	3.001
SOUTH AFRICA	1152	213	-0.156	-0.202	0.762	1.134	0.561	0.933	0.183
SPAIN	560	91	-0.013	0.150	10.513	13.988	6.636	9.976	3.618
SWEDEN	1091	213	-0.042	-0.003	2.522	3.192	1.633	2.283	0.788
SWITZERLAND	1023	143	-0.026	0.056	2.923	3.778	1.714	2.593	1.095
TAIWAN	3516	654	-0.003	0.268	11.496	14.945	2.660	6.218	7.916
THAILAND	1247	184	-0.047	0.178	3.908	5.438	1.582	3.100	2.147
TURKEY	634	153	-0.050	0.208	5.572	7.276	1.566	3.211	3.708
UNITED KINGDOM	3885	703	-0.051	-0.015	2.962	3.613	1.818	2.489	0.904
UNITED STATES	14,470	2271	-0.056	0.127	2.497	2.939	1.820	2.260	0.376
URUGUAY	1	1	0.165	0.480	3.220	3.220	0.219	0.219	3.001
Total	75,790	12,874	-0.013	0.124	4.913	6.212	2.392	3.672	2.134

This table presents the number of firm-year observations, the number of distinct firms, and the descriptive statistics of key variables by country. The sample comprises 75,790 firm-year observations (12,874 firms) from 43 countries for all key variables except for *REM*. Due to missing data when evaluating *REM*, the number of total firm-year observations for *REM* is 69,784 (12,792 firms) from 43 countries.

Table 3
Correlation matrix among key variables.

	AEM	REM	EX_FIN_1	EX_FIN_2	DEBT_FIN_1	DEBT_FIN_2	EQUITY_FIN
AEM	1						
REM	0.139***	1					
EX_FIN_1	0.140***	0.022***	1				
EX_FIN_2	0.139***	0.027***	0.980***	1			
DEBT_FIN_1	0.111***	0.013***	0.839***	0.817***	1		
DEBT_FIN_2	0.119***	0.024***	0.870***	0.905***	0.927***	1	
EQUITY_FIN	0.150***	0.026***	0.816***	0.809***	0.461***	0.563***	1

Notes: This table presents the pairwise correlation coefficients among the key variables. *, **, and *** indicate significance at 10 %, 5%, and 1%, respectively.

Table 4

Regression results of earnings management: Baseline.

Variables	AEM (1)		AEM (2)		REM (3)		REM (4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
EX_FIN_1	0.043***	11.06			0.019***	3.50		
EX_FIN_2			0.027***	7.17			0.017***	3.18
SIZE	-0.242***	-13.35	-0.243***	-13.35	0.029	1.12	0.028	1.10
REV_GROWTH	0.014***	4.30	0.013***	4.24	-0.047***	-10.65	-0.047***	-10.66
LOSS	0.288***	93.10	0.289***	93.35	0.007*	1.65	0.007*	1.67
Constant	-0.139***	-12.95	-0.138***	-12.86	0.080***	5.16	0.080***	5.15
Year FE	YES		YES		YES		YES	
Firm FE	YES		YES		YES		YES	
R ²	0.131		0.129		0.012		0.012	
N	75,790		75,790		69,784		69,784	

Notes: This table presents regression results of *AEM* and *REM* for the entire sample. In this table, we use *EX_FIN_1* or *EX_FIN_2* as the independent variables. All models adopt firm-fixed effects estimation. The estimated coefficients are reported in the standardized form. *, **, and *** indicate significance at 10 %, 5%, and 1%, respectively.

performance inevitably creates the incentive to boost accounting earnings.

5.2. Debt versus equity financing

Table 5 shows the estimation results when we separate debt from equity financing. Models (1) and (2) adopt *AEM* as an accrual-based earnings management variable, whereas Models (3) and (4) use *REM* to measure firms' real earnings management. We find that, except for Model (1), the coefficients of debt-to-internal capital ratios (*DEBT_FIN_1*; *DEBT_FIN_2*) are insignificant, whereas *EQUITY_FIN* has a positive and statistically significant coefficient in all models. Notably, *EQUITY_FIN* has a much larger coefficient than the debt variable (except Model (1)). The findings are consistent with Hypothesis 2, suggesting that equity financing is more vulnerable to information asymmetry than debt financing, thus giving equity issuers stronger incentives to manage reported earnings using both accruals and real activities than those issuing debt. Accounting information provides critical information, especially for new stock buyers who receive residual claims to the issuing firm's cash flow. Meanwhile, creditors can claim cash flow rights prior to shareholders, and protect themselves by making debt covenants and obtaining collateral. Overall, our results provide support for the information asymmetry-based explanation of corporate earnings management; firms manage earnings more closely when they are more reliant on financing methods, which are subject to information asymmetry.

Table 5 presents mixed results on the predominant method of earnings management for firms raising equity capital. Although Model (2) suggests that equity financing has a relatively large impact on accruals, the standardized coefficient of Model (1) is smaller than the coefficients for real earnings management (Models (3) and (4)). Given that Models (3) and (4) offer an insignificant coefficient for debt capital variables, the previous regression result (Table 4) reveals the relatively weak effect of external financing on real earnings management due to the similarly weak effect of debt financing (the standardized coefficients suggest almost no economic impacts). As discussed above, real earnings management may damage firms' fundamental value by altering their underlying corporate activities. Since debt financing is less vulnerable to problems of information asymmetry, debt issuers may not have a strong incentive to engage in real earnings management.

Table 5

Regression results of earnings management: Debt versus equity.

Variables	AEM (1)		AEM (2)		REM (3)		REM (4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
DEBT_FIN_1	0.040***	8.32			0.004	0.62		
DEBT_FIN_2			-0.002	-0.36			-0.003	-0.37
EQUITY_FIN	0.015***	3.10	0.037***	7.20	0.020***	2.88	0.024***	3.20
SIZE	-0.247***	-13.55	-0.233***	-12.75	0.032	1.25	0.035	1.34
REV_GROWTH	0.014***	4.31	0.014***	4.30	-0.047***	-10.62	-0.047***	-10.63
LOSS	0.288***	92.82	0.289***	93.20	0.007	1.61	0.007*	1.67
Constant	-0.141***	-13.13	-0.135***	-12.62	0.080***	5.20	0.081***	5.25
Year FE	YES		YES		YES		YES	
Firm FE	YES		YES		YES		YES	
R ²	0.131		0.132		0.012		0.012	
N	75,790		75,790		69,784		69,784	

This table indicates the regression results of *AEM* and *REM*. In this table, we use *DEBT_FIN_1* (or *DEBT_FIN_2*) and *EQUITY_FIN* as the independent variables. All models adopt firm-fixed effects estimation. The estimated coefficients are reported in the standardized form. *, **, and *** indicate significance at 10 %, 5%, and 1%, respectively.

5.3. Further analyses

5.3.1. Alternative dependent and independent variables

As a robustness test, we replicate the analyses using alternative measures of dependent and independent variables. Previous analyses use the entire sample to estimate Eq.s (1) and (3) – (5). Critics may claim that the estimation cannot accurately capture the discretionary earnings management, since different industries have varying business practices that generate different coefficients. To mitigate this concern, we estimate these models by industry, in accordance with the approach taken by many single-country studies (Teoh et al., 1998a, b; Chung et al., 2002), and repeat the previous analyses.⁷

The results are presented in Table 6. The findings indicate that *EX_FIN_1* and *EX_FIN_2* have positive and significant coefficients in both the *AEM* (Panel A) and *REM* (Panel B) analyses. Compared to those regarding *DEBT_FIN_1* and *DEBT_FIN_2*, the estimated coefficient for *EQUITY_FIN* remains significantly positive and is much larger in magnitude. Consistent with the results in prior analyses, these findings support the view that external financing enhances the incentive for both accrual and real earnings management. The motive is particularly strong when firms raise equity capital that is more subject to information asymmetry than debt financing.

We also replicate the analyses using the absolute value of earnings management measures. The untabulated results are materially unchanged for accrual-based earnings management, while we do not find a significant relationship between real earnings management and the external capital ratio. The mixed result is attributable to the fact that firms generally desire to boost reported earnings when they look to the external capital market, and also to the fact that firms tend to use accruals for earnings management to conduct fund-raising activities.

Regarding our key independent variable, we have deflated external capital (debt and equity) by retained earnings to highlight the difference between external and internal financing. There is a concern that the retained earnings are affected by firms' earnings and dividend payouts. Therefore, our external financing measures may absorb the influence of earnings management and the dividend policy. To address this concern, we replace the retained earnings with the total assets, and construct *EX_ASSET_1*, *EX_ASSET_2*, *DEBT_ASSET_1*, *DEBT_ASSET_2*, and *EQUITY_ASSET* as alternative independent variables. We re-conduct the aforementioned analyses using these alternative independent variables.

Table 7 shows these results. Panels A and B provide the estimation results when we use *AEM* and *REM* as proxies for earnings management, respectively. The coefficients for *EX_ASSET_1* and *EX_ASSET_2* remain significantly positive, indicating that firms raising more external capital are significantly associated with increased accrual-based and real earnings management. It is noteworthy that Panel A reveals significantly larger economic effects from external financing than previous regressions. Model (1) indicates that a one standard deviation increase of *EX_ASSET_1* raises discretionary accruals by approximately 30 % of its standard deviation. The result suggests that the effect of external financing on earnings management is not trivial. Previous tables found relatively minimal economic impacts, possibly because we scaled the external capital using internal funds while adopting the variable to distinguish the effect of external financing from simple leverage effects. When decomposing external financing into debt and equity financing, we consistently find positive and statistically significant coefficients on equity financing (*EQUITY_ASSET*), while *DEBT_ASSET_2* is not significantly associated with real earnings management. Moreover, except for Model (3) of Panel A, the magnitude of the coefficient for *EQUITY_ASSET* is larger than that for *DEBT_ASSET_1* or *DEBT_ASSET_2*. These results further support our prediction that firms have stronger incentives to manage their earnings when engaging more actively in equity financing.

5.3.2. Institutional characteristics and the effect of external financing on earnings management

Institutional environments, such as the legal system and disclosure requirements, influence problems arising from information asymmetry in the capital markets (Brockman and Chung, 2003). A well-functioning institutional setting imposes a high litigation risk and significant costs of a damaged reputation on opportunistic corporate behaviors (Leuz et al., 2003; Xiao, 2013; Larrain et al., 2017). Therefore, sophisticated institutional environments may effectively prevent insiders from extracting private benefits (La Porta et al., 1998; Claessens et al., 2002; Nenova, 2003; Dyck and Zingales, 2004; Gopalan and Jayaraman, 2012; Hwang et al., 2018), thereby allowing outside shareholders to realize adequate risk-adjusted returns. In contrast, it is extremely important for minority shareholders under weak institutional environments to identify the firms that are extracting private benefits. In such a situation, accounting information serves as an important source of information. Similarly, creditors need public information, such as that related to accounting, to know borrowers' financial soundness, especially in countries with weak institutional environments. Given that firms have stronger incentives to engage in earnings management as outside investors rely more heavily on accounting information, strong institutional environments will decrease the level of engagement in earnings management. In this section, we examine the relationship between external financing and earnings management when explicitly controlling for the influence of institutional environments. Furthermore, we test the idea that well-developed institutional environments attenuate the effect of external financing on earnings management.

To address the issue, we adopt five country-level institutional measures commonly used in previous studies (Leuz et al., 2003; Francis et al., 2013; Haga et al., 2019): Djankov et al.'s (2008) revised anti-director rights index (*ADRI*), Djankov et al.'s (2007) creditor rights index (*CRI*), institutional governance (*WGI*), minority investor's protection (*MIP*), and financial market development (*MCAP*). Numerous international studies use *ADRI*, which indicates the degree of legal investor protection. Minority shareholders are more capable of preventing their wealth from being expropriated by controlling shareholders as *ADRI* increases.⁸ We also include *CRI*

⁷ Industry classification is based on the two-digit Global Industry Classification Standard (GICS) code.

Table 6
Regression results of earnings management: Alternative dependent variables.

Panel A: Regression results of <i>AEM</i> computed by industry estimations								
Variables	(1)		(2)		(3)		(4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
<i>EX_FIN_1</i>	0.009**	2.19						
<i>EX_FIN_2</i>			0.013***	3.25				
<i>DEBT_FIN_1</i>					-0.012**	-2.53		
<i>DEBT_FIN_2</i>							0.004	0.86
<i>EQUITY_FIN</i>					0.021***	4.30	0.012**	2.22
<i>SIZE</i>	0.014	0.76	0.013	0.72	0.021	1.14	0.016	0.83
<i>REV_GROWTH</i>	0.191***	58.51	0.191***	58.54	0.191***	58.55	0.191***	58.55
<i>LOSS</i>	-0.034***	-10.60	-0.034***	-10.72	-0.034***	-10.57	-0.034***	-10.76
<i>Constant</i>	0.053***	4.84	0.053***	4.77	0.055***	5.00	0.053***	4.79
<i>Year FE</i>	YES		YES		YES		YES	
<i>Firm FE</i>	YES		YES		YES		YES	
<i>R</i> ²	0.075		0.075		0.073		0.075	
<i>N</i>	75,790		75,790		75,790		75,790	

Panel B: Regression results of <i>REM</i> computed by industry estimations								
Variables	(1)		(2)		(3)		(4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
<i>EX_FIN_1</i>	0.019***	7.03						
<i>EX_FIN_2</i>			0.019***	7.17				
<i>DEBT_FIN_1</i>					0.010***	2.93		
<i>DEBT_FIN_2</i>							0.009**	2.54
<i>EQUITY_FIN</i>					0.016***	4.59	0.015***	4.15
<i>SIZE</i>	0.134***	10.55	0.133***	10.48	0.135***	10.61	0.135***	10.60
<i>REV_GROWTH</i>	-0.145***	-65.94	-0.145***	-65.94	-0.145***	-65.90	-0.145***	-65.88
<i>LOSS</i>	0.017***	7.86	0.017***	7.80	0.017***	7.71	0.017***	7.70
<i>Constant</i>	-0.002	-0.30	-0.003	-0.37	-0.002	-0.31	-0.002	-0.32
<i>Year FE</i>	YES		YES		YES		YES	
<i>Firm FE</i>	YES		YES		YES		YES	
<i>R</i> ²	0.019		0.019		0.019		0.019	
<i>N</i>	69,784		69,784		69,784		69,784	

Notes: This table presents regression results of *AEM* (Panel A) and *REM* (Panel B) by adopting industry-level estimations for earnings management measurements. In this table, we use *EX_FIN_1*, *EX_FIN_2*, *DEBT_FIN_1*, *DEBT_FIN_2*, and *EQUITY_FIN* as the independent variables. All models adopt firm-fixed effects estimation. The estimated coefficients are reported in the standardized form. *, **, and *** indicate significance at 10 %, 5%, and 1%, respectively.

to examine whether the legal protection of creditors affects firms' incentives to manage earnings for debt financing. *WGI* is a composite measure for countries incorporating the following six broad dimensions of governance: (1) voice and accountability; (2) political stability and absence of violence; (3) government effectiveness; (4) regulatory quality; (5) rule of law; and (6) control of corruption. *MIP* is a country-level consolidated proxy for measuring the strength of minority investors' protection against the misuse of corporate assets by directors for their personal gain, as well as shareholder rights, governance safeguards, and corporate transparency requirements. Finally, *MCAP* is defined as a country's total stock market capitalization scaled by GDP. Countries with developed financial markets generally have effective regulations and enforcements regarding finance and disclosure. *WGI*, *MIP*, and *MCAP* are obtained from the World Bank website. High values indicate well-developed institutional environments. Given that these country-level measures are likely correlated, estimations include one of these variables and its interaction term with the external financing variable.

Table 8 presents regression results when we adopt *EX_FIN_2* as an external financing variable; Panel A adopts *AEM* as a dependent variable, while Panel B uses *REM*. To include the country-level variables, we adopt OLS with industry dummies. This analysis shows mixed results regarding the effect of institutional characteristics on earnings management. While Models (1) and (2) offer a negative and significant coefficient for the interaction term involving *EX_FIN_2*, the institutional characteristic variables themselves (*ADRI* and *CR1*) have a positive and significant coefficient in many of these estimations (these variables have a significantly positive coefficient even when the interaction term is removed). In marked contrast, Model (3) carries a positive and significant coefficient on the interaction term, while the country-level variable itself (*WGI*) has a negative and significant coefficient. The results are also mixed for

⁸ Most international accounting research uses the original anti-director rights index (Original *ADRI*), which was created by La Porta et al. (1998). However, the original index has been criticized recently for its coding problems (Spamann, 2010).

Table 7
Regression results of earnings management: Alternative independent variables.

Panel A: Regression results of AEM									
Variables	(1)		(2)		(3)		(4)		
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	
<i>EX_ASSET_1</i>	0.294***	43.10							
<i>EX_ASSET_2</i>			0.143***	20.18					
<i>DEBT_ASSET_1</i>					0.244***	40.31			
<i>DEBT_ASSET_2</i>							0.091***	14.62	
<i>EQUITY_ASSET</i>					0.199***	20.91	0.183***	18.85	
<i>SIZE</i>	-0.242***	-13.51	-0.261***	-14.37	-0.275***	-14.63	-0.205***	-10.73	
<i>REV_GROWTH</i>	0.018***	5.74	0.016***	4.96	0.017***	5.45	0.017***	5.28	
<i>LOSS</i>	0.282***	92.49	0.285***	92.25	0.282***	92.52	0.285***	92.42	
Constant	-0.161***	-15.25	-0.161***	-14.93	-0.167***	-15.76	-0.149***	-13.77	
Year FE	YES		YES		YES		YES		
Firm FE	YES		YES		YES		YES		
R ²	0.144		0.148		0.143		0.148		
N	75,790		75,790		75,790		75,790		

Panel B: Regression results of REM									
Variables	(1)		(2)		(3)		(4)		
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	
<i>EX_ASSET_1</i>	0.046***	4.70							
<i>EX_ASSET_2</i>			0.020**	2.01					
<i>DEBT_ASSET_1</i>					0.033***	3.83			
<i>DEBT_ASSET_2</i>							0.008	0.87	
<i>EQUITY_ASSET</i>					0.049***	3.54	0.045***	3.28	
<i>SIZE</i>	0.030	1.16	0.027	1.05	0.036	1.35	0.048*	1.78	
<i>REV_GROWTH</i>	-0.047***	-10.53	-0.047***	-10.62	-0.047***	-10.49	-0.047***	-10.51	
<i>LOSS</i>	0.007*	1.65	0.008*	1.80	0.007	1.64	0.008*	1.81	
Constant	0.078***	5.03	0.078***	5.02	0.079***	5.07	0.083***	5.27	
Year FE	YES		YES		YES		YES		
Firm FE	YES		YES		YES		YES		
R ²	0.011		0.012		0.011		0.012		
N	69,784		69,784		69,784		69,784		

Notes: This table presents the regression results of AEM (Panel A) and REM (Panel B) by adopting alternative independent variables. In this table, we use *EX_ASSET_1*, *EX_ASSET_2*, *DEBT_ASSET_1*, *DEBT_ASSET_2*, and *EQUITY_ASSET* as the independent variables. All models adopt firm-fixed effects estimation. The estimated coefficients are reported in the standardized form. *, **, and *** indicate significance at 10 %, 5%, and 1%, respectively.

MIP and *MCAP* (Models (4) and (5)). Untabulated analyses reveal an insignificant coefficient for the conformity between reported earnings and taxable income, of which the index is available from [Watrin et al. \(2014\)](#) and [Sundvik \(2017\)](#). Although we find mixed results for the effect of institutional setting on earnings management, [Table 8](#) consistently provides a positive and significant coefficient for *EX_FIN_2*, suggesting that our main hypothesis is supported when we explicitly control for the effect of institutional characteristics. The results are also materially unchanged when we use *EX_FIN_1*.

5.3.3. Endogeneity of external-to-internal capital ratio

Although we have treated the external-to-internal capital ratio as an exogenous variable, the ratio may be endogenously determined, depending on the characteristics and environments. Our results may be biased due to the endogeneity problem if the error term of the estimation equation is correlated with the external-to-internal capital ratio. One potential interpretation is that firms subject to information asymmetry rely less on external financing and manage earnings more closely. Although this interpretation predicts a negative correlation between earnings management and the external-to-internal capital ratio, we implement two-stage least squares (2SLS) regression analyses that treat the external-to-internal capital ratio as an endogenous variable to address potential concerns regarding endogeneity problems.

Firms' reliance on external financing is inevitably associated with their dividend policy, which affects the availability of internal funds. We adopt the dividend ratio (dividends over net income; hereafter denoted by *DIVIDEND*) as an instrumental variable. Firms must look to the external capital market as they undertake more investment projects. We include the percentage of assets growth (*ASSET_GROWTH*) as another instrumental variable. Further, we use the mean of the external-to-internal capital ratio for other observations in the same country and industry (*m_EX_FIN_1*; *m_EX_FIN_2*) as an instrument. This analysis adopts country-level institutional characteristic variables as well as industry dummies.

[Table 9](#) shows the 2SLS regression results when adopting *ADRI* as an institutional characteristic variable.⁹ Panels A and B measure earnings management using AEM and REM, respectively. In each Panel, Model (1) adopts *EX_FIN_1* as a proxy for reliance on external

Table 8

Regression results of earnings management: Controlling for institutional characteristics.

Panel A: Regression results of <i>AEM</i>										
Variables	(1)		(2)		(3)		(4)		(5)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
<i>EX_FIN_2</i>	0.090***	26.85	0.089***	26.54	0.090***	25.45	0.092***	25.58	0.088***	23.45
<i>ADRI</i>	0.071***	20.75								
<i>ADRI *EX_FIN_2</i>	-0.010***	-3.21								
<i>CRI</i>			-0.002	-0.64						
<i>CRI *EX_FIN_2</i>			-0.007**	-1.96						
<i>WGI</i>					-0.016***	-4.40				
<i>WGI*EX_FIN_2</i>					0.006**	2.04				
<i>MIP</i>							-0.036***	-9.93		
<i>MIP* EX_FIN_2</i>							0.002	0.62		
<i>MCAP</i>									-0.023***	-6.29
<i>MCAP*EX_FIN_2</i>									0.016***	3.39
<i>SIZE</i>	-0.083***	-24.18	-0.097***	-28.44	-0.093***	-26.67	-0.107***	-30.34	-0.093***	-26.31
<i>REV_GROWTH</i>	-0.029***	-8.51	-0.026***	-7.59	-0.027***	-7.86	-0.023***	-6.66	-0.024***	-6.58
<i>LOSS</i>	0.370***	109.97	0.367***	108.93	0.368***	108.80	0.364***	107.66	0.362***	102.14
<i>Constant</i>	-0.091***	-7.48	-0.098***	-7.99	-0.094***	-7.71	-0.102***	-8.37	-0.102***	-7.96
<i>Year FE</i>	YES		YES		YES		YES		YES	
<i>Industry FE</i>	YES		YES		YES		YES		YES	
<i>R²</i>	0.170		0.164		0.164		0.164		0.159	
<i>N</i>	75,790		75,790		75,790		75,790		68,930	

Panel B: Regression results of <i>REM</i>										
Variables	(1)		(2)		(3)		(4)		(5)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
<i>EX_FIN_2</i>	0.046***	16.52	0.047***	16.52	0.044***	14.83	0.043***	14.11	0.047***	14.69
<i>ADRI</i>	0.042***	14.82								
<i>ADRI *EX_FIN_2</i>	-0.015***	-5.95								
<i>CRI</i>			0.019***	6.80						
<i>CRI *EX_FIN_2</i>			-0.006**	-2.00						
<i>WGI</i>					-0.078***	-26.39				
<i>WGI*EX_FIN_2</i>					0.014***	5.83				
<i>MIP</i>							0.050***	16.63		
<i>MIP* EX_FIN_2</i>							-0.005	-1.46		
<i>MCAP</i>									0.027***	8.86
<i>MCAP*EX_FIN_2</i>									0.000	0.11
<i>SIZE</i>	0.067***	23.09	0.061***	21.36	0.078***	26.59	0.074***	24.74	0.059***	19.99
<i>REV_GROWTH</i>	-0.141***	-49.24	-0.140***	-48.83	-0.144***	-50.32	-0.144***	-50.05	-0.142***	-47.06
<i>LOSS</i>	0.038***	13.34	0.037***	13.04	0.043***	15.02	0.041***	14.27	0.037***	12.41
<i>Constant</i>	-0.029***	-2.73	-0.032***	-2.99	-0.018*	-1.74	-0.026**	-2.43	-0.044***	-3.99
<i>Year FE</i>	YES		YES		YES		YES		YES	
<i>Industry FE</i>	YES		YES		YES		YES		YES	
<i>R²</i>	0.022		0.022		0.035		0.027		0.023	
<i>N</i>	69,784		69,784		69,784		69,784		63,425	

Notes: This table presents regression results of *AEM* (Panel A) and *REM* (Panel B) by considering the effects of country-level factors on earnings management. In this table, we use *EX_FIN_2* as the independent variable. The estimated coefficients are reported in the standardized form. *, **, and *** indicate significance at 10 %, 5%, and 1%, respectively.

financing, while Model (2) uses *EX_FIN_2*. These variables are employed as dependent variables in the first-stage regressions. The first-stage regression results indicate that the external-to-internal capital ratio is positively and significantly associated with the *DIVIDEND* and country-industry mean of the external-to-internal capital ratio. Although we do not find a significant relationship between *ASSET_GROWTH* and the external-to-internal capital ratios, F-statistics reject the null hypothesis that the coefficients of all the instrumental variables are zero. The first-stage regression also suggests large firms with high revenue growth or poor previous performance rely on external financing. Large firms are less subject to information asymmetry, and thus conduct external financing via more inexpensive means. Higher revenue growth is associated with more growth opportunities, which motivates firms to engage more actively in external financing. Firms that are performing poorly must turn to the external capital markets due to their small internal funds.

⁹ In this analysis, we adopt observations that pay dividends and generate positive values for *DIVIDEND*. As a result, the number of observations analyzed decreases to 46,243 for *AEM* analysis and 42,476 for *REM* analysis.

Table 9

Regression results of earnings management: 2SLS.

Panel A: 2SLS regression results of AEM								
Variables	(1)				(2)			
	First stage		Second stage		First stage		Second stage	
	Coef.	t-stat	Coef.	z-stat	Coef.	t-stat	Coef.	z-stat
<i>EX_FIN_1</i>			0.357***	9.43				
<i>EX_FIN_2</i>							0.389***	9.56
<i>DIVIDEND</i>	0.126***	18.99			0.120***	18.26		
<i>ASSET_GROWTH</i>	0.001	0.61			0.001	0.61		
<i>m_EX_FIN_1</i>	0.629***	22.31						
<i>m_EX_FIN_2</i>					0.601***	20.76		
<i>ADRI</i>	-0.072	-0.81	0.065	0.66	-0.062	-0.71	0.075	0.75
<i>SIZE</i>	0.029***	7.04	-0.027***	-5.77	0.028***	6.83	-0.027***	-5.80
<i>REV_GROWTH</i>	0.007*	1.68	-0.019***	-3.88	0.008*	1.92	-0.019***	-3.96
<i>LOSS</i>	0.070***	14.86	0.308***	51.37	0.075***	16.16	0.304***	48.50
<i>Constant</i>	-0.381	-0.50	0.876	1.03	-0.402	-0.53	0.945	1.10
<i>Industry FE</i>	YES		YES		YES		YES	
<i>Year FE</i>	YES		YES		YES		YES	
<i>Instruments</i>	<i>DIVIDEND;ASSET_GROWTH; m_EX_FIN_1</i>				<i>DIVIDEND;ASSET_GROWTH; m_EX_FIN_2</i>			
<i>F</i>	43.587***				51.000***			
<i>Chi2</i>	13.191***				15.842***			
<i>N</i>	46,243				46,243			

Panel B: 2SLS regression results of REM								
Variables	(1)				(2)			
	First stage		Second stage		First stage		Second stage	
	Coef.	t-stat	Coef.	z-stat	Coef.	t-stat	Coef.	z-stat
<i>EX_FIN_1</i>			0.174***	5.45				
<i>EX_FIN_2</i>							0.207***	6.02
<i>DIVIDEND</i>	0.128***	18.54			0.122***	17.80		
<i>ASSET_GROWTH</i>	0.001	0.61			0.001	0.63		
<i>m_EX_FIN_1</i>	0.624***	21.43						
<i>m_EX_FIN_2</i>					0.598***	20.03		
<i>ADRI</i>	-0.091	-0.99	-0.237***	-2.85	-0.079	-0.87	-0.229***	-2.73
<i>SIZE</i>	0.030***	7.01	0.101***	25.57	0.029***	6.80	0.101***	25.24
<i>REV_GROWTH</i>	0.009**	1.97	-0.154***	-37.51	0.010**	2.12	-0.154***	-37.31
<i>LOSS</i>	0.069***	14.04	0.019***	3.80	0.074***	15.23	0.016***	3.00
<i>Constant</i>	-0.414	-0.54	0.530	0.76	-0.430	-0.57	0.576	0.82
<i>Industry FE</i>	YES		YES		YES		YES	
<i>Year FE</i>	YES		YES		YES		YES	
<i>Instruments</i>	<i>DIVIDEND;ASSET_GROWTH; m_EX_FIN_1</i>				<i>DIVIDEND;ASSET_GROWTH; m_EX_FIN_2</i>			
<i>F</i>	17.091***				25.009***			
<i>Chi2</i>	310.262***				302.376***			
<i>N</i>	42,476				42,476			

Notes: This table indicates the 2SLS regression results of AEM (Panel A) and REM (Panel B). We use *DIVIDEND*, *ASSET_GROWTH*, and the mean external-to-internal capital ratio for other firm-years in the same country and industry (*m_EX_FIN_1* or *m_EX_FIN_2*) as instrumental variables. The F-statistic is for the null hypothesis that all the coefficients of the instrumental variables (*DIVIDEND*; *ASSET_GROWTH*; *m_EX_FIN_1* or *m_EX_FIN_2*) are zero. The estimated coefficients are reported in the standardized form. *, **, and *** indicate significance at 10 %, 5%, and 1%, respectively.

The second-stage regressions find that the endogenized external-to-internal capital ratios have positive and significant coefficients. This result provides further support for our hypothesis, suggesting that external financing motivates firms to engage in earnings management.¹⁰

5.3.4. Subsample analysis

Table 2 shows that U.S. and Japanese firms comprise significant portions of our sample. These facts raise a potential criticism of our results, because they assert that the positive relationship between the reliance on external financing and earnings management

¹⁰ A potential concern regarding our estimation is the multi-collinearity problem arising from the inclusion of two similar variables (*ASSET_GROWTH* and *REV_GROWTH*). However, the correlation coefficient between the two variables is low (0.105, not reported). We also replicate the estimation by deleting *REV_GROWTH*, and find qualitatively the same results (not reported).

simply captures the difference between U.S. (Japanese) and non-U.S. (non-Japanese) companies. To address this concern, we replicate our analyses by deleting the U.S. or Japanese observations (Panels A and B of Table 10). Table 2 also indicates that a few countries, such as Uruguay, Ecuador, or Colombia, have relatively small numbers of observations. Following Haga et al. (2019), we delete the firm-years in countries with fewer than 100 observations (Panel C of Table 10). Finally, Table 2 shows there are companies that have extremely high or low *AEM* and *REM*. To mitigate the concern that the results stem from such extreme values of earnings management variables, we remove observations that have *AEM* or *REM* in the top and bottom 10 percent (Panel D of Table 10).

Table 10 replicates the aforementioned analyses (firm-fixed effects model). For brevity, we report the results of the external financing variable with total debt (*EX_FIN_2*, *DEBT_FIN_2* and *EQUITY_FIN*).¹¹ For each panel, Models (1) and (3) adopt *EX_FIN_2* as a key independent variable, whereas Models (2) and (4) estimate the effects of debt and equity financing on earnings management separately. In each panel of Table 10, we find that the external-to-internal capital ratio has a positive and significant coefficient. The models also consistently offer a positive and significant coefficient for the equity-to-internal capital ratio, while *DEBT_FIN_2* does not have a significant coefficient.¹² These results suggest that our main results do not arise from specific countries and observations with extremely high/low earnings management.

5.3.5. Further discussion

Watts and Zimmerman (1990) note that previous studies commonly find firms with high leverage tend to choose income-increasing accounting methods. Dhaliwal et al. (1991) show evidence that leverage is negatively associated with earnings quality. We have not employed leverage in this research since our main variable (external-to-internal capital ratio) potentially incorporates its effects. As a robustness check, we replicate the regression analyses by adding leverage (firm's debt over assets). Consistent with our former discussions, the results (not reported) suggest that the external-to-internal capital ratio has a positive and significant impact on earnings management. When we decompose the external capital to debt and equity, only the equity-to-internal capital ratio has a significant relationship with earnings management.

It is noteworthy that our main variable is very close to the proxy for firms' life-cycle stage (growing or matured) proposed by DeAngelo et al. (2006). DeAngelo et al. (2006) adopt the ratio of retained earnings-to-total equity (or total assets) and argue that mature companies (firms with high retained earnings-to-total equity ratio) pay significantly higher dividends than growing companies. We stress the consistency of our argument with the idea of DeAngelo et al. (2006). Growing firms must turn to the external capital markets to finance their rich investment opportunities. These firms have an incentive to manage their earnings to improve their financing conditions, since the external capital markets are subject to information asymmetry. Growing firms naturally have a low retained earnings-to-total equity ratio (or high external-to-internal capital ratio), while they pay small dividends to increase their internal financing. We think of the firm's life stage as a proxy for the needs of external financing, which incentivizes increased earnings management.

6. Conclusions

We examine the effect of firms' external financing on earnings management using data from 75,790 observations of 12,874 distinct firms located in 43 countries. Our main analyses adopt firm-fixed effects models to examine whether firms increase their earnings management when they have increased external capital relative to internal funds. We find evidence that both accrual-based and real earnings management are positively associated with the degree to which a given firm relies on external financing. The positive effect of external financing on earnings management is attributable mainly to equity financing rather than debt financing. These results are robust to alternative estimations of earnings management and reliance on external financing, the controlling of country-level factors, estimations that mitigate endogeneity concerns, and the removal of countries with sample sizes that are either extremely large or small. We argue that firms manage their reported earnings to improve their financing conditions in the external capital markets. Accounting information plays an important role in the external capital markets, which are subject to information asymmetry, and this fact incentivizes firms to manage their reported earnings. Furthermore, equity financing is more vulnerable to information asymmetry than debt financing. Equity markets rely more heavily on accounting information to evaluate equity issuers' financing conditions. Therefore, equity financing motivates firms to engage more heavily in earnings management.

Existing international earnings management research incorporating firm-level characteristics is still extremely limited. Our study extends the work of previous studies by introducing a new factor that significantly affects corporate earnings management; firms' reliance on external financing. Evidence provided by international data is particularly important, since the data vary widely in terms of external financing, and a significant portion of the variation is likely attributable to exogenous factors. We construct new variables to address the issue and present robust evidence that external financing induces earnings management. Overall, we present evidence of information asymmetry-based explanations of corporate earnings management. Firms manage their earnings to improve their financing conditions, which are subject to information asymmetry. Furthermore, the cross-country results in this study highlight the adverse impacts of external financing and contribute to the construction of more desirable accounting standards.

¹¹ The results are qualitatively the same if we use *EX_FIN_1*, *DEBT_FIN_1*, and *EQUITY_FIN* as external financing variables.

¹² In unreported analyses, we remove observations that have *AEM* (*REM*) in the top and bottom 5 percent. We also conduct regression analyses by deleting observations from a country that has an extremely high or low mean value of *AEM* and *REM* (Ecuador, Kenya, Colombia, and Uruguay for *AEM* regressions; Ecuador, New Zealand, Argentina, and Uruguay for *REM* regressions). The results do not qualitatively change.

Table 10

Regression results of earnings management: Removing firm-years in specific countries.

Panel A: Regression results for non-U.S. companies								
Variables	AEM (1)		AEM (2)		REM (3)		REM (4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
<i>EX_FIN_2</i>	0.027***	6.72			0.019***	3.13		
<i>DEBT_FIN_2</i>			-0.010*	-1.80			-0.004	-0.55
<i>EQUITY_FIN</i>			0.044***	7.99			0.025***	3.09
<i>SIZE</i>	-0.195***	-9.61	-0.180***	-8.81	0.015	0.49	0.023	0.78
<i>REV_GROWTH</i>	0.006*	1.85	0.006*	1.89	-0.045***	-9.00	-0.045***	-8.99
<i>LOSS</i>	0.273***	77.82	0.272***	77.62	0.005	0.88	0.004	0.87
<i>Constant</i>	-0.089***	-6.75	-0.085***	-6.45	0.078***	3.94	0.081***	4.06
<i>Year FE</i>	YES		YES		YES		YES	
<i>Firm FE</i>	YES		YES		YES		YES	
<i>R²</i>	0.120		0.123		0.011		0.012	
<i>N</i>	61,320		61,320		56,518		56,518	
Panel B: Regression results for non-Japanese companies								
Variables	AEM (1)		AEM (2)		REM (3)		REM (4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
<i>EX_FIN_2</i>	0.024***	5.52			0.016**	2.45		
<i>DEBT_FIN_2</i>			-0.004	-0.73			-0.006	-0.79
<i>EQUITY_FIN</i>			0.036***	6.11			0.025***	3.03
<i>SIZE</i>	-0.181***	-8.72	-0.172***	-8.25	0.036	1.22	0.043	1.45
<i>REV_GROWTH</i>	0.012***	3.27	0.012***	3.34	-0.050***	-9.83	-0.050***	-9.79
<i>LOSS</i>	0.316***	80.93	0.316***	80.83	0.006	1.16	0.006	1.16
<i>Constant</i>	-0.195***	-13.99	-0.193***	-13.82	0.056***	2.75	0.058***	2.85
<i>Year FE</i>	YES		YES		YES		YES	
<i>Firm FE</i>	YES		YES		YES		YES	
<i>R²</i>	0.162		0.164		0.010		0.010	
<i>N</i>	58,650		58,650		53,982		53,982	
Panel C: Regression results when removing countries with fewer than 100 observations								
Variables	AEM (1)		AEM (2)		REM (3)		REM (4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
<i>EX_FIN_2</i>	0.028***	7.33			0.016***	3.02		
<i>DEBT_FIN_2</i>			-0.001	-0.25			-0.003	-0.46
<i>EQUITY_FIN</i>			0.038***	7.25			0.023***	3.14
<i>SIZE</i>	-0.246***	-13.51	-0.236***	-12.91	0.028	1.11	0.035	1.36
<i>REV_GROWTH</i>	0.014***	4.39	0.014***	4.46	-0.047***	-10.63	-0.047***	-10.60
<i>LOSS</i>	0.289***	93.21	0.289***	93.06	0.007*	1.65	0.007*	1.65
<i>Constant</i>	-0.137***	-12.81	-0.135***	-12.58	0.080***	5.18	0.082***	5.29
<i>Year FE</i>	YES		YES		YES		YES	
<i>Firm FE</i>	YES		YES		YES		YES	
<i>R²</i>	0.129		0.132		0.012		0.012	
<i>N</i>	75,551		75,551		69,562		69,562	
Panel D: Regression results for removing observations with extreme values of AEM or REM								
Variables	AEM (1)		AEM (2)		REM (3)		REM (4)	
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat
<i>EX_FIN_2</i>	0.012***	4.54			0.004***	4.68		
<i>DEBT_FIN_2</i>			0.006	1.61			0.001	1.01
<i>EQUITY_FIN</i>			0.011***	2.77			0.004***	3.19
<i>SIZE</i>	-0.055***	-4.23	-0.054***	-4.09	0.023***	5.65	0.024***	5.80
<i>REV_GROWTH</i>	-0.003	-1.20	-0.003	-1.15	-0.023***	-31.06	-0.023***	-31.05
<i>LOSS</i>	0.134***	58.74	0.133***	58.66	0.008***	12.33	0.008***	12.29
<i>Constant</i>	-0.021***	-3.19	-0.021***	-3.18	0.146***	70.44	0.146***	70.43
<i>Year FE</i>	YES		YES		YES		YES	
<i>Firm FE</i>	YES		YES		YES		YES	
<i>R²</i>	0.083		0.084		0.126		0.126	
<i>N</i>	60,632		60,632		55,827			

(continued on next page)

Table 10 (continued)

Panel D: Regression results for removing observations with extreme values of <i>AEM</i> or <i>REM</i>									
Variables	<i>AEM</i> (1)		<i>AEM</i> (2)		<i>REM</i> (3)		<i>REM</i> (4)		
	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	Coef.	t-stat	
									55,827

Notes: This table indicates the regression results of *AEM* and *REM* for non-U.S. companies (Panel A), non-Japanese companies (Panel B), countries with 100 or more observations (Panel C), and the sample removing observations with *AEM* or *REM* in the top and bottom 10 percent. In this table, we use *EX_FIN_2*, *DEBT_FIN_2*, and *EQUITY_FIN* as the independent variables. All models adopt firm-fixed effects estimation. The estimated coefficients are reported in the standardized form. *, **, and *** indicate significance at 10 %, 5%, and 1%, respectively.

Author contributions

Yuyang Zhang conceived the theoretical framework, designed the empirical research and wrote the paper; Konari Uchida provided data and extensive revisions during the study and gave comments for publication; Liping Dong collected data and analyzed them. All authors have given approval to the final version of the manuscript.

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Declaration of Competing Interest

None.

Appendix A. Supplementary data

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