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Do Earnings Manipulations Matter Differently in Different Markets of China? Cost of Capital Consequences

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Abstract

This study investigates whether and how a firm's cost of equity capital is influenced by the extent of a firm's real earnings management (REM). Using a large sample of Hong Kong and Chinese firms over the 9-year period 2009-2017, we find that our implied cost of equity estimates are positively associated with both the extent of REM and the extent of accrual-based earnings management (AEM), but the positive association is stronger for REM than for AEM. We also provide evidence suggesting that the effect of AEM and REM on the cost of equity is more pronounced for Hong Kong firms than Chinese firms, and within Chinese firms, it is less pronounced for the state-owned enterprises (SOEs). Collectively, our results suggest that while both REM and AEM exacerbate the quality of earnings used by outside investors, REM does so to a greater extent than AEM, and thus the market demands a higher risk premium for REM activities than for AEM activities and that this cost of capital-increase effect is more prominent in a developed market like Hong Kong and mitigated by state ownership in China because of investors' expectations for a lower level of detriments to firm fundamentals by REM due to government's protection in a less developed market like China.

JEL classification: G14, M41, M43

Keywords Real earnings management; Accrual-based earnings management; Implied cost of equity; SOE.

1. Introduction

Theory and evidence indicate that managers' concerns over current performance motivate them to engage in manipulating current-period earnings at the expense of future-period earnings (e.g., Stein 1989; Fudenberg and Tirole 1995; Healy and Wahlen 1999; Pauwels et al. 2004; Graham et al.

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2005). This managerial myopia arises because outside investors and analysts typically rely on current-period earnings when forming their expectations on future earnings, and a variety of contractual obligations (e.g., earnings-based bonus contracts and debt covenants) are linked to current-period reported earnings. Insofar as managers are concerned with boosting current performance, such as stock prices, they have incentives to inflate current earnings by borrowing future earnings for use in the current period.

Current-period reported earnings can be managed in two different ways. First, managers can manipulate reported earnings through discretionary accrual choices that are allowed under Generally Accepted Accounting Principles (GAAP). This within-GAAP accrual-based earnings management (hereafter AEM) typically occurs toward the end of an accounting period, after most real operating activities are completed. While it directly influences the amount of accounting accruals, AEM has no direct effect on cash flows. Second, managers can also manipulate reported earnings by structuring real activities. Specifically, they can alter the timing and scale of real activities such as production, sales, investment, and financing activities throughout the accounting period in such a way that a specific earnings target can be met. For example, reported earnings can be temporarily boosted by accelerating the timing of production and sales schedules, by cutting discretionary expenditures, and/or by deferring the timing of their occurrences. Following Roychowdhury (2006), these real operation management activities that deviate from normal business practices with the primary objective of manipulating current-period earnings are referred to as real earnings management (hereafter REM). Unlike AEM, REM can have direct consequences on current and future cash flows (as well as accounting accruals), are more difficult for average investors to understand, and are normally less subject to external monitoring and scrutiny by auditors, regulators, and other outside stakeholders.

Kim and Sohn (2013) investigates whether and how REM activities influence a firm's cost of equity capital, that is, a key factor determining outside investors' resource allocation decisions. They predict and find that REM is positively associated with the cost of capital because it increases noises or errors in earnings and decreases investors' expectations on future cash flow levels. This effect is robust after controlling for the corresponding effect of AEM. The objective of our study is extending Kim and Sohn's (2013) findings into Hong Kong and Chinese markets.

We expect that REM activities increase the cost of equity for Hong Kong and Chinese firms as well because it deteriorates long-term firm fundamentals. We also expect that REM increases the cost of equity to a greater extent than AEM does for two reasons (Kim and Sohn 2013). First, REM introduces more noise in reported earnings than AEM because it not only affects accruals but also distorts cash flows through real operation-manipulating activities. Second, REM is more difficult to detect than AEM, and REM activities are normally less subject to external monitoring or scrutiny. As a result, managers can misappropriate more cash using REM than they do using AEM. This managerial opportunism causes outside investors to assess the expected level of future cash flows to be lower for REM-intensive firms than for AEM-intensive firms, all else being equal. Next, we expect that the cost-of-equity-increasing effect of AEM and REM is more pronounced for Hong Kong firms than Chinese firms because investors in more developed markets such as Hong Kong are more sensitive to the deteriorating firm fundamentals caused by managerial opportunism than they are in less developed markets. Finally, for Chinese firms, we expect that the cost-of-equity-increasing effect of AEM and REM is less pronounced for the state owned enterprises (SOEs) because investors of such firms may expect that Chinese government will bail out their firms even when firm fundamentals are damaged by managerial opportunism.

Using yearly cross-sectional regressions of the implied cost of equity on our proxies for REM and AEM, beta, size, book-to-market ratio, and other innate risk factors for Hong Kong and Chinese listed firms during 2009-2017, we find that our measure of the implied cost of equity is positively associated with both REM and AEM after controlling for all other factors, and the positive association is stronger for REM than for AEM, which is consistent with our prediction. This finding suggests that the market seems to penalize REM activities to a greater extent than AEM activities, in the form of a higher cost of equity, all else being equal. We also find that the cost-of-equity-increasing effect by REM is more pronounce for Hong Kong firms. Finally, we find that the cost-of-equity-increasing effect of AEM is less pronounced for SOEs in China.

This study adds to the existing literature in several respects. First, to our knowledge, our study is the first to examine the association between REM and the cost of equity (henceforth the CoE) and to compare the CoE effect of REM with the same effect of AEM for Hong Kong and Chinese firms. Previous studies document that AEM increases the CoE as well as the cost of debt (e.g., Francis et al. 2004, 2005[1]; Bharath, Sunder, and Sunder 2008), and REM also increases the CoE (Kim and Sohn 2013). We extend these studies to Hong Kong and Chinese firms, and compare the effect of REM with that of AEM. Second, our study contributes to the extant REM literature as well. We compare the CoE-increasing-effect of REM between Hong Kong and Chinese firms, and between SOEs and non-SOEs in Chinese market.

The paper proceeds as follows. Section 2 reviews the extant literature and develops our research hypotheses. Section 3 explains how we measure our research variables, that is, the implied CoE and intensity of REM and AEM, and specifies our empirical model used for hypothesis testing. Section

1) Core, Guay, and Verdi (2008) criticize this conclusion and show that accrual quality is not priced, using two-stage cross-sectional regression. However, this is too high a standard, because already known common risk factors such as beta, size, and book-to-market ratio cannot also consistently pass this bar in their results.

4 describes our sample and data sources and presents empirical results. Section 5 performs sensitivity tests, and the final section presents our conclusions.

2. Related Research and Hypothesis Development

2.1. Extant research on REM

Roychowdhury (2006) has developed empirical models that allow researchers to separate the normal levels of real operational activities as reflected in cash flows from operations (CFO), production costs, and discretionary expenditures from their abnormal levels. His analysis shows that managers engage in real activities manipulation to meet certain earnings targets. Since Roychowdhury's work, subsequent studies dealing with REM issues have provided evidence supporting that, while the expected, normal levels of real activities are associated with optimal operational decisions, their unexpected, abnormal levels capture managerial opportunism to intervene in the financial reporting process.

One strand of previous REM research focuses on whether managers use REM as a substitute or complement for AEM when making strategic decisions on the timing and magnitude of earnings manipulation. For example, Cohen, Dey, and Lys (2008) examine the impact of SOX's passage on managerial choice between AEM and REM. The authors document that firms were heavily involved in AEM in the pre-SOX period but that this involvement declined significantly after the passage of SOX. Their finding shows that the passage of SOX has motivated firms to switch from AEM to REM. The above evidence is consistent with the analytical results of Ewert and Wagenhofer (2005), who demonstrate that managers switch from AEM to REM in an environment of tightened accounting standards or more stringent enforcements. The survey results of Graham, Harvey, and Rajgopal (2005) also reveal that the large majority of managers are willing to delay the timing of new investment projects to meet a certain earnings target, even when such a deferment has adverse implications on long-term firm value. A subsequent study by Cohen and Zarowin (2010) investigates the behaviors of REM and AEM around seasoned equity offerings, that is, during the period in which managers have relatively high incentives to artificially inflate current-period earnings. Consistent with Cohen et al. (2008), the authors also find that the seasoned equity offering firms substituted from AEM to REM in the post-SOX period, since SOX has made AEM more costly than REM. The above results, taken as a whole, suggest that managers take into account potential costs and benefits associated with their choice between AEM and REM when deciding upon earnings management strategies. The closest paper to our study is Kim and Sohn (2013). Using the U.S. sample, they investigate the effect of REM on the CoE and find that, after controlling for the effects of AEM and other factors on the CoE, REM has an incremental impact on the increase in the CoE of a firm. Our study extends their findings to Hong Kong and Chinese firms and further investigates a differential CoE effect in a cross-section.

2.2. The impact of REM on the cost of equity

As reviewed in the previous section, we now have evidence that managers not only use discretionary accounting choices, but also manage the timing and scale of real operations to manipulate reported earnings. Given that REM is not only pervasive but also costly to a firm, a natural question to ask is how do outside investors respond to opportunistic REM activities? To address this question using Hong Kong and Chinese samples, our hypotheses, described below, are concerned with whether and how REM is associated with the CoE.

Similar to AEM, REM is intended to mask true earnings performance, and thus distort the quality (or precision) of reported earnings as an indicator of future cash flows. Lambert, Leuz, and Verrecchia (2007, henceforth LLV) argue that low-quality financial reports make it difficult for outside investors to align their investment objectives with firms. The authors analytically demonstrate that the increased noise in information about future cash flows leads to increased CoE. Specifically, if, for firm *j*, $\tilde{Z}_j$ is accounting earnings and $\tilde{V}_j$ is end-of-period cash flow, then accounting earnings, which is a noisy signal for the end-of-period cash flow, can be expressed as $\tilde{Z}_j = \tilde{V}_j + \tilde{\varepsilon}_j$, where $\tilde{\varepsilon}_j$ is the noise in the earnings information. Because the future cash flow is unobservable, the market's assessment for the variance of firm *j*'s future cash flow and the covariance structure of firm *j*'s future cash flow with all other firms' cash flows in the market should be conditioned by the quality of firm *j*'s reported earnings. Given that $\tilde{Z}_j$ is a noisy signal, the expected CoE can be expressed as follows (LLV; Ashbaugh-Skaife et al. 2009):

(M1) $$E(\tilde{R}_j \mid \Phi) = \frac{R_f H(\Phi) + 1}{H(\Phi) - 1}$$

(M2) $$H(\Phi) = \frac{E(\tilde{V}_j \mid \Phi)}{\frac{1}{N_\tau}\left[\frac{Var(\tilde{\varepsilon}_j)}{Var(\tilde{Z}_j)}\left(Cov(\tilde{V}_j, \tilde{V}_j) + Cov(\tilde{V}_j, \sum_{k \neq j} \tilde{V}_k)\right)\right]}$$

where Φ is a broader information set that conditions investors' assessments of the end-of-period cash flow; $E(\tilde{R}_j \mid \Phi)$ is the expected CoE for firm *j* given Φ; R_f is the risk-free interest rate; N_τ is the aggregate risk tolerance of the market; and $Cov(\tilde{V}_j, \sum_{k \neq j} \tilde{V}_k)$ is the covariance of firm *j*'s future cash flow with all other firms' cash flows in the market.

Ashbaugh-Skaife et al. (2009) use the above relation to establish a theoretical link between internal control deficiencies and the CoE. Likewise, we use the above relation to explain how REM is linked to the implied CoE. As shown above, the expected CoE increases with the ratio of noise- or error-in-earnings variance to earnings variance ($\frac{Var(\tilde{\varepsilon}_j)}{Var(\tilde{Z}_j)}$), because this ratio increases investors' assessments of future cash flow variance ($Cov(\tilde{V}_j, \tilde{V}_j)$) and covariance with other firms ($Cov(\tilde{V}_j, \sum_{k \neq j} \tilde{V}_k)$). This path is called the "*direct effect*" by LLV. On the other hand, when firm *j*'s earnings information is noisier or more opaque, its manager could misappropriate more cash, which in turn decreases the level of future cash flows. The cost of capital, i.e., $E(\tilde{R}_j \mid \Phi)$, increases when the level of expected future cash flows, i.e., $E(\tilde{V}_j \mid \Phi)$, decreases, as shown above, which LLV call the "*indirect effect*."

By increasing noise in current-period reported earnings, REM deteriorates the quality of the earnings signal (as an indicator of true future cash flows). The increased variance of this noise or its ratio to earnings variance increases investor-assessed variance and covariance of future cash flows, that is, the denominator in Eq. (M2). This direct effect increases the expected CoE, as shown in Eq. (M1).[2] On the other hand, REM influences short-term reported earnings at the expense of distorting current-period real operations, and thus is generally value destroying, particularly in the long term; REM could mask the true earnings performance, which, in turn, provides managers with opportunities and means to misappropriate cash. Recognizing that REM has a negative effect on future cash flows, outside investors are likely to assess future cash flows to be lower for REM-intensive firms. Put differently, the investor-assessed level of future cash flows, given available information, that is, the numerator in Eq. (M2), decreases with the intensity of REM. The LLV model clearly shows that this indirect effect of REM on expected future cash flow, i.e., $E(\tilde{V}_j \mid \Phi)$, increases the expected CoE. Both the direct and indirect effects lead us to predict that the CoE increases with the intensity of REM. This predicted positive relation between REM and the CoE is empirically confirmed based on U.S. data by Kim and Sohn (2013). We expect that this theoretical relation will pay out empirically for Hong Kong and Chinese firms as well. Thus, we state our first hypothesis in the form of an alternative hypothesis:

H1: *The cost of equity increases with the intensity of REM, all else being equal, for Hong Kong and Chinese firms.*

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2) We do not assume that the average investors in the market detect firms' REM activities, which even regulators and auditors frequently fail to detect. We just assume that REM decreases the quality of current-period reported earnings as an indicator of true future cash flows.

2.3. The relative importance of REM versus AEM

Our second hypothesis concerns the relative importance of REM and AEM in terms of their impact on the CoE. Our test is predicated on the existence of the association of the cost of equity with REM (as reported in Kim and Sohn (2013) based on U.S. data, and hypothesized in H1 for Hong Kong and Chinese firms) and with AEM (as documented in previous research). In the context of the LLV model, we presume that both REM and AEM increase noise in earnings by deteriorating earnings quality as an indicator of true future cash flows. Moreover, we argue that REM exacerbates information problems to a greater extent than AEM for the following reasons. First, REM adds more noise in reported earnings than AEM because it not only affects accruals but also distorts cash flows through real operation manipulations. As a result, the variance of this noise and its ratio to earnings variance are larger, and thus investor-assessed variance and covariance of future cash flows are larger in REM than in AEM. As a result, REM has a greater direct effect on the cost of capital than AEM. This greater direct effect means that REM increases the cost of capital to a greater extent than AEM.

Second, REM typically has adverse cash flow consequences. While AEM only affects accrual numbers, REM boosts short-term earnings at the expense of distorting real operations (Roychowdhury 2006); it causes real operations to deviate from their optimal levels, thereby dampening a firm's ability to generate future cash flows in the long run. Also, REM is more difficult to detect than AEM, and REM activities are normally less subject to external monitoring or scrutiny by auditors, regulators, analysts, or credit rating agencies (Cohen et al. 2008). Kim and Sohn (2013) also suggest that the effect of REM on the cost of capital is more pronounced for the high earnings management incentive subsample than for the low earnings management incentive subsample, implying that the degree of managerial opportunism is higher in REM-intensive firms. As a result, managers can misappropriate more cash using REM than they do using AEM. Because of these reasons, REM adversely affects the level of future cash flows and investors' expectations on it to a greater extent than AEM. This greater indirect effect also indicates that REM increases the cost of capital to a greater extent than AEM.

The implication from the above discussions is that, all else being equal, the amount of risk premium that rational investors demand is greater for REM-intensive firms than for AEM-intensive firms. We test this prediction using our sample of Hong Kong and Chinese firms through our second hypothesis below (in alternative form):

H2: *The cost of equity increases with the intensity of REM to a greater extent than it does with the intensity of AEM, all else being equal, for Hong Kong and Chinese firms.*

2.4. Cross-sectional difference in the cost of capital effect of REM

Our third hypothesis is about the cross-sectional difference in the above CoE-effect between Hong Kong and Chinese markets. Prior studies document the existence of cost of capital increasing effect of earnings management worldwide (Bhattacharya, Daouk, and Welker 2003). It is also well established that auditors put more time and resources and thus increase audit fees when auditing their clients in a stronger legal regime country (Choi et al. 2008, De and Sen 2002, Francis and Wang 2008, Khurana and Raman 2004, Taylor and Simon 1999). Combining these two findings, we can derive a prediction that the effect of earnings management on cost of capital will be more pronounced in a stronger legal regime country. Since the institutions and their enforcement to protect investors are more efficient and stronger in Hong Kong, the negative consequences of earnings management on the cost of capital will be greater for Hong Kong firms than they are for Chinese firms. Moreover, this difference will be more pronounced with regard to REM than AEM because REM has more serious cash flow effects, which are more important concerns for investor protections. This leads to our third hypothesis (in alternative form):

H3: *The effect of REM on the cost of equity is larger for Hong Kong firms than it is for Chinese firms.*

Our final hypothesis is about the cross-sectional difference in the CoE-effect between SOEs and non-SOEs within Chinese market. SOEs in China are more entrenched in the sense that Chinese government has a strong incentive to protect these firms and thus frequently bails out them if they are in danger of financial distress or bankruptcy (e.g., Cull and Xu 2003; Xu 1998). Investors in these firms understand this incentive and thus may expect government's protections even though these companies' fundamentals are deteriorated substantially due to REM. Therefore, they will require less increase in CoE for the managerial opportunism to boost earnings using REM. This reasoning is consistent with Chen et al. (2011) who report that the effect of audit quality on cost of equity is more pronounced for non-SOEs than for SOEs. The above discussion leads us to predict a less positive relation between REM and the CoE in SOEs than in non-SOEs. We thus formulate our last hypothesis as follows (in alternative form):

H4: *The effect of REM on the cost of equity is smaller for the government owned enterprises (SOEs) than it is for non-SOEs.*

In the LLV framework, the effect of information quality on the CoE is fully captured by an appropriately specified *forward-looking* beta. Thus, if we could properly estimate forward-looking beta, our REM proxies would not be able to explain cross-firm differences in the CoE because all the effects of REM on the CoE would be subsumed by this forward-looking beta. However, because historical beta estimates using historical returns (such as the beta in our Eq. (6) below) do not fully capture all the earnings quality effects of REM activities, our REM proxies have an incremental explanatory power over and beyond beta with respect to the CoE. This reasoning is consistent with that of Ashbaugh-Skaife et al. (2009), who link internal control deficiencies with the CoE in the context of the LLV model. It is still controversial whether firm-specific factors such as earnings quality are diversifiable, and whether they are priced by the market in large economies. Previous research provides empirical evidence that the information risk associated with low accrual quality resulting from AEM is non-diversifiable and thus priced in the market (Francis et al. 2004, 2005; Easley and O'Hara 2004; O'Hara 2003). On the other hand, other studies suggest that firm-specific factors are diversifiable and thus not priced by investors. For example, Hughes, Liu, and Liu (2007) argue in their analytical model that the information asymmetry of a firm does not affect its cost of capital in a cross-sectional setting once beta is controlled for. Based on this controversy, we do not conclude whether firm-specific information risk (e.g., REM-related earnings quality) is non-diversifiable, and thus priced. We simply posit, within the LLV model, that it is an incremental variable in explaining the cost of capital to supplement the historical beta, which is a noisy proxy for the forward-looking beta.

3. Measurement of Main Variables and Empirical Specification

3.1. Implied cost of equity capital

Previous research suggests several methods for measuring the *ex ante* costs of equity capital implied by alternative equity valuation models with different assumptions.[3] Among these methods, we consider four representative methods, developed by Claus and Thomas (2001), Gebhardt, Lee, and Swaminathan (2001), Gode and Mohanram (2003), and Easton and Monahan (2005). We first estimate the implied cost of equity, *CoE*, by deriving the discount rate that equates the currently observed stock price and predicted value derived from each of the four methods.[4] Recent research by Hail and Leuz (2006) shows that alternative CoE estimates from different valuation methods are highly correlated with each other, and are similar within a reasonable range. Similar to Dhaliwal, Krull, and Li (2007), we obtain a comprehensive measure of the CoE by taking an average of these four different CoE estimates. We use this average estimate as our measure of the

3) Examples of alternative models used for measuring the cost of equity are proposed by O'Hanlon and Steele (2000), Claus and Thomas (2001), Gebhardt et al. (2001), Easton et al. (2002), Baginski and Whalen (2003), Gode and Mohanram (2003), Easton (2004), Easton and Monahan (2005), and Ohlson and Juettner-Nauroth (2005).

4) From now on, we use the terms *cost of equity* (the CoE) and *implied cost of equity* (the implied CoE) interchangeably, unless stated otherwise.

implied cost of equity throughout the paper, because the averaging process mitigates potential measurement errors associated with each individual estimate of the CoE. Appendix A provides a detailed description of how we obtain the four CoE estimates using the four different valuation models.

3.2. Intensity of AEM

As in other studies, we use an abnormal portion of total accruals or, equivalently, discretionary accruals (*DAC*) as our proxy for the outcome of opportunistic AEM. To decompose total accruals into the expected, normal portion and the unexpected, abnormal portion, we employ the modified Jones (1991) model as proposed by Dechow, Sloan, and Sweeney (1995)[5]:

(1) $$TAC_{jt} / A_{jt-1} = \beta_1[1/A_{jt-1}] + \beta_2[\Delta Sales_{jt} / A_{jt-1}] + \beta_3[PPE_{jt} / A_{jt-1}] + \varepsilon_{jt}$$

where, for firm *j* and in year *t* (or *t* - 1), *TAC* denotes total accruals; *A*, *ΔSales*, and *PPE* represent total assets, changes in net sales dollars, and gross property, plant, and equipment, respectively; and ε is an error term. Total accruals (*TAC*) are computed as $TAC_{jt} = EBXI_{jt} - CFO_{jt}$, where $EBXI_{jt}$ represents earnings before extraordinary items and discontinued operations and CFO_{jt} is cash flow from operations, which is taken directly from the statement of cash flows.

Eq. (1) is estimated cross-sectionally for each industry and in each year. Using the estimated parameters of Eq. (1), we compute nondiscretionary total accruals, denoted by *NTAC*, as

(2) $$NTAC_{jt} = \hat{\beta}_1[1/A_{jt-1}] + \hat{\beta}_2[(\Delta Sales_{jt} - \Delta REC_{jt})/A_{jt-1}] + \hat{\beta}_3[PPE_{jt} / A_{jt-1}]$$

where ΔREC_{jt} is the change in net receivables and the other variables are as defined earlier. We then obtain *DAC* by taking the difference between *TAC/A* and *NTAC*. We take the absolute value of *DAC*, construct a decile portfolio based on the ranked value of |*DAC*|, and then compute the standardized decile rank (which ranges from 0 to 1), denoted by *SR*|*DAC*|, as our main proxy for the intensity of AEM.

5) Many prior studies (e.g., Dechow and Dichev 2002) use current accruals instead of total accruals as the dependent variable. We use total accruals to measure our AEM proxies because the competing variable (i.e., REM proxies) includes research and development expenditure (R&D), which is an investment in intangible assets, as one component. We reason that including depreciation and amortization expenses, the latter of which is directly related to intangible assets and R&D, in measuring AEM variables parallels more the method of REM measurement in this sense. However, the essence of our main implications is unaltered when using current accruals to measure AEM proxies.

3.3. Intensity of REM

Similar to Roychowdhury (2006), Cohen et al. (2008), and Cohen and Zarowin (2010), we develop our proxies for the intensity of REM by focusing on three methods of manipulating real operational activities with an aim to temporarily boost reported earnings: (1) offering excessive sales discounts or lenient credit terms to temporarily boost sales revenues in the current period, (2) conducting overproduction to report a lower cost of goods sold in the current period, and (3) reducing discretionary expenditures in the current period.

As in other studies, we decompose the actual CFO into the normal (expected) portion and the abnormal (unexpected) portion by estimating Eq. (3) for each industry and year in which the normal CFO is assumed to be a linear function of sales and changes in sales:

$$\frac{CFO_{jt}}{A_{j,t-1}} = a_1 \frac{1}{A_{j,t-1}} + a_2 \frac{Sales_{jt}}{A_{j,t-1}} + a_3 \frac{\Delta Sales_{jt}}{A_{j,t-1}} + \varepsilon_{jt} \quad (3)$$

Income-boosting strategies via overproduction and cutting discretionary expenditures, such as R&D and marketing expenditures, lead one to observe abnormally high production costs and abnormally low discretionary expenses relative to sales (Roychowdhury 2006). To decompose actual production costs and discretionary expenses into the normal, expected portion and the abnormal, unexpected portion, we estimate Eqs. (4) and (5), respectively, for each industry and year:

$$\frac{Prod_{jt}}{A_{j,t-1}} = a_1 \frac{1}{A_{j,t-1}} + a_2 \frac{Sales_{jt}}{A_{j,t-1}} + a_3 \frac{\Delta Sales_{jt}}{A_{j,t-1}} + a_4 \frac{\Delta Sales_{j,t-1}}{A_{j,t-1}} + \varepsilon_{jt} \quad (4)$$

$$\frac{DiscE_{jt}}{A_{j,t-1}} = a_1 \frac{1}{A_{j,t-1}} + a_2 \frac{Sales_{j,t-1}}{A_{j,t-1}} + \varepsilon_{jt} \quad (5)$$

where, for each firm *j* and year *t*, *Prod* refers to production costs, which is the sum of cost of goods sold and change in inventory, and *DiscE* denotes discretionary expenses computed by the sum of advertising expenses, R&D expenses, and selling, general and administrative expenses.

Abnormal CFO, abnormal *Prod*, and abnormal *DiscE*, denoted by *AbCFO*, *AbProd*, and *AbDiscE*, respectively, are the differences between actual values of CFO, *Prod*, and *DiscE* and their normal levels (i.e., the fitted values of Eqs. (3), (4), and (5), respectively). We use the unsigned values of these variables, that is, $|AbCFO|$, $|AbProd|$, and $|AbDiscE|$, in our main analyses. To alleviate concerns over the possibility that these residual-based measures are unduly influenced by a small number of outliers, and are measured with errors, we classify them into deciles, using the ranked values of |*AbCFO*|, |AbProd|, and |AbDiscE| in each sample year, with zero representing the smallest decile (which includes firms with the least REM activities) and nine representing the highest decile (which includes firms with the most intense REM activities). We then standardize the decile rank (by dividing it by nine) such that its value ranges from zero to one. Our first proxy for the intensity of REM is the standardized decile ranks of |*AbCFO*|, |*AbProd*|, and |*AbDiscE*|, denoted by *SR*|*AbCFO*|, *SR*|*AbProd*|, and *SR*|*AbDiscE*|, respectively. Besides mitigating any outlier effect, this standardized rank serves better for the purpose of comparing their coefficients with that on our AEM proxy in relation to the implied cost of equity.

Given a level of sales, firms that boost reported earnings via REM are likely to use one or all of three REM strategies, that is, upward sales manipulation, overproduction, and reduction of discretionary expenses (Cohen et al. 2008). To capture the effect of REM via all three strategies or various combinations of the three strategies on the cost of equity, we also develop a single, comprehensive measure of REM, denoted by *SR*|*AbREM*|, by averaging and standardizing the three individual decile ranks of |*AbCFO*|, |*AbProd*|, and |*AbDiscE*|.

3.4. Empirical specification

To test our hypotheses H1 to H4, we posit the following regression:

$$CoE_{jt} = \alpha_0 + \alpha_1 Beta_{jt} + \alpha_2 Size_{jt} + \alpha_3 BM_{jt} + \alpha_4 RankAEM_{jt} + \alpha_5 RankREM_{jt} + \sum_k \alpha_k InnateFactor_{jt} + \varepsilon_{jt} \quad (6)$$

where, for firm *j* and year *t*, *CoE* denotes our measure of the implied cost of equity, which is the average of four implied cost of equity estimates from four different equity valuation models; *Beta*, *Size*, and *BM* represent security beta, firm size, and book-to-market ratio, respectively; *RankAEM* and *RankREM* are our test variables, which represent the standardized decile ranks of our AEM and REM measures, respectively; and *InnateFactor* represents intrinsic factors that are deemed to influence a firm's earnings quality and thus the cost of equity. Appendix B provides the detailed definitions of all the variables used in our study.

Given voluminous evidence that the implied cost of equity or expected rate of return is negatively (positively) related to *Size* (*Beta* and *BM*), we expect to observe $\alpha_1 > 0$, $\alpha_2 < 0$, and $\alpha_3 > 0$. Furthermore, the significant coefficients on these three variables with expected signs could be viewed as an indication that our measure of CoE correctly captures the underlying riskiness of a firm (e.g., Botosan and Plumlee 2005, 2013; Hail and Leuz 2006). In Eq. (6), *RankAEM* refers to *SR*|*DAC*|, while *RankREM* refers to an individual REM proxy (i.e., *SR*|*AbCFO*|, *SR*|*AbProd*|, or *SR*|*AbDiscE*|), the comprehensive REM proxy (i.e., *SR*|*AbREM*|), or their signed values, depending on empirical specifications.[6] Hypothesis H1 translates as $\alpha_5 > 0$, while H2 is supported if $\alpha_5 > \alpha_4 > 0$. To test H3 and H4, we create an indicator variable to represent Hong Kong firms, *HK*, and state owned enterprises, *SOE*, and interact each of these indicators with our AEM and REM proxies. H3 is supported if the coefficient on *RankREM*HK* is significantly positive, whereas H4 is confirmed if the coefficient on *RankREM*SOE* is significantly negative.

Previous research shows that the quality of reported earnings (and thus *CoE*) is associated with several innate factors that reflect a firm's business model and operating environments (Francis et al. 2004, 2005). In an attempt to isolate the CoE effect of opportunistic earnings manipulation, captured by our test variables (i.e., *RankAEM* and *RankREM*) from the effect of these innate factors, we include a total of seven innate factors, that is, leverage (*Lev*), the degree of marketization for each province or provincial level region in Fan and Wang (2006) (*Marketindex*), operating cycle (*OpCycle*), capital intensity (*Capital*), intangible intensity (*Intangible*), long-term earnings growth (*Ltg*), and idiosyncratic return volatility (IdioSync).

4. Empirical Results

4.1. Samples, data sources, and descriptive statistics

One of the main objective of this study is to compare the effect of AEM and REM on cost of capital between a strong legal regime country and a weak legal regime country. To this end, we use Hong Kong and Chinese firms as our sample. We extract financial statement data, stock price and monthly return data, and analysts' earnings and long-term growth forecasts for Hong Kong and Chinese firms from CSMAR and DATASTREAM, respectively. The initial sample consists of all firms in these two databases for the 9-year sample period 2009-2017, which is 40,680 firm-years. We exclude firms in the financial service industry to maintain homogeneous interpretations of various accounting variables (e.g., accounting accruals and debt obligations) across our sample firms in different industries. To estimate *CoE* from the four alternative methods described in Appendix A, we delete all observations with missing or negative earnings forecasts for either fiscal year $t + 1$ or $t + 2$, denoted by F_{t+1} or F_{t+2}, respectively. We use actual earnings forecast data for fiscal year $t + 3$ (i.e., F_{t+3}) for the methods to require it. When F_{t+3} is missing, we estimate it by $F_{t+2}*F_{t+2}/F_{t+1}$ for the method of Gebhardt et al. (2001), and by $F_{t+2}*(1 + Ltg)$, where *Ltg* is analysts' long-term growth forecast, for the method of Claus and Thomas (2001). When *Ltg* is missing, we

6) The main results are qualitatively very similar when we use the raw values of |*DAC*|, |*AbCFO*|, |*AbProd*|, |*AbDiscE*|, and |*AbREM*| instead of their ranked values. However, we use ranked values in our reported analyses because it is difficult to interpret the relative importance of AEM and REM on the cost of capital using the coefficients on these raw values.

assume a long-term growth rate of 4%, following Gode and Mohanram (2003).[7] A similar approach is used for the earnings forecasts of longer horizons when they are necessary, depending on which valuation method is used. For the Gode and Mohanram (2003) method, we discard observations with short-term growth smaller than long-term growth. For the Claus and Thomas (2001) method, we delete observations with $F_{t+5} < 0$.

To obtain future book values of equity, which is required to compute future residual incomes, we assume that the clean surplus relation holds and that the current dividend payout ratio is maintained in the future. For all four *CoE* estimates, we set *CoE* to be equal to 0.50 if it exceeds 0.50, which is consistent with Dhaliwal et al. (2007).[8] We delete observations without the mean *CoE* of the four estimates. To be included in our sample, a firm must have all the financial statement data required for computing our main research variables, the AEM and REM proxies, for each sample year. Our sample size is further reduced owing to the data requirement for all the control variables. To alleviate concerns over potential problems arising from the existence of extreme observations, we delete observations that fall within the top and bottom 1% of the annual empirical distributions of our major research variables included in Eq. (6), as well as observations with negative book values of equity.

After applying the above selection criteria and data requirements, we obtain a sample of 7,866 firm-years, out of which 5,355 firm-years are from Chinese market. As in Cohen et al. (2008), our final sample (7,866 observations) consists of larger and more profitable firms than the CSMAR population due to the data requirements.

Table 1 provides descriptive statistics for the sample used for estimating Eq. (6). The mean and median of our *CoE* are 7.71% and 5.40%, respectively, with a standard deviation of 6.8%, suggesting that our *CoE* is reasonably distributed. With respect to three fundamental determinants of *CoE*, the sample mean (median) values are 0.94 (0.95) for *Beta*, 21.5 (21.4) for *Size*, and 0.48 (0.42) for *BM*, and their standard deviations are fairly large relative to their respective mean values, suggesting that they are reasonably distributed, with wide variations across sample firms.

With respect to AEM-related variables, consistent with evidence reported in many other studies, the mean and median values of (signed) abnormal accruals, that is, *DAC*, are close to 0, though both are positive, while the mean and median values of absolute (unsigned) abnormal accruals, that is, $|DAC|$, are about 6.3% and 3.7%, respectively, of lagged total assets. The mean $|DAC|$ of 6.3% for our sample is almost identical to that for the winsorized sample of Cohen et al. (2008).

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7) The essence of the main implications is unchanged with the sample excluding the observations without *Ltg* values.

8) Our results are robust to whether we use the original estimates or winsorize them at the cut-off value of 0.50.

With respect to the three unsigned REM-related variables, namely, abnormal CFO (|*AbCFO*|), abnormal production costs (|*AbProd*|), and abnormal discretionary expenses (|*AbDiscE*|), the following is noteworthy. First, the mean and median values of |*AbCFO*| are 7.4% and 5.2%, respectively, of lagged total assets with relatively large standard deviation of 7.9%. This suggests that our sample firms engage actively in REM activities that have cash flow consequences, and that the extent of their REM activities varies widely across firms. Second, |*AbProd*| has a mean and a median of 15.0% and 10.3% of lagged total assets, respectively, with a large standard deviation of 16.0%. The large standard deviation suggests that REM practices via temporary production restructuring activities vary widely across firms. Finally, the mean and median values of |*AbDiscE*| are 16.8% and 9.7%, respectively, of lagged total assets, with a very large standard deviation of 26.4%. The sign and magnitude of the signed REM proxies (not reported here) are similar to those reported in Cohen et al. (2008). We omit the explanation on other control variables because they are self-explanatory.

Table 1 Descriptive statistics

	n	mean	Std.	25%	median	75%
r	7,866	0.0771	0.0683	0.0308	0.0540	0.0994
DAC	7,866	0.0043	0.1689	-0.0351	0.0010	0.0385
|*DAC*|	7,866	0.0634	0.1566	0.0159	0.0369	0.0981
|*AbCFO*|	7,866	0.0741	0.0793	0.0241	0.0519	0.0981
|*AbProd*|	7,866	0.1501	0.1603	0.0448	0.1030	0.2005
|*AbDiscE*|	7,866	0.1678	0.2644	0.0334	0.0973	0.2142
SR|*DAC*|	7,866	0.4784	0.3132	0.2222	0.4444	0.7778
SR|*AbREM*|	7,866	0.4947	0.2148	0.3333	0.4815	0.6296
SOE	7,866	0.7600	0.4271	1	1	1
Beta	7,866	0.9355	0.2478	0.7793	0.9503	1.1067
Size	7,866	21.5009	0.9102	20.8589	21.3906	22.0041
BM	7,866	0.4753	0.2845	0.2536	0.4197	0.6412
Lev	7,866	0.4922	0.1743	0.3715	0.5055	0.6232
Marketindex	7,866	7.2319	2.0045	5.5200	7.2300	8.9900
OpCycle	7,866	5.2123	1.0268	4.5452	5.1678	5.8460
Capital	7,866	0.3042	0.1805	0.1676	0.2791	0.4291
Intangible	7,866	0.1661	0.1645	0.0756	0.1224	0.1915
Ltg	7,866	0.2246	0.5135	-0.0065	0.1450	0.3326
IdioSync	7,866	0.0730	0.0177	0.0600	0.0710	0.0844

This table presents descriptive statistics for the major variables used in the full model sample. All the variables are as defined in Appendix B.

4.2 Results of main regressions: Tests of hypotheses H1 to H4

Table 2 presents the results of our main regressions to test H1 and H2. To alleviate concerns over potential problems arising from cross-sectional dependency in the data, we estimate regression coefficients by applying the Fama-MacBeth (1973) procedure throughout the paper. In Column (1), we regress our estimate of the implied cost of equity, *CoE*, on AEM and control variables without including REM. The coefficient on *SR|DAC|* is positive and significant at the 1% level. This means that AEM increases the cost of equity, consistent with prior studies (Francis et al. 2004). In Columns (2) to (5), we include each of three individual REM variables or the aggregate REM variable without the AEM proxy and conduct the same analysis. The coefficients on *SR|AbCFO|*, *SR|AbProd|*, and *SR|AbREM|* are significantly positive in Columns (2), (3), and (5), respectively, while that on *SR|AbDiscE|* is insignificant. This means that a firms' cost of equity increases with the intensity of its REM activities, supporting H1. In Column (6), we include the AEM and the aggregate REM variables together. The coefficient on *SR|DAC|* is still positive but its significance drops to the 10% level (0.0025, t-value = 1.97). In contrast, the coefficient on *SR|AbREM|* is positive and significant at the 1% level (0.0153, t-value = 4.31), confirming H1 again. This result indicates that the CoE-increasing effect of REM is incremental to the same effect of AEM, and the effect is larger for REM than it is for AEM, supporting H2. The Wald test indicates that the difference between the coefficients on AEM and REM in Column (6) is statistically significant at the 1% level (unreported).

We now turn to the control variables. Consistent with our priors, CoE is positively related to *BM* at the 1% level, while it is negatively related to Size at the same level. The coefficient on *Beta* is insignificant. These highly significant coefficients provide a validation that our cost of equity estimate adequately captures a firm's underlying riskiness and that the basic risk factors explain firms' riskiness well in Chinese market. The coefficients on seven innate factors are stable across different model specifications in terms of their significance and signs. The coefficients on *Capital, Intangible, Ltg* and *IdioSync* are insignificant across all specifications. The coefficients on Lev and *Marketindex* are significantly positive at the 1% or 5% level, while the coefficient on *OpCycle* is significantly negative at the 5% level.

In sum, the results in Table 2 demonstrate that Hong Kong and Chines firms' cost of equity increases with the intensity of REM even after controlling for the effect of AEM, and this CoE-increasing effect of REM is larger than that of AEM because REM not only affects accruals but also jeopardizes firms' cash flow generating abilities and long-term business fundamentals by distorting their optimal operations and investments.

Table 2 Regressions to test H1 and H2

Dep. Var. = *CoE*						
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.0181	-0.0179	-0.0193	-0.0192	-0.0249	-0.0248
	(-0.74)	(-0.73)	(-0.79)	(-0.78)	(-1.01)	(-1.01)
SR|DAC|	0.0002					0.0025
	(3.70)***					(1.97)*
SR|AbCFO|		0.0079				
		(3.50)***				
SR|AbProd|			0.0092			
			(4.05)***			
SR|AbDiscE|				0.0009		
				(0.38)		
SR|AbREM|					0.0142	0.0153
					(4.08)***	(4.31)***
Beta	-0.0000	-0.0001	0.0001	-0.0000	0.0001	0.0001
	(-0.01)	(-0.04)	(0.04)	(-0.00)	(0.03)	(0.04)
Size	-0.0038	-0.0035	-0.0035	-0.0038	-0.0036	-0.0036
	(-3.94)***	(-3.69)***	(-3.64)***	(-3.96)***	(-3.73)***	(-3.73)***
BM	0.0678	0.0686	0.0691	0.0679	0.0696	0.0694
	(17.76)***	(18.00)***	(18.04)***	(17.80)***	(18.11)***	(18.06)***
Lev	0.0253	0.0255	0.0254	0.0253	0.0253	0.0256
	(5.99)***	(6.04)***	(6.00)***	(5.99)***	(6.00)***	(6.06)***
Marketindex	0.0010	0.0009	0.0010	0.0010	0.0009	0.0009
	(2.56)**	(2.50)**	(2.58)***	(2.56)**	(2.49)**	(2.49)**
OpCycle	-0.0023	-0.0021	-0.0020	-0.0022	-0.0016	-0.0015
	(-2.38)**	(-2.20)**	(-2.10)**	(-2.25)**	(-1.63)	(-1.56)
Capital	0.0062	0.0068	0.0076	0.0064	0.0085	0.0080
	(1.26)	(1.39)	(1.54)	(1.30)	(1.72)*	(1.62)
Intangible	0.0001	0.0005	-0.0008	-0.0002	-0.0026	-0.0023
	(0.03)	(0.12)	(-0.17)	(-0.05)	(-0.51)	(-0.46)
Ltg	0.0001	-0.0001	-0.0006	0.0001	-0.0005	-0.0005
	(0.08)	(-0.12)	(-0.49)	(0.07)	(-0.43)	(-0.39)
IdioSync	-0.0129	-0.0206	-0.0142	-0.0131	-0.0205	-0.0192
	(-0.22)	(-0.36)	(-0.25)	(-0.23)	(-0.36)	(-0.33)
Year Dummy	yes	yes	yes	yes	yes	yes
Industry Dummy	yes	yes	yes	yes	yes	yes
N	7,866	7,866	7,866	7,866	7,866	7,866
adj. R^2	0.229	0.230	0.230	0.229	0.231	0.231

This table presents the main regression analysis results to test H1 and H2. The effects of AEM and REM after controlling for three risk factors and seven innate factors on the implied cost of equity are reported. Column 1 reports the coefficients on the AEM proxy, columns 2 to 4 report the coefficients on the individual REM proxies when each of them is separately included, column 5 reports the coefficient on the aggregate REM proxy, and column 6 reports the coefficients on the AEM and aggregate REM proxies when they are included together. All the variables are as defined in Appendix B. Wald tests indicate that the impact of the aggregate REM on the cost of equity is statistically greater than that of AEM at the 1% level in column 6. The value of the coefficient is the average of annual coefficients from Fama and MacBeth regressions, and the t-value is computed by dividing this average coefficient by the standard error of annual coefficients after correcting for serial correlations using the Newey-West method. The numbers in parentheses are t-values, and ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively (two tailed).

The results of testing H3 are reported in Table 3. In this analysis, we create a dummy variable representing Hong Kong firms and interact it with our AEM and REM proxies to see a differential CoE-increasing effect of Hong Kong firms compared to Chinese firms. For brevity, we use the aggregate REM variable only but the results for the individual REM proxies are qualitatively the same. We include AEM only in Column (1), REM only in Column (2), and AEM and REM together in Column (3). In all columns, the coefficients on *SR|DAC|* and *SR|AbREM|* are significantly positive, indicating that the CoE of Chinese firms increases with the intensity of AEM and REM, consistent with the results in Table 2. More importantly, the coefficient on *SR|AbREM|*HK* is positive and significant at the 5% level in Columns (2) and (3). For example, it is 0.0078 with a t-value of 2.55 in Column (3). This means that the CoE-increasing effect of REM is more pronounced for Hong Kong firms than it is for Chinese firms, supporting H3. The coefficient on *SR|DAC|*HK* is also positive in Columns (1) and (3) but statistically not significant. From now on, we omit explanations on the control variables since they are similar with those in Table 2.

Overall, the results in Table 3 show that investors demand a higher risk premium in face with managerial opportunism through REM in Hong Kong market, where the legal and extra-legal institutions and law enforcements for investor protections are stronger, than they do in Chinese market.

Table 3 Regression results to test H3

Dep. Var. = *CoE*			
	(1)	**(2)**	**(3)**
Intercept	-0.0191	-0.0211	-0.0234
	(-0.64)	(-0.70)	(-0.78)
SR|DAC|	0.0008		0.0014
	(3.23)***		(1.91)*
*SR|DAC| * HK*	0.0071		0.0088
	(1.20)		(1.44)
SR|REM|		0.0137	0.0143
		(2.57)**	(2.63)***
*SR|REM| * HK*		0.0040	0.0078
		(2.46)**	(2.55)**
HK	0.0041	-0.0013	0.0010
	(1.18)	(-0.29)	(0.20)
Beta	-0.0003	-0.0005	-0.0001
	(-0.09)	(-0.13)	(-0.03)
Size	-0.0037	-0.0034	-0.0034
	(-3.27)***	(-2.95)***	(-3.01)***
BM	0.0698	0.0717	0.0717
	(15.60)***	(15.89)***	(15.87)***
Lev	0.0284	0.0287	0.0289
	(5.14)***	(5.19)***	(5.23)***

Dep. Var. = *CoE*			
	(1)	(2)	(3)
Marketindex	0.0007	0.0007	0.0007
	(1.46)	(1.48)	(1.42)
OpCycle	-0.0021	-0.0015	-0.0013
	(-1.80)*	(-1.25)	(-1.10)
Capital	-0.0044	-0.0014	-0.0022
	(-0.69)	(-0.23)	(-0.36)
Intangible	-0.0021	-0.0051	-0.0052
	(-0.30)	(-0.70)	(-0.71)
Ltg	0.0015	0.0008	0.0008
	(0.83)	(0.42)	(0.43)
IdioSync	0.0551	0.0384	0.0419
	(0.74)	(0.52)	(0.57)
Year Dummy	yes	yes	yes
Industry Dummy	yes	yes	yes
N	7,866	7,866	7,866
adj. R^2	0.223	0.225	0.225

This table presents the regression analysis results to test H3. The effects of AEM and REM after controlling for three risk factors and seven innate factors on the implied cost of equity are reported. Column 1 reports the coefficients on the AEM proxy, column 2 reports the coefficient on the aggregate REM proxy, and column 3 reports the coefficients on the AEM and aggregate REM proxies when they are included together. All the variables are as defined in Appendix B. The value of the coefficient is the average of annual coefficients from Fama and MacBeth regressions, and the t-value is computed by dividing this average coefficient by the standard error of annual coefficients after correcting for serial correlations using the Newey-West method. The numbers in parentheses are t-values, and ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively (two tailed).

The results to test H4 are summarized in Table 4. Here we use only Chinese firms for the analysis. We create an indicator variable representing government owned enterprises (*SOE*) and interact it with our AEM and REM variables to see whether the CoE-increasing effect of REM is less pronounced for SOEs. We separately include *SR|DAC|*, *SR|AbCFO|*, *SR|AbProd|*, *SR|AbDiscE|*, and *SR|AbREM|* with the interaction with *SOE* and each of them in Columns (1) to (5), respectively. Similar with Table 2, the coefficients on *SR|DAC|*, *SR|AbCFO|*, *SR|AbProd|*, and *SR|AbREM|* are significantly positive, while that on *SR|AbDiscE|* is insignificant. More importantly, the coefficients on *SR|DAC|*SOE*, *SR|AbCFO|*SOE*, *SR|AbProd|*SOE*, *SR|AbDiscE|*SOE*, and *SR|AbREM|*SOE* are all negative, and those on *SR|DAC|*SOE* and *SR|AbREM|*SOE* are statistically significant at the 5% and 10% levels, respectively. The result is similar when our AEM and REM proxies are included together in Column (6). The coefficient on *SR|AbREM|*SOE* is negative and significant at the 5% level (-0.0163, t-value = -2.11), while that on *SR|DAC|*SOE* becomes insignificant.[9]

9) In Tables 3 and 4, the coefficients on *SR|DAC|*HK* and *SR|DAC|*SOE* are insignificant when the corresponding REM interactions are included together. We conjecture that the correlation between the

In sum, the results in Table 4 show that, in Chinese market, the CoE-increasing effect of REM is less pronounced for SOEs than it is for non-SOEs probably because investors in SOEs expect future government protections against their firms' deterioration in fundamentals caused by managers' opportunistic REM, confirming H4.

Table 4 Regression results to test H4

Dep. Var. = *CoE*						
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Intercept	-0.0216	-0.0240	-0.0250	-0.0245	-0.0332	-0.0322
	(-0.88)	(-0.97)	(-1.02)	(-0.99)	(-1.34)	(-1.30)
SR|DAC|	0.0010					0.0056
	(3.06)***					(1.97)*
SR|DAC| SOE*	-0.0005					0.0041
	(-2.50)**					(0.76)
SR|AbCFO|		0.0131				
		(2.86)***				
*SR|AbCFO| * SOE*		-0.0072				
		(-1.39)				
SR|AbProd|			0.0145			
			(3.26)***			
*SR|AbProd| * SOE*			-0.0074			
			(-1.48)			
SR|AbDiscE|				0.0041		
				(0.93)		
*SR|AbDiscE| * SOE*				-0.0044		
				(-0.89)		
SR|AbREM|					0.0246	0.0272
					(3.70)***	(3.92)***
*SR|AbREM| * SOE*					-0.0145	-0.0163
					(-1.94)*	(-2.11)**
SOE	-0.0039	0.0003	0.0004	-0.0015	0.0041	0.0030
	(-1.26)	(0.11)	(0.15)	(-0.49)	(0.99)	(0.67)
Beta	0.0000	-0.0001	0.0001	0.0000	0.0001	0.0001
	(0.01)	(-0.03)	(0.04)	(0.01)	(0.03)	(0.06)
Size	-0.0041	-0.0038	-0.0038	-0.0041	-0.0038	-0.0038
	(-4.20)***	(-3.94)***	(-3.87)***	(-4.21)***	(-3.94)***	(-3.94)***
BM	0.0682	0.0688	0.0693	0.0683	0.0698	0.0697
	(17.86)***	(18.06)***	(18.10)***	(17.90)***	(18.18)***	(18.13)***
Lev	0.0254	0.0256	0.0255	0.0255	0.0256	0.0258
	(6.00)***	(6.06)***	(6.03)***	(6.03)***	(6.07)***	(6.10)***
Marketindex	0.0010	0.0009	0.0010	0.0010	0.0009	0.0009
	(2.53)**	(2.49)**	(2.58)**	(2.54)**	(2.50)**	(2.51)**

AEM and REM variables can cause this result but it remains puzzling.

Dep. Var. = *CoE*						
	(1)	(2)	(3)	(4)	(5)	(6)
OpCycle	-0.0024	-0.0023	-0.0022	-0.0023	-0.0017	-0.0017
	(-2.56)**	(-2.39)**	(-2.31)**	(-2.41)**	(-1.82)*	(-1.74)*
Capital	0.0065	0.0074	0.0081	0.0068	0.0092	0.0088
	(1.32)	(1.51)	(1.65)*	(1.38)	(1.86)*	(1.76)*
Intangible	-0.0001	0.0001	-0.0012	-0.0006	-0.0030	-0.0027
	(-0.04)	(0.03)	(-0.24)	(-0.13)	(-0.60)	(-0.54)
Ltg	-0.0001	-0.0003	-0.0009	-0.0001	-0.0008	-0.0007
	(-0.09)	(-0.29)	(-0.69)	(-0.08)	(-0.59)	(-0.55)
IdioSync	-0.0172	-0.0254	-0.0211	-0.0181	-0.0273	-0.0254
	(-0.30)	(-0.44)	(-0.37)	(-0.31)	(-0.47)	(-0.44)
Year Dummy	yes	yes	yes	yes	yes	yes
Industry Dummy	yes	yes	yes	yes	yes	yes
N	5,355	5,355	5,355	5,355	5,355	5,355
adj. R^2	0.229	0.231	0.231	0.229	0.231	0.231

This table presents the regression analysis results to test H4. The effects of AEM and REM after controlling for three risk factors and seven innate factors on the implied cost of equity are reported. Column 1 reports the coefficients on the AEM proxy, columns 2 to 4 report the coefficients on the individual REM proxies when each of them is separately included, column 5 reports the coefficient on the aggregate REM proxy, and column 6 reports the coefficients on the AEM and aggregate REM proxies when they are included together. All the variables are as defined in Appendix B. Wald tests indicate that the impact of the aggregate REM on the cost of equity is statistically greater than that of AEM at the 1% level in column 6. The value of the coefficient is the average of annual coefficients from Fama and MacBeth regressions, and the t-value is computed by dividing this average coefficient by the standard error of annual coefficients after correcting for serial correlations using the Newey-West method. The numbers in parentheses are t-values, and ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively (two tailed).

5. Sensitivity Tests

5.1. Using signed AEM and REM measures

To proxy for the intensity of AEM and REM, our analyses thus far use the unsigned measures of AEM and REM. This approach implicitly assumes that opportunistic earnings management, whether REM or AEM, is either income increasing or income decreasing. This is consistent with previous AEM research, which provides evidence that managers engage in income-decreasing AEM under certain situations (e.g., Jones 1991; Ramanna and Roychowdhury 2010). However, the extant REM literature has paid attention only to income-increasing REM (e.g., Roychowdhury 2006; Zang 2012; Cohen et al. 2008). To the extent that our sample firms engage only in income-increasing AEM or REM, our results using the unsigned measures of AEM and REM could be biased. To address this possibility, we re-estimate our main regression in Eq. (6) using the signed measures of AEM and REM, denoted by *SRDAC*, *SRAbCFO*, *SRAbProd*, *SRAbDiscE*, and *SRAbREM*, in lieu of their unsigned measures.[10]

10) We multiply -1 to *AbCFO* and *AbDiscE* so that their larger values represent more intense REM, as in

As presented in Table 5, the use of these signed measures does not alter the main thrust of our earlier results using the unsigned measures. When *SRDAC, SRAbCFO, SRAbProd, SRAbDiscE,* and *SRAbREM* are individually included in Columns (1) to (5), respectively, the coefficients on *SRDAC, SRAbCFO, SRAbProd,* and *SRAbREM* are significantly positive, as in the unsigned case in Table 2. Moreover, the coefficient on *SRAbDiscE* (which is insignificant in Table 2) becomes significant, which is consistent with H1. As shown in Column (6), when the aggregate REM measure (*SRAbREM*) is included together with the AEM variable (*SRDAC*), the coefficient on *SRAbREM* is positive and significant at the 1% level (0.0130, t-value = 3.72). The coefficient on *SRDAC* is still positive but its significance drops to the 10% level. In short, a comparison of the results reported in the corresponding columns of Tables 2 and 5 indicates that our results are robust to whether the signed or unsigned measures of AEM and REM are used.

Table 5 Using signed AEM and REM proxies

Dep. Var. = *CoE*						
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.0188	-0.0089	-0.0119	-0.0098	-0.0002	-0.0021
	(-0.77)	(-0.36)	(-0.48)	(-0.39)	(-0.01)	(-0.08)
SRDAC	0.0057					0.0024
	(2.48)**					(1.99)*
SRAbCFO		0.0122				
		(5.34)***				
SRAbProd			0.00494			
			(2.18)**			
SRAbDiscE				0.00465		
				(1.74)*		
SRAbREM					0.0143	0.0130
					(4.35)***	(3.72)***
Beta	-0.0002	-0.0000	0.0002	0.0001	0.0004	0.0002
	(-0.09)	(-0.01)	(0.09)	(0.05)	(0.15)	(0.10)
Size	-0.0039	-0.0030	-0.0035	-0.0033	-0.0027	-0.0029
	(-4.10)***	(-3.09)***	(-3.65)***	(-3.32)***	(-2.79)***	(-2.92)***
BM	0.0676	0.0685	0.0682	0.0670	0.0678	0.0677
	(17.74)***	(18.09)***	(17.96)***	(17.49)***	(17.87)***	(17.82)***
Lev	0.0237	0.0281	0.0271	0.0248	0.0276	0.0267
	(5.48)***	(6.59)***	(6.29)***	(5.84)***	(6.48)***	(6.05)***
Marketindex	0.0010	0.0010	0.0011	0.0010	0.0010	0.0011
	(2.56)**	(2.64)***	(2.65)***	(2.58)***	(2.70)***	(2.68)***
OpCycle	-0.0020	-0.0023	-0.0022	-0.0022	-0.0022	-0.0020
	(-2.04)**	(-2.40)**	(-2.29)**	(-2.34)**	(-2.26)**	(-2.12)**

AbProd, following prior research. The signed aggregated REM measure, *SRAbREM*, is constructed by averaging and standardizing the decile ranks of these three individual REM proxies after this conversion.

Dep. Var. = *CoE*						
	(1)	(2)	(3)	(4)	(5)	(6)
Capital	0.0056	0.0001	0.0048	0.0057	0.0020	0.0021
	(1.14)	(0.02)	(0.99)	(1.16)	(0.41)	(0.43)
Intangible	-0.0017	0.0008	-0.0016	-0.0049	-0.0065	-0.0067
	(-0.33)	(0.17)	(-0.33)	(-0.81)	(-1.23)	(-1.26)
Ltg	-0.0000	0.0001	-0.0001	-0.0005	-0.0008	-0.0008
	(-0.01)	(0.04)	(-0.09)	(-0.41)	(-0.62)	(-0.60)
IdioSync	-0.0066	-0.0091	-0.0124	-0.0090	-0.0072	-0.0051
	(-0.12)	(-0.16)	(-0.22)	(-0.16)	(-0.13)	(-0.09)
Year Dummy	yes	yes	yes	yes	yes	yes
Industry Dummy	yes	yes	yes	yes	yes	yes
N	7,866	7,866	7,866	7,866	7,866	7,866
adj. R^2	0.229	0.232	0.229	0.229	0.231	0.231

This table presents the main regression analysis results to test H1 and H2 using signed AEM and REM proxies. The effects of AEM and REM after controlling for three risk factors and seven innate factors on the implied cost of equity are reported. Column 1 reports the coefficients on the AEM proxy, columns 2 to 4 report the coefficients on the individual REM proxies when each of them is separately included, column 5 reports the coefficient on the aggregate REM proxy, and column 6 reports the coefficients on the AEM and aggregate REM proxies when they are included together. All the variables are as defined in Appendix B. Wald tests indicate that the impact of the aggregate REM on the cost of equity is statistically greater than that of AEM at the 1% level in column 6. The value of the coefficient is the average of annual coefficients from Fama and MacBeth regressions, and the t-value is computed by dividing this average coefficient by the standard error of annual coefficients after correcting for serial correlations using the Newey-West method. The numbers in parentheses are t-values, and ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively (two tailed).

5.2. Controlling for the effect of Big N auditors

Chen et al. (2011) document that Big N auditors reduces cost of equity and this effect is more prominent for non-SOEs. Because they report that audit quality is one of important cost of capital determinants affecting SOEs and non-SOEs differentially, we control for Big N auditor dummy (*BigN*) in testing H4 to see whether our results are sensitive to this control. We include *BigN* and *BigN*SOE* in our regression model and report the results in Table 6. As shown in all columns, the inferences are very similar with those reported in Table 4. The coefficients on *SR|DAC|*, *SR|AbCFO|*, *SR|AbProd|*, and *SR|AbREM|* are significantly positive, while that on *SR|AbDiscE|* is insignificant. The coefficients on *SR|DAC|*SOE*, *SR|AbCFO|*SOE*, *SR|AbProd|*SOE, SR|AbDiscE|*SOE*, and *SR|AbREM|*SOE* are all negative, and those on *SR|DAC|*SOE* and *SR|AbREM|*SOE* are statistically significant at the 5% and 10% levels, respectively. When the AEM and REM proxies are included together in Column (6). The coefficient on *SR|AbREM|*SOE* is negative and significant at the 5% level (-0.0165, t-value = -2.21), while that on *SR|DAC|*SOE* becomes insignificant.

Consistent with Chen et al. (2011), the coefficient on *BigN* is significantly negative in all columns, and that on *BigN*SOE* is significantly positive in most columns, implying that Big N auditors reduce cost of equity and this effect is more pronounced for non-SOEs. In short, the differential effect of AEM/REM on cost of capital between SOEs and non-SOEs is not affected when the differential effect of audit quality is controlled.

Table 6 Controlling for Big N auditors

Dep. Var. = *CoE*						
	(1)	(2)	(3)	(4)	(5)	(6)
Intercept	-0.0214	-0.0230	-0.0243	-0.0247	-0.0326	-0.0331
	(-0.89)	(-0.96)	(-1.11)	(-0.98)	(-1.36)	(-1.38)
SR|DAC|	0.0011					0.0058
	(3.16)***					(1.98)*
SR|DAC| SOE*	-0.0006					0.0045
	(-2.51)**					(0.80)
SR|AbCFO|		0.0144				
		(2.75)***				
*SR|AbCFO| * SOE*		-0.0069				
		(-1.41)				
SR|AbProd|			0.0151			
			(3.09)***			
*SR|AbProd| * SOE*			-0.0072			
			(-1.45)			
SR|AbDiscE|				0.0046		
				(0.95)		
*SR|AbDiscE| * SOE*				-0.0050		
				(-1.04)		
SR|AbREM|					0.0236	0.0263
					(3.62)***	(3.84)***
*SR|AbREM| * SOE*					-0.0144	-0.0165
					(-1.95)*	(-2.21)**
*BigN * SOE*	0.0192	0.0200	0.0185	0.0175	0.0207	0.0190
	(1.97)*	(2.12)**	(1.52)	(1.94)*	(1.94)*	(2.31)**
SOE	-0.0040	0.0003	0.0004	-0.0014	0.0047	0.0032
	(-1.28)	(0.12)	(0.16)	(-0.59)	(0.89)	(0.64)
BigN	-0.0301	-0.0290	-0.0281	-0.0237	-0.0245	-0.0232
	(-2.24)**	(-2.13)**	(-2.33)**	(-2.21)**	(-2.59)**	(-2.50)**
Control variables	yes	yes	yes	yes	yes	yes
Year Dummy	yes	yes	yes	yes	yes	yes
Industry Dummy	yes	yes	yes	yes	yes	yes
N	5,355	5,355	5,355	5,355	5,355	5,355
adj. R^2	0.238	0.240	0.237	0.232	0.239	0.242

This table presents the regression analysis results to test H4 after controlling for the effect of Big N auditors. The effects of AEM and REM after controlling for three risk factors and seven innate factors on the implied cost of equity are reported. Column 1 reports the coefficients on the AEM proxy, columns 2 to 4 report the coefficients on the individual REM proxies when each of them is separately included, column 5 reports the coefficient on the aggregate REM proxy, and column 6 reports the coefficients on the AEM and aggregate REM proxies when they are included together after controlling for the effect of Big N auditors separately for SOEs and non-SOEs. All the variables are as defined in Appendix B. Wald tests indicate that the impact of the aggregate REM on the cost of equity is statistically greater than that of AEM at the 1% level in column 6. The value of the coefficient is the average of annual coefficients from Fama and MacBeth regressions, and the t-value is computed by dividing this average coefficient by the standard error of annual coefficients after correcting for serial correlations using the Newey-West method. The numbers in parentheses are t-values, and ***, **, and * indicate statistical significance at the 0.01, 0.05, and 0.10 levels, respectively (two tailed).

5.3. Other sensitivity tests

Our analyses thus far have implicitly assumed that analysts' earnings forecasts used to derive the implied cost of equity from a valuation model are efficient, in the sense that analysts adjust their earnings forecasts downward by undoing the income-increasing effects of AEM and REM on current earnings. However, if they fail to do so, and this failure is more serious for REM than for AEM, the forecasts can be generally overestimated, and particularly so for firms boosting earnings via REM. In such a case, the results of our main analyses could be mechanically driven; that is, the implied CoE measures estimated from various valuation models (by equating current price with the present value of current and future earnings stream) could be biased upward (Easton and Sommers 2007), and to a greater extent for REM-intensive firms. We conveniently call this upward bias in the CoE estimate the "numerator effect."

To investigate whether our main regression results are sensitive to this potential numerator effect, we re-estimate our main regression after including the average forecast error (forecasted earnings minus actual earnings) for the past three years, *PastFE*, as an additional control variable. Unreported results show that the coefficient on *PastFE* is significantly positive across all specifications at the 1% level, suggesting that there exists a non-trivial numerator effect. We find, however, that the coefficients on our AEM and REM proxies remain qualitatively similar in terms of their significance, magnitude, and sign, and the related statistical inferences remain unaltered, even after including *PastFE*. This suggests that our main results reported in Tables 2 to 4 are unlikely to be driven by analysts' optimism bias or the associated measurement errors in our implied cost of equity estimates caused by analysts' optimism bias.

We also repeat our main analyses, using the performance-adjusted measure of AEM as proposed by Kothari et al. (2005). Unreported results of our main regressions are robust to the use of this alternative method. We also estimate our main regression in Eq. (6), using the standardized normal variables (i.e., the raw values of variables minus their means deflated by their standard deviations) for all variables. Unreported results show that statistical inferences on our test variables are qualitatively similar to those reported in the paper.

As a further sensitivity check, we also estimate our main regression in Eq. (6), using raw values of AEM and REM in lieu of their standardized ranked values, and find that their coefficients are positive and significant at the 1% level. Finally, we also re-estimate our main regression in Eq. (6) after adding industry and year fixed effects, using firm-years pooled over the 9-year period. Though not tabulated, the results of a pooled ordinary least squares regression with standard errors corrected for firm-level clustering show that our main results are robust to the use of this alternative estimation.

6. Conclusion

With annual cross-sectional regressions of the implied cost of equity measure on our proxies for REM and AEM and other risk factors using Hong Kong and Chinese listed firm data, this study documents evidence that AEM and REM are positively associated with the implied cost of equity and that this association is stronger for REM than for AEM. We provide evidence that this CoE-increasing effect of REM is more pronounced for Hong Kong than for Chinese firms. We also find that, in Chinese market, the CoE-increasing effect of REM is less pronounced for state owned enterprises (SOEs) than non-SOEs.

Our results provide important implications for managers, regulators, and researchers. First, our evidence using Hong Kong and Chinese data indicates that the lesson documented in Kim and Sohn (2013) on the CoE-increasing effect of U.S. firms' REM is also applied to Hong Kong and Chinese firms because the investors in these markets see through REM's cash flow consequences and are able to factor this into the increased cost of capital. Second, our results suggest that regulators in Hong Kong and Chinese markets who are concerned with the quality of reported earnings should understand that REM and AEM are substitutes for each other and that rational investors in these markets are able to take into account (at least partially) the relative costs of REM and AEM when making investment decisions. Our findings also imply that Chinese market regulators need to put more efforts on the investor protections, especially for non-government owned firms, because the naive investors in this market do not fully understand the implications and consequences of managers' opportunistic REM and thus cannot properly protect themselves by asking higher risk premiums against firms with more intense REM activities. Finally, our results suggest that academic researchers interested in the quality of Hong Kong or Chinese firms' reported earnings should consider REM (as well as AEM) as an important factor determining earnings quality. Given that little is known about what firm-level and/or institution-level factors influence managers' abilities, incentives, and opportunities to rely more on costly REM (relative to AEM) as an earnings management strategy in these markets, we recommend further research on the issue.

As in other REM studies, the results reported in this study are subject to measurement errors inherent in the estimation of REM (as well as AEM), and should thus be interpreted cautiously. Our residual-based measures of abnormal CFO, abnormal production costs, and abnormal discretionary expenditures may suffer from non-trivial measurement errors, in the sense that these measures of abnormal operating activities may simply reflect the outcome of optimal business decisions in certain firms or operating environments rather than the outcome of opportunistic REM with an aim to interfere with a transparent financial reporting. However, this noise introduces a "conservative" bias against rejecting our null hypotheses of no association, because if REM for optimal business decisions can be excluded from our sample, we would observe that the association between the cost of equity and our REM measures is likely to become even stronger than otherwise. Nevertheless, one cannot rule out the possibility that these measurement errors are significant enough to render our reported results unreliable or spurious. One way to alleviate this concern is to develop more refined models that provide a finer decomposition of the outcomes associated with normal, optimal business decisions and abnormal, opportunistic decisions. Given the scope of our study, we leave the above issue to future research.

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Appendix A. Estimation of Implied Cost of Equity

The detailed empirical specifications for the four methods used to estimate the implied cost of equity, denoted by r, are as explained below (firm subscripts are subsumed).

1. Claus and Thomas (2001) Method

$$P_t = BV_t + \frac{F_{t+1} - r_t BV_t}{(1+r_t)} + \frac{F_{t+2} - r_t BV_{t+1}}{(1+r_t)^2} + \frac{F_{t+3} - r_t BV_{t+2}}{(1+r_t)^3} + \frac{F_{t+4} - r_t BV_{t+3}}{(1+r_t)^4}$$

$$+ \frac{F_{t+5} - r_t BV_{t+4}}{(1+r_t)^5} + \frac{(F_{t+5} - r_t BV_{t+4})(1+g_t)}{(r_t - g_t)(1+r_t)^5}$$

where P_t is the stock price six months after fiscal year-end *t*; BV_t is the per share book value of equity at fiscal year-end *t*; $F_{t+\tau}$ and *g*t are the I/B/E/S consensus earnings forecast for fiscal year $t + \tau$ and long-term growth forecast (we use 4% for the firms without such data), respectively, which are issued five months after fiscal year-end *t*; and r_t is cost of equity in year *t* (i.e., CoE_t). The future book values are estimated by assuming clean surplus accounting, i.e., $BV_{t+\tau} = BV_{t+\tau-1} + F_{t+\tau} - pr_t{*}F_{t+\tau}$ (pr_t is the payout ratio for fiscal year *t*, which is assumed to be maintained in the future). We follow Frankel and Lee (1998) in choosing the timing of P_t and $F_{t+\tau}$.

2. Gebhardt, Lee, and Swaminathan (2001) Method

$$P_t = BV_t + \frac{(FROE_{t+1} - r_t)BV_t}{(1+r_t)} + \frac{(FROE_{t+2} - r_t)BV_{t+1}}{(1+r_r)^2} + TV$$

$$TV = \sum_{\tau=3}^{T-1} \frac{(FROE_{t+\tau} - r_t)BV_{t+\tau-1}}{(1+r_t)^\tau} + \frac{(FROE_{t+T} - r_t)BV_{t+T-1}}{r_t(1+r_t)^{T-1}}$$

where $FROE_{t+\tau}$ is F_t+τ/$BV_{t+\tau-1}$, T = 12, and all other variables are as defined above. The linear interpolation to the industry median return on equity (ROE) is used to estimate $FROE_{t+4}$ to $FROE_{t+T}$, where all the firms are grouped into the same 48 industry classifications as in Fama and French (1997) and the industry median ROE is computed by averaging all the firms' ROEs (except negative ROEs) in each industry for at least the past five years, up to 10 years.

3. Gode and Mohanram (2003) Method

$$r_t = \frac{g_t}{2} + \sqrt{(\frac{g_t}{2})^2 + \frac{F_{t+1}}{P_t}(gs_t - g_t)}$$

where gs_t is short-term growth estimated by $(F_{t+2} - F_{t+1})/F_{t+1}$, and all other variables are as defined above.

4. Easton and Monahan (2005) Method

$$P_t = \frac{F_{t+2} + r_t \times pr_t \times F_{t+1} - F_{t+1}}{r_t^2},$$

where all the variables are as defined above.

Appendix B. Variable Definition and Measurement

CoE, r	=	implied cost of equity, estimated by the average of the four implied cost of equity estimates from the methods of Claus and Thomas (2001), Gebhardt et al. (2001), Gode and Mohanram (2003), and Easton and Monahan (2005);
Beta	=	market beta, estimated by regressing the monthly raw returns to CRSP value-weighted market returns over the past 36 months ending in the fiscal year-end month of year *t*;
MC	=	market capitalization (annual Compustat data item 199 x item 25);
Size	=	natural log of *MC*;
BM	=	book-to-market ratio of common equity, computed by the book value of equity (annual Compustat data item 60) at fiscal year-end *t* divided by the market value of equity (CRSP per share stock price x annual Compustat item 25) six months after fiscal year-end;
A	=	total assets (annual Compustat data item 6);
Sales	=	annual Compustat data item 12;
ROA	=	net income (annual Compustat data item 172) divided by lagged total assets;
REC	=	accounts receivable (annual Compustat data item 2);
PPE	=	gross property, plant, and equipment (annual Compustat data item 7);
TAC/A	=	total accruals divided by lagged total assets, where total accruals (*TAC*) are computed by income before extraordinary items (annual Compustat data item 123) minus CFO;
DAC	=	discretionary accruals, estimated by the modified Jones model;
NTAC	=	non-discretionary accruals, estimated by the modified Jones model;
AbCFO	=	level of abnormal CFO, where CFO is computed by annual Compustat data item 308 minus item 124 in and after 1987, by $NIBE - [(\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD) + Dep]$ before 1987, where *CA* is current assets (item 4), *Cash* is cash and short-term investments (item 1), *CL* is current liabilities (item 5), *STD* is short-term debt (item 34), and *Dep* is depreciation and amortization expenses (item 14));
AbProd	=	level of abnormal production costs, where production costs are defined as the sum of the cost of goods sold (annual Compustat data item 41) and the change in inventories (item 3);
AbDiscE	=	the level of abnormal discretionary expenses, where discretionary expenses are defined as the sum of advertising expenses (annual Compustat data item 45), R&D expenses (item 46), and SG&A expenses (item 189);
SRDAC	=	standardized decile rank of *DAC*, which is computed by ranking *DAC* into deciles each year and standardizing them to the range of 0 to 1;
SR|DAC|	=	standardized decile rank of |*DAC*|, which is computed by ranking |*DAC*| into deciles each year and standardizing them to the range of 0 to 1;
PredSR|DAC|	=	standardized decile rank of *exp*|*DAC*|, which is computed by ranking *exp*|*DAC*| into deciles each year and standardizing them to the range of 0 to 1, where *exp*|*DAC*| is the expected value of |*DAC*| using the annual mean coefficients from the first-stage simultaneous regressions and each firm's raw values of independent variables used in the first-stage simultaneous regressions;
SRAbCFO	=	standardized decile rank of *AbCFO*, which is computed by ranking (-1)**AbCFO* into deciles 0 to 9 each year and dividing those deciles by 9 to standardize them to the range of 0 to 1;
SRAbProd	=	standardized decile rank of *AbProd*, which is computed by ranking *AbProd* into deciles 0 to 9 each year and dividing those deciles by 9 to standardize them to the range of 0 to 1;
SRAbDiscE	=	standardized decile rank of *AbDiscE*, which is computed by ranking (1)**AbDiscE* into deciles 0 to 9 each year and dividing those deciles by 9 to standardize them to the range of 0 to 1;
SRAbREM	=	standardized decile rank of REM, which is estimated by averaging *SRAbCFO*, *SRAbProd*, and *SRAbDiscE* and ranking this average into deciles 0 to 9 each year and dividing those deciles to standardize that them to the range of 0 to 1;

SR|AbCFO|	=	standardized decile rank of |*AbCFO*|, which is computed by ranking |*AbCFO*| into deciles 0 to 9 each year and dividing those deciles by 9 to standardize them to the range of 0 to 1;
SR|AbProd|	=	standardized decile rank of |*AbProd*|, which is computed by ranking |*AbProd*| into deciles 0 to 9 each year and dividing those deciles by 9 to standardize them to the range of 0 to 1;
SR|AbDiscE|	=	standardized decile rank of |*AbDiscE*|, which is computed by ranking |*AbDiscE*| into deciles 0 to 9 each year and dividing those deciles by 9 to standardize them to the range of 0 to 1;
SR|AbREM|	=	standardized decile rank of REM, which is estimated by ranking |*AbCFO*|, |*AbProd*|, and |*AbDiscE*| into deciles each year, averaging the deciles of three variables, and standardizing that average to the range of 0 to 1;
StdCFO	=	standard deviation of CFO for the past five fiscal years, including the current fiscal year, deflated by lagged total assets;
FstdCFO	=	standard deviation of *CFO* for the future three fiscal years from fiscal year $t + 1$ deflated by total assets at the end of fiscal year *t*;
StdSales	=	standard deviation of sales for the past five fiscal years, including the current fiscal year, deflated by lagged total assets;
StdTAC	=	standard deviation of *TAC* for the past five fiscal years, including the current fiscal year, deflated by lagged total assets;
VarRatio	=	ratio of *Std(ε)* to *StdROA*, where *Std(ε)* is the standard deviation of errors for the future three fiscal years from fiscal year $t + 1$, and $\varepsilon_{t+1} = NI_t$ (net income, annual Compustat data item 172) $- CFO_{t+1}$, $\varepsilon_{t+2} = NI_t - CFO_{t+2}$, $\varepsilon_{t+3} = NI_t - CFO_{t+3}$, each error deflated by current total assets, and *StdROA* is the standard deviation of *ROA* for the future three fiscal years;
MnFCFOA	=	average of *CFOA* for the future three fiscal years from fiscal year $t + 1$, where *CFOA* = *CFO*/lagged total assets;
OpCycle	=	operating cycle, computed by the natural log of the sum of days accounts receivable and days inventory;
Intangible	=	intangible intensity, measured by a dummy variable that takes the value of one if the sum of R&D and advertising expenses is positive, and zero otherwise;
Capital	=	capital intensity, computed by the ratio of the net book value of PPE (annual Compustat data item 8) to total assets;
Lev	=	leverage, computed by total liabilities (annual Compustat data item 181) divided by total assets;
IdioSync	=	idiosyncratic volatility, estimated by the standard deviation of the residuals from the market model regressions used to estimate *Beta*;
#Anal	=	analyst coverage, the number of I/B/E/S analysts who issued one-year-ahead earnings forecasts five months after fiscal year-end;
Disp	=	forecast dispersion, computed by the standard deviation of I/B/E/S one-year-ahead analysts' earnings forecasts issued five months after fiscal year-end deflated by the book value of equity per share at fiscal year-end;
Ltg	=	I/B/E/S analyst forecast for long-term earnings growth;
HK	=	indicator variable that takes the value of one if a firm is a Hong Kong firm, and zero otherwise;
SOE	=	indicator variable that takes the value of one if a firm is a state owned enterprise, and zero otherwise;
BigN	=	indicator variable that takes the value of one if a firm is audited by a Big N auditor, and zero otherwise;
Marketindex	=	the degree of marketization for each province or provincial level region, constructed by Fan and Wang(2006).