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Does Income Smoothing Improve Earnings Informativeness? – A Comparison between the US and China Markets*

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Abstract

Tucker and Zarowin (2006) examine the impact of income smoothing on earnings informativeness, as proxied by the future earnings response coefficient (FERC). In this paper, we replicate Tucker and Zarowin (2006) and compare the results between the US and China markets. Specifically, using a sample of US firms from 2003 to 2008, we first find results consistent with Tucker and Zarowin (2006) that income smoothing improves FERC. However, our analysis for the China market over the same sample period indicates that income smoothing has little impact on FERC. Within the China market, we further find that income smoothing does not affect FERC for state-owned enterprises (SOEs) but weakly affects FERC for non-state-owned enterprises (non-SOEs). We argue that the market-level differences in information environment partly account for the differential impacts of income smoothing on FERC.

I. Introduction

The prior accounting literature has been interested in assessing the informativeness of earnings since the publication of two seminal papers by Ball and Brown (1968) and Beaver (1968). Early studies have documented a clear annual-window association between stock returns and current earnings. However, this contemporaneous return-earnings relation is found to be weak (e.g. Lev, 1989; Francis and Schipper, 1999; Lev and Zarowin, 1999). Collins, Kothari, Shanken, and Sloan (1994; hereinafter, CKSS), who initiated the FERC (i.e. future earnings response coefficient) framework, argue that current earnings' lack of timeliness explains the weak relation, implying that future earnings should be included in the traditional return-earnings relation model. Since then, a large strand of studies has applied the FERC framework to proxy for earnings

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informativeness and have documented that FERC is affected by firms' disclosure practice, information intermediaries, and corporate accounting policies.[2]

As one of the key indicators of earnings quality, income smoothing has been widely examined for decades. When managers use their reporting discretions to smooth earnings over time, the informativeness of earnings can be either improved or impaired depending on the managerial incentives underlying income smoothing activities. Specifically, if managers smooth earnings to efficiently communicate private information about the firm, income smoothing improves earnings informativeness. On the other hand, if managers smooth earnings to opportunistically mask the real performance of the firm, the reported earnings become less informative. It is an empirical question which incentive dominates in a cross-sectional setting. To investigate this question, Tucker and Zarowin (2006, hereinafter TZ) implement CKSS's framework and provide large sample evidence from US firms consistent with the incentive of efficient private information communication. They document that income smoothing is associated with more informative earnings, as reflected by higher FERC.

In this paper, we apply TZ's research design to the China market and examine if TZ's findings still hold in China. As an important emerging market, China is generally considered to be a market with poor investor protection, which in turn leads to a poor information environment (Morck *et al.*, 2000). Also, in China, most listed firms are partially privatised and corporate ownership is highly concentrated in the central/local government or in government-controlled institutions such as state-owned enterprises (SOEs). According to Piotroski and Wong (2000), this unique institutional environment in China reduces the transparency in financial reporting. For example, since the controlling shareholders of SOEs exercise nearly full control over major corporate decisions, related-party transactions are prevalent among SOEs, which significantly curbs managers' incentives to provide transparent information to the public. Therefore, it is interesting to examine how managers' income smoothing activities affect earnings informativeness in China.

Using a sample of US firms from 2003 to 2008,[3] we find evidence consistent with TZ that FERC is higher for "higher-smoothing" firms than that for "lower-smoothing" firms. For the sample of Chinese firms, income smoothing does not affect FERC. However, we find that for both US firms and Chinese firms, income smoothing has a significant positive impact on the earnings response coefficient (ERC). These results are robust to decomposing earnings into cash flows and accruals components and to controlling for potentially omitted variables and cross-sectional correlations.

We argue that the market-level difference in information environment may partly account for the different results from the two markets with respect to the impact of income smoothing on FERC. In particular, as a better information environment makes value-relevant information more accessible to average investors, it reduces the costs for private information searching and facilitates more efficient investment decision making. Therefore, for firms in a market with a rich information environment (e.g. the US market), investors are able to utilise all sources of information to better interpret managers'

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2 Examples are Kothari and Sloan (1992), Gelb and Zarowin (2002), Lundholm and Myers (2002), Ettredge *et al*., (2005), Orpurt and Zang (2009), and Ayers and Freeman (2003).

3 For comparison purposes, we construct the US sample and the Chinese sample using the same sample period. We start the sample from 2003 because cash flow statements are not available in China until 1998 and the income smoothing measure requires the availability of the most recent 5-year time series of financial data. The sample period ends at 2008 because the FERC model requires 3-year (i.e. from t+1 to t+3) future annual earnings and returns data. The results are robust if we use TZ's sample period of 1993 to 2000 for the US firms.

income smoothing incentives in conveying private information about future earnings (i.e. income smoothing improves FERC). On the contrary, in a market with a poor information environment (e.g. the China market) where the information set is incomplete and the information uncertainty is high, investors may not be able to apply smoothed earnings to predict future earnings (i.e. income smoothing has no impact on FERC). Our explanation is consistent with a concurrent paper by Cheng *et al.* (2014), who provide large sample evidence from US firms that the average associations between income smoothing and ERC/FERC are dependent on the firm-level information environment. Cheng *et al.'s* (2014) finding has one important implication, namely that the information environment plays an important role when evaluating the effect of financial reporting quality on ERC and FERC.

In addition, given that the dominance of SOEs in the China market is a key factor affecting firms' reporting incentive (Piotroski and Wong, 2012), we further separate our Chinese firms into SOEs and non-state-owned enterprises (non-SOEs) and investigate if the impacts of income smoothing on FERC differ for these two subgroups. The results show that income smoothing does not affect FERC for SOEs but does weakly affect FERC for non-SOEs. In analysing the extended model where earnings are decomposed into cash flows and accruals components, the evidence shows that the current returns of higher-smoothing non-SOEs incorporate more information about their future cash flows. These results are consistent with the conjecture that SOEs and non-SOEs have different information environments. For non-SOEs, investors may rely more on information other than reported earnings when assessing firm value.

The remainder of this paper is organised as follows: Section II describes the research methodology applied by TZ; in Section III, we present our sample and descriptive statistics and report our empirical results; and Section IV concludes the paper.

II. Research Methodology

2.1 Measure of Income Smoothing

TZ measure income smoothing as the negative correlation between the change in discretionary accruals and the change in pre-discretionary income based on the modified Jones (1991) model adjusted for firm's performance (Kothari *et al*., 2005).

$$\frac{TAcc_t}{TA_{t-1}} = a_1 \frac{1}{TA_{t-1}} + a_2 \frac{\Delta Sales_t}{TA_{t-1}} + a_3 \frac{PPE_t}{TA_{t-1}} + a_4 ROA_t + \varepsilon_t \qquad (1)$$

Equation (1) is estimated cross-sectionally each year within the same industry group (industry is defined by the two-digit SIC for US firms and the one-digit Industry Classifying Index Code for Chinese firms) to obtain the expected (non-discretionary) accruals, and the difference between the observed value and the fitted value (i.e. the residual $\hat{\varepsilon}_t$) is the discretionary accruals predicted (*DAP*). Pre-discretionary income (*PDI*) is then defined as net income minus discretionary accruals. As the volatility of earnings consists of three components (i.e. the volatility of operating cash flows, the volatility of accruals, and the correlation between operating cash flows and accruals), the volatility of earnings will be lower when the correlation between operating cash flows and accruals is more negative. Therefore, the more negative the correlation, the smoother the income stream should be. Therefore, the income smoothing measure is the negative correlation between the change in a firm's discretionary accruals and the change in its pre-discretionary income using a 5-year rolling window: $IS\_Raw_{it} = -Corr\ (\Delta DAP_{it}\ ,\ \Delta PDI_{it})$. To control for industry and time effects, TZ use a firm's fractional ranking of raw income smoothing (between 0 and 1) within its industry-year and refer to it as $IS_{it.}$ As a result, a higher value of IS_{it} represents a higher level of income smoothing.

2.2 Measures of Earnings Informativeness

To investigate the ability of returns to reflect information in current and future earnings, CKSS develop the FERC framework as follows:

$$R_t = \beta_0 + \beta_1 UX_t + \textstyle\sum_{k=1}^{3} \beta_{k+1} \Delta E_t (X_{t+k}) + \varepsilon_t \ , \tag{2}$$

where R_t is the continuously compounded return for fiscal year t, X_t is the continuously compounded growth rate of earnings, $UX_t = X_t - E_{t\text{-}1}(X_t)$ is the unexpected earnings growth rate, and ΔE_t is the change in market expectations from the beginning to the end of period t. Under the assumption that earnings follow a random walk, CKSS use the realised earnings for year $t+k$ as the proxy for the earnings expectation formed at the end of year t and use past earnings to form an expectation at the beginning of the year t. However, as CKSS point out, using realised future earnings to proxy for investors' expectation introduces an error into the variables problem. To reduce the measurement error, they include future returns as the instrument variable in the model. Furthermore, to increase the power of the test, Lundholm and Myers (2002) combine three future years' earnings into variable X_{t3} and three future years' returns into R_{t3}, making a more general model as follows:

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + \varepsilon_t \ , \tag{3}$$

where the coefficient b_2 represents ERC and the coefficient b_3 represents FERC. Both ERC and FERC are predicted to be positive.

To test the impact of income smoothing on earnings informativeness, TZ expand equation (3) by adding the income smoothing measure IS and its interactions with the independent variables as follows:

$$\begin{aligned} R_t = {} & b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + b_5 IS_t + b_6 IS_t * X_{t-1} \\ & + b_7 IS_t * X_t + b_8 IS_t * X_{t3} + b_9 IS_t * R_{t3} + e_t \end{aligned} \tag{4}$$

If the dominating effect of income smoothing is to convey information about future earnings, the coefficient b_8 should be positive. If the dominating effect of income smoothing is to garble accounting earnings information, then the coefficient b_8 should be negative.

Table 1 Variable Definitions

Variables for Estimating Discretionary Accruals		
$TAcc_t$	=	Total accruals, the dependent variable, measured as income before extraordinary items less operating cash flows less cash flows from extraordinary items, at year t, following the approach in Hribar and Collins (2002)
$\Delta Sales_t$	=	Change in sales, sales revenue at year t less sales revenue at year t-1
PPE_t	=	Net property, plant and equipment at year t

ROA_t	=	Return on assets at year *t*, measured as net income before extraordinary items (*IB*) at year *t*, scaled by total assets at year *t-1*
TA_{t-1}	=	Total assets at year *t-1*
Variables in the FERC Model		
R_t	=	The buy-and-hold returns for the 12-month period starting 3 months after year t-1 fiscal year-end
X_{t-1}	=	The income before extraordinary items available to common stockholders for fiscal year t-1, scaled by market value at the beginning of fiscal year t
X_t	=	The income before extraordinary items available to common for fiscal year t, scaled by market value at the beginning of fiscal year t
X_{t3}	=	The sum of income before extraordinary items available to common for fiscal year t+1 through t+3, scaled by market value at the beginning of fiscal year t
R_{t3}	=	The annually compounded stock returns for fiscal year t+1 through t+3
IS_t	=	The reversed fractional ranking of the Pearson Correlation between the current year and past four years' change in discretionary accruals and change in pre-managed income
CFO_{t-1}	=	The cash flows from operations reported in cash flow statements for fiscal year t-1, scaled by market value at the beginning of fiscal year t
CFO_t	=	The cash flows from operations reported in cash flow statements for fiscal year t, scaled by market value at the beginning of fiscal year t
CFO_{t3}	=	The cash flows from operations reported in cash flow statements for fiscal year t+1 though t+3, scaled by market value at the beginning of fiscal year t
ACC_{t-1}	=	The total accruals for fiscal year t-1 calculated by subtracting operating cash flows from net income before extraordinary items, scaled by market value at the beginning of fiscal year t
ACC_t	=	The total accruals for fiscal year t, scaled by market value at the beginning of fiscal year t
ACC_{t3}	=	The total accruals for fiscal year t+1 through t+3, scaled by market value at the beginning of fiscal year t
EPS_t	=	The income before extraordinary items available to common, scaled by total shares outstanding at the beginning of fiscal year t
EPS_{t3}	=	The sum of income before extraordinary items available to common for fiscal year t+1 through t+3, scaled by total shares outstanding at the beginning of fiscal year t
Control Variables		
$SIZE_t$	=	The within industry-year fractional ranking (between 0 and 1) of a firm's market value at the beginning of fiscal year t
BM_t	=	The within industry-year fractional ranking (between 0 and 1) of a firm's book-to-market ratio at the beginning of fiscal year t
$Earnstd_t$	=	The within industry-year fractional ranking (between 0 and 1) of a firm's standard deviation of income before extraordinary items for fiscal year t+1 to t+3, scaled by the market value at the beginning of fiscal year t
$NANAL_t$	=	The within industry-year fractional ranking (between 0 and 1) of a firm's average number of analyst forecasts included in monthly consensus compiled by IBES during the fiscal year for US firms and calculated from the Detailed Financial Analyst Forecast Database for Chinese firms. If a firm-year is not covered, the number of analyst following is set to 0
$LOSS_t$	=	1 if a firm reports negative earnings for fiscal year t and 0 otherwise
SOE_t	=	1 if a firm is a state-owned enterprise for fiscal year t and 0 otherwise. This variable is only applicable for Chinese firms.

III. Data and Main Empirical Results

3.1 Sample Selection

For the US sample, we collect financial statement data from the 2012 version of the COMPUSTAT database, stock returns and prices from CRSP, and numbers of analysts from the IBES summary history file. We first replicate TZ's results using the same sample period (1993 to 2000). The sample period starts with 1993 because 1988 is the first year in which firms are required to report cash flow statements and we require the availability of the most recent 5-year time series of financial data (i.e. *ΔDAP* and *ΔPDI*) to calculate the income smoothing measure. We exclude firms in the financial industries (SIC 6000-6999) due to the unique nature of their accounting requirements. The untabulated results are comparable to those documented by TZ.

We also construct a Chinese sample using the 2011 version of the China Stock Market and Accounting Research (CSMAR) Financial Statement Database, Trading Database, and Financial Analyst Forecast Database. Since cash flow statements are not available in China until 1998, the sample period for the primary analysis starts from 2003. The period ends at 2008 because the FERC model requires 3-year (i.e. from t+1 to t+3) future annual earnings and returns data. Similarly, we exclude firms from the financial industries (one-digit Industry Classifying Index Code is "I"). We focus only on Chinese tradable A-shares on the Shanghai and Shenzhen exchanges. For comparison purposes, we construct our main US sample using the same sample period as the Chinese sample, namely 2003 to 2008.[4]

To obtain the income smoothing measure, we first estimate discretionary accruals. For the original US sample, we use the data from 1998-2008 and estimate equation (1) on each of the 672 industry-year cross-sections after excluding those that have fewer than 10 observations and winsorising the regression variables at the top and bottom 1% standard deviations each year. For the Chinese sample, we follow the same estimation procedure, which results in the estimation of equation (1) on each of the 131 industry-year cross-sections.

We use the residual from equation (1) as the measure of a firm's discretionary accruals (*DAP*). *PDI* is calculated as net income scaled by beginning total assets minus *DAP*. We delete firm-year observations that have missing data for either *ΔDAP* or *ΔPDI* in the current year or any of the past 4 years. In addition, we delete the firm-year observations that have missing data for (a) past, current, and future three years' earnings, operating cash flows, and accruals and (b) current and future three years' returns. To minimise the effect of outliers, we delete the observations in the top or bottom 1% of the distribution of the above variables, consistent with the procedures applied by TZ. These procedures result in 13,194 firm-year observations for the US sample and 4,854 firm-year observations for the Chinese sample.

3.2 Descriptive Statistics and Correlations

Table 2 presents the mean, standard deviation, median, minimum, and maximum of the coefficient estimates and R^2. Panels A and B show our replication using the US and the Chinese sample, respectively. The results are comparable to those reported in TZ. In particular, the coefficients on $\frac{\Delta Sales_t}{TA_{t-1}}$ are both significantly positive, consistent with the asset turnover theory that accruals should be positively related to change in sales; the

[4] For simplicity, we only report results for US and Chinese firms during this period.

coefficients on ROA_t are also significantly positive, confirming that the accruals are associated with firm performance; and the coefficients on $\frac{PPE_t}{TA_{t-1}}$ are both significantly negative.

The results reported in Table 2 reflect some fundamental differences between US and Chinese firms. For example, the mean (median) of the coefficient on Δ*Sales* is 0.018 (0.025) and 0.036 (0.039) for the US and the Chinese sample, respectively, reflecting a lower accrual ratio per dollar increase in sales in the US, perhaps due to the tighter credit policy in the US. The mean (median) of the coefficient on *PPE* is -0.088 (-0.084) and -0.102 (-0.103) for the US and the Chinese samples respectively, reflecting a lower depreciation rate in the US.

Table 2 Cross-Sectional Estimation of Discretionary Accruals

The Jones Model, modified by Kothari *et al.* (2005):

$$\frac{TAcc_t}{TA_{t-1}} = a * \frac{1}{TA_{t-1}} + b * \frac{\Delta Sales_t}{TA_{t-1}} + c * \frac{PPE_t}{TA_{t-1}} + d * ROA_t + \varepsilon_t$$

Panel A: Summary statistics of the estimated coefficients and R^2 of 672 US industry-year regressions from 1998-2008

Statistics	*a*	*b*	*c*	*d*	R^2
Mean	-0.029	0.018	-0.088	0.474	0.765
Std Dev	2.925	0.168	0.113	0.294	0.205
Median	0.015	0.025	-0.084	0.501	0.821
Minimum	-59.277	-0.932	-0.784	-1.881	0.021
Maximum	16.257	0.990	0.858	1.780	1.000

Panel B: Summary statistics of the estimated coefficients and R^2 of 131 China industry-year regressions from 1998-2008

Statistics	*a*	*b*	*c*	*d*	R^2
Mean	0.107	0.036	-0.102	0.672	0.447
Std Dev	14.674	0.115	0.075	0.318	0.190
Median	-0.479	0.039	-0.103	0.686	0.463
Minimum	-51.957	-0.486	-0.347	-0.281	0.063
Maximum	37.265	0.285	0.108	1.406	0.903

For the US sample, industries are classified by the first two digits of the SIC code. For the Chinese sample, industries are classified by the first digit of the Industry Classifying Index Code released by the CSRC. All the variables are defined in Table 1.

Table 3 Panel A provides the descriptive statistics for all the variables in our primary tests. Our results are consistent with those reported in TZ. In particular, for the US sample, the mean and median for all the returns and earnings variables as well as the income smoothing measures are very similar as those documented by TZ. Comparing the descriptive statistics of the US sample with those of the Chinese sample, we find that the return variables are positively skewed for both markets, while the earnings variables are negatively (positively) skewed in the US (China) market. In addition, for the US firms, the median 3-year future earnings (0.118) is roughly three times the median of the current earnings (0.042), while for the Chinese firms, the median of future earnings (0.092) is four times the median of current earnings (0.024), suggesting that the structural changes in China over the sample period with respect to earnings are evident. More importantly, the statistics indicate that Chinese firms have smoother earnings relative to US firms (i.e. the mean of *Corr* (*ΔDAP, ΔPDI*) is -0.775 for the Chinese sample compared with -0.632 for the US sample).

Table 3 Sample Statistics

Panel A1: Descriptive statistics (13,194 US observations during 2003-2008)

Variable	Mean	Std Dev	Median	Minimum	Maximum
R_t	0.174	0.679	0.058	-0.829	3.366
X_{t-1}	-0.012	0.183	0.037	-1.271	0.248
X_t	0.003	0.154	0.042	-0.893	0.363
X_{t3}	0.060	0.485	0.118	-2.451	1.939
R_{t3}	0.305	1.171	0.023	-0.945	7.553
ACC_t	-0.075	0.171	-0.037	-1.210	0.455
CFO_t	0.078	0.151	0.073	-0.519	0.931
Corr (*ΔDAP, ΔPDI*)	-0.632	0.483	-0.850	-1.000	0.997

Panel A2: Descriptive statistics (4,854 Chinese observations during 2003-2008)

Variable	Mean	Std Dev	Median	Minimum	Maximum
R_t	0.363	1.069	0.066	-0.768	4.019
X_{t-1}	0.019	0.069	0.024	-0.284	0.162
X_t	0.027	0.077	0.024	-0.246	0.238
X_{t3}	0.143	0.322	0.092	-0.639	1.448
R_{t3}	1.292	1.766	0.779	-0.789	9.120
ACC_t	-0.038	0.110	-0.021	-0.456	0.291
CFO_t	0.063	0.105	0.043	-0.224	0.460
Corr (*ΔDAP, ΔPDI*)	-0.775	0.362	-0.929	-1.000	0.984

Panel B1: Pairwise Pearson (Spearman) correlations above (below) the diagonal (13,194 US firm-year observations during 2003-2008)

Variable	R_t	X_{t-1}	X_t	X_{t3}	R_{t3}	*Corr*
R_t	-	-0.209	0.089	0.148	-0.114	0.008#
X_{t-1}	0.016!	-	0.537	0.306	-0.014#	-0.219
X_t	0.311	0.581	-	0.444	-0.082	-0.22
X_{t3}	0.34	0.362	0.513	-	0.306	-0.125
R_{t3}	-0.121	0.141	0.081	0.464	-	0.001#
Corr (*ΔDAP, ΔPDI*)	-0.052	-0.294	-0.279	-0.194	-0.067	-

Panel B2: Pairwise Pearson (Spearman) correlations above (below) the diagonal (4,854 Chinese firm-year observations during 2003-2008)

Variable	R_t	X_{t-1}	X_t	X_{t3}	R_{t3}	*Corr*
R_t	-	0.053	0.296	0.212	-0.232	-0.007#
X_{t-1}	0.198	-	0.572	0.332	-0.058	-0.226
X_t	0.418	0.717	-	0.499	-0.035*	-0.155
X_{t3}	0.245	0.503	0.617	-	0.257	-0.102
R_{t3}	-0.201	-0.012#	-0.029*	0.227	-	-0.007#
Corr (*ΔDAP, ΔPDI*)	-0.059	-0.224	-0.177	-0.14	-0.025!	-

The unmarked correlations are statistically significant at the 1% level or lower; * indicates statistically significant at the 1%-5% level; ! indicates statistically significant at the 5%-10% level; and # indicates statistically insignificant.

Table 3 Panel B provides the pairwise correlations for all the variables used in the primary tests. As expected, the correlations between current returns and current/future earnings are generally significantly positive. Also, the future returns are significantly correlated with future earnings, consistent with CKSS's argument that future returns should not influence the regression results except through their role as a proxy for the measurement error in future earnings. More importantly, the variable *Corr* (*ΔDAP, ΔPDI*) is negatively associated with past, current, and future earnings for all the samples, consistent with TZ's signalling argument that firms with better performance smooth earnings to a larger degree.

3.3 Main Tests Results

Table 4 presents the main tests results.[5] To confirm that income smoothing strengthens earnings persistence, we first estimate the earnings persistence model:

$$EPS_{t3} = a_0 + a_1 EPS_t + a_2 IS_t + a_3 IS_t * EPS_t + \varepsilon_t \quad (5)$$

Consistent with the prediction, Panel A of Table 4 shows that the coefficients on $IS_t{*}EPS_t$ are significantly positive (i.e. a_3 = 0.863, t = 9.46 for the US sample, and a_3 = 1.751, t = 8.96 for the Chinese sample).

Secondly, to provide the baseline results, we estimate the benchmark CKSS model (equation 3). We report the baseline results in Panel B of Table 4. As predicted, both ERC and FERC are significantly positive. In particular, for the US sample, the coefficient on X_t is 0.742 (t = 16.20) and the coefficient on X_{t3} is 0.341, (t = 25.03), very similar to TZ. Furthermore, as predicted, the coefficients on past earnings (-1.399, t = -39.48) and on future returns (-0.104, t = 20.61) are both negative. The results hold for the Chinese sample. One difference is that the loadings on current earnings and future earnings for the Chinese sample are much higher (2.261, t = 11.03 for current earnings and 0.766, t = 17.50 for future earnings) than the loadings for the US samples.

Thirdly, we present the results of our primary tests in Panel C of Table 3. For the US sample, we find results consistent with TZ's argument that income smoothing improves FERC, as evidenced by the significantly positive coefficient on $IS_t{*}X_{t3}$ (0.417, t = 8.75). The results also indicate that the ERC of a higher-smoothing firm is greater than that of a lower-smoothing firm (the coefficient on $IS_t{*}X_t$ is 0.937, t = 5.06). Furthermore, the coefficients on IS_t (-0.052, t = -2.59) and on $IS_t{*}X_{t-1}$ (-1.476, t = -9.77) are both significant, confirming their role as control variables. Moreover, unlike TZ, our results show that the coefficient on X_{t3} (0.161, t = 6.70) kept its significance after the inclusion of income smoothing. This suggests that stock price incorporates information about future earnings regardless of the presence of income smoothing. However, when testing the primary model using the Chinese sample, we find some interesting results that show that while income smoothing has no impact on FERC (i.e. the coefficient on $IS_t{*}X_{t3}$ is 0.105, t = 0.68), it does improves ERC (i.e. the coefficient on $IS_t{*}X_t$ is 3.840, t = 4.61).

We argue that the market-level difference in information environment may partly account for the different results from the two markets with respect to the impact of income smoothing on FERC. In particular, as a better information environment makes value-relevant information more accessible to average investors, it reduces the costs of private information searching and facilitates more efficient investment decision making.

[5] For comparison purposes, in each of the panels, we present, in two columns, (1) the results using the US sample and (2) the results using the Chinese sample.

Therefore, for firms in a market with a rich information environment (e.g. the US market), investors are able to utilise all sources of information to better interpret managers' income-smoothing incentives in conveying private information about future earnings (i.e. income smoothing improves FERC). On the other hand, in a market with a poor information environment (e.g. the China market) where the information set is incomplete and the information uncertainty is high, investors may not be able to apply smoothed earnings to predict future earnings (i.e. income smoothing has no impact on FERC). Regarding the results for ERC, since one of the main purposes of income smoothing is to make current earnings more permanent and thus better representative of firm value, investors will always value current earnings more for higher-smoothing firms regardless of the richness of the information environment. Therefore, we find that income smoothing improves ERC for both the US and Chinese samples.

TZ further extend the primary model by decomposing earnings into operating cash flows and accruals components and interacting each with IS_t as follows:

$$\begin{aligned} R_t = b_0 &+ b_1 CFO_{t-1} + b_2 CFO_t + b_3 CFO_{t3} + b_4 ACC_{t-1} + b_5 ACC_t \\ &+ b_6 ACC_{t3} + b_7 R_{t3} + b_8 IS_t + b_9 IS_t * CFO_{t-1} + b_{10} IS_t * CFO_t \\ &+ b_{11} IS_t * CFO_{t3} + b_{12} IS_t * ACC_{t-1} + b_{13} IS_t * ACC_t \\ &+ b_{14} IS_t * ACC_{t3} + b_{15} IS_t * R_{t3} + e_t \end{aligned} \tag{6}$$

The purpose of the extended model is to examine whether income smoothing allows more information about future cash flows to be incorporated into the current stock prices. In Panel D of Table 4, we report the results for the estimation of the extended model. The coefficient on the variable IS_t*CFO_{t3} is significantly positive for the US sample (i.e. 0.311, t = 5.94) but insignificant for the Chinese sample (i.e. 0.177, t = 1.14). These results are consistent with the findings from the primary model on earnings variables. In particular, for US firms, income smoothing is associated with an increase in stock price informativeness about future cash flows. For Chinese firms, due to the relatively poor information environment, investors cannot fully appreciate the signalling effect of income smoothing on future cash flows. Also, for each US and Chinese sample, the coefficient on the variable IS_t*CFO_t is positive and significant (i.e. t-values of 4.41 and 4.37 for the US sample and the Chinese sample, respectively), suggesting that stock price always captures more information about current cash flows when firms report smoother earnings. Regarding the accrual component, we report consistent evidence that the coefficient on IS_t*ACC_t is positive and significant for all samples, while the coefficient on IS_t*ACC_{t3} is positive and significant only for the US sample and marginally significant for the Chinese sample (i.e. 0.257, t = 1.71). Since there is no underlying theory on how income smoothing affects the predictability of accruals, we do not provide an explanation for this result. We leave this unanswered question for future research.

3.4 Robustness Tests

One concern of the primary model is that we cannot rule out the possibility that the existence of other omitted factors could make stock prices incorporate more information about current and future earnings. To alleviate this concern, we include firm size (*SIZE*), book-to-market ratio (*BM*), future earnings variability (*EarnStd*), and analyst following (*NANAL*).[6] Firm size and analyst following are used to control for differences in

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[6] Due to limited availability of data, we do not include institutional holding as a control variable in our analysis.

Table 4 Main Tests

Panel A: Earnings persistence model

$$EPS_{t3} = a_0 + a_1 EPS_t + a_2 IS_t + a_3 IS_t * EPS_t + \varepsilon_t$$

Dep = EPS_{t3}	US	China
EPS_t	1.061***	1.391***
	(25.65)	(14.75)
IS_t	0.039***	0.042***
	(2.91)	(2.81)
IS_t*EPS_t	**0.863*****	**1.751*****
	(9.46)	(8.96)
Constant	0.027***	0.098***
	(3.53)	(11.96)
Observations	13,194	4,853
Adj. R-squared	0.203	0.261
Prob > F	0	0

Panel B: Benchmark CKSS model

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + e_t$$

Dep = R_t	US	China
X_{t-1}	-1.399***	-2.912***
	(-39.48)	(-14.16)
X_t	0.742***	2.261***
	(16.20)	(11.03)
X_{t3}	**0.341*****	**0.766*****
	(25.03)	(17.50)
R_{t3}	-0.104***	-0.163***
	(-20.61)	(-20.69)
Constant	0.167***	0.390***
	(29.43)	(25.62)
Observations	13,194	4,853
Adj. R-squared	0.150	0.173
Prob > F	0	0

Panel C: Primary model

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + b_5 IS_t + b_6 IS_t * X_{t-1} + b_7 IS_t * X_t + b_8 IS_t * X_{t3} + b_9 IS_t * R_{t3} + e_t$$

Dep = R_t	US	China
X_{t-1}	-0.967***	-2.619***
	(-17.27)	(-7.96)
X_t	0.523***	0.945***
	(7.05)	(2.68)
X_{t3}	0.161***	0.686***
	(6.70)	(7.83)
R_{t3}	-0.102***	-0.160***
	(-10.92)	(-9.92)
IS_t	-0.052***	-0.027
	(-2.59)	(-0.50)
IS_t *X_{t-1}	-1.476***	-1.531*
	(-9.77)	(-1.68)
IS_t *X_t	0.937***	3.840***
	(5.06)	(4.61)

IS_t *X_{t3}	**0.417*****	**0.105**
	(8.75)	(0.68)
IS_t *R_{t3}	-0.010	-0.005
	(-0.57)	(-0.20)
Constant	0.188***	0.392***
	(16.23)	(13.04)
Observations	13,194	4,853
Adj. R-squared	0.162	0.178
Prob > F	0	0

Panel D: Extended model - Earnings decomposition

$$R_t = b_0 + b_1 CFO_{t-1} + b_2 CFO_t + b_3 CFO_{t3} + b_4 ACC_{t-1} + b_5 ACC_t + b_6 ACC_{t3} + b_7 R_{t3} + b_8 IS_t + b_9 IS_t * CFO_{t-1} + b_{10} IS_t * CFO_t + b_{11} IS_t * CFO_{t3} + b_{12} IS_t * ACC_{t-1} + b_{13} IS_t * ACC_t + b_{14} IS_t * ACC_{t3} + b_{15} IS_t * R_{t3} + e_t$$

Dep = R_t	US	China
CFO_{t-1}	-0.883***	-0.609
	(-9.30)	(-1.49)
CFO_t	0.483***	1.068***
	(4.62)	(2.77)
CFO_{t3}	0.260***	0.615***
	(9.46)	(6.72)
ACC_{t-1}	-0.747***	-2.168***
	(-13.86)	(-7.86)
ACC_t	0.310***	0.088
	(4.57)	(0.30)
ACC_{t3}	-0.067***	0.370***
	(-2.60)	(4.38)
R_{t3}	-0.118***	-0.160***
	(-12.90)	(-10.21)
IS_t	-0.048**	0.048
	(-2.02)	(0.82)
IS_t*CFO_{t-1}	-1.259***	-2.953***
	(-6.44)	(-3.19)
IS_t*CFO_t	0.919***	3.579***
	(4.41)	(4.37)
IS_t*CFO_{t3}	**0.311*****	**0.177**
	(5.94)	(1.14)
IS_t*ACC_{t-1}	-1.547***	-1.873**
	(-10.44)	(-2.33)
IS_t*ACC_t	0.706***	3.626***
	(4.06)	(4.85)
IS_t*ACC_{t3}	0.442***	0.257*
	(8.88)	(1.71)
IS_t*R_{t3}	0.001	-0.002
	(0.05)	(-0.07)
Constant	0.104***	0.241***
	(7.78)	(7.31)
Observations	13,194	4,853
Adj. R-squared	0.186	0.215
Prob > F	0	0

Two-tailed t-statistics are presented in the parentheses. *, **, and *** denote t-statistics are significant at the 10%, 5%, and 1% levels, respectively. All the variables are defined in Table 1.

information environment across sample firms. Larger-sized firms with greater analyst following tend to have a richer information environment. The book-to-market ratio is used to control for firm growth since high-growth firms tend to reflect more of their value from future earnings. Finally, we control for future earnings variability because volatile earnings are more difficult to predict. All the control variables are defined in the variable definitions in Table 1.

We first add the control variables mentioned above to the primary model one at a time, referred to as Z_t in Equation (7):

$$\begin{aligned} R_t &= b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + b_5 IS_t + b_6 IS_t * X_{t-1} \\ &\quad + b_7 IS_t * X_t + b_8 IS_t * X_{t3} + b_9 IS_t * R_{t3} + b_{10} Z_t + b_{11} Z_t * X_{t3} + e_t \end{aligned} \tag{7}$$

Panel A of Table 5 reports the results. In all the individual models, the coefficient on IS_t*X_{t3} remains positive and significant for the US sample, consistent with TZ's conclusion that income smoothing improves FERC. For the Chinese sample, we confirm our previous conclusion that income smoothing improves ERC but not FERC, as evidenced by the significantly positive coefficient on IS_t*X_t but insignificant coefficient on IS_t*X_{t3} after including the control variables. Panel B of Table 5 presents the results with all the control variables. Still, the finding that the current returns of higher-smoothing firms incorporate more information in their future earnings only holds for US firms, not for Chinese firms.

In addition, Panel A and Panel B of Table 5 show consistent evidence regarding the control variables. For both the US and Chinese samples, the coefficient on the interaction between X_{t3} and firm size and analyst following is significantly positive, confirming that the information environment is richer for large firms and firms with greater analyst following. The coefficient on the interaction between X_{t3} and future earnings variability is significantly negative, confirming that stock price contains less information about future earnings when the earnings are more difficult to predict. Interestingly, in contradiction to the significantly positive coefficient for the US firms, the coefficient on the interaction between X_{t3} and growth is negative for the Chinese firms. This suggests that the stock prices of high-growth firms in China incorporate less future earnings information.

Since losses are more difficult to predict than profits, which are more likely to be normal and persistent, TZ control for differences in persistence using the *LOSS* dummy.

$$\begin{aligned} R_t &= b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + b_5 IS_t + b_6 IS_t * X_{t-1} \\ &\quad + b_7 IS_t * X_t + b_8 IS_t * X_{t3} + b_9 IS_t * R_{t3} + b_{10} LOSS_t \\ &\quad + b_{11} LOSS_t * X_t + b_{11} LOSS_t * X_{t3} + e_t \end{aligned} \tag{8}$$

Appendix Table I shows that after controlling for *LOSS*, the coefficient on IS_t*X_{t3} is significantly positive (i.e. 0292, t = 5.32) for the US firms but insignificant (i.e. -0.050, t = -0.28) for the Chinese firms, consistent with the previous findings. But the coefficient on IS_t*X_t is insignificant for both the US firms (i.e. 0.248, t = 1.37) and the Chinese firms (i.e. 0.644, t = 0.67), suggesting that the impact of income smoothing on ERC is largely explained by the differences in persistence of earnings. In addition, both ERC and FERC are attenuated for loss firms in both the US and Chinese samples, suggesting that the stock price of loss firms reflects less information about their current and future earnings than that of profit firms.

Table 5 Additional Tests - Controlling for Potentially Omitted Variables

Panel A: Adding a single new control variable

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + b_5 IS_t + b_6 IS_t * X_{t-1} + b_7 IS_t * X_t + b_8 IS_t * X_{t3} + b_9 IS_t * R_{t3} + b_{10} Z_t + b_{11} Z_t * X_{t3} + e_t$$

Z=	*SIZE*		*BM*		*EarnStd*		*NANAL*	
Dep = R_t	US	China	US	China	US	China	US	China
X_{t-1}	-0.951***	-2.600***	-0.945***	-2.532***	-0.968***	-2.623***	-0.958***	-2.496***
	(-16.98)	(-7.89)	(-16.99)	(-7.73)	(-17.28)	(-8.07)	(-17.14)	(-7.65)
X_t	0.530***	0.921***	0.522***	1.005***	0.516***	0.740**	0.529***	1.003***
	(7.14)	(2.61)	(7.07)	(2.85)	(6.94)	(2.12)	(7.14)	(2.86)
X_{t3}	0.065**	0.293***	0.070**	1.023***	0.206***	1.912***	0.033	-0.453***
	(2.34)	(2.80)	(2.49)	(10.04)	(6.46)	(13.24)	(1.03)	(-2.72)
R_{t3}	-0.103***	-0.163***	-0.097***	-0.160***	-0.102***	-0.165***	-0.104***	-0.149***
	(-11.09)	(-10.15)	(-10.49)	(-9.99)	(-10.98)	(-10.34)	(-11.22)	(-9.26)
IS_t	-0.055***	0.011	-0.037*	-0.043	-0.052***	-0.030	-0.051**	0.011
	(-2.74)	(0.20)	(-1.88)	(-0.79)	(-2.62)	(-0.56)	(-2.54)	(0.20)
IS_t*X_{t-1}	-1.482***	-1.611*	-1.435***	-1.055	-1.493***	-1.555*	-1.439***	-1.335
	(-9.83)	(-1.78)	(-9.58)	(-1.16)	(-9.88)	(-1.73)	(-9.55)	(-1.48)
IS_t*X_t	0.937***	3.695***	0.920***	3.847***	0.912***	3.799***	0.942***	3.675***
	(5.07)	(4.46)	(5.01)	(4.64)	(4.92)	(4.62)	(5.10)	(4.46)
IS_t*X_{t3}	**0.400*****	**-0.002**	**0.352*****	**0.206**	**0.429*****	**0.104**	**0.396*****	**-0.024**
	(8.39)	(-0.02)	(7.32)	(1.34)	(8.96)	(0.69)	(8.32)	(-0.16)
IS_t*R_{t3}	-0.009	-0.003	-0.009	0.000	-0.010	-0.006	-0.008	-0.014
	(-0.52)	(-0.10)	(-0.49)	(0.01)	(-0.58)	(-0.23)	(-0.43)	(-0.53)
Z_t	-0.039*	-0.167***	-0.250***	-0.080*	0.041**	0.109**	-0.139***	-0.622***
	(-1.91)	(-3.46)	(-13.28)	(-1.76)	(2.19)	(2.53)	(-6.29)	(-8.37)
Z_t*X_{t3}	0.305***	0.854***	0.192***	-0.789***	-0.079**	-1.590***	0.325***	1.713***
	(6.67)	(6.90)	(5.42)	(-6.50)	(-2.10)	(-10.59)	(6.20)	(8.09)
Constant	0.199***	0.445***	0.311***	0.432***	0.166***	0.299***	0.259***	0.775***
	(13.37)	(11.97)	(21.16)	(12.43)	(11.12)	(7.78)	(15.66)	(13.86)
Observations	13,194	4,853	13,191	4,853	13,194	4,853	13,194	4,853
R-squared	0.166	0.188	0.175	0.190	0.163	0.198	0.167	0.196
Adj. R-squared	0.165	0.186	0.175	0.188	0.163	0.197	0.166	0.194
F test	237.9	101.7	254.7	103.1	234.0	108.9	240.0	107.4
Prob > F	0	0	0	0	0	0	0	0

Panel B: Full model

Dep = R_t	US	China
X_{t-1}	-0.932***	-2.399***
	(-13.63)	(-7.42)
X_t	0.595***	0.937***
	(6.51)	(2.69)
X_{t3}	0.004	1.131***
	(0.07)	(5.30)
R_{t3}	-0.083***	-0.150***
	(-7.30)	(-9.38)
IS_t	-0.032	0.009
	(-1.34)	(0.17)
IS_t*X_{t-1}	-1.368***	-0.930
	(-7.65)	(-1.05)
IS_t*X_t	0.717***	3.616***
	(3.17)	(4.44)

$\boldsymbol{IS_t*X_{t3}}$	**0.346***** (5.99)	**0.036** (0.24)
IS_t*R_{t3}	-0.043** (-1.98)	-0.009 (-0.35)
$SIZE_t$	0.024 (0.58)	-0.037 (-0.70)
$SIZE_t*X_{t3}$	0.264*** (2.85)	0.452*** (3.00)
BM_t	-0.299*** (-11.86)	-0.101** (-2.22)
BM_t*X_{t3}	0.184*** (4.02)	-0.591*** (-4.82)
$EARNSTD_t$	0.163*** (6.77)	0.109** (2.51)
$EARNSTD_t*X_{t3}$	-0.340*** (-6.91)	-1.412*** (-9.12)
$NANAL_t$	-0.190*** (-4.26)	-0.691*** (-8.45)
$NANAL_t*X_{t3}$	-0.099 (-0.95)	1.039*** (4.00)
Constant	0.465*** (14.93)	0.788*** (12.81)
Observations	8,638	4,853
Adj. R-squared	0.196	0.221
Prob > F	0	0

Two-tailed t-statistics are presented in the parentheses. *, **, and *** denote t-statistics are significant at the 10%, 5%, and 1% level, respectively. All the variables are defined in Table 1.

Appendix Table II reports the results from Fama-MacBeth regressions, which control for the potential positive cross-sectional correlations of the residuals. The results are consistent with the previous findings that income smoothing improves FERC for the US firms but has no effect on FERC for the Chinese firms.

3.5 Additional Analysis of the China Results

In the China market, a significant portion of listed firms are owned by the state and legal entities (mostly SOEs). The Chinese Government frequently appoints managers, which suggests that managers may have more incentives to act in the best interests of the state and legal persons than in the best interests of public shareholders. Therefore, this unique ownership structure significantly reduces information transparency (Piotroski and Wong, 2012). For example, profit maximisation is not the SOEs' sole objective, and related-party transactions are prevalent in SOEs, which suppresses incentives to supply information to the public. In our sample, about 71.5% of the firms are SOEs. It is likely that our main finding that income smoothing has no impact on FERC in the China market is driven by the unique ownership structure of SOEs.

Table 6 compares the results between SOEs and non-SOEs for estimation of the primary model (Panel A) and the extended model (Panel B). The classification of a Chinese firm's ownership type is based on the owner who has the largest ownership control in the firm. CSMAR has collected ownership data from firms' annual reports since 2001, when disclosure of the identity of the ultimate owner became mandatory. SOEs are defined as firms owned by state asset management bureaus or other SOEs controlled by the government.

Table 6 Additional Analysis for China Market (SOEs versus Non-SOEs)

Panel A: Primary Model

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + b_5 IS_t + b_6 IS_t * X_{t-1} + b_7 IS_t * X_t + b_8 IS_t * X_{t3} + b_9 IS_t * R_{t3} + e_t$$

Dep= R_t	SOE	Non-SOE
X_{t-1}	-2.505***	-2.774***
	(-6.13)	(-4.87)
X_t	0.624	1.470**
	(1.45)	(2.33)
X_{t3}	0.741***	0.590***
	(6.94)	(3.78)
R_{t3}	-0.156***	-0.169***
	(-8.48)	(-5.10)
IS_t	-0.047	0.011
	(-0.73)	(0.10)
IS_t*X_{t-1}	-2.403**	-0.143
	(-2.12)	(-0.09)
IS_t*X_t	**5.363*** **	**1.374**
	(5.23)	(0.95)
IS_t*X_{t3}	**-0.088**	**0.421**
	(-0.47)	(1.55)
IS_t*R_{t3}	-0.011	0.010
	(-0.35)	(0.19)
Constant	0.393***	0.392***
	(11.17)	(6.76)
Observations	3,468	1,385
Adj. R-squared	0.182	0.169
Prob > F	0	0

Panel B: Extended Model - Earnings Decomposition

$$R_t = b_0 + b_1 CFO_{t-1} + b_2 CFO_t + b_3 CFO_{t3} + b_4 ACC_{t-1} + b_5 ACC_t + b_6 ACC_{t3} + b_7 R_{t3} + b_8 IS_t + b_9 IS_t * CFO_{t-1} + b_{10} IS_t * CFO_t + b_{11} IS_t * CFO_{t3} + b_{12} IS_t * ACC_{t-1} + b_{13} IS_t * ACC_t + b_{14} IS_t * ACC_{t3} + b_{15} IS_t * R_{t3} + e_t$$

Dep = R_t	SOE	Non-SOE
CFO_{t-1}	-0.576	-0.142
	(-1.17)	(-0.19)
CFO_t	0.732	1.868***
	(1.55)	(2.70)
CFO_{t3}	0.689***	0.447**
	(6.26)	(2.57)
ACC_{t-1}	-2.004***	-2.353***
	(-5.77)	(-4.97)
ACC_t	-0.339	0.923*
	(-0.95)	(1.70)
ACC_{t3}	0.392***	0.285**
	(3.58)	(2.02)
R_{t3}	-0.149***	-0.190***
	(-8.32)	(-5.87)
IS_t	0.076	0.009
	(1.10)	(0.08)

IS_t*CFO_{t-1}	-3.035***	-3.846**
	(-2.74)	(-2.25)
$\boldsymbol{IS_t*CFO_t}$	**4.486*** **	**1.788**
	(4.57)	(1.19)
$\boldsymbol{IS_t*CFO_{t3}}$	**-0.007**	**0.627** **
	(-0.04)	(2.09)
IS_t*ACC_{t-1}	-2.335**	-1.413
	(-2.38)	(-0.98)
IS_t*ACC_t	4.581***	1.864
	(5.16)	(1.34)
IS_t*ACC_{t3}	0.252	0.320
	(1.34)	(1.21)
IS_t*R_{t3}	-0.017	0.038
	(-0.56)	(0.74)
Constant	0.200***	0.317***
	(5.05)	(5.24)
Observations	3,468	1,385
Adj. R-squared	0.222	0.204
Prob > F	0	0

Two-tailed t-statistics are presented in the parentheses. *, **, and *** denote t-statistics are significant at 10%, 5%, and 1% level. All the variables are defined in the variable definition in Table 1.

The results for SOEs are consistent with our previous findings that in the China market, a higher-smoothing firm's future earnings and cash flows are incorporated in its current stock price to the same extent as a lower-smoothing firm's future earnings and cash flows. For non-SOEs, although income smoothing still only has a little impact on FERC (i.e. the coefficient on IS_t*X_{t3} is 0.421, t = 1.55), its impact on the ability of current returns to capture the information in future cash flows is significant and positive (i.e. the coefficient on IS_t*CFO_{t3} is 0.627, t = 2.09). These results suggest that compared with SOEs, non-SOEs have a relatively better information environment, in which investors may utilise other information more to understand the impact of income smoothing on the informativeness of earnings and cash flows. However, it is puzzling that different from SOEs, the income smoothing of non-SOEs does not improve ERC anymore (i.e. the coefficient on IS_t*X_t is 1.374, t = 0.95). We leave it for future research to explore the potential explanations.

IV. Conclusion

In this paper, we re-examine the impact of income smoothing on earnings informativeness and compare the results between the US and China markets. We find that while income smoothing improves FERC in the US market, it has little impact on FERC in the China market. We further conduct additional analyses with respect to the impact of income smoothing on FERC by comparing SOEs and non-SOEs. The results offer some preliminary support for our argument that the country-level difference in information environment may partly account for the different results from the two markets.

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Appendix

Table I Robustness Tests - Profit versus Loss Firms

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + b_5 IS_t + b_6 IS_t * X_{t-1} + b_7 IS_t * X_t + b_8 IS_t * X_{t3} + b_9 IS_t * R_{t3} + b_{10} LOSS_t + b_{11} LOSS_t * X_t + b_{11} LOSS_t * X_{t3} + e_t$$

Dep = R_t	US	China
X_{t-1}	-0.835***	-2.699***
	(-15.48)	(-7.28)
X_t	3.267***	10.277***
	(23.87)	(18.82)
X_{t3}	0.374***	0.396***
	(13.45)	(3.63)
R_{t3}	-0.107***	-0.156***
	(-11.96)	(-9.72)
IS_t	-0.034*	0.184***
	(-1.76)	(2.96)
IS_t*X_{t-1}	-1.023***	-3.437***
	(-7.04)	(-3.36)
IS_t*X_t	0.248	0.644
	(1.37)	(0.67)
IS_t*X_{t3}	**0.292*** **	**-0.050**
	(6.32)	(-0.28)
IS_t*R_{t3}	-0.009	-0.007
	(-0.51)	(-0.28)
$LOSS_t$	0.026	-0.064
	(1.59)	(-1.42)
$LOSS_t*X_t$	-3.236***	-11.847***
	(-24.26)	(-21.85)
$LOSS_t*X_{t3}$	-0.411***	-0.252**
	(-16.68)	(-2.17)
Constant	-0.011	0.071*
	(-0.76)	(1.79)
Observations	13,194	4,854
Adj. R-squared	0.232	0.277
Prob > F	0	0

Two-tailed t-statistics are presented in the parentheses. *, **, and *** denote t-statistics are significant at 10%, 5%, and 1% level. All the variables are defined in Table 1 in the main text.

Table II Robustness Tests - Fama-MacBeth Regressions

Panel A: Primary Model

$$R_t = b_0 + b_1 X_{t-1} + b_2 X_t + b_3 X_{t3} + b_4 R_{t3} + b_5 IS_t + b_6 IS_t * X_{t-1} + b_7 IS_t * X_t + b_8 IS_t * X_{t3} + b_9 IS_t * R_{t3} + e_t$$

Dep = R_t	US	China
X_{t-1}	-0.486**	-0.931
	(-3.79)	(-1.59)
X_t	0.505**	1.077**
	(3.52)	(3.33)
X_{t3}	0.108**	0.467***
	(3.21)	(6.09)
R_{t3}	-0.053*	-0.111*
	(-2.04)	(-2.14)
IS_t	-0.062	-0.017
	(-0.90)	(-0.22)

IS_t*X_{t-1}	-1.281**	-1.352***
	(-3.82)	(-4.08)
IS_t*X_t	1.083***	1.735**
	(4.80)	(2.62)
$\boldsymbol{IS_t*X_{t3}}$	**0.306****	**-0.178**
	(3.94)	(-1.02)
IS_t*R_{t3}	-0.032	0.015
	(-1.06)	(0.41)
Constant	0.168	0.327
	(0.94)	(0.84)
Observations	13,194	4,854
R-squared	0.165	0.246
Prob > F	0.000483	0.000110

Panel B: Extended Model

$$R_t = b_0 + b_1 CFO_{t-1} + b_2 CFO_t + b_3 CFO_{t3} + b_4 ACC_{t-1} + b_5 ACC_t + b_6 ACC_{t3} + b_7 R_{t3} + b_8 IS_t + b_9 IS_t * CFO_{t-1} + b_{10} IS_t * CFO_t + b_{11} IS_t * CFO_{t3} + b_{12} IS_t * ACC_{t-1} + b_{13} IS_t * ACC_t + b_{14} IS_t * ACC_{t3} + b_{15} IS_t * R_{t3} + e_t$$

Dep = R_t	US	China
CFO_{t-1}	-1.019***	-0.893***
	(-6.82)	(-4.52)
CFO_t	0.762**	1.245**
	(2.67)	(3.76)
CFO_{t3}	0.213***	0.396***
	(4.60)	(4.87)
ACC_{t-1}	-0.271**	-0.584
	(-2.65)	(-1.58)
ACC_t	0.391*	0.786**
	(2.26)	(4.01)
ACC_{t3}	-0.066	0.352***
	(-1.18)	(7.02)
R_{t3}	-0.066*	-0.104*
	(-2.26)	(-2.06)
IS_t	-0.060	-0.037
	(-0.79)	(-0.38)
IS_t*CFO_{t-1}	-0.710	-1.044
	(-1.71)	(-1.68)
$\boldsymbol{IS_t*CFO_t}$	**0.675***	**1.578**
	(2.14)	(1.62)
$\boldsymbol{IS_t*CFO_{t3}}$	**0.282*****	**-0.122**
	(4.57)	(-0.67)
IS_t*ACC_{t-1}	-1.307**	-1.543***
	(-3.48)	(-5.65)
IS_t*ACC_t	0.785**	1.724*
	(2.72)	(2.43)
IS_t*ACC_{t3}	0.391**	-0.098
	(3.40)	(-0.72)
IS_t*R_{t3}	-0.026	0.010
	(-0.75)	(0.29)
Constant	0.118	0.318
	(0.67)	(0.82)
Observations	13,194	4,853
R-squared	0.203	0.254
Prob > F	0.00498	0.0410

Two-tailed t-statistics are presented in the parentheses. *, **, and *** denote t-statistics are significant at 10%, 5%, and 1% level. All the variables are defined in Table 1 in the main text.