EARNINGS MANAGEMENT AND THE EFFECT OF EARNINGS QUALITY IN RELATION TO STRESS LEVEL AND BANKRUPTCY LEVEL OF CHINESE LISTED FIRMS

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Abstract

This paper investigates the link between earnings management and earnings quality for the Chinese firms listed in the Shanghai and Shenzhen stock exchanges from 2003 to 2007. The earnings quality is measured by four separate earnings attributes: accruals quality, earnings persistence, earnings predictability, and earnings smoothness. We find that the stressed/bankrupt firms prefer opportunistic earnings management; the non-stressed/non-bankrupt firms are more likely to choose more efficient earnings management than the stressed/non-bankrupt firms. We find that earnings management performs better than earnings quality in predicting future profitability. We also find that the earnings quality has deteriorated over the sample period; the number of stressed/bankrupt firms increased and the number of non-stressed/non-bankrupt firms decreased.

Keywords: Earnings Management, Earnings Quality, Listed Firm

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1. Introduction

Earnings management is a universal phenomenon in firms' financial reporting or release of earnings-related information. The purpose of earnings management is to demonstrate reasonable earnings quality that meets either the shareholders' expectation, or the requirement of obtaining relevant authorization from regulators (Francis et al., 2008). Thus, earnings management has much in common with earnings quality (represented by accruals quality, earnings persistence, earnings predictability, and earnings smoothness in our study). For instance, highly managed earnings can yield low-quality earnings (Lo, 2008), as the "artificial" information may lead to an incorrect decision. However, the absence of earnings management is insufficient to guarantee high-quality earnings, because other factors (such as capital market and management compensation) contribute to the quality of earnings (Lo, 2008).

Earnings management is widespread in China's listed firms (Noronha et al., 2008; Wu, 2004). One important reason is the administrative governance approach adopted in China, where regulators often rely on accounting numbers to govern the listed firms (Lu & Liu, 2007). For example, the China Securities Regulatory Commission (CSRC) requires listed firms to meet a certain level of return on equity (ROE) before they can apply for permission to issue additional shares to existing shareholders (rights issues); and the most important criterion for de-listing a listed company is a reported net loss for three consecutive years (Qi et al., 2005). A peculiar feature of the Chinese listed firms is that some of them are in financial distress and should be bankrupt in terms of the criteria used in developed countries. However, they are still being listed on the stock markets in China, in contrast with the practice of mature stock markets in developed countries.

McKeown, Mutchler, and Hopwood (1991, hereafter MMH) create a model to divide the firms into financially stressed and non-stressed. They find that the financially stressed and non-stressed firms employ contrasting earnings management techniques and differing earning quality. Altman (2006) develops an Emerging Market Score model (EMS, hereafter) to group firms as bankrupt and non-bankrupt, and states that the bankrupt and non-bankrupt firms can be identified to some extent by earnings management approaches.

The firms listed on the emerging stock markets of China can be described by both MMH and EMS models. Thus, we borrow the two models to conduct an analysis on earnings management and earnings quality in relation to the firms' financial status of being stressed or non-stressed, and their status as bankrupt or non-bankrupt; classifying firms into four quadrants: (1) stressed/bankrupt (SB), (2) non-stressed/bankrupt (NSB), (3) stressed/non-bankrupt

(SNB), and (4) non-stressed/non-bankrupt (NSNB). However, due to zero samples of firms in the quadrant of NSB, our research focuses on firms in the quadrants of SB, SNB, and NSNB, disregarding the empty class of NSB.

To our best knowledge, no research until now has been published on the earnings management and earnings quality with the classifications of Chinese listed firms as SB, SNB and NSNB. This study empirically investigates how the four earnings attributes affect future profitability, examining the efficiency of earnings management in each firm classification (SB, SNB and NSNB), and thus it fills a void. We find that the stressed/bankrupt firms are more likely to choose opportunistic earnings management; the other two firm classifications are more likely to choose efficient earnings management, with the non-stressed/non-bankrupt firms more likely to choose more efficient earnings management than stressed/non-bankrupt firms. We also find earnings management is a better measure than earnings quality, in predicting future profitability. Further, we find that as the earnings quality has deteriorated over the study period, the number of stressed/bankrupt firms increases and the number of non-stressed/non-bankrupt firms decreases.

This research contributes to the literature in the following three ways. First, it is the first study to classify the Chinese listed firms along two dimensions: stressed versus non-stressed, and bankrupt versus non-bankrupt. Sample firms are then divided into three groups: stressed bankrupt, stressed non-bankrupt and non-stressed non-bankrupt, due to zero observations in the non-stressed bankrupt category. Second, it extends the existing literature such as Francis et al. (2004, 2005, 2007, 2008), Boonlert-U-Thai et al. (2006) and Siregar and Utama (2008) by investigating the type of earnings management and the effect of earnings quality in Chinese listed firms. Third, this research can be a reference to assist standard setters, security analysts, regulators and other accounting-information users in appraising relation between the earnings quality and earnings management, across stress level and bankruptcy level axes for Chinese listed firms.

In the next section, we review the literature and develop hypotheses. Section 3 explains the measures of earning quality and classification of the Chinese listed firms. Section 4 describes the sample selection and basic statistics. Section 5 presents the regression analyses. Section 6 provides sensitivity analysis. Section 7 summaries the findings.

2. Literature review, hypothesis development and research design

2.1 Literature review

Earnings management in China

Research on earnings management in China has flourished in recent years. Extant studies have documented that earnings management is a widespread phenomenon in China. Chen and Yuan (2004) and Jian and Wong (2004) provide strong evidence that Chinese listed firms boost their earnings dramatically to gain authorization for initial public offerings (IPOs), to issue new shares or to avoid being delisted. Aharony et al. (2000) show the existence of earnings management prior to the IPOs of Chinese stock sold to foreign investors, and point out the existence of earnings management in the IPOs of China's B-share (quoted and settled in foreign currency; mainlanders and foreigners can trade in foreign currency) and H-share (also listed on Hong Kong and other foreign Stock markets) firms; Wei et al. (2000) document a case of earnings management in China's A-share (quoted in Renminbi, and only mainlanders and selected foreign institutional investors are allowed to trade) IPO firms. Chen and Yuan (2004) document a sample of China' listed firms that applied earnings management for rights issues during 1996-1998.

Prior studies also report the impact of managerial compensation incentives on earnings management in China's listed firms. Kim and Park (2005) and Liu et al. (2003) show that high managerial compensation of listed firms in China is closely related to firms' profitability manipulation. Liu and Lu (2004) find that earnings management of Chinese listed firms is mainly induced by controlling owners' tunneling activity. Zhu and Su (2002) find that small and medium-sized firms in China have incentives to manage earnings for management compensation and tax expense savings. Ting et al. (2009) examine the relationships that exist among the default risk, earnings management, and top management compensation of publicly-listed firms on the Chinese stock market, revealing a greater likelihood of default amongst larger discretionary accruals and lower top management compensation.

Meanwhile, many studies document earnings management in response to the "10 percent rule"[36] in China. For instance, Chen and Yuan (2004) and Haw et al. (2005) have explored the fact that listed firms in China were required to achieve a minimum return on equity (ROE) of 10 percent in each of the previous three years before they could apply for permission to issue additional shares. Chen et al. (2000) and Haw et

[36] In July 2002, the Chinese government imposed a minimum ROE of 10 percent as a threshold of qualification for firms to initiate seasoned-equity offerings.

al. (2003) show that firms whose ROE are in the range of 10 to 11 percent ("borderline firms") have higher discretionary items such as abnormal accruals and non-operating income than other firms. Haw et al. (2003) further show that the borderline firms' earnings-response coefficient in relation to earnings management is lower than that of the control firms, and that the borderline firms that conducted rights issues later had less managed earnings than those that did not.

Prior research on efficient and opportunistic earnings management

Several researchers have found evidence that suggests the opportunistic perspective is a common motivation for earnings management. Gaver et al. (1995), and Holthausen et al. (1995) find evidence that accruals management focuses on the manipulation of bonus income. Balsam et al. (2002) examine a negative relationship between unexpected discretionary accruals and stock returns around the earnings announcement date, and indicate that the market views discretionary accruals as opportunistic.

In contrast, other studies find evidence that earnings management is efficient, rather than opportunistic. Subramanyam (1996), Gul et al. (2000), Krishnan (2003) and Kothari et al. (2005) conclude that the behavior of discretionary accruals is consistent with efficient earnings management, as discretionary accruals have a significant positive relationship with future profitability. Siregar and Utama (2008) find evidence that the type of earnings management selected by Jakarta Stock Exchange-listed firms tends toward efficient earnings management.

Prior research on Earnings quality

Previous research related to measurement of both earnings quality and the tests on its capital market effects is relatively scarce. Francis et al. (2004) improve the literature on earnings quality by examining the relation between the cost of equity capital and seven attributes of earnings: accruals quality, persistence, predictability, smoothness, value relevance, timeliness, and conservatism. Their empirical models predict a positive association between information quality and cost of equity; they find that firms with the least favorable values of each earnings attribute generally experience larger cost of equity than firms with the most favorable values of each earnings attribute. Francis et al. (2007) investigate the relations among voluntary disclosure, earnings quality, and cost of capital and find that firms with favourable earnings attributes have more expansive voluntary disclosures than firms with poor earnings attributes.

Francis et al. (2008) also examine the link between CEO reputation and earnings attributes quality by considering a managerial human capital dimension (CEO reputation as proxy) in explaining the earnings quality (earnings attributes as proxy) of firms' reporting decisions. Francis et al. (2005) investigate the relation among the accruals quality as an earnings attribute, and the cost of debt and cost of equity. Measuring accruals quality as the standard deviation of residuals from regressions, relating current accruals to cash flows, they find that poorer accruals quality is associated with larger costs of debt and cost of equity. Boonlert-U-Thai et al. (2006) explore the effects of investors-protection on reported earnings quality, where the earnings quality is measured by four earning attributes (accruals quality, earnings persistence, earnings predictability, and earnings smoothness), finding that favorable values of each earnings attribute occur in countries whose institutional characteristics provide relatively strong investor-protection.

2.2 Hypothesis development

Earnings quality has a close relationship with earnings management in evaluating an entity's financial health (Lo, 2008). Earnings management directly affects the overall integrity of financial reporting and significantly influences resource allocation throughout firms (Dechow et al., 1995; Healy & Wahlen, 1999). There are two types of earnings management: efficient and opportunistic (Subramanyam, 1996). Earnings management is efficient if managers use their discretion to communicate private information about firm profitability, which is yet to be reflected in the historical cost-based earnings; it is opportunistic if managers use their discretion to maximize their personal utility rather than communicating private information about firm profitability (Subramanyam, 1996). Siregar and Utama (2008) measure earnings management as discretionary accrual (also usedas the measure of earnings management in this paper); they calculate discretionary accrual as the residuals, from the firm-specific expectations model suggested by Jones (1991).

Subramanyam (1996) demonstrates that discretionary accruals have the ability to signal levels of future profitability with a positive relation, after controlling for current levels of operating cash flows and non-discretionary accruals. Therefore, we test whether or not the discretionary accruals have an effect on future profitability, by identifying efficient or opportunistic earnings management among the three types of Chinese firms (SB, SNB, and NSNB). If earnings management is efficient, then discretionary accruals have a significant positive relationship with future profitability. If it is opportunistic, then discretionary accruals have a significant negative relationship or insignificant relationship with future profitability.

We predict that the financial statements of near-bankrupt firms are more likely to reflect evidence of material overstatements of earnings (as such firms are presumably motivated by a desire to conceal signs of distress) than those of non-bankrupt firms. We assume that stressed firms are more likely to manipulate earnings than non-stressed firms, across both bankrupt and non-bankrupt firms. We therefore argue that the type of earnings management is opportunistic for SB firms, less efficient for SNB firms and more efficient for NSNB firms in relation to the value of the four earnings attributes.

In summary, the four hypotheses lead to different predictions between the earnings management and earnings quality:

H 1: Earnings quality measured as accruals quality value indicates that the earnings management is more likely to be opportunistic for SB firms, less efficient for SNB firms and more efficient for NSNB firms.

H 2: Earnings quality measured as earnings persistence value indicates that the earnings management is more likely to be opportunistic for SB firms, less efficient for SNB firms and more efficient for NSNB firms.

H 3: Earnings quality measured as earnings predictability value indicates that the earnings management is more likely to be opportunistic for SB firms, less efficient for SNB firms and more efficient for NSNB firms.

H 4: Earnings quality measured as smoothness value indicates that the earnings management is more likely to be opportunistic for SB firms, less efficient for SNB firms and more efficient for NSNB firms.

3. Measures of earnings quality and the classification of firms

Prior literature has also characterized the four earnings attributes as indicators of earnings quality: accruals quality, earnings persistence, earnings predictability, and earnings smoothness (Francis et al., 2004). Accruals quality refers to the extent to which accruals map onto the related cash flow realization, when accruals shift or adjust the recognition of cash flows over time so that the adjusted earnings offer a better measure for predicting future earnings and cash flows (Boonlert-U-Thai et al., 2006; Krishnan, 2003). Earnings persistence captures earnings sustainability; persistent earnings are viewed as desirable because they are recurring (Penman & Zhang, 2002; Richardson, 2003; Scott, 2000). Earnings predictability refers to the ability of current earnings to predict future earnings. Earnings smoothness refers to the use of accruals to smooth earnings; low smoothness means that a firm's management has not engaged in smoothing practices (Chaney & Lewis, 1995; Demski, 1998; Fudenberg & Tirole, 1995; Ronen & Sadan, 1981).

Our analyses require measures of the four earnings attributes. We measure the four attributes on a firm- and year-specific basis, using the relevant accounting information for rolling five-year windows, t-4,……t. The use of the firm as its own benchmark mitigates concerns that differences among firms in a given industry give rise to noisy measures of the constructs (Francis et al., 2004). However, the firm-specific approach requires a time-series of observations about each firm, while an industry approach requires only a sufficient size cross-section of firms in a given industry at a point in time (Francis et al., 2004).

Accruals quality

The difference between earnings and cash is accruals (Bao & Bao, 2004; Schipper & Vincent, 2003; Sloan, 1996). One role of accruals is to shift or adjust the recognition of cash flows over time so that the adjusted number better measures firm performance. Dechow and Dichev (2002) develop a measure of accruals quality and argue that the quality of accruals and earnings is lowered by the magnitude of estimation error in accruals.

The measure of accruals quality is based on Dechow and Dichev's (2002) model relating to total current accruals to the lagged, current, and future cash flows from operations:

$$\frac{TCA_{j,t}}{TotalAsset_{j,t-1}} = b_0 + b_1 * \frac{CFO_{j,t-1}}{TotalAsset_{j,t-1}} + b_2 * \frac{CFO_{j,t}}{TotalAsset_{j,t-1}} + b_3 * \frac{CFO_{j,t+1}}{TotalAsset_{j,t-1}} + \varepsilon_{j,t} \quad (1)$$

Where:

$TCA_{j,t}$	Firm j's total current accruals in t ($\Delta CA_{j,t} - \Delta CL_{j,t} - \Delta Cash_{j,t} + \Delta STDEBT_{j.,t} + \Delta TP_{j,t}$);
$Total\ Asset_{j,t-1}$	Firm j's total assets in year t-1;
$CFO_{j,t}$	Firm j's cash flow from operations in year t;
$CA_{j,t}$	Firm j's current assets in year t;
$CL_{j,t}$	Firm j's current liabilities in year t;
$Cash_{j,t}$	Firm j's cash in year t;
$STDEBT_{j,t}$	Firm j's debt in current liabilities in year t; and
$TP_{j,t}$	Firm j's taxes payable in year t.

For each firm-year, we estimate Equation (1) using rolling five-year windows and measure the accruals quality ($AccrualsQuality_{j,t}$) as the variable of interest. $AccrualsQuality_{j,t} = \sigma(\hat{\varepsilon}_{j,t})$, is equal to the standard deviation of estimated residuals. Large (small) values of AccrualsQuality correspond to lower (higher) accruals quality and lower (higher) earnings quality.

Earnings persistence

Kormendi and Lipe (1987) regress current earnings on last year's earnings to estimate the slope-coefficient estimates of earnings persistence. This study employs the measure in Kormendi and Lipe (1987) with the following equation:

$$\frac{Earn_{j,t}}{TotalAssets_{j,t-1}} = \alpha + \delta_1 * \frac{Earn_{j,t-1}}{TotalAsset_{j,t-1}} + V_{j,t} \quad (2)$$

Where:

$Earn_{j,t}$ Firm's j net income before extraordinary items in year t; and

$Earn_{j,t-1}$ Firm's j net income before extraordinary items in year t-1.

For each firm-year, we estimate Equation (2) using rolling five-year windows. The measure capturing earnings persistence is based on the slope-coefficient estimate (δ_1, hereafter, Persist). Values of δ_1 close to one (or greater than one) indicate highly persistent earnings while values close to zero imply highly transitory earnings. Persistent earnings are viewed as higher quality, while transitory earnings are viewed as lower quality.

Earnings predictability

Francis et al. (2004) measure earnings predictability using the square root of the estimated error-variance from the earnings-persistence equation. In this study, earnings predictability is calculated using the square root of the error variance from the equation of earnings persistence:

$$\Pr ed_{j,t} = \sqrt{\sigma^2(\hat{v}_{j,t})} \quad (3)$$

Where:

$\sigma^2(\hat{v}_{j,t})$ Estimated-error variance of firm j in year t, calculated from Eq. (2).

Our measure of earnings predictability is also derived from the firm- and year-specific models. Large (small) values of predictability imply less (more) predictable earnings. More predictable earnings are viewed as higher quality, while less predictable earnings are viewed as lower quality.

Earnings smoothness

Bowen et al. (2003) measure earnings smoothness as the standard deviation of operating cash flows divided by the standard deviation of earnings. Similarly, Francis et al. (2004) measure earnings smoothness as the ratio of standard deviation of net income before extraordinary items divided by the total assets at beginning of year, to the standard deviation of cash flow from operations divided by total assets at beginning of year. Since all these measures of smoothness are closely related, this study adopts the one proposed by Bowen et al. (2003):

$$Smooth_{j,t} = \frac{\sigma(CFO_{j,t} / TotalAssets_{j,t-1})}{\sigma(Earn_{j,t} / TotalAsset_{j,t-1})} \quad (4)$$

Where:

σ Firm j's standard deviation;

$CFO_{j,t}$ Firm j's operating cash flows in year t (indirect approach); and

$Earn_{j,t}$ Firm j's net income before extraordinary items in year t.

Ratios in excess of one indicate more variability in operating cash flows relative to the variability of earnings, which implies the use of accruals to smooth earnings. Standard deviations are calculated over rolling five-year windows. Thus, large (small) values of $Smooth_{j,t}$ indicate more (less) earnings smoothness and low (high) earnings quality.

MMH Firm-Year model

According to McKeown et al. (1991), the MMH firm-year model classified a firm in the stressed category if it exhibited at least one of the following financial distress signals:

1) Negative working capital in the current year;

2) A loss from operations in any of the three years prior to bankruptcy;
3) A retained earnings deficit in year-3 (where year-1 is the last financial statement date preceding bankruptcy); and
4) A bottom-line loss in any of the last three pre-bankruptcy years.

The MMH firm-year model is adopted in this study to classify Chinese listed firms as stressed and non-stressed in the classification of both bankrupt and non-bankrupt firms.

The Emerging Market Score Model (EMS Model)

According to Rosner (2003), prior literature and anecdotal evidence (most recently provided by allegations relative to Enron, Global Crossing, and Worldcom) suggest that failing firms (defined here as pre-bankruptcy firms) may be motivated to engage in financial reporting to conceal their distress. Rosner also explains that the bankruptcy classification is based on a firm's ex-ante bankrupt state. Therefore, bankrupt firms were considered as pre-bankruptcy situations in Rosner's study, as well as in this study.

Due to the imperfect delisting system in the Chinese stock exchange, we use the EMS model to split the sample observation of the firm-year into bankrupt and non-bankrupt categories. The EMS model is a predictive model which combined four different financial ratios to determine the likelihood of bankruptcy amongst firms (Altman, 2006). This model was first developed in the mid-1990s to provide an analytical framework for the then-growing, but still nascent emerging market firms issuing bonds in nonlocal currency (usually US dollars) (Altman, 2006).

The EMS model is as follows (Altman, 2006):

$$EMScore = 6.56 * X1 + 3.26 * X2 + 6.72 * X3 + 1.05 * X4 + 3.25 \quad (5)$$

EM Score below 0 indicates a bankrupt condition.

Where

X_1 = working capital/total assets;

X_2 = retained earnings/total assets;

X_3 = EBIT/total assets; and

X_4 = book value of equity/total liabilities.

Altman (2006) states that the EMS model was tested on samples of manufacturers and non-manufacturers, public firms, private firms, specific industries (e.g., retailers, telecoms, airlines, etc.), in over 20 countries including China, and its accuracy and reliability has remained high.

According to Altman (2006), the EMS system for rating emerging market credits is based first on a fundamental financial review derived from a quantitative risk model, and second, on the assessments of specific credit risks in the emerging market, to arrive at a final modified rating. This rating can then be used by the investors, after considering the appropriate sovereign yield spread, to assess equivalent bond ratings and intrinsic values.

The foundation of the EMS model is an enhancement of the Z''-Score model, resulting in an EMS and its associated bond rating equivalent (BRE) (Altman, 2006).

4. Sample selection and basic statistics

4.1. Data and sample selection

The data consists of the firms that issued A-shares and have been listed in the Shanghai and Shenzhen stock exchanges for the years from 2003 to 2007. Since the computation of accruals quality and the MMH firm-year model require prior and subsequent year's data, the analysis period is extended from 2000 to 2008. We calculate the earnings attributes by rolling over five-year windows; a firm is included in the year t sample if data are available in years t-4 to t.

To mitigate concern that differences in sample composition drive comparisons for each kind of firms, we further require that data on the variables used are available for each year in the sample period. The data are collected from the CSMAR Financial Databases developed by the Shenzhen GTA Information Technology Co. After we eliminate the firms that issued B-shares, the analysed sample consists of 987 firms with a total of 4935 firm-year observations for the period 2003-2007.

Table 1. The classification of firms in the sample

The samples listed on A-shares and in Shanghai and Shenzhen stock exchanges for the years from 2003 to 2007. There were no firms classified as NSB. Therefore, we have only three types of firms (SB, SNB and NSNB) in this study. The final sample consists of 987 firms with a total of 4935 firm-year observations for the period 2003-2007.

	Stressed	Non-stressed	Total
2003			
Bankruptcy	42	0	42
Non-bankruptcy	462	483	945
Total	504	483	987
2004			
Bankruptcy	58	0	58
Non-bankruptcy	501	428	929
Total	559	428	987
2005			
Bankruptcy	78	0	78
Non-bankruptcy	541	368	909
Total	619	368	987
2006			
Bankruptcy	87	0	87
Non-bankruptcy	566	334	900
Total	653	334	987
2007			
Bankruptcy	81	0	81
Non-bankruptcy	562	344	906
Total	643	344	987

Table 1 presents the classification of the firms in the sample. Two items are noteworthy. First, no firms fall under the classification of NSB, and therefore, we have only three kinds of firms (SB, SNB and NSNB) in this study. In addition, the earnings quality has deteriorated over time[37] – as evidenced by the declining NSNB firm numbers from 483 (2003) to 344 (2007) and increasing numbers of SB and SNB firms from 42 to 81 and 462 to 562 in 2003 and 2007, respectively.

The sample statistics of relevant accounting variables and earnings attributes are presented in Table 2. On average, the sample SB, SNB and NSNB firms have positive future cash flow from operation, future non-discretionary net income and future change earnings (CFO_{t+1}, $NDNI_{t+1}$, and ΔNI_{t+1}). The mean of discretionary accruals and non-discretionary accruals (DAC and NDAC) are negative for SB and SNB firms. The NSNB firms have the lowest mean of accruals quality, earnings predictability and earnings smoothness, and SB firms have the highest mean of each earnings quality attribute. This evidence shows that NSNB firms are more likely to have better earnings quality than SNB firms and SB firms, and SB firms are more inclined to have the worst earnings quality.

[37] Table 4 reveals that NSNB (non-stressed and non-bankrupt) firms have the highest earnings quality for each of the four earnings attributes. SB (stressed and bankrupt) firms have the lowest earnings quality for each of the four earnings attributes.

Table 2. Statistics of relevant accounting variables and earnings attributes

This study measures the four attributes on a firm- and year-specific basis, using the relevant accounting information for rolling five-year windows, t-4,…t. So the firm-years 2001 to 2005 are used to calculate the earnings attributes for the year 2005; the firm-years 2002 to 2006 for the year 2006; and the firm-years 2003 to 2007 for the year 2007.
$CFO_{j, t+1}$ = cash flows from operation one year ahead, $\Delta NI_{j, t+1}$ = change in earnings one year ahead, $NDNI_{j, t+1}$ = non-discretionary net income one year ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, $TA_{j, t}$ = total assets, AccrualQuality = the standard deviation of firm j's residuals from a regression of current accruals on lagged, current, and future cash flows from operation, Persistence = the slope-coefficient estimates of current earnings on last year's earnings, Predictability = the square root of the error variance from firm j's persistence model, Smoothness = the ratio of firm j's standard deviation of cash flows from operations (scaled by assets) to the standard deviation of earnings before extraordinary items (scaled by assets).

	Mean	Std.Dev	10%	25%	Median	75%	90%
Panel A: Stressed-bankrupt firms (SB)							
$CFO_{j, t+1}$	0.089	0.763	-4.827	-0.004	0.012	0.066	8.852
$\Delta NI_{j, t+1}$	0.210	0.753	-5.353	-0.029	0.141	0.314	4.706
$NDNI_{j, t+1}$	0.082	1.122	-10.654	-0.068	0.014	0.088	12.000
$DAC_{j, t}$	-0.154	0.975	-11.929	-0.226	-0.099	0.032	5.317
$NDAC_{j, t}$	-0.039	0.091	-0.614	-0.076	-0.027	0.014	0.203
$CFO_{j, t}$	0.124	0.894	-0.341	-0.008	0.011	0.047	12.003
$TA_{j, t}$	0.843	0.433	0.007	0.645	0.823	0.962	4.041
AccrualQuality	0.108	0.195	0.001	0.025	0.063	0.125	2.519
Persistence	0.403	2.129	-17.130	-0.161	0.009	0.460	14.968
Predictability	0.209	0.245	0.005	0.081	0.127	0.240	1.839
Smoothness	0.255	0.382	0.020	0.097	0.137	0.248	3.817
Panel B: Stressed-nonbankrupt firms (SNB)							
$CFO_{j, t+1}$	0.074	0.269	-1.870	0.007	0.055	0.114	6.429
$\Delta NI_{j, t+1}$	0.005	0.123	-2.530	-0.014	0.005	0.028	1.468
$NDNI_{j, t+1}$	0.036	0.232	-1.019	-0.037	0.018	0.082	4.975
$DAC_{j, t}$	-0.011	0.202	-4.714	-0.069	0.000	0.061	2.448
$NDAC_{j, t}$	-0.033	0.114	-0.705	-0.091	-0.031	0.018	1.928
$CFO_{j, t}$	0.069	0.172	-0.970	0.014	0.060	0.110	5.101
$TA_{j, t}$	1.137	0.588	0.146	0.963	1.048	1.171	14.982
AccrualQuality	0.061	0.082	0.000	0.014	0.035	0.078	1.470
Persistence	0.311	0.988	-13.261	-0.128	0.162	0.628	9.864
Predictability	0.042	0.059	0.000	0.011	0.026	0.056	1.298
Smoothness	0.079	0.173	0.008	0.039	0.055	0.080	3.176
Panel C: Nonstressed and nonbankrupt firms (NSNB)							
$CFO_{j, t+1}$	0.043	0.136	-1.411	0.002	0.018	0.086	0.786
$\Delta NI_{j, t+1}$	0.011	0.087	-0.717	-0.008	0.006	0.029	1.439
$NDNI_{j, t+1}$	0.042	0.117	-0.616	-0.016	0.038	0.091	0.722
$DAC_{j, t}$	0.022	0.123	-1.008	-0.032	0.016	0.078	1.111
$NDAC_{j, t}$	0.007	0.089	-1.032	-0.036	0.012	0.051	0.663
$CFO_{j, t}$	0.029	0.087	-0.431	0.002	0.009	0.035	1.559
$TA_{j, t}$	1.225	0.915	0.249	1.019	1.101	1.231	24.894
AccrualQuality	0.054	0.093	0.000	0.012	0.029	0.056	1.201
Persistence	0.538	1.200	-8.483	0.004	0.445	0.930	12.634
Predictability	0.020	0.021	0.000	0.007	0.013	0.024	0.295
Smoothness	0.056	0.065	0.003	0.028	0.043	0.066	1.040

The correlation coefficients between the variables and four earnings quality attributes are shown in Table 3. DAC has positive correlation with CFO_{t+1} for NSNB and SNB firms, and negative correlation with SB firms, indicating that NSNB and SNB firms have a higher future profitability than SB firms. In addition, the four earnings quality attributes exhibit small positive correlations among the four classifications of firms (except the correlations of predictability and smoothness for SB and SNB firms) indicating relatively little overlap among the four earnings quality attributes. The variables have small correlations with each other in the correlation matrix.

Table 3. Pearson correlation coefficients

Variables	$CFO_{j, t+1}$	$\Delta NI_{j, t+1}$	$NDNI_{j, t+1}$	$DAC_{j, t}$	$NDAC_{j, t}$	$CFO_{j, t}$	AccrualQuality	Persistence	Predictability	Smoothness
Panel A: Stressed-bankrupt firms (SB)										
$CFO_{j, t+1}$	1.000									
$\Delta NI_{j, t+1}$	0.027	1.000								
$NDNI_{j, t+1}$	0.683	0.443	1.000							
$DAC_{j, t}$	-0.074	-0.200	-0.225	1.000						
$NDAC_{j, t}$	-0.005	-0.002	0.003	-0.062	1.000					
$CFO_{j, t}$	0.040	-0.027	0.019	-0.858	-0.014	1.000				
AccrualQuality	0.032	0.052	0.009	-0.053	-0.030	0.108	1.000			
Persistence	-0.022	-0.086	-0.062	0.117	-0.004	0.009	0.090	1.000		
Predictability	-0.138	-0.030	-0.152	0.014	0.154	0.018	0.091	0.236	1.000	
Smoothness	-0.053	0.029	-0.077	-0.070	0.088	0.085	0.130	-0.001	0.730	1.000
Panel B: Stressed-nonbankrupt firms (SNB)										
$CFO_{j, t+1}$	1.000									
$\Delta NI_{j, t+1}$	0.124	1.000								
$NDNI_{j, t+1}$	0.859	0.160	1.000							
$DAC_{j, t}$	0.035	-0.277	-0.077	1.000						
$NDAC_{j, t}$	-0.076	-0.068	0.135	-0.440	1.000					
$CFO_{j, t}$	0.047	0.006	0.020	-0.697	-0.083	1.000				
AccrualQuality	-0.042	-0.004	0.056	-0.069	0.199	-0.040	1.000			
Persistence	-0.037	-0.097	0.029	-0.054	0.126	0.006	0.105	1.000		
Predictability	-0.055	-0.015	0.003	-0.068	0.159	-0.020	0.196	0.314	1.000	
Smoothness	0.018	0.042	0.080	-0.150	0.174	0.106	0.199	-0.171	0.612	1.000
Panel C: Nonstressed and nonbankrupt firms (NSNB)										
$CFO_{j, t+1}$	1.000									
$\Delta NI_{j, t+1}$	0.168	1.000								
$NDNI_{j, t+1}$	0.671	0.115	1.000							
$DAC_{j, t}$	0.055	-0.048	-0.111	1.000						
$NDAC_{j, t}$	-0.132	-0.040	0.217	-0.700	1.000					
$CFO_{j, t}$	0.245	0.091	0.034	-0.495	0.041	1.000				
AccrualQuality	0.060	0.027	0.038	-0.032	0.138	-0.060	1.000			
Persistence	0.046	0.018	0.038	-0.025	0.035	-0.048	0.044	1.000		
Predictability	0.110	0.004	0.023	0.080	0.015	0.143	0.122	0.021	1.000	
Smoothness	0.025	0.001	0.076	0.034	0.112	0.103	0.264	0.064	0.307	1.000

The table reports the Pearson correlations for SB, SNB and NSNB firms. Definitions of variables can be found in Tables 2. There are total 346 SB, 2632 SNB and 1957 NSNB firm-year observations. Significance at the 5% level (two-tail).

5. Regression analyses

To follow Francis et al. (2004), we rank each attribute each year, and form deciles. High values of earnings persistence correspond to high earnings quality. By contrast, high values of accruals quality, earnings predictability, and earnings smoothness correspond to poor earnings quality. To be consistent across the four attributes, this study ranks earnings persistence in descending order and the other three attributes in ascending order, so that firms in the top decile (decile 1) have the best values of each earnings attribute,

while firms in the bottom decile (decile 10) have the worst values of each earnings attribute. This study uses the decile rank of each attribute rather than its raw value, which reduces the effects of extreme observations and generates a new order with a precise range to calculate the regression results.

Table 4 provides means of the four-earnings attributes variables. We report means for both the raw and ranked variables. This table reveals that the SB (stressed and bankrupt) firms have the lowest earnings quality and the highest ranked variables for each of the four earnings attributes. The SNB (stressed and non-bankrupt) firms have a higher earnings quality and lower ranked variables compared with the SB (stressed and bankrupt) firms for each of the four earnings attributes. The NSNB (non-stressed and non-bankrupt) firms have the highest earnings quality and the lowest ranked variables for each of the four earnings attributes.

Table 4. Earnings attribute variables (raw and rank data) used in this study

Note: These earnings attribute variables are based on rolling over five-year windows; a firm is included in the year t sample if data are available in year t-4 to t. Then this study ranks each attribute each year, and forms deciles. High values of earnings persistence correspond to high earnings quality. By contrast, high values of accruals quality, earnings predictability, and earnings smoothness are indicative of poor earnings quality. To be consistent across the four attributes, this study ranks earnings persistence in descending order and the other three attributes in ascending order, so that firms in the top decile (decile 1) have the best values of each earnings attribute, while firms in the bottom decile (decile 10) have the worst values of each earnings attribute. Stdresid is the standard deviation of estimated residual for accruals quality. Persist is earnings persistence. Pred is earnings predictability. Smooth is earnings smoothness.

Earnings Attributes	SB	SNB	NSNB
Stdresid	0.108	0.061	0.054
Persist	0.245	0.311	0.538
Pred	0.210	0.042	0.020
Smooth	0.255	0.079	0.056
Rank(Stdresid)	6.837	5.584	5.056
Rank(Persist)	6.321	5.801	4.848
Rank(Pred)	9.341	5.761	4.184
Rank(Smooth)	9.081	5.619	4.472

Francis et al. (2004) examine the relation between earnings attributes and investors' resource allocation decisions, using the cost of equity capital as a summary indicator of those decisions. Siregar and Utama (2008) investigate whether firms listed on the Jakarta Stock Exchange conduct efficient or opportunistic earnings management by examining discretionary accruals' ability to signal future profitability, after controlling for current levels of operating cash flow and non-discretionary accruals. Therefore, in this section, we apply regression analyses to test the four hypotheses by employing the measure based on these two studies and using the following equation:

$$X_{j,t+1} = b_0 + b_1 DAC_{j,t} + b_2 NDAC_{j,t} + b_3 CFO_{j,t} + b_4 Attribute^{k}_{j,t} + \varepsilon_{j,t} \quad (6)$$

Where:

$Attribute^{k}_{j,t}$ is the decile rank of firm j's value of the *k*th earnings attribute in year t,
k = {AccrualsQuality, Persistence, Predictability, Smoothness}.

$DAC_{j,t}$ = discretionary accruals;

$NDAC_{j,t}$ = non-discretionary accruals;

$CFO_{j,t}$ = cash flows from operating activities; and

$X_{j,t+1}$ is the future profitability, measured by each of the following variables.

1. $CFO_{j,t+1}$ = one-year-ahead cash flows from operations
2. $NDNI_{j,t+1}$ = one-year-ahead non-discretionary net income ($CFO_{j,t+1} + NDAC_{j,t+1}$)
3. $\Delta NI_{j,t+1}$ = one-year-ahead change in earnings ($NI_{j,t+1} - NI_{j,t}$)

All valuables scaled by total assets at beginning of years.

Earnings are decomposed into three variables: discretionary accruals (DAC), non-discretionary accruals (NDAC), and cash flow from operations (CFO) (Subramanyam, 1996). DAC is the variable of interest, and if the type of earnings management is efficient, the coefficient (b_1) will be positive. If the earnings management is opportunistic, the DAC coefficient (b_1) will be either zero or negative (Siregar

& Utama, 2008). Discretionary accruals (DAC) are defined as the residuals, and non-discretionary accruals (NDAC) are fitted values, both from Jones' model (1991).

The variables of future profitability in the model have been validated by Siregar and Utama (2008). They state that earnings and discretionary accruals tend to have a stationary nature. The use of change in earnings will control for the stationary nature of discretionary accruals. Cash flows from operations and non-discretionary net income do not have a discretionary-accrual component, so they do not have the inherent problems of earnings. This evidence shows that among these three measures, it is believed that non-discretionary net income (NDNI) and cash flows from operations (CFO) are more reliable than change in net income (ΔNI) because they do not include any discretionary-accrual components. For comprehensiveness, we conduct separately 36 regressions with future profitability in the regression equation, as $CFO_{j,t+1}$, $NDNI_{j,t+1}$, and $\Delta NI_{j,t+1,}$ for each of the three firm classifications (i.e., NSNB, SNB, and SB firms), with each of the four earnings attributes (AccrualQuality, Earnings Persistence, Earnings Predictability, and Earnings Smoothness**)** included.

We now turn to interpreting the results of testing each hypothesis. As shown in Table 5, evidence in support of Hypothesis 1, with the independent variable of accruals quality, would be indicated by a more positive value of b_1 for NSNB firms, less positive value for SNB firms and negative value for SB firms. Table 5 reports results of the multivariate regressions. The first column reports results of the regression using future cash flows from operations ($CFO_{j, t+1}$): the NSNB firms $b_1 = 0.304$ ($P < 0.000$), SNB firms $b_1 = 0.159$ ($P < 0.012$), SB firms b_1=-0.125 ($P < 0.208$). The second column reports results of regression using non-discretionary non-income ($NDNI_{j, t+1}$): the NSNB firms $b_1 = 0.171$ ($P < 0.001$), SNB firms $b_1 = 0.025$ ($P < 0.651$), SB firms b_1=-0.934 ($P < 0.000$). The third column reports results of regression using $\Delta NI_{j, t+1}$: the NSNB firms b_1 = -0.078 ($P < 0.052$), SNB firms $b_1 = -0.709$ ($P < 0.000$), SB firms b_1=-0.677 ($P < 0.000$).

Concerning the results for the variable of interest b_1, we turn to testing the coefficient of non-discretionary accruals (b_2). For $NDNI_{j, t+1,}$ the results show that NSNB and SNB firms have positive and SB firms have negative coefficients ($b_2 = 0.443$, $P < 0.000$; $b_2 = 0.289$, $P < 0.000$; $b_2 = -0.685$, $P < 0.352$), respectively. The following results show regression using cash flow from operations on $CFO_{j, t+1}$: the NSNB firms $b_3 = 0.589$ ($P < 0.000$), SNB firms b_3 = 0.200 ($P < 0.003$), and SB firms b_3=-0.086 ($P < 0.427$). Subramanyam (1996) states that both types of cash flow, from operations and non-discretionary accruals, have incremental information content and improve earnings' ability to predict future profitability. Therefore, the two variables are adopted here to analyze efficient or opportunistic earnings management for Chinese listed firms.

The results are consistent with our expectation and suggest that NSNB firms with the highest earnings quality prefer more efficient earnings management than SNB firms with higher earnings quality. SB firms with the lowest earnings quality are more likely to opportunistically manage earnings to avoid de-listing. In addition, this study finds that NSNB firms have positive coefficients insignificantly related to future profitability. SB and SNB firms have positive or negative coefficients insignificantly related to future profitability. The results are somewhat weaker, but we find that NSNB firms are better indicators than both SNB and SB firms in predicting future profitability in relation to accruals quality.

Table 5. Regression on future profitability with AccrualQuality (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.125	0.208	-0.934	0.000	-0.677	0.000
$NDAC_{j, t}$	-0.131	0.811	-0.685	0.352	-0.533	0.271
$CFO_{j, t}$	-0.086	0.427	-0.856	0.000	-0.665	0.000
AccrualsQuality	0.009	0.603	0.015	0.529	-0.024	0.128
Adj.R^2	-0.008		0.156		0.188	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.159	0.012	0.025	0.651	-0.709	0.000
$NDAC_{j, t}$	-0.018	0.827	0.289	0.000	-0.706	0.000
$CFO_{j, t}$	0.200	0.003	0.065	0.258	-0.613	0.000
AccrualsQuality	-0.003	0.279	0.002	0.211	0.000	0.581
Adj.R^2	0.010		0.018		0.359	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.304	0.000	0.171	0.001	-0.078	0.052
$NDAC_{j, t}$	0.077	0.292	0.443	0.000	-0.114	0.019
$CFO_{j, t}$	0.589	0.000	0.147	0.006	0.040	0.327
AccrualsQuality	0.002	0.231	0.000	0.905	0.000	0.712
Adj.R^2	0.100		0.054		0.010	

$CFO_{j, t+1}$ = cash flows from operation one year ahead, $\Delta NI_{j, t+1}$ = change in earnings one year ahead, $NDNI_{j, t+1}$ = non-discretionary net income one year ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, AccrualQuality = the standard deviation of firm j's residuals from a regression of current accruals on lagged, current, and future cash flows from operation.

As shown in Table 6, we turn to the Hypothesis 2 with the independent variable of earnings persistence, which predicts that discretionary accruals make future profitability somewhat higher for SNB firms and the highest for NSNB firms, and the lowest for SB firms. The first column of Table 6 shows the regression results on $CFO_{j, t+1}$: NSNB firms b_1 = 0.297 (P < 0.000), SNB firms b_1 = 0.161 (P < 0.011), SB firms b_1=-0.120 (P < 0.240). The second column shows the results on $NDNI_{j, t+1}$: NSNB firms b_1 = 0.168 (P < 0.001), SNB firms b_1 =0.024 (P < 0.658), SB firms b_1= -0.950 (P < 0.000). The third column shows all the negative results of regression on $\Delta NI_{j, t+1}$. The coefficient b_1 indicates that NSNB firms are more likely to be efficient, SNB firms are less likely to be efficient, and SB firms are opportunistic; these findings are consistent with our expectations.

The results of regression on $CFO_{j, t+1}$ and $NDNI_{j, t+1}$ show that NSNB firms have positive coefficients b_2 = 0.064 (P < 0.373), 0.444 (P < 0.006), b_3 = 0.587 (P < 0.000), 0.143 (P < 0.008), respectively, which indicates that NSNB firms are likely to be more efficient than SNB firms, which have b_2 = -0.020 (P < 0.807), 0.298 (P < 0.000), b_3 = 0.203 (P < 0.002), 0.063 (P < 0.272). SB firms seem opportunistic with coefficients b_2 = -0.135 (P < 0.805), -0.709 (P < 0.335), b_3= -0.078 (P < 0.478), -0.867 (P < 0.000), respectively.

We turn to testing earnings persistence b_4, and find that NSNB firms have positive significant and SNB firms have negative coefficients, significant with $\Delta NI_{j, t+1}$ ($b_4^{EarningsPersistence}$ =0.045, P < 0.004; $b_4^{EarningsPersistence}$ = -0.003, P < 0.000), respectively. In addition, NSNB firms have positive insignificant coefficients for $CFO_{j, t+1}$ and $NDNI_{j, t+1}$; while both SB and SNB firms have positive or negative insignificant coefficients. We interpret the results as suggesting that NSNB firms are better indicators than both SNB and SB firms in predicting future profitability in relation to earnings persistence.

Table 6. Regression on future profitability with Earnings Persistence (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.120	0.240	-0.950	0.000	-0.675	0.000
$NDAC_{j, t}$	-0.135	0.805	-0.709	0.335	-0.553	0.256
$CFO_{j, t}$	-0.078	0.478	-0.867	0.000	-0.655	0.000
Persistence	-0.001	0.961	0.016	0.504	0.006	0.710
Adj.R^2	-0.009		0.156		0.181	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.161	0.011	0.024	0.658	-0.707	0.000
$NDAC_{j, t}$	-0.020	0.807	0.298	0.000	-0.691	0.000
$CFO_{j, t}$	0.203	0.002	0.063	0.272	-0.610	0.000
Persistence	-0.003	0.225	0.001	0.649	-0.003	0.000
Adj.R^2	0.010		0.017		0.364	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.297	0.000	0.168	0.001	-0.080	0.047
$NDAC_{j, t}$	0.064	0.373	0.444	0.000	-0.117	0.015
$CFO_{j, t}$	0.587	0.000	0.143	0.008	0.039	0.342
Persistence	0.001	0.447	0.002	0.179	0.045	0.004
Adj.R^2	0.099		0.056		0.010	

$CFO_{j, t+1}$ = cash flows from operation one year ahead, $\Delta NI_{j, t+1}$ = change in earnings one year ahead, $NDNI_{j, t+1}$ = non-discretionary net income one year ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, Persistence = the slope-coefficient estimates of current earnings on last year's earnings.

As Table 2 shows, NSNB firms have large firm size (measured by total assets), which strongly impacts on earnings persistence. Frankel and Litov (2009) note that firm size can be related to a company's earnings persistence because it indicates the strength of the company's competitive position. On the other hand, SB firms have more volatile earnings, as shown by changes in earnings; this evidence shows that large earnings changes are more volatile and less persistent. Brooks and Buckmaster (1976) find that earnings tend to revert to levels observed prior to large earnings changes.

Table 7 shows the regression results with the independent variable of earnings predictability. The regressions on $CFO_{j, t+1}$ and $NDNI_{j,t+1}$ of NSNB firms have coefficients b_1 = 0.277 (P < 0.000), 0.178 (P < 0.001), respectively, which indicates that NSNB firms are likely to be more efficient than SNB firms

that have b_1 = 0.158 (P < 0.012), 0.024 (P < 0.653). SB firms seem opportunistic with coefficients b_1= -0.104 (P < 0.289), -0.905 (P < 0.000). In addition, for $\Delta NI_{j, t+1}$, NSNB, SNB and SB firms have b_1=-0.083 (P <0.049), -0.709 (P <0.000), -0.668 (P <0.000), respectively. It is clear that NSNB and SNB firms are more likely to have efficient earnings management than SB firms because two out of three DAC coefficients are positive.

We turn to testing the coefficient of non-discretionary accruals (b_2), for $NDNI_{j, t+1,}$ with the result that NSNB and SNB firms have positive coefficients (b_2 = 0.451, P < 0.000, b_2 =0.307, P < 0.000, b_2= -0.440, P < 0.552), respectively. Next we test cash flow from operations (b_3) for $CFO_{j, t+1,}$ finding that NSNB firms have more significant positive coefficients (b_3 = 0.567, P < 0.000) than SNB firms (b_3 = 0.200, P < 0.003), while SB firms have a negative coefficient (b_3=-0.061, P < 0.567). The results reveal that NSNB firms more likely to have efficient earnings management than SNB firms, and SB firms are more likely to have opportunistic earnings management.

In addition, this study finds that NSNB firms have a positive coefficient with future profitability. In particular, NSNB firms have a significant positive coefficient on $\Delta NI_{j, t+1}$ ($b_4^{EarningsPredictability}$ = 0.009, P < 0.005). SB and SNB firms have an insignificant coefficient with future profitability. We interpret these results as indicating that NSNB firms are better indicators than both SNB and SB firms in predicting future profitability in relation to earnings predictability.

Table 7. Regression on future profitability with Earnings Predictability (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.104	0.289	-0.905	0.000	-0.668	0.000
$NDAC_{j, t}$	0.054	0.922	-0.440	0.552	-0.555	0.260
$CFO_{j, t}$	-0.061	0.567	-0.821	0.000	-0.648	0.000
Predictability	-0.084	0.036	-0.112	0.037	0.004	0.916
Adj.R^2	0.010		0.170		0.180	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.158	0.012	0.024	0.653	-0.709	0.000
$NDAC_{j, t}$	-0.015	0.854	0.307	0.000	-0.702	0.000
$CFO_{j, t}$	0.200	0.003	0.063	0.268	-0.613	0.000
Predictability	-0.004	0.080	-0.002	0.451	0.000	0.668
Adj.R^2	0.001		0.017		0.359	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.277	0.000	0.178	0.001	-0.083	0.049
$NDAC_{j, t}$	0.043	0.558	0.451	0.000	-0.120	0.016
$CFO_{j, t}$	0.567	0.000	0.154	0.006	0.036	0.395
Predictability	0.002	0.229	0.001	0.679	0.009	0.005
Adj.R^2	0.100		0.054		0.010	

$CFO_{j, t+1}$ = cash flows from operation one year ahead, $\Delta NI_{j, t+1}$ = change in earnings one year ahead, $NDNI_{j, t+1}$ = non-discretionary net income one year ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation. Predictability = the square root of the error variance from firm j's persistence model.

Finally, Table 8 reports regression results with the independent variable of earnings smoothness. The results of regression on $CFO_{j, t+1}$ and $NDNI_{j,t+1}$ show that NSNB firms have coefficients b_1 = 0.318 (P < 0.000), 0.160 (P < 0.004), respectively, which indicates that NSNB firms are likely to be more efficient than SNB firms, which have b_1 = 0.157 (P < 0.013), 0.021 (P < 0.701). SB firms seem opportunistic with coefficients b_1= -0.120 (P < 0.226), -0.925 (P < 0.000). For $\Delta NI_{j, t+1}$, these three firms have the negative coefficient b_1.

With the regressions on $CFO_{j, t+1}$ and $NDNI_{j, t+1}$, NSNB firms show positive coefficients b_2 = 0.087 (P < 0.247), 0.430 (P < 0.000), b_3 = 0.607 (P < 0.000), 0.137 (P < 0.014), respectively, which indicate that NSNB firms are likely to be more efficient than SNB firms, which have b_2 = -0.043 (P < 0.594), 0.277 (P < 0.000), b_3 = 0.194 (P < 0.004), 0.051 (P < 0.371). SB firms seem opportunistic with coefficients b_2 = -0.093 (P < 0.865), -0.611 (P < 0.407), b_3= -0.074 (P < 0.865), -0.835 (P < 0.000), respectively.

Next, we turn to testing earnings smoothness b_4, and find that NSNB firms have the positive insignificant coefficients for $CFO_{j, t+1}$, $NDNI_{j, t+1}$ and $\Delta NI_{j, t+1}$. Both SB and SNB firms show positive or negative insignificant coefficients. In particular, SNB

firms have a negative significant coefficient on $\Delta NI_{j, t+1}$ ($b_4^{EarningsSmoothness}$ = -0.004, P < 0.000). We interpret the results as showing that NSNB firms are better indicators than both SNB and SB firms in predicting future profitability in relation to earnings smoothness.

Table 8. Regression on future profitability with Earnings Smoothness (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.120	0.226	-0.925	0.000	-0.668	0.000
$NDAC_{j, t}$	-0.093	0.865	-0.611	0.407	-0.577	0.237
$CFO_{j, t}$	-0.074	0.492	-0.835	0.000	-0.652	0.000
Smoothness	-0.031	0.396	-0.060	0.222	0.022	0.493
Adj.R^2	-0.006		0.160		0.182	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.157	0.013	0.021	0.701	-0.712	0.000
$NDAC_{j, t}$	-0.043	0.594	0.277	0.000	-0.721	0.000
$CFO_{j, t}$	0.194	0.004	0.051	0.371	-0.622	0.000
Smoothness	0.003	0.305	0.005	0.026	-0.004	0.000
Adj.R^2	0.010		0.020		0.364	0.000
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.318	0.000	0.160	0.004	-0.085	0.043
$NDAC_{j, t}$	0.087	0.247	0.430	0.000	-0.124	0.014
$CFO_{j, t}$	0.607	0.000	0.137	0.014	0.035	0.412
Smoothness	0.002	0.314	0.001	0.477	0.000	0.636
Adj.R^2	0.099		0.054		0.010	

$CFO_{j, t+1}$ = cash flows from operation one year ahead, $\Delta NI_{j, t+1}$ = change in earnings one year ahead, $NDNI_{j, t+1}$ = non-discretionary net income one year ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, Smoothness = the ratio of firm j's standard deviation of cash flows from operations (scaled by the beginning total assets) to the standard deviation of earnings before extraordinary items (scaled by the beginning total assets);

Based on the above analysis of the four hypotheses, we find that the $DAC_{j, t}$ (b_1) is of the most interest to us as a measure of earnings management, as it is significantly related to the three measures of future profitability ($CFO_{j,t+1}$, $NDNI_{j,t+1}$, and $\Delta NI_{j,t+1,}$); but most of the four earnings quality attributes (b_4) have an insignificant relationship with the future profitability measures. This finding suggests that earnings management performs better than earnings quality in predicting future profitability. Kallunki and Martikainen (2003) demonstrate that earnings management is a better metric to predict future profitability, because firms use discretionary accruals to manage this year's earnings upwards/downwards, if they believe that the next year's earnings will be high/low. Similarly, a high-quality earnings number will be a good indicator of future performance. However, a low-quality earnings number is insufficient to guarantee a prediction of future performance (Francis et al., 2004).

6. Sensitivity analysis[38]

Our results are robust, as shown with the following sensitivity analyses:

1. Changes in EMS default equivalent rating (D)

According to Altman (2006), actual EMS default equivalent rating (D) scores below 1.75 are used as the proxy for D (in the main test, EMS default equivalent rating of 0 is rated D). We consider the default equivalent rating as 1.75 to estimate the type of earnings management and the effect of earnings quality for Chinese listed firms. The results show that there are also three categories (SB, SNB and NSNB) of Chinese listed firms. Then we repeat the cross-sectional tests for the four hypotheses. The main results show quite a similar pattern for earnings management with the main test.

2. Using Z'' – Score Model (1993 Altman model)

While consistent with the 1993 Altman model[39], we perform an alternative bankruptcy model to

[38] To save the space, the results in sensitivity analysis are not shown here. However, all the results are available on request by contacting the corresponding author.

[39] $Z'' = 6.56 (X_1) + 3.26 (X_2) + 6.72 (X_3) + 1.05 (X_4)$

classify the Chinese listed firms. This particular model is also useful within an industry where the type of financing of assets differs greatly among firms and is subject to important adjustments (Altman, 1993). Calculating earnings management based on the three types of firms (SB, SNB and NSNB), we obtained similar results and conclude that our findings are robust for the main test.

3. Changes in scaling the accounting variables by average

The main earnings management tests are based on scaling by the beginning total assets. We used the average total assets instead to calculate the earnings management for the three classifications of firms. These results also do not differ qualitatively from the results in our main analysis.

4. Changes in accruals quality model

We evaluate the robustness of our findings to use the level of total accruals as the measure of accrual quality. Firms with larger values of total accruals are expected to have more opportunistic earnings management than firms with smaller values of total accruals. Results using the total accruals measure are similar to these results based on accruals quality.

5. Using ROA persistence model

Dechow and Schrand (2004) evaluated persistence of earnings and ROA to calculate which one is more persistent. With respect to the cross-sectional tests of earnings persistence, we adopt ROA to identify the persistence[40] for SB, SNB and NSNB firms. Results show that NSNB firms have a more positive coefficient than SNB firms, and that SB firms have a negative coefficient.

7. Conclusion and remarks

This paper investigates the relation between earnings management and four attributes of earnings: accrual quality, persistence, predictability, and smoothness. We examine the type of earnings management and the effect of earnings quality in Chinese listed firms. In addition, we adopt the MMH firm-year model and EMS model to split the Chinese listed firms into four categories – stressed/bankrupt firms (SB), stressed/non-bankrupt firms (SNB), non-stressed/bankrupt firms (NSB) and non-stressed/non-bankrupt firms (NSNB) firms. Due to the zero sample size, the NSB firms cannot be effectively identified. Our research therefore focuses only on three types of firms: SB, SNB and NSNB.

Using the different types of Chinese firms listed in the Shanghai and Shenzhen stock exchange from 2003-2007, we find that the stressed/bankrupt (SB) firms are likely to become opportunistic in earnings management, and the non-stressed/non-bankrupt (NSNB) firms are more inclined to choose more efficient earnings management than stressed/non-bankrupt (SNB) firms. We find that earnings management performs better than earnings quality in predicting future profitability. We also find that as the earnings quality has deteriorated over the sample period: the number of stressed/bankrupt firms increases and the number of non-stressed/non-bankrupt firms decreases.

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Z'' < 1.10 = Zone I (no errors in bankruptcy classification).

Where

X_1 = working capital/total assets;

X_2 = retained earnings/total assets;

X_3 = EBIT/total assets; and

X_4 = book value of equity/total liabilities.

[40] The regression model is as the following:

$ROA_{j,t} = a + b * ROA_{j,t-1} + \varepsilon_{j,t-1}$

Where b is the cash flow persistence parameter.

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Sensitivity Test 1 - Sample Composition

	Stressed	Non stressed	Total
2003			
Bankruptcy	85	0	85
Nonbankruptcy	417	485	902
Total	502	485	987
2004			
Bankruptcy	107	0	107
Nonbankruptcy	450	430	880
Total	557	430	987
2005			
Bankruptcy	145	0	145
Nonbankruptcy	472	370	842
Total	617	370	987
2006			
Bankruptcy	153	0	153
Nonbankruptcy	498	336	834
Total	651	336	987
2007			
Bankruptcy	148	0	148
Nonbankruptcy	493	346	839
Total	641	346	987

Notes: The samples listed on A-shares and in Shanghai and Shenzhen stock exchanges for the fiscal years 2003 to 2007. There are zero sample-year observations for NSB firms in this study, and so analysis of NSB firms is disregarded due to non-sub-sample. The final sample consists of 987 firms with a total of 4935 firm-year observations for the period 2003-2007.

Sensitivity Test 1: Earnings attribute variables (raw and rank data) used in this study

Earnings Attributes	SB	SNB	NSNB
Stdresid	0.094	0.058	0.054
Persist	0.413	0.297	0.533
Pred	0.148	0.037	0.019
Smooth	0.191	0.074	0.056
Rank(Stdresid)	6.556	5.499	5.057
Rank(Persist)	6.217	5.738	4.868
Rank(Pred)	8.668	5.464	4.211
Rank(Smooth)	8.298	5.374	4.492

Note: These earnings attribute variables are based on rolling over five-year windows; a firm is included in the year t sample if data are available in year t-4 to t. Then this study ranks each attribute each year, and forms deciles. High values of earnings persistence correspond to high earnings quality. By contrast, high values of accruals quality, earnings predictability, and earnings smoothness are indicative of poor earnings quality. To be consistent across the four attributes, this study ranks earnings persistence in descending order and the other three attributes in ascending order, so that firms in the top decile (decile 1) have the best values of each earnings attributes, while firms in the bottom decile (decile 10) have the worst values of each earnings attributes. Stdresid is standard deviation of estimated residual for accruals quality. Persist is earnings persistence. Pred is earnings predictability. Smooth is earnings smoothness.

Sensitivity Test 1 - Regression on future profitability with AccrualQuality (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.112	0.124	-0.900	0.000	-0.676	0.000
$NDAC_{j, t}$	-0.139	0.660	-0.577	0.173	-0.538	0.057
$CFO_{j, t}$	-0.066	0.405	-0.818	0.000	-0.651	0.000
AccrualsQuality	0.006	0.805	-0.010	0.441	0.017	0.052
Adj.R^2	-0.001		0.155		0.193	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.134	0.065	0.003	0.957	-0.741	0.000
$NDAC_{j, t}$	-0.054	0.553	0.265	0.001	-0.767	0.000
$CFO_{j, t}$	0.157	0.039	0.041	0.533	-0.655	0.000
AccrualsQuality	-0.003	0.291	0.003	0.222	0.000	0.570
Adj.R^2	0.007		0.016		0.390	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.300	0.000	0.164	0.002	-0.080	0.046
$NDAC_{j, t}$	0.073	0.309	0.418	0.000	-0.113	0.020
$CFO_{j, t}$	0.588	0.000	0.143	0.008	0.038	0.343
AccrualsQuality	0.002	0.228	0.000	0.871	0.000	0.705
Adj.R^2	0.100		0.047		0.010	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, AccrualQuality = the standard deviation of firm j's residuals from a regression of current accruals on lagged, current, and future cash flows from operation.

Sensitivity Test 1 - Regression on future profitability with Earnings Persistence (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.110	0.140	-0.923	0.000	-0.673	0.000
$NDAC_{j, t}$	-0.126	0.691	-0.597	0.159	-0.505	0.076
$CFO_{j, t}$	-0.062	0.442	-0.837	0.000	-0.643	0.000
Persistence	0.000	0.996	0.015	0.239	-0.002	0.828
Adj.R^2	-0.002		0.157		0.186	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.131	0.071	0.005	0.932	-0.742	0.000
$NDAC_{j, t}$	-0.061	0.497	0.277	0.000	-0.756	0.000
$CFO_{j, t}$	0.156	0.040	0.041	0.527	-0.656	0.000
Persistence	-0.003	0.287	0.001	0.709	-0.003	0.000
Adj.R^2	0.007		0.015		0.395	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.293	0.000	0.161	0.003	-0.082	0.041
$NDAC_{j, t}$	0.061	0.394	0.418	0.000	-0.116	0.016
$CFO_{j, t}$	0.586	0.000	0.138	0.011	0.037	0.359
Persistence	-0.001	0.495	0.009	0.015	0.000	0.626
Adj.R^2	0.099		0.048		0.010	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, Persistence = the slope-coefficient estimates of current earnings on last year's earnings.

Sensitivity Test 1 - Regression on future profitability with Earnings Predictability (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.109	0.134	-0.895	0.000	-0.672	0.000
$NDAC_{j, t}$	-0.086	0.788	-0.491	0.250	-0.568	0.047
$CFO_{j, t}$	-0.060	0.449	-0.808	0.000	-0.643	0.000
Predictability	-0.013	0.382	-0.021	0.303	0.022	0.100
$Adj.R^2$	0.000		0.156		0.191	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.141	0.052	0.008	0.900	-0.740	0.000
$NDAC_{j, t}$	-0.045	0.619	0.287	0.000	-0.762	0.000
$CFO_{j, t}$	0.166	0.030	0.044	0.501	-0.654	0.000
Predictability	-0.005	0.087	-0.001	0.521	0.000	0.627
$Adj.R^2$	0.008		0.015		0.390	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.272	0.000	0.168	0.002	-0.085	0.042
$NDAC_{j, t}$	0.039	0.599	0.423	0.000	-0.119	0.016
$CFO_{j, t}$	0.564	0.000	0.147	0.009	0.035	0.413
Predictability	0.002	0.178	0.000	0.802	0.090	0.007
$Adj.R^2$	0.100		0.047		0.010	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation. Predictability = the square root of the error variance from firm j's persistence model.

Sensitivity Test 1 - Regression on future profitability with Earnings Smoothness (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.110	0.131	0.897	0.000	-0.669	0.000
$NDAC_{j, t}$	-0.126	0.690	-0.543	0.200	-0.543	0.055
$CFO_{j, t}$	-0.062	0.433	-0.810	0.000	-0.645	0.000
Smoothness	0.000	0.992	-0.007	0.701	0.028	0.027
$Adj.R^2$	-0.002		0.154		0.195	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.123	0.092	-0.011	0.859	-0.752	0.000
$NDAC_{j, t}$	-0.090	0.324	0.241	0.002	-0.792	0.000
$CFO_{j, t}$	0.142	0.067	0.014	0.828	-0.674	0.000
Smoothness	0.003	0.238	0.006	0.015	-0.004	0.000
$Adj.R^2$	0.007		0.019		0.397	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.311	0.000	0.151	0.007	-0.087	0.038
$NDAC_{j, t}$	0.081	0.277	0.403	0.000	-0.123	0.015
$CFO_{j, t}$	0.604	0.000	0.130	0.020	0.033	0.430
Smoothness	0.001	0.370	0.001	0.395	0.000	0.628
$Adj.R^2$	0.100		0.048		0.010	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, Smoothness = the ratio of firm j's standard deviation of cash flows from operations (scaled by the beginning total assets) to the standard deviation of earnings before extraordinary items (scaled by the beginning total assets);

Sensitivity Test 2 - Sample Composition

	Stressed	Non stressed	Total
2003			
Bankruptcy	403	8	411
Nonbankruptcy	100	476	476
Total	503	484	987
2004			
Bankruptcy	449	23	472
Nonbankruptcy	108	407	515
Total	557	430	987
2005			
Bankruptcy	513	19	532
Nonbankruptcy	104	351	455
Total	617	370	987
2006			
Bankruptcy	531	10	541
Nonbankruptcy	120	326	446
Total	651	336	987
2007			
Bankruptcy	477	8	485
Nonbankruptcy	164	338	502
Total	641	346	987

Notes: The samples listed on A-shares and in Shanghai and Shenzhen stock exchanges for the fiscal years 2003 to 2007. Ideally, this study obtains four types of classifications: SB, SNB, NSB, and NSNB firms. Since the NSB firms (8, 23, 19, 10, and 8, respectively in each year), do not meet the minimum sample size for regression, this study calculates each earnings attribute based on the three remaining firm classifications (SB, SNB, and NSNB) for Chinese listed companies. The final sample consists of 987 firms with a total of 4935 firm-year observations for the period 2003-2007.

Sensitivity Test 2: Earnings attribute variables (raw and rank data) used in this study

Earnings Attributes	SB	SNB	NSNB
Stdresid	0.068	0.060	0.054
Persist	0.333	0.286	0.479
Pred	0.069	0.040	0.019
Smooth	0.105	0.085	0.056
Rank(Stdresid)	5.846	5.386	5.041
Rank(Persist)	5.893	5.536	4.916
Rank(Pred)	6.411	5.420	4.183
Rank(Smooth)	6.293	5.139	4.466

Note: These earnings attribute variables are based on rolling over five-year windows; a firm is included in the year t sample if data are available in year t-4 to t. Then this study ranks each attribute each year, and forms deciles. High values of earnings persistence correspond to high earnings quality. By contrast, high values of accruals quality, earnings predictability, and earnings smoothness are indicative of poor earnings quality. To be consistent across the four attributes, this study ranks earnings persistence in descending order and the other three attributes in ascending order, so that firms in the top decile (decile 1) have the best values of each earnings attributes, while firms in the bottom decile (decile 10) have the worst values of each earnings attributes. Stdresid is standard deviation of estimated residual for accruals quality. Persist is earnings persistence. Pred is earnings predictability. Smooth is earnings smoothness.

Sensitivity Test 2 - Regression on future profitability with AccrualQuality (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.083	0.095	-0.843	0.000	-0.690	0.000
$NDAC_{j, t}$	-0.227	0.024	-0.514	0.000	-0.706	0.000
$CFO_{j, t}$	-0.039	0.473	-0.757	0.000	-0.652	0.000
AccrualsQuality	-0.001	0.838	0.002	0.560	0.007	0.005
Adj.R^2	0.003		0.126		0.204	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.109	0.047	0.063	0.274	-0.811	0.000
$NDAC_{j, t}$	-0.103	0.416	0.554	0.290	-0.896	0.000
$CFO_{j, t}$	0.156	0.009	0.109	0.085	-0.752	0.000
AccrualsQuality	-0.004	0.267	0.003	0.425	0.000	0.951
Adj.R^2	0.022		0.043		0.600	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.348	0.000	0.180	0.002	-0.128	0.001
$NDAC_{j, t}$	0.078	0.311	0.422	0.000	-0.129	0.006
$CFO_{j, t}$	0.633	0.000	0.164	0.004	0.011	0.770
AccrualsQuality	0.002	0.200	0.000	0.891	0.000	0.919
Adj.R^2	0.110		0.043		0.018	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, AccrualQuality = the standard deviation of firm j's residuals from a regression of current accruals on lagged, current, and future cash flows from operation.

Sensitivity Test 2 - Regression on future profitability with Earnings Persistence (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.079	0.112	-0.849	0.000	-0.691	0.000
$NDAC_{j, t}$	-0.220	0.029	-0.522	0.000	-0.678	0.000
$CFO_{j, t}$	-0.035	0.513	-0.763	0.000	-0.651	0.000
Persistence	-0.002	0.516	0.004	0.319	0.000	0.943
Adj.R^2	0.003		0.126		0.200	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.103	0.059	0.066	0.256	-0.813	0.000
$NDAC_{j, t}$	-0.133	-1.080	0.580	0.000	-0.893	0.000
$CFO_{j, t}$	0.153	0.010	0.112	0.075	-0.751	0.000
Persistence	-0.005	0.156	-0.001	0.733	-0.007	0.002
Adj.R^2	0.024		0.042		0.610	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.339	0.000	0.174	0.003	-0.127	0.001
$NDAC_{j, t}$	0.061	0.420	0.418	0.000	-0.128	0.006
$CFO_{j, t}$	0.630	0.000	0.158	0.005	0.011	0.773
Persistence	0.000	0.738	0.001	0.341	0.700	0.070
Adj.R^2	0.109		0.044		0.017	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, Persistence = the slope-coefficient estimates of current earnings on last year's earnings.

Sensitivity Test 2 - Regression on future profitability with Earnings Predictability (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.091	0.067	-0.854	0.000	-0.682	0.000
$NDAC_{j, t}$	-0.215	0.031	-0.484	0.000	-0.695	0.000
$CFO_{j, t}$	-0.045	0.400	-0.766	0.000	-0.643	0.000
Predictability	-0.007	0.048	-0.010	0.021	0.008	0.001
Adj.R^2	0.005		0.129		0.205	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.105	0.059	0.055	0.348	-0.813	0.000
$NDAC_{j, t}$	-0.137	0.278	0.550	0.000	-0.902	0.000
$CFO_{j, t}$	0.152	0.013	0.099	0.122	-0.754	0.000
Predictability	0.000	0.995	0.004	0.266	-0.001	0.721
Adj.R^2	0.019		0.045		0.600	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.325	0.000	0.190	0.002	-0.122	0.004
$NDAC_{j, t}$	0.047	0.553	0.431	0.000	-0.123	0.011
$CFO_{j, t}$	0.616	0.000	0.174	0.004	0.016	0.694
Predictability	0.001	0.513	0.001	0.623	0.000	0.734
Adj.R^2	0.109		0.044		0.018	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation. Predictability = the square root of the error variance from firm j's persistence model.

Sensitivity Test 2 - Regression on future profitability with Earnings Smoothness (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.081	0.102	-0.844	0.000	-0.679	0.000
$NDAC_{j, t}$	-0.234	0.019	-0.501	0.000	-0.709	0.000
$CFO_{j, t}$	-0.038	0.478	-0.757	0.000	-0.646	0.000
Smoothness	0.002	0.674	-0.001	0.784	0.013	0.000
Adj.R^2	0.003		0.126		0.212	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.110	0.049	0.051	0.386	-0.829	0.000
$NDAC_{j, t}$	-0.124	0.324	0.543	0.000	-0.939	0.000
$CFO_{j, t}$	0.159	0.010	0.089	0.174	-0.779	0.000
Smoothness	-0.002	0.648	0.005	0.194	0.006	0.009
Adj.R^2	0.019		0.046		0.607	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.372	0.000	0.177	0.004	-0.127	0.002
$NDAC_{j, t}$	0.098	0.220	0.418	0.000	-0.128	0.009
$CFO_{j, t}$	0.659	0.000	0.162	0.006	0.011	0.778
Smoothness	0.072	0.010	0.000	0.921	0.000	0.996
Adj.R^2	0.005		0.230		0.041	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, Smoothness = the ratio of firm j's standard deviation of cash flows from operations (scaled by the beginning total assets) to the standard deviation of earnings before extraordinary items (scaled by the beginning total assets);

Sensitivity Test 3: Earnings attribute variables (raw and rank data) used in this study

Earnings Attributes	**SB**	**SNB**	**NSNB**
Stdresid	0.107	0.061	0.054
Persist	0.221	0.276	0.417
Pred	0.201	0.042	0.019
Smooth	0.297	0.075	0.048
Rank(Stdresid)	6.837	5.583	5.056
Rank(Persist)	6.081	5.748	4.971
Rank(Pred)	9.341	5.781	4.183
Rank(Smooth)	9.292	5.675	4.332

Note: These earnings attribute variables are based on rolling over five-year windows; a firm is included in the year t sample if data are available in year t-4 to t. Then this study ranks each attribute each year, and forms deciles. High values of earnings persistence correspond to high earnings quality. By contrast, high values of accruals quality, earnings predictability, and earnings smoothness are indicative of poor earnings quality. To be consistent across the four attributes, this study ranks earnings persistence in descending order and the other three attributes in ascending order, so that firms in the top decile (decile 1) have the best values of each earnings attributes, while firms in the bottom decile (decile 10) have the worst values of each earnings attributes. Stdresid is standard deviation of estimated residual for accruals quality. Persist is earnings persistence. Pred is earnings predictability. Smooth is earnings smoothness.

Sensitivity Test 3 - Regression on future profitability with AccrualQuality (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.104	0.131	-0.156	0.021	-0.860	0.000
$NDAC_{j, t}$	1.292	0.717	3.481	0.321	-3.854	0.229
$CFO_{j, t}$	-0.092	0.308	-0.159	0.073	-0.865	0.000
AccrualsQuality	0.008	0.703	0.021	0.276	-0.027	0.129
$Adj.R^2$	-0.005		0.016		0.440	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.054	0.372	0.025	0.576	-0.745	0.000
$NDAC_{j, t}$	-2.077	0.000	-0.821	0.004	-0.906	0.000
$CFO_{j, t}$	0.182	0.012	0.106	0.051	-0.614	0.000
AccrualsQuality	0.000	0.974	-0.000	0.990	0.000	0.554
$Adj.R^2$	0.030		0.009		0.396	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.265	0.000	0.206	0.000	-0.171	0.000
$NDAC_{j, t}$	-1.880	0.000	-0.569	0.005	0.064	0.745
$CFO_{j, t}$	0.395	0.000	0.278	0.000	-0.038	0.448
AccrualsQuality	0.001	0.480	0.001	0.443	0.001	0.365
$Adj.R^2$	0.107		0.049		0.019	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, AccrualQuality = the standard deviation of firm j's residuals from a regression of current accruals on lagged, current, and future cash flows from operation.

Sensitivity Test 3 - Regression on future profitability with Earnings Persistence (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.105	0.135	-0.144	0.038	-0.861	0.000
$NDAC_{j, t}$	1.470	0.682	3.498	0.322	-3.345	0.301
$CFO_{j, t}$	-0.091	0.316	-0.141	0.115	-0.857	0.000
Persistence	0.004	0.843	-0.010	0.618	0.009	0.633
Adj.R^2	-0.006		0.012		0.435	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.055	0.366	0.023	0.605	-0.739	0.000
$NDAC_{j, t}$	-2.063	0.000	-0.844	0.002	-0.815	0.000
$CFO_{j, t}$	0.183	0.012	0.103	0.057	-0.607	0.000
Persistence	0.000	0.859	0.001	0.599	-0.002	0.002
Adj.R^2	0.030		0.010		0.400	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.268	0.000	0.208	0.000	-0.174	0.000
$NDAC_{j, t}$	-1.885	0.000	-0.577	0.004	0.026	0.893
$CFO_{j, t}$	0.396	0.000	0.278	0.000	-0.039	0.439
Persistence	0.002	0.038	0.002	0.059	0.000	0.945
Adj.R^2	0.111		0.052		0.018	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, Persistence = the slope-coefficient estimates of current earnings on last year's earnings.

Sensitivity Test 3 - Regression on future profitability with Earnings Predictability (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.090	0.188	-0.141	0.037	-0.856	0.000
$NDAC_{j, t}$	2.913	0.416	5.023	0.157	-3.849	0.239
$CFO_{j, t}$	-0.074	0.405	-0.137	0.120	-0.854	0.000
Predictability	-0.101	0.025	-0.085	0.054	0.020	0.622
Adj.R^2	0.015		0.026		0.435	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.053	0.379	0.025	0.581	-0.744	0.000
$NDAC_{j, t}$	-1.981	0.000	-0.785	0.005	-0.865	0.000
$CFO_{j, t}$	0.181	0.012	0.105	0.052	-0.614	0.000
Predictability	-0.002	0.224	-0.001	0.520	0.000	0.547
Adj.R^2	0.030		0.010		0.396	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.244	0.000	0.191	0.000	-0.183	0.000
$NDAC_{j, t}$	-1.932	0.000	-0.609	0.002	0.021	0.913
$CFO_{j, t}$	0.374	0.000	0.263	0.000	-0.049	0.342
Predictability	0.002	0.254	0.001	0.010	0.001	0.429
Adj.R^2	0.108		0.050		0.019	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation. Predictability = the square root of the error variance from firm j's persistence model.

Sensitivity Test 3 - Regression on future profitability with Earnings Smoothness (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.101	0.140	-0.152	0.025	-0.854	0.000
$NDAC_{j, t}$	1.923	0.597	3.570	0.321	-3.893	0.237
$CFO_{j, t}$	-0.084	0.347	-0.150	0.091	-0.854	0.000
Smoothness	-0.031	0.497	0.009	0.844	0.020	0.630
$Adj.R^2$	-0.004		0.011		0.435	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.054	0.366	0.026	0.568	-0.744	0.000
$NDAC_{j, t}$	-2.235	0.000	-0.964	0.001	-0.978	0.000
$CFO_{j, t}$	0.170	0.019	0.095	0.080	-0.621	0.000
Smoothness	0.004	0.107	0.003	0.059	-0.002	0.010
$Adj.R^2$	0.031		0.012		0.398	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.260	0.000	0.198	0.000	-0.183	0.000
$NDAC_{j, t}$	-1.927	0.000	-0.622	0.002	-0.005	0.981
$CFO_{j, t}$	0.392	0.000	0.270	0.000	-0.049	0.341
Smoothness	0.000	0.899	0.000	0.622	0.001	0.444
$Adj.R^2$	0.107		0.049		0.019	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, Smoothness = the ratio of firm j's standard deviation of cash flows from operations (scaled by the beginning total assets) to the standard deviation of earnings before extraordinary items (scaled by the beginning total assets);

Sensitivity Test 4: Earnings attribute variables (raw and rank data) used in this study

Earnings Attributes	**SB**	**SNB**	**NSNB**
Stdresid	0.338	0.084	0.062
Rank(Stdresid)	7.646	5.597	4.844

Note: The accruals quality variable is based on rolling over five-year windows; a firm is included in the year t sample if data are available in year's t-4 to t. Then this study ranks accruals quality each year, and forms deciles. High value of accruals quality is indicative of poor earnings quality. This study ranks accruals quality in ascending order, so that firms in the top decile (decile 1) have the best values of each earnings attributes, while firms in the bottom decile (decile 10) have the worst values of each earnings attributes. Stdresid is standard deviation of estimated residual for accruals quality.

Sensitivity Test 4 - Regression on future profitability with TotalAccruals (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.116	0.243	-0.936	0.000	-0.678	0.000
$NDAC_{j, t}$	-0.138	0.800	-0.689	0.349	-0.542	0.265
$CFO_{j, t}$	-0.077	0.475	-0.850	0.000	-0.653	0.000
TtoalAccruals	0.007	0.676	-0.012	0.594	-0.015	0.303
$Adj.R^2$	-0.008		0.156		0.184	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.171	0.007	0.035	0.522	-0.707	0.000
$NDAC_{j, t}$	-0.020	0.804	0.310	0.000	-0.702	0.000
$CFO_{j, t}$	0.192	0.004	0.057	0.322	-0.614	0.000
TotalAccruals	0.006	0.008	-0.005	0.011	-0.001	0.372
$Adj.R^2$	0.013		0.021		0.359	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.277	0.000	0.136	0.020	-0.104	0.019
$NDAC_{j, t}$	0.040	0.605	0.406	0.000	-0.144	0.006
$CFO_{j, t}$	0.573	0.000	0.120	0.035	0.021	0.632
TotalAccruals	0.001	0.432	0.002	0.158	0.001	0.193
$Adj.R^2$	0.099		0.056		0.012	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operation, TotalAccruals = the level of total accruals as the measure of accrual quality in the sensitivity test.

Sensitivity Test 5: Earnings attribute variables (raw and rank data) used in this study

Earnings Attributes	**SB**	**SNB**	**NSNB**
ROA Persist	0.349	0.380	0.456
Rank(ROA Persist)	6.081	5.783	4.915

Note: The ROA persistence variable is based on rolling over five-year windows; a firm is included in the year t sample if data are available in year's t-4 to t. Then this study ranks ROA persistence each year, and forms deciles. High value of ROA persistence is indicative of good earnings quality. This study ranks ROA persistence in descending order, so that firms in the top decile (decile 1) have the best values of each earnings attributes, while firms in the bottom decile (decile 10) have the worst values of each earnings attributes. ROA Persist is return on assets persistence.

Sensitivity Test 5 - Regression on future profitability with ROA Persistence (decile ranking)

Variable	$CFO_{j, t+1}$		$NDNI_{j, t+1}$		$\Delta NI_{j, t+1}$	
	Coef	p value	Coef	p value	Coef	p value
Panel A: Stressed-bankrupt firms (SB)						
$DAC_{j, t}$	-0.142	0.163	-0.960	0.000	-0.668	0.000
$NDAC_{j, t}$	-0.129	0.813	-0.684	0.352	-0.546	0.261
$CFO_{j, t}$	-0.099	0.368	-0.876	0.000	-0.649	0.000
ROA Persistence	0.014	0.402	-0.022	0.334	-0.001	0.957
Adj.R^2	-0.006		0.158		0.180	
Panel B: Stressed-nonbankrupt firms (SNB)						
$DAC_{j, t}$	0.161	0.011	0.024	0.660	-0.706	0.000
$NDAC_{j, t}$	-0.021	0.791	0.298	0.000	-0.691	0.000
$CFO_{j, t}$	0.204	0.002	0.063	0.274	-0.609	0.000
ROA Persistence	0.009	0.087	0.001	0.659	-0.003	0.000
Adj.R^2	0.023		0.017		0.364	
Panel C: Nonstressed and nonbankrupt firms (NSNB)						
$DAC_{j, t}$	0.301	0.000	0.173	0.001	-0.079	0.049
$NDAC_{j, t}$	0.072	0.317	0.450	0.000	-0.117	0.015
$CFO_{j, t}$	0.589	0.000	0.147	0.006	0.040	0.324
ROA Persistence	0.003	0.070	0.002	0.126	0.059	0.013
Adj.R^2	0.101		0.056		0.010	

$CFO_{j, t+1}$ = cash flows from operation one-year-ahead, $\Delta NI_{j, t+1}$ = change in earnings one-year-ahead, $NDNI_{j, t+1}$ = non-discretionary net income one-year-ahead, $DAC_{j, t}$ = discretionary accruals, $NDAC_{j, t}$ = non-discretionary accruals, $CFO_{j, t}$ = cash flows from operations, ROA Persistence = the slope-coefficient estimates of current ROA on last year's ROA.