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Audit delay and accruals-based earnings management: evidence from an emerging market

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Abstract

Purpose – There are two opposite effects of audit delay on earnings management. From the auditors' perspective, spending more hours on auditing and having a longer audit delay would indicate a lower level of earnings management. From the managers' perspective, spending more time on report preparation and experiencing a longer audit delay would result in more "appropriate" accounting methods that firms could use to manipulate earnings. This paper examines the possible non-linear relationship between audit delay and accruals-based earnings management in the emerging market of China, where publicly listed companies can have twice the time to file their annual reports compared with US accelerated filers.

Design/methodology/approach – We use observations from a sample of publicly listed firms in the emerging market of China during the period of 2003–2022. This paper utilizes the Panel Smooth Transition Regression (PSTR) model proposed by Gonzalez *et al*. (2017) and Fok *et al*. (2005) to examine the association between audit delay and accrual-based earnings management.

Findings – In contrast to prior studies, our results show that there is a nonlinear association between accrual-based earnings management and audit delay in the emerging market of China. The non-linear relationship between audit delay and discretionary accruals is observed in client firms with non-Big 4, non-industry specialist, high internal control (IC) quality and non-state-owned (SOE) client firms. For Big 4, industry specialist, low IC quality and SOE client firms, it is only to be found in the downward earnings management groups.

Originality/value – This paper contributes to the literature in the following ways. First, our results show a nonlinear association between accrual-based earnings management and audit delay, which provides a distinct understanding of the relationship between the two. Second, consistent with corporate disclosure theory, our results indicate that managers tend to delay disclosures when they are motivated to manage earnings upwards but not when they are motivated to manage earnings downwards. Contributing to this literature, our results further suggest that the effect of such a delay on income-creating earnings management exists only in the early stages of the delay and could decline as audit delay lengthens. Our empirical evidence should be of interest to standard setters, regulators, and investors in China, as well as regulatory bodies in other emerging markets.

Keywords Accrual-based earnings management, Audit delay, Positive and negative earnings management, Nonlinear relations

Paper type Research paper

1. Introduction

In this paper, we examine how audit time pressure affects accrual-based earnings management levels in the emerging markets of China. Prior studies have shown the effect of audit time pressure on earnings quality in developed markets such as US market (e.g. McDaniel, 1990; Otley and Pierce, 1996; Willett and Page, 1996; Asare *et al.*, 2000; Braun, 2000; Coram *et al.*, 2004; Bennett *et al.*, 2013). Our study extends the stream of research to the emerging markets with relatively low pressure on audit reports. In particular, we examine the following research questions: First, is there a nonlinear association between audit delay and accrual-based

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earnings management? Second, does the association between audit delay and earnings management depend on whether the earnings management is income-increasing or income-decreasing?

Regulation on filing dates can influence audit delays. A stricter deadline for report filing would reduce the time a firm can spend on audit, leading to a shorter audit delay. Market regulators set filing deadlines instead of audit deadlines to put time pressure on firms. For example, depending on the filing status of publicly listed firms – accelerated filers or non-accelerated filers, U.S. firms have a report filing period of 60–75 days after SEC rules 33–8128 and 33–8644 took effect. These rules require mandatory reductions in audit delay for firms, leading to lower quality earnings (Lambert *et al.*, 2017). In contrast, Chinese firms have a period of 120 days to file their annual reports. Thus, Chinese firms have less time pressure than U.S. firms. We, therefore, extend the stream of research to China, a market with less time pressure, to test whether the association between accrual-based earnings management and audit delay found in the US market also exist in the emerging market setting. In this paper, we define audit delay as the length of time from a company's fiscal year-end to the date of the auditor's report (Ashton *et al.*, 1987). During this period, auditors gather appropriate and sufficient evidence to conclude fieldwork and issue an audit opinion on a company's financial statements (Arens *et al.*, 2010). This topic is important for two reasons. First, regulatory rules such as SEC rules 33–8128 and 33–8644 shorten the annual report filing period to provide investors with more timely information. However, Lambert *et al.* (2017) provide evidence that these rules push the affected firms to file with lower-quality earnings. Thus, it is controversial whether accelerating the filings process is an effective way to improve the report quality and benefit investors. As regulators in many countries pay increasing attention to financial information quality and attempt to adopt similar accelerating filing rules, it's critical to understand the association between audit delay and earnings management in the emerging market setting.

Second, there are two opposing effects on the association between audit delay and earnings management. From the auditors' perspective, more audit hours and a longer audit delay would indicate more audit efforts and lower level of earnings management. From client firms' perspective, spending more time on report preparation and having a longer audit delay would result in more "appropriate" accounting policies client firms could use to manipulate earnings. Prior studies have examined the issue through the auditors' perspective (McDaniel, 1990; Otley and Pierce, 1996; Willett and Page, 1996; Asare *et al.*, 2000; Braun, 2000; Coram *et al.*, 2004; Bennett *et al.*, 2013). In general, the results suggest that increased audit hours and more audit delay will be associated with increased financial information quality.

However, there is limited research on the client firm managers' perspective. As an exception, Zang (2012) posits that managers adjust accrual-based earnings on the extent of real activities manipulation, implying that managers take some time to evaluate whether the level of real activities manipulation meets expectations before deciding on the level of accrual-based earnings management. In addition, the limitation in accounting choices means managers need more time to reach the desired accrual-based earnings figure. Stricter regulations, audit procedures, and litigation risk associated with earnings management also prompt managers to weigh costs and benefits over time. Hence, from the managers' point of view, a longer audit delay correlates with higher earnings management.

Using the emerging market setting with less time pressure, we examine the association between audit delay and accruals-based earnings management using a sample of Chinese firms from 2003 to 2022. Unlike prior studies, our results show a nonlinear association between accrual-based earnings management and audit delay. Further, this nonlinear relationship is consistently observed in client firms with non-Big 4, non-industry specialist, high IC quality, and non-SOE status. For Big 4, industry specialist, low IC quality and SOE client firms, it is only to be found in the downward earnings management groups.

The paper contributes to the literature in the following ways. First, our results show that there is a nonlinear association between accrual-based earnings management and audit delay.

Prior studies (e.g. Lambert *et al.*, 2017) provide evidence that the rules on timely disclosures push the affected firms to report lower-quality earnings. Adding to the line of research, our findings would help the researchers with a better understanding of the complex relationship between earnings management and audit delay. Second, consistent with corporate disclosure theory, which shows that firms delay the disclosure of good news and accelerate the release of bad news before stock option award periods (Aboody and Kasznik, 2000), our results indicate that managers tend to delay disclosures when motivated to manage earnings upwards but not when motivated to manage earnings downwards. Contributing to this literature, our results further suggest that the effect of such a delay on income-creasing earnings management only exists in the early stages of the delay and could diminish as audit delay lengthens.

The structure of the paper proceeds as follows. Section 2 reviews prior studies and develops research questions. Section 3 reports sample selection and research methods. Section 4 provides empirical results. Section 5 concludes the findings.

2. Literature review and research questions

The theoretical background of the timeliness of corporate disclosure originates from both agency theory and signaling theory. According to agency theory (e.g. Jensen and Meckling, 1976), agency cost could increase when principals such as shareholders and creditors incur monitoring costs to ensure managers align their activities with shareholders' interests. Because of information asymmetry, these monitoring costs could increase when there are conflicts of interest among principals and managers. Voluntary and timely disclosure can help reduce information asymmetry and hence agency costs. According to agency theory, firms with longer audit delays may have more serious agency problems as reflected in higher earnings management. Firms with poorer performance, which experience more motivation to manage earnings upwards, would have longer audit delays compared to firms with better performance, which experience less motivation to manage earnings upwards.

Signaling theory posits that managers could manipulate the disclosure levels to send different signals to the investors and creditors in the capital market about the current condition and future potentials of a firm (Myers and Majluf, 1984). Typically, firms with poorer performance tend to withhold information from outside investors, while firms with better performance tend to disclose more information to justify their market position and market-based compensation. Managers who perform better than their peers tend to use voluntary and timely disclosure to send signals about the quality work performed within a firm to outside investors. According to signaling theory, firms with shorter audit delays are more likely to be better performers who have less motivation to manage earnings upwards.

Therefore, both theories suggest a positive relationship between audit delay and earnings management. Healy and Whalen (1999) suggest that managers can use their knowledge of firm's situation to select reporting methods, estimates, and disclosure approaches that match the firm's conditions. And, because auditing only provides limited assurance but not absolute insurance, management's use of judgment creates opportunities for managers to engage in earnings management. Although extensive research focuses on audit delay (Doyle and Magilke, 2013; Impink *et al.*, 2011; Krishnan and Yang, 2009), results on the association between audit delay and accrual-based earnings management are mixed. While some studies (e.g. Krishnan and Yang, 2009; Impink *et al.*, 2011) find no significant relationship, whereas others (e.g. Doyle and Magilke, 2013) find a positive association between audit delay and financial reporting quality.

Since the SEC enacted rules 33–8128 and 33–8644 to reduce the 10-K filing period from 90 days to 60–75 days (SEC, 2002, SEC, 2005), researchers have started to examine whether time pressure imposed on audit would impair financial reporting quality. For instance, Coram *et al.* (2004) show that increasing time pressure results in auditors collecting insufficient evidence and engaging in quality-threatening behaviors in audit adjustments. Similarly, Caramanis and Lennox (2008) find that fewer audit hours heighten the degree to which

managers can report aggressively higher earnings. Lee and Son (2009) suggest that auditors who lengthen their audit work are likely to permit less earnings management. Salterio and Legresley (2011) and Bennett *et al.* (2013) conclude that the accelerated filing increases negotiation between auditors and clients and lowers the report quality. Lambert *et al.* (2017) demonstrate that firms that have to reduce their audit delays to meet the new deadlines exhibit lower earnings quality.

However, other research reports no relationship or even a positive relationship between the audit delay and earnings quality. For instance, Krishnan and Yang (2009) report no association between audit delay and earnings quality around the first filing deadline change. Similarly, Impink *et al.* (2011) conclude that the accelerated deadlines in 2003 and 2006 did not induce a general increase in late filing. In contrast, Doyle and Magilke (2013) find that the reporting quality of accelerated filling firms increased in the second deadline period. Pacheco-Paredes and Wheatley (2021) find that heightened real earnings management is associated with longer abnormal audit report lags. Greiner *et al.* (2017) find a positive association between aggressive real earnings management and audit report lags. Bryan and Mason (2020) find that earnings smoothing increases with audit report lag as shown by a negative relationship between earnings volatility and audit report lag.

The literature documents various firm-level factors influencing earnings management. For instance, audit committee interlocks may help convert earnings management motivations into actions and facilitate the transition from accrual-based to real earnings management (Dharwadkar *et al.*, 2024). Also, political connections can play an important role in the trade-off between real and accrual-based earnings management (Ahmed *et al.*, 2022). Typically, politically connected firms facing a lower threat of regulatory enforcement could take advantage of this latitude to boost accrual-based earnings management while reducing real earnings management. Firms with greater financial distress tend to engage more in income-increasing accruals-based earnings management (e.g. Viana *et al.*, 2022). Meanwhile, audit firm attributes could affect audit delay in the face of financial reporting complexity (FRC). For instance, the audit firm tenure and non-audit services moderate the effect of FRC on audit delay (Chen *et al.*, 2022). Mnif and Kchaou (2023) show that poor sustainability reporting readability is associated with longer assurance delays, and the type of assurance provider moderates this relationship.

Overall, there is no consensus about the association between audit delay and report quality. A possible explanation is that prior studies use a linear approach to test the association between audit delay and accrual-based earnings management. However, the relationship may not be strictly linear because both auditors and managers play roles, and their dominant effect may change with the length of the audit delay. To address this issue, we employ the Panel Smooth Transition Regression (PSTR) model proposed by Gonzalez *et al.* (2017) and Fok *et al.* (2005) to examine the association between audit delay and accrual-based earnings management.

Prior studies suggest a linear association between audit delay and report quality (McDaniel, 1990; Coram *et al.*, 2004; Bennett *et al.*, 2013; Caramanis and Lennox, 2008; Lambert *et al.*, 2017). Yet as mentioned, audit delay can produce two opposing effects on accrual-based earnings management. From the auditors' perspective, a longer audit delay may indicate more audit efforts, implying higher audit quality and lower earnings management. From the managers' perspective, a longer audit delay can imply more time to manipulate earnings. Given these two contrasting forces, assuming a linear association may be unwarranted. Thus, our first research question is:

RQ1. Is there a nonlinear association between audit delay and accrual-based earnings management?

Accrual-based earnings management has two directions: (1) income-increasing earnings management and (2) income-decreasing earnings management. Income-increasing earnings management implies an aggressive action, whereas income-decreasing earnings management signifies managers' conservative estimate of the future. Managers are more willing to disclose

good news instead of bad news while auditors are usually more prudent with progressive earnings management rather than conservative earnings management (Kothari *et al*., 2009; Nelson *et al*., 2001). The different attitudes of auditors and managers toward income-increasing and income-decreasing earnings management thus, in turn, lead to different associations between audit delay and accrual-based earnings management. Consequently, our second research question is:

RQ2. Does the association between audit delay and accrual-based earnings management depend on whether the earnings management is income-increasing or income-decreasing?

3. Research design

3.1 Sample

From the China Stock Market and Accounting Research (CSMAR) database, we initially obtain all the A-share firms listed on Shenzhen and Shanghai Stock Exchanges from 2003 to 2022. After excluding banks, financial institutions, and firms with missing financial data, our final sample consists of 47,249 firm-year observations [1].

3.2 Methodology

We employ the PSTR model, recently developed by Gonzalez *et al.* (2017) and Fok *et al.* (2005), to study research questions. This approach has been recently used to model a nonlinear relationship between institutional ownership and firm performance or cost of capital (Hsieh *et al.*, 2019; Daryaei and Fattahi, 2020). The PSTR model can be viewed as a generalization of the threshold panel model of Hansen (1999). The advantage of the PSTR model over the traditional OLS model is that the PSTR model uses a sequential approach to examine the relationship (linear or nonlinear) between the dependent variable (earnings management) and the variable of interest (audit delay) whereas OLS model simply subjectively assumes that there is a linear relationship between earnings management and audit delay. In particular, PSTR extends the modeling strategy for the univariate smooth transition regression model to the panel context. This approach comprises of model specification based on homogeneity tests, parameter estimation, and diagnostic checking, including tests for parameter constancy and no remaining nonlinearity (Gonzalez *et al.*, 2017).

The basic PSTR model is defined as follows:

$$y_{it} = \mu_i + \beta_0' x_{it} + \beta_1' x_{it} \mathrm{G}(s_{it};\, \gamma, c) + \varepsilon_{it} \tag{1}$$

Where x_{it} is an explanatory variable vector; $_i$ represents the fixed individual effect and ε_{it} is the independent identically distributed error. $G(s_{it};\, \gamma,\, c)$ is the transition function and is normalized to transform between 0 and 1 smoothly with the change of s_{it}. s_{it} is the transition variable that determines the switch between regimes. γ is the speed of transformation. c is the threshold critical value. β_0 and β_1 are the parameter variables of linear and nonlinear parts, respectively. The nonlinear regression coefficients can be expressed as $\beta_0 + \beta_1 G(s_{it};\, \gamma, c)$. The value of s_{it} determines the value of the transition function $\mathrm{G}(s_{it};\, \gamma,\, c)$ and thus the regression coefficients $\beta_0 + \beta_1 G(s_{it};\, \gamma,\, c)$.

Based on the form of $G(s_{it};\, \gamma, c)$, PSTR model can be divided into logistic and exponential transition functions. The logistic specification transition function therein is widely used as in Equation (2).

$$G(s_{it};\, \gamma, c) = \left(1 + \exp\left(-\gamma \prod_{j=1}^{m} (s_{it} - c_j)\right)\right)^{-1} \quad with\, \gamma > 0\, and\, c_1 \le c_2 \le \ldots \le c_m \tag{2}$$

Where the threshold critical value $c = (c_1, \ldots, c_m)$ is an m-dimensional vector which implies that $m+1$ regimes are associated with the change of S_{it}. It is usually sufficient to consider $m = 1$ or $m = 2$. When $m = 1$, as S_{it} increases from low to high, the transition function $G(s_{it}; \gamma, c)$ attains its value from zero to one, the regression coefficient changes from β_0 to $\beta_0 + \beta_1$. The model experiences a single monotonic transition from the low regime to the high regime where the transform is centered around the critical threshold value, c. When $m = 2$, transition function $G(s_{it}; \gamma, c)$ has its minimum value $(1 + \exp(\gamma(c_1 - c_2/2)^2))^{-1}$ at $(c_1+c_2)/2$ and attains the maximum value 1 both at low and high values of S_{it}, the regression coefficient changes from $\beta_0 + \beta_1$ to $\beta_0 + \beta_1 * (1 + \exp(\gamma(c_1 - c_2/2)^2))^{-1}$, then back to $\beta_0 + \beta_1$ as S_{it} increases. The model experiences a symmetric transition from high regime to low regime then back to high regime again where the transform is centered on the threshold critical value $(c_1+c_2)/2$.

The building procedure of PSTR model includes three stages: specification, estimation and evaluation (Gonzalez *et al.*, 2017). Specification stage consists of testing homogeneity, selecting the transition variable S_{it} and determining the appropriate form of the transition function if homogeneity is rejected. That is, choosing the proper value of m in equation (2) (Lee and Lin, 2012). Estimation stage includes measuring the threshold critical value c, the transition speed value γ and the regression coefficients of both linear and nonlinear parts in the model β_0 and β_1. Evaluation stage includes tests for parameter constancy and no remaining nonlinearity.

3.3 Variable measurement

3.3.1 Dependent variable: discretionary accruals (DA). We employ the cross-sectional version of the modified Jones (1991) model presented by DeFond and Jiambalvo (1994) and Kasznik (1999) to measure discretionary accruals and use it as the proxy of accrual-based earnings management. The modified Jones model is as follows:

$$\frac{TAC_{it}}{A_{it-1}} = \alpha_1\left(\frac{1}{A_{it-1}}\right) + \alpha_2\left(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right) + \alpha_3\left(\frac{PPE_{it}}{A_{it-1}}\right) + \varepsilon_{it} \tag{3}$$

Where TAC_{it} represents the total accruals defined as the difference between $EBXI_{it}$ and CFO_{it}. $EBXI_{it}$ is the earnings before extraordinary items and discontinued operations, CFO_{it} is the operating cash flows, A_{it} represents total assets, ΔREV_{it} is the change in sales from the preceding year, ΔREC_{it} is the change in accounts receivable, and PPE_{it} is the gross value of property, plant and equipment.

We estimate the above regression cross-sectionally for industry-years with at least 15 observations in each industry-year combination. We then calculate discretionary accruals as:

$$DA_{it} = \frac{TAC_{it}}{A_{it-1}} - \left(\widehat{\alpha}_1\left(\frac{1}{A_{it-1}}\right) + \widehat{\alpha}_2\left(\frac{\Delta REV_{it} - \Delta REC_{it}}{A_{it-1}}\right) + \widehat{\alpha}_3\left(\frac{PPE_{it}}{A_{it-1}}\right)\right) \tag{4}$$

*3.3.2 Variable of interest: audit delay (*D*).* Following Ashton *et al.* (1987), we define audit delay as the length of time from a company's fiscal year-end to the date of the auditor's report.

3.3.3 Control variables. We examine accrual-based earnings management as a function of audit delay and a number of control variables identified in prior studies. Prior literature suggests CEO related variables constrain firm's earnings management behavior, such as whether CEO is the chairperson of the board, the amount of the CEO's base salary, the ratio of the CEO's bonus divided by the total compensation received by the CEO (Efendi *et al.*, 2007;

Cohen *et al.*, 2008). Corporate behavior in China, however, is more influenced by ownership and governance structure than by CEO. Consequently, we choose the ratio of primary shareholder's shareholding (*FSS*) as a proxy for firms' governance. Prior research also shows that earnings management is related to firm performance (McNichols, 2000), we therefore include *ROE* as growth control variable. In addition, Barton and Simko (2002) and Baber *et al.* (2011) contend that firms with aggressive accounting policies are more likely to exhibit balance sheet bloat in the future, so asset-liability ratio (*DTA*) is included as operation stability control variable. Becker *et al.* (1998) and Roychowdhury (2006) find that firm size can affect earnings management; hence we use industry-adjusted log value of total Assets (*TA*) to control the impact of firm size to earnings management. We further control institutional investor shareholding ratio (*INSTI*), which is measured by the proportion of institutional investor shareholding to total share capital, as the prior literature (e.g. Daryaei and Fattahi, 2020) indicates an impact of institutional ownership on firm performance and hence it may affect earnings management levels. Appendix presents variable definition.

3.4 Model specification

Based on the method and variables mentioned above, we then construct a basic PSTR model on the relationship between accrual-based earnings management measured by the absolute value of discretional accruals (*ABDA*) and audit delay as follows:

$$\begin{aligned} ABDA_{it} = {} & {}_i + (\beta_0 D_{it} + \beta_1 TA_{it} + \beta_2 FSS_{it} + \beta_3 ROE_{it} + \beta_4 DTA_{it} + \beta_5 INSTI_{it}) + (\beta_0 D_{it} \\ & + \beta_1 TA_{it} + \beta_2 FSS_{it} + \beta_3 ROE_{it} + \beta_4 DTA_{it} + \beta_5 INSTI_{it}) * D_{it} G(D_{it}; \gamma, c) + \varepsilon_{it} \end{aligned} \tag{5}$$

Where $G(D_{it}; \gamma, c) = (1 + \exp(-\gamma \prod_{j=1}^{m}(D_{it} - c_j)))^{-1}$, D_{it} is the transition variable, $c = (c_1, \ldots, c_m)'$ is a m-dimensional vector of threshold parameters and the slope parameter γ determines the smoothness of the transitions. In addition, the transition function $G(D_{it}; \gamma, c)$ is bounded between zero and one. The value of D_{it} determines the value of $G(D_{it}; \gamma, c)$ and then determines the association between audit delay and accrual-based earnings management, $\beta_0 + \beta_0 G(D_{it}; \gamma, c)$.

4. Empirical results

4.1 Primary results

Table 1 presents descriptive statistics of our sample firms. All continuous variables are winsorized at the 1st and 99th percentiles to eliminate the potential outlier effects. In addition to the full sample, we also divide our sample firms into (1) income-increasing earnings management group (positive *DA* sample) and (2) income-decreasing earnings management group (negative *DA* sample). Audit delay (*D*) ranges between 17 days to 120 days for all the samples. The mean audit delay for the income-increasing earnings management group and income-decreasing earnings management group is 95.140 days and 96.880 days, respectively.

On average, income-increasing earnings management group has a much higher return on equity (*ROE*) than income-decreasing earnings management group (0.0800 vs. −0.0750). In addition, liability to asset ratio (*DTA*) of income-increasing earnings management group is lower than income-decreasing earnings management group (0.420 vs. 0.478).

Following the estimation process for PSTR model mentioned above, we first test linearity against the PSTR model and determine the order *m* of the logistic transition function. Based on Hansen (1996), Gonzalez *et al.* (2017), Colletaz and Hurlin (2006), we replace Equation (5) with its first-order expansion regarding $\gamma = 0$ and test an equivalent hypothesis that is based on the following regression:

Table 1. Descriptive statistics

	Mean	SD	Min	p25	p50	p75	Max
Panel A: Full sample (47,249)							
DA	0.005	0.107	−0.981	−0.039	0.005	0.049	0.475
D	95.950	20.240	17	84	102	113	120
FSS	0.347	0.153	0.0440	0.228	0.322	0.451	0.780
DTA	0.447	0.208	0.0210	0.284	0.444	0.601	0.951
ROE	0.008	0.611	−13.480	0.023	0.065	0.113	0.492
TA	22.050	1.327	18.290	21.120	21.870	22.780	26.600
INSTI	0.462	0.239	0.000	0.283	0.486	0.649	0.934
Panel B: Upward earnings management sample (25,243)							
DA	0.069	0.077	0.000	0.021	0.045	0.088	0.069
D	95.140	20.360	17	83	100	113	120
FSS	0.353	0.153	0.044	0.233	0.330	0.457	0.353
DTA	0.420	0.203	0.021	0.259	0.415	0.570	0.420
ROE	0.080	0.236	−13.480	0.040	0.078	0.125	0.080
TA	22.06	1.300	18.290	21.150	21.890	22.800	22.060
INSTI	0.467	0.241	0.000	0.285	0.494	0.657	0.934
Panel C: Downward earnings management sample (22,006)							
DA	−0.068	0.088	−0.981	−0.086	−0.043	−0.019	0.000
D	96.880	20.070	17	85	103	114	120
FSS	0.341	0.154	0.044	0.223	0.313	0.445	0.780
DTA	0.478	0.210	0.021	0.319	0.481	0.633	0.951
ROE	−0.075	0.851	−13.480	0.008	0.047	0.095	0.492
TA	22.030	1.356	18.290	21.090	21.850	22.770	26.600
INSTI	0.455	0.237	0.000	0.281	0.476	0.639	0.934

Source(s): Authors' own creation/work

$$ABDA_{it} = {}_{i} + (\beta_0 D_{it} + \beta_1 TA_{it} + \beta_2 FSS_{it} + \beta_3 ROE_{it} + \beta_4 DTA_{it} + \beta_5 INSTI_{it}) + \left(\beta_0^1 D_{it} + \beta_1^1 TA_{it} + \beta_2^1 FSS_{it} + \beta_3^1 ROE_{it} + \beta_4^1 DTA_{it} + \beta_5^1 INSTI_{it}\right) * D_{it} + \ldots + \left(\beta_0^m D_{it} + \beta_1^m TA_{it} + \beta_2^m FSS_{it} + \beta_3^m ROE_{it} + \beta_4^m DTA_{it} + \beta_5^m INSTI_{it}\right) * D_{it}^m + \varepsilon_{\mathrm{it}} \quad (6)$$

In practice, it is usually sufficient to consider $m = 1$or $m = 2$ for the transition function, as these values allow for commonly encountered types of variation in the parameters (Gonzalez *et al.*, 2017). Therefore, we initially set the value of m equal to 2 then take the sequential tests of statistical hypotheses for $m = 0$ (linear model), $m = 1$ (nonlinear model with monotonically increasing in two regimes) and $m = 2$ (nonlinear model with symmetric transition in three regimes). Table 2 illustrates sequential tests results of selecting *m*. The results reject all the null hypotheses when we apply m = 0, m = 1, and m = 2, which indicate that the Equation (6) is nonlinear model with symmetric transition in three regimes. In the following step, we apply $m = 2$ transition function to full sample and $m = 1$ transition function to the positive *DA* sample and negative *DA* sample.

The next step is to estimate the threshold parameter (c) and transition slope (γ) in Equation (2). Following Goffe *et al.* (1994), we use the stimulated annealing method to estimate c and γ. In the full sample, the value of c is 24.89 and γ is 32.22; in the positive *DA* sample, c equals 22.17 and γ equals 45.23; in negative *DA* sample, c equals 24.12 and γ equals 28.14. Based on the estimated values of c and γ, we then construct the transition functions.

Table 2. Sequential test of parameter selection

	Full sample	Positive DA sample	Negative DA sample
H_{01}: $\beta_0^2 = 0$ (with m = 2)	165.449	197.053	497.200
	(0.0000)	(0.0761)	(0.0001)
H_{02}: $\beta_0^1 = 0 \mid \beta_0^2 = 0$ (with m = 1)	409.423	485.068	1700.014
	(0.0000)	(0.0076)	(0.0000)
H_{03}: $\beta_0^1 = 0 \mid \beta_0^2 = \beta_0^2 = 0$ (with m = 0)	44378.977	44803.621	44801.066
	(0.0000)	(0.0000)	(0.0000)

Note(s): *We initially set the value of m equal to 0, 1, and 2 then take the sequential tests of statistical hypotheses for $m = 0$ (linear model), $m = 1$ (nonlinear model with monotonically increasing in two regimes) and $m = 2$ (nonlinear model with symmetric transition in three regimes). The results reject all the null hypotheses when we apply m = 0, m = 1, and m = 2, which indicate that the Equation (6) is nonlinear model with symmetric transition in three regimes

Source(s): Authors' own creation/work

Table 3 shows transition functions summarized for the full sample, positive *DA* sample and negative *DA* sample. All the transition functions are logistic specifications.

Based on the transition functions estimated in Table 3, we apply OLS regression to estimate other parameters in the PSTR model. Table 4 presents the nonlinear regression results in full sample, positive *DA* sample and negative *DA* sample. In the full sample, the coefficient of audit delay variable (D) is 0.0018 (p-value = 0.3686), which is not statistically significant. When we further divide the sample into positive and negative *DA* samples, we find that such results for full sample are driven by different situations between positive *DA* sample and negative *DA* sample. In the positive *DA* sample, the coefficient of audit delay variable (D) is −0.0163 (p-value = 0.0007), which is negative and statistically significant. These indicate that for the income-increasing (upward) earnings management firms, the discretionary accruals will decrease with audit delay. However, when audit delay further increases, the negative effect of audit delay on upward earnings management will weaken, as indicated by the significant and positive coefficient of D*G(D_{it}; γ, c) (0.0161, p = 0.0008). In contrast, in the negative *DA* sample, the coefficient of audit delay variable (D) is 0.0114 (p-value = 0.0015), which is positive and statistically significant. This indicates that for the income-decreasing (downward) earnings management firms, the discretionary accruals will increase with audit delay. Again, this suggests the effect of auditor on deterring downward earnings management will increase with audit delay. However, when audit delay further increases, this deterring effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0113, p = 0.0017).

In addition, in the full sample, the coefficient of return on equity (*ROE*) is −0.0227 (p-value = 0.0001), which is negative and statistically significant. When we further divide the

Table 3. Transition function

Full sample	$G(D_{it};\gamma,c) = (1+\exp(-32.22*(D-24.89)/20.24))^{-1}$
Positive *DA* sample	$G(D_{it};\gamma,c) = (1+\exp(-45.23*(D-22.17)/20.24))^{-1}$
Negative *DA* sample	$G(D_{it};\gamma,c) = (1+\exp(-28.14*(D-24.12)/20.24))^{-1}$

Note(s): *We estimate the threshold parameter (c) and transition slope (γ) in Equation (2). Following Goffe *et al.* (1994), we use stimulated annealing method to estimate c and γ. The estimation results for full sample, positive *DA* sample and negative *DA* sample are summarized here

Source(s): Authors' own creation/work

Table 4. Parameter estimation results for PSTR models

	Full sample Threshold (c): 24.89 Slope (γ): 32.22		Positive DA sample Threshold (c): 22.17 Slope (γ): 45.23		Negative DA sample Threshold (c): 24.12 Slope (γ): 28.14	
	Coefficient	*p*-value	Coefficient	*p*-value	Coefficient	*p*-value
Intercept	0.1878***	0.000	0.1287***	0.000	0.2336***	0.000
D	0.0018	0.3686	−0.0163***	0.0007	0.0114***	0.0015
FSS	0.0435	0.2727	0.0587	0.3784	−0.0310	0.6312
DTA	0.0196	0.4834	−0.0078	0.8705	0.0443	0.3503
ROE	−0.0227***	0.0001	0.0249	0.8223	−0.0264***	0.0001
TA	−0.0098***	0.0000	0.0098**	0.0398	−0.0203***	0.0000
INSTI	0.0498*	0.0966	0.0151	0.7545	0.0814	0.1146
*D**G(D_{it}; γ, *c*)	−0.0018	0.3691	0.0161***	0.0008	−0.0113***	0.0017
*FSS**G(D_{it}; γ, *c*)	−0.0537	0.1769	−0.0588	0.3781	0.00175	0.7859
*DTA**G(D_{it}; γ, *c*)	0.0234	0.4025	0.0234	0.6267	0.0313	0.5107
*ROE**G(D_{it}; γ, *c*)	0.0095	0.1102	0.0016	0.9888	0.0109*	0.0976
*TA**G(D_{it}; γ, *c*)	0.0020	0.3750	−0.0145***	0.0020	0.0099**	0.0131
*INSTI**G(D_{it}; γ, *c*)	−0.0020	0.9467	0.0433	0.3707	−0.0554	0.2824
F Statistics #	4.91***	0.000	4.92***	0.000	4.91***	0.000
Year fixed effect	Yes		Yes		Yes	
R-square	0.0344		0.0354		0.0712	
N	47,249		25,243		22,006	

Note(s): *, **, *** significant at the 0.10, 0.05, and 0.01 levels (two tails), respectively
Source(s): Authors' own creation/work

sample into positive *DA* sample and negative *DA* sample, we find that such results for full sample are driven by negative *DA* sample. In the positive *DA* sample, the coefficient of return on equity (ROE) is 0.0249 (*p*-value = 0.8223), which is not statistically significant. In the negative *DA* sample, the coefficient of return on equity (ROE) is −0.0264 (*p*-value = 0.0001), which is not statistically significant. Thus, it indicates that firms with higher ROE are more likely to manage earnings downward. In addition, although it is insignificant in the full sample and positive *DA* sample, the coefficient of *ROE**G(D_{it}; γ, *c*) is positive and marginally significant (0.0109, *p*-value = 0.0976). This indicates that as audit delays lengthen, the motivation of downward earnings management will become weaker.

We further find that in the full sample, the coefficient of firm size (TA) is −0.0098 (*p*-value = 0.0000), which is negative and statistically significant. When we further divide the sample into positive *DA* sample and negative *DA* sample, we find that such results for full sample are driven by negative *DA* sample. In the positive *DA* sample, the coefficient of firm size (TA) is 0.0098 (*p*-value = 0.0398), which is positive and statistically significant. This indicates that in the positive *DA* group, larger firms are more likely to manage earnings upward. In addition, the coefficient of *TA**G(D_{it}; γ, *c*) is negative and significant (0. = 0.0145, *p*-value = 0.0020), suggesting that motivation from larger firms to manage earnings upward will become weaker with longer audit delay.

In contrast, in the negative *DA* sample, the coefficient of firm size (TA) is −0.0203 (*p*-value = 0.0000), which is negative and statistically significant. Thus, this indicates that larger firms with negative *DA* are more likely to manage earnings downward. In addition, the coefficient of *TA**G(D_{it}; γ, *c*) is positive and significant (0.0099, *p*-value = 0.0131). This indicates that as audit delays lengthen, the motivation of downward earnings management for larger firms with negative *DA* will become weaker.

Based on the results in Table 4, we then construct PSTR models for the full sample in Equation (7), positive *DA* sample in Equation (8) and negative *DA* sample in Equation (9).

$$ABDA_{it} = 0.1878 - 0.0227 * ROE_{it} - 0.0098 * TA_{it} + 0.0498 * INSTI_{it} + \varepsilon_{it} \quad (7)$$

$$ABDA_{it} = 0.1287 + (-0.0163 + 0.0161 * G(D_{it}; 45.23, 22.17)) * D_{it} + (0.0098 - 0.0145 * G(D_{it}; 45.23, 22.17)) * AT_{it} + \varepsilon_{it} \quad (8)$$

$$ABDA_{it} = 0.2336 + (0.0114 - 0.0113 * G(D_{it}; 28.14, 24.12)) * D_{it} + (-0.0264 + 0.0109 * G(D_{it;}; 28.14, 24.12)) * ROE_{it} + (-0.0203 + 0.0099 * G(D_{it}; 28.14, 24.12)) * TA_{it} + \varepsilon_{it} \quad (9)$$

Equation (7) includes a symmetric transition function with two transition positions and three regimes. Equations (8) and (9) include a monotonical transition function with one transition position and two regimes.

Figure 1 presents changes in the coefficient of audit delay in the PSTR model estimated in Table 4 for positive *DA* and negative *DA* firms, separately. It shows that in the positive *DA* sample, as audit delay changes from 17 days to 22.17 days then to 120 days, the coefficient of audit delay (*D*) changes from −0.0163 to −0.0082 then to 0. This means as audit delay increases, firms show an increasing tendency to manage their accrual-based earnings, and after a certain point (D = 22.17 days), the deterring effect of auditors on positive earnings management becomes weaker. In addition, Figure 1 shows that in the negative *DA* sample, as audit delay changes from 17 days to 28.14 days then to 120 days, the coefficient of audit delay (*D*) changes from 0.0114 to 0.0058 then to 0. This suggests that as the audit delay increases, companies first show a decreasing likelihood of managing their earnings downward, and after a certain point (D = 24.17 days), the deterring effect of auditors on downward earnings management weakens.

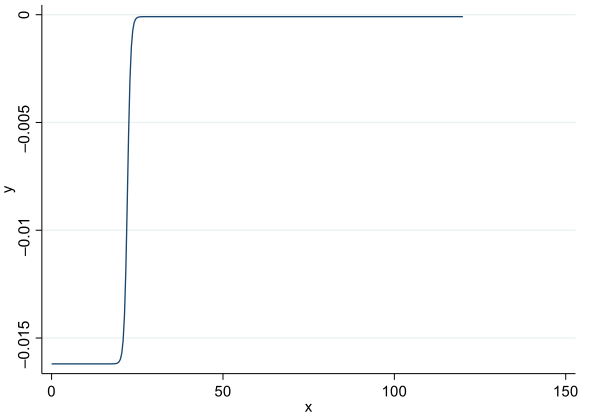
Thus, the results indicating a decreasingly negative association between audit delay and accrual-based earnings management in the positive *DA* sample suggest that, in the Chinese market, when firms manage their accrual-based earnings—whether upwards or downwards—during the early stages of an audit, the association between audit delay and accrual-based earnings management is more attributable to auditors rather than managers. This is reflected in the deterrent of both upward and downward earnings management during this stage. However, with the extension of audit delays, the association between audit delay and accrual-based earnings management is weakened.

4.2 Big 4 vs. non-big 4 client firms

Audit quality could be an important factor in deterring earnings management, as the literature documents that audit quality will shorten and audit report lag (e.g. Rusmin and Evans, 2017) and good quality audit will deter earnings management (e.g. Becker *et al.*, 1998; Hoang *et al.*, 2022). For instance, Rusmin and Evans (2017) find that companies audited by industry-specialist auditors have shorter audit delays, and Big 4 auditors perform significantly faster audit work than their non-Big 4 counterparts. In addition, assuming that Big Six auditors are of higher quality than non-Big Six auditors and using a cross-sectional version of the Jones (1991) model, Becker *et al.* (1998) show that clients of non-Big Six auditors report discretionary accruals that increase income relatively more than the discretionary accruals reported by clients of Big Six auditors.

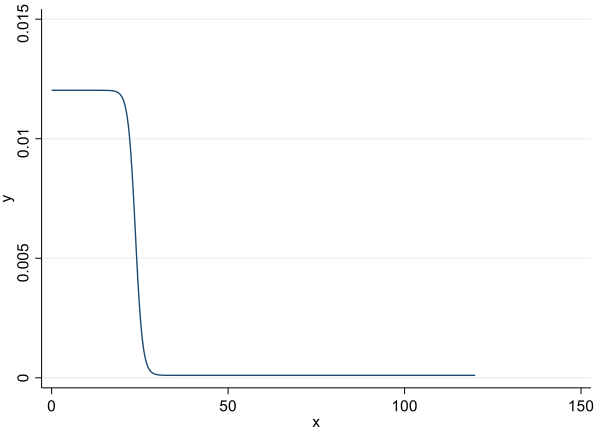
Therefore, we separately examine the relationship between audit delay and discretionary accruals for client firms audited by Big 4 and Non-Big 4 auditors. Table 5 presents the nonlinear regression results in full sample, positive DA sample and negative DA sample of Big 4 client firms. In the full sample, the coefficient of audit delay variable (D) is 0.0163 (*p*-value = 0.0322), which is statistically significant. In the positive DA sample, the coefficient of

Positive Discretionary Accruals sample



*X-axis represents audit delay (*D*), Y-axis represents the coefficient of audit delay in Equation (8)

Negative Discretionary Accruals sample



*X-axis represents audit delay (*D*), Y-axis represents the coefficient of audit delay in Equation (9)

Figure 1. Audit delay coefficients and audit delay. Source: Authors' own creation/work

audit delay variable (D) is 0.0313 (p-value = 0.0151), which is positive and statistically significant. This indicates that for the income-increasing (upward) earnings management Big 4 client firms, the discretionary accruals will increase with audit delay. However, when audit delay further increases, the positive effect of audit delay on upward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0315,

Table 5. Parameter estimation results of PSTR models for Big 4 vs. non-Big 4 client firms

	Full sample with Big4 Threshold (c): 32.91 Slope (γ): 26.20 Coefficient (*p*-value)	Positive DA sample with Big4 Threshold (c): 31.26 Slope (γ): 22.11 Coefficient (*p*-value)	Negative DA sample with Big4 Threshold (c): 27.56 Slope (γ): 1.71 Coefficient (*p*-value)
Panel A. Big 4 client firms			
Intercept	0.3812***	0.2758**	0.3629**
	(0.0000)	(0.0297)	(0.0232)
D	0.0163**	0.0313**	0.0214**
	(0.0322)	(0.0151)	(0.0354)
FSS	−0.5026	−1.1527	−0.1581
	(0.2676)	(0.2569)	(0.7555)
DTA	0.3682	−1.0673	−0.9715*
	(0.5616)	(0.7533)	(0.0865)
ROE	0.3464	0.5952	0.7291
	(0.2382)	(0.3004)	(0.3353)
TA	−0.0518	−0.0069	−0.0005
	(0.2010)	(0.9683)	(0.9851)
INSTI	0.5496	0.0843	−0.6269
	(0.5870)	(0.9798)	(0.2858)
*D*G(Dit; γ, c)*	−0.0163**	−0.0315**	−0.0202**
	(0.0319)	(0.0144)	(0.0385)
*FSS*G(Dit; γ, c)*	0.5175	1.1607	0.1786
	(0.2548)	(0.2546)	(0.7320)
*DTA*G(Dit; γ, c)*	−0.3507	1.0567	1.0336*
	(0.5804)	(0.7557)	(0.0747)
*ROE*G(Dit; γ, c)*	−0.3613	−0.4155	−0.7449
	(0.2187)	(0.4706)	(0.3267)
*TA*G(Dit; γ, c)*	0.0385	−0.0030	−0.0174
	(0.3417)	(0.9861)	(0.5113)
*INSTI*G(Dit; γ, c)*	−0.6014	−0.0787	0.5143
	(0.5521)	(0.9811)	(0.3958)
F Statistics	4.92***	3.73***	4.88***
	(0.0000)	(0.0000)	(0.0000)
Year fixed effect	Yes	Yes	Yes
R-square	0.0628	0.1027	0.1344
N	2,731	1,394	1,337

	Full sample without Big4 Threshold (c): 24.60 Slope (γ): 34.48 Coefficient (*p*-value)	Positive DA sample without Big4 Threshold (c): 22.24 Slope (γ): 44.84 Coefficient (*p*-value)	Negative DA sample without Big4 Threshold (c): 24.05 Slope (γ): 27.47 Coefficient (*p*-value)
Panel B. Non Big 4 client firms			
Intercept	0.1813***	0.1210***	0.2327***
	(0.0000)	(0.0000)	(0.0000)
D	0.0025	−0.0140***	0.0119***
	(0.2506)	(0.0042)	(0.0014)
FSS	0.0457	0.0584	−0.0374
	(0.2655)	(0.3978)	(0.5703)
DTA	0.0161	−0.0007	0.0421
	(0.5764)	(0.9882)	(0.3832)

(*continued*)

Table 5. Continued

	Full sample without Big4 Threshold (c): 24.60 Slope (γ): 34.48 Coefficient (*p*-value)	Positive DA sample without Big4 Threshold (c): 22.24 Slope (γ): 44.84 Coefficient (*p*-value)	Negative DA sample without Big4 Threshold (c): 24.05 Slope (γ): 27.47 Coefficient (*p*-value)
ROE	−0.0233***	−0.0600	−0.0265***
	(0.0001)	(0.6136)	(0.0001)
TA	−0.0101***	0.0082*	−0.0206***
	(0.0000)	(0.0892)	(0.0000)
INSTI	0.0548*	0.0287	0.0854
	(0.0758)	(0.5620)	(0.1049)
D*G*(Dit; γ, c)*	−0.0025	0.0139***	−0.0118***
	(0.2509)	(0.0043)	(0.0015)
FSS*G*(Dit; γ, c)*	−0.0551	−0.0569	0.0219
	(0.1804)	(0.4108)	(0.7397)
DTA*G*(Dit; γ, c)*	0.0279	0.0174	0.0325
	(0.3324)	(0.7204)	(0.5021)
ROE*G*(Dit; γ, c)*	0.0101*	0.0856	0.0110*
	(0.0934)	(0.4710)	(0.0981)
TA*G*(Dit; γ, c)*	0.0026	−0.0127***	0.0102**
	(0.2741)	(0.0075)	(0.0124)
*INSTI*G*(Dit; γ, c)*	−0.0048	0.0325	−0.0562
	(0.8769)	(0.5100)	(0.2854)
F Statistics	46.10***	22.94***	41.24***
	(0.0000)	(0.0000)	(0.0000)
Year fixed effect	Yes	Yes	Yes
R-square	0.0346	0.0352	0.0712
N	44,518	23,849	20,669

Note(s): We re-run the analysis by dividing the sample into client firms audited by Big 4 and non-Big 4 auditors
*, **, *** significant at the 0.10, 0.05, and 0.01 levels (two tails), respectively
Source(s): Authors' own creation/work

$p = 0.0144$). In the negative DA sample, the coefficient of audit delay variable (D) is 0.0214 (p-value = 0.0354), which is negative and statistically significant. This indicates that for the income-decreasing (downward) earnings management Big 4 client firms, the discretionary accruals will increase with audit delay. Again, this suggests the effect of auditor on deterring downward earnings management will increase with audit delay. However, when audit delay further increases, this deterring effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0202, $p = 0.0385$).

Table 5 Panel A shows that in the positive DA Big 4 client sample, as audit delay changes from 17 days to 31.26 days then to 120 days, the coefficient of audit delay (D) changes from 0.0313 to 0.0157 then to 0. This means as the length of audit delay increases, firms show an increasing tendency to manage their accrual-based earnings, and after certain point (D = 31.26 days), the enhancing effect of auditors on positive earnings management becomes weaker. In addition, in the negative DA sample, as audit delay changes from 17 days to 27.56 days then to 120 days, the coefficient of audit delay (D) changes from 0.0214 to 0.0107 then to 0. This suggests that as the length of audit delay increases, companies show a decreasing likelihood of managing their earnings downward first, and after a certain point, such a deterring effect of auditors on downward earnings management weakens (D = 27.56 days).

Table 5 Panel B presents the nonlinear regression results in full sample, positive DA sample and negative DA sample of non-Big 4 client firms. The results are consistent with what is reported in Table 4. In the full sample, the coefficient of audit delay variable (D) is 0.0025 (p-value = 0.2506), which is statistically not significant. When we further divide the sample into positive DA sample and negative DA sample of non-Big 4, we find that the insignificant results are due to conflicting results for positive DA sample and negative DA sample of non-Big 4 client firms. In the positive DA sample, the coefficient of audit delay variable (D) is −0.0140 (p-value = 0.0042), which is negative and statistically significant. This indicates that for the income-increasing (upward) earnings management non-Big 4 client firms, the discretionary accruals will decrease with audit delay. However, when the length of audit delay further increases, the positive effect of audit delay on upward earnings management will weaken, as indicated by the significant and positive coefficient of D*G(D_{it}; γ, c) (0.0139, p = 0.0043). In the negative DA sample, the coefficient of audit delay variable (D) is 0.0119 (p-value = 0.0014), which is negative and statistically significant. This indicates that for the income-decreasing (downward) earnings management non-Big 4 client firms, the discretionary accruals will increase with audit delay. Again, this suggests the effect of auditor on deterring downward earnings management will increase with audit delay. However, when audit delay further increases, this deterring effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0118, p = 0.0015).

Table 5 Panel B shows that in the positive DA sample, as audit delay changes from 17 days to 22.24 days then to 120 days, the coefficient of audit delay (D) changes from −0.0140 to −0.0070 then to 0. This means as the length of audit delay increases, firms show an increasing tendency to manage their accrual-based earnings, and after certain point (D = 22.24 days), the deterring effect of auditors on positive earnings management becomes weaker. In addition, in the negative DA sample, as audit delay changes from 17 days to 24.05 days then to 120 days, the coefficient of audit delay (D) changes from 0.0114 to 0.0057 then to 0. This suggests that as the length of audit delay increases, companies first show a decreasing likelihood of managing their earnings downward, and after a certain point (D = 24.05 days), such a deterring effect of auditors on downward earnings management weakens.

4.3 Industry specialist vs. non-industry specialist client firms

Industry specialist could also be a factor influencing audit delay. For instance, Rusmin and Evans (2017) find that companies audited by industry-specialist auditors have shorter audit delays. We further divide the full sample into industry specialist group and non-industry specialist group. The results are reported in Table 6. Table 6 Panel A presents the nonlinear regression results in full sample, positive and negative DA samples of industry specialist client firms. In the full sample, the coefficient of audit delay variable (D) is 0.0018 (p-value = 0.4032), which is statistically not significant. In the positive DA sample, the coefficient of audit delay variable (D) is −0.0147 (p-value = 0.7316), which is insignificant. Further, there is an insignificant coefficient of D*G(D_{it}; γ, c) (0.0146, p = 0.7328). In the negative DA sample, the coefficient of audit delay variable (D) is 0.0116 (p-value = 0.0042), which is positive and statistically significant. This indicates that for the income-decreasing (downward) earnings management industry specialist client firms, the discretionary accruals will decrease with audit delay. However, when audit delay further increases, the reinforcing effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0115, p = 0.0044).

Table 6 Panel A shows that in the positive DA sample, there is no significant turning point as the coefficient of audit delay remains insignificant. In addition, in the negative DA sample, as audit delay changes from 17 days to 23.85 days then to 120 days, the coefficient of audit delay (D) changes from 0.0116 to 0.0001 then to 0. This suggests that as the length of audit delay increases, companies first show a decreasing likelihood of managing their earnings

Table 6. Parameter Estimation Results for PSTR Models by Industry specialist auditor vs. Non industry specialist auditor

	Full sample with industry specialist auditor Threshold (c): 24.95 Slope (γ): 36.34 Coefficient (*p*-value)	Positive DA sample with industry specialist auditor Threshold (c):17 Slope (γ): 31.64 Coefficient (*p*-value)	Negative DA sample with industry specialist auditor Threshold (c): 23.85 Slope (γ): 33.34 Coefficient (*p*-value)
Panel A. Industry specialist auditor			
Intercept	0.1176***	0.0303	0.1787***
	(0.0000)	(0.2672)	(0.0000)
D	0.0018	−0.0147	0.0116***
	(0.4032)	(0.7316)	(0.0042)
FSS	0.0260	0.2952	−0.0331
	(0.5229)	(0.1993)	(0.6241)
DTA	0.0070	0.0165	0.0464
	(0.8108)	(0.9238)	(0.3597)
ROE	−0.0255***	1.3076**	−0.0255***
	(0.0000)	(0.0111)	(0.0001)
TA	−0.0060**	−0.0016	−0.0184***
	(0.0203)	(0.9661)	(0.0001)
INSTI	0.0591*	0.0635	0.0949
	(0.0649)	(0.7241)	(0.1002)
*D**G*(Dit; γ, c)*	−0.0018	0.0146	−0.0115***
	(0.4032)	(0.7328)	(0.0044)
*FSS**G*(Dit; γ, c)*	−0.0199	−0.2768	0.0368
	(0.6242)	(0.2294)	(0.5859)
*DTA**G*(Dit; γ, c)*	0.0312	−0.0108	0.0303
	(0.2859)	(0.9499)	(0.5513)
*ROE**G*(Dit; γ, c)*	0.0149**	−1.2729**	0.0130*
	(0.0177)	(0.0134)	(0.0521)
*TA**G*(Dit; γ, c)*	0.0015	0.0015	0.0105**
	(0.5458)	(0.9671)	(0.0230)
*INSTI**G*(Dit; γ, c)*	−0.0174	−0.0151	−0.0767
	(0.5858)	(0.9331)	(0.1827)
F Statistics	26.437***	17.919***	22.858***
	(0.0000)	(0.0000)	(0.0000)
Year fixed effect	YES	YES	YES
R-square	0.0282	0.0390	0.0582
N	32,202	17,391	14,811

	Full sample without industry specialist auditor Threshold (c): 31.14 Slope (γ): 31.25 Coefficient (*p*-value)	Positive DA sample without industry specialist auditor Threshold (c): 22.63 Slope (γ): 0.64 Coefficient (*p*-value)	Negative DA sample without industry specialist auditor Threshold (c): 20.35 Slope (γ):60.97 Coefficient (*p*-value)
Panel B. Non industry specialist auditor			
Intercept	0.1740***	−0.1274	0.1730**
	(0.0001)	(0.2388)	(0.0168)

(*continued*)

Table 6. Continued

	Full sample without industry specialist auditor Threshold (c): 31.14 Slope (γ): 31.25 Coefficient (*p*-value)	Positive DA sample without industry specialist auditor Threshold (c): 22.63 Slope (γ): 0.64 Coefficient (*p*-value)	Negative DA sample without industry specialist auditor Threshold (c): 20.35 Slope (γ):60.97 Coefficient (*p*-value)
D	0.0022	0.0105***	0.4740**
	(0.4102)	(0.0026)	(0.0453)
FSS	0.1571	0.0225	3.2016**
	(0.1659)	(0.8677)	(0.0349)
DTA	0.0797	0.0044	5.6332**
	(0.1871)	(0.9554)	(0.0427)
ROE	0.0414	0.1818***	7.7830*
	(0.4327)	(0.0003)	(0.0617)
TA	−0.0113***	0.0035	−0.5284**
	(0.0069)	(0.5159)	(0.0412)
INSTI	−0.0453	−0.0415	−1.7311**
	(0.5676)	(0.6025)	(0.0469)
D*G*(Dit; γ, c)*	−0.0022	−0.0091***	−0.4738**
	(0.4095)	(0.0017)	(0.0454)
FSS*G*(Dit; γ, c)*	−0.1843	−0.0210	−3.2378**
	(0.1031)	(0.8874)	(0.0329)
DTA*G*(Dit; γ, c)*	−0.0205	0.0168	−5.5528**
	(0.7342)	(0.8448)	(0.0457)
ROE*G*(Dit; γ, c)*	−0.0569	−0.1757***	−7.8024*
	(0.2804)	(0.0010)	(0.0611)
TA*G*(Dit; γ, c)*	0.0045	−0.0071	0.5204**
	(0.2135)	(0.1479)	(0.0444)
*INSTI*G*(Dit; γ, c)*	0.1032	0.1220	1.7705**
	(0.1919)	(0.1624)	(0.0420)
F Statistics	27.107***	5.730***	23.798***
	(0.0000)	(0.0018)	(0.0000)
Year fixed effect	Yes	Yes	Yes
R-square	0.0438	0.0220	0.0932
N	15,047	7,852	7,195

Note(s): We re-run the analysis by dividing the sample into client firms audited by industry specialist vs. non-industry specialist. If the auditor of a company has a higher-than-average share of audit services in its industry, it is considered an industry specialist auditor. Otherwise, it is considered a non-industry specialist auditor
*, **, *** significant at the 0.10, 0.05, and 0.01 levels (two tails), respectively
Source(s): Authors' own creation/work

downward, and after a certain point (D = 23.85 days), such a deterring effect of auditors on downward earnings management weakens.

Table 6 Panel B presents the nonlinear regression results in full sample, positive and negative DA samples of non-industry specialist client firms. In the full sample, the coefficient of audit delay variable (D) is 0.0022 (*p*-value = 0.4102), which is statistically not significant. In the positive DA sample, the coefficient of audit delay variable (D) is 0.0105 (*p*-value = 0.0026), which is positive and statistically significant. This indicates that for the income-increasing (upward) earnings management non-industry specialist client firms, discretionary accruals will increase with audit delay. However, when audit delay further increases, the positive effect of audit delay on upward earnings management will weaken, as indicated by the significant and positive coefficient of D*G(D_{it}; γ, c) (−0.0091, p = 0.0017). In the negative DA sample, the coefficient of audit delay variable (D) is 0.4740

(p-value = 0.0453), which is positive and statistically significant. This indicates that for the income-decreasing (downward) earnings management non-industry specialist client firms, discretionary accruals will increase with audit delay. However, when audit delay further decreases, this deterring effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.4738, p = 0.0454).

Table 6 Panel B shows that in the positive DA sample, as audit delay changes from 17 days to 22.63 days then to 120 days, the coefficient of audit delay (D) changes from 0.0105 to 0.0014 then to 0. This means as the length of audit delay increases, firms show an increasing tendency to manage their accrual-based earnings, and after certain point (D = 22.63 days), the effect of auditors on positive earnings management becomes weaker. In addition, in the negative DA sample, as audit delay changes from 17 days to 20.35 days then to 120 days, the coefficient of audit delay (D) changes from 0.4740 to 0.0002 then to 0. This suggests that as the length of audit delay increases, companies first show a decreasing likelihood of managing their earnings downward, and after a certain point (D = 20.35 days), then such a deterring effect of auditors on downward earnings management weakens.

4.4 High internal control (IC) quality vs. low IC quality client firms

The literature documents that internal control (IC) quality could affect audit delay. We further conduct additional analyses on high IC quality client firms vs. low IC quality client firms. Table 7 reports the results. Table 7 Panel A presents the nonlinear regression results in full sample, positive and negative DA samples of high IC quality client firms. In the full sample, the coefficient of audit delay variable (D) is 0.0021 (p-value = 0.3841), which is statistically not significant. When we further divide the sample into positive and negative DA samples, we find that the insignificant results are due to conflicting results for the positive and negative DA samples of high IC quality client firms. In the positive DA sample, the coefficient of audit delay variable (D) is −0.0107 (p-value = 0.0556), which is negative and statistically significant. This indicates that for the income-increasing (upward) earnings management non-Big 4 client firms, the discretionary accruals will decrease with audit delay. However, when audit delay further increases, the positive effect of audit delay on upward earnings management will weaken, as indicated by the significant and positive coefficient of D*G(D_{it}; γ, c) (0.0106, p = 0.0571). In the negative DA sample, the coefficient of audit delay variable (D) is 0.0174 (p-value = 0.0000), which is positive and statistically significant. This indicates that for the income-decreasing (downward) earnings management high IC quality client firms, the discretionary accruals will increase with audit delay. Again, this suggests the effect of auditor on deterring downward earnings management will increase with audit delay. However, when audit delay further increases, this deterring effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0173, p = 0.0000).

Table 7 Panel A shows that in the positive DA sample, as audit delay changes from 17 days to 22.02 days then to 120 days, the coefficient of audit delay (D) changes from −0.0107 to −0.0001 then to 0. This means as the length of audit delay increases, firms show an increasing tendency to manage their accrual-based earnings, and after certain point (D = 22.02 days), the deterring effect of auditors on positive earnings management becomes weaker. In addition, in the negative DA sample, as audit delay changes from 17 days to 23.91 days then to 120 days, the coefficient of audit delay (D) changes from 0.0174 to −0.0001 then to 0. This suggests that as audit delay increases, companies first show a decreasing likelihood of managing their earnings downward, and after a certain point, such a deterring effect of auditors on downward earnings management weakens.

Table 7 Panel B presents the nonlinear regression results in full sample, positive DA sample and negative DA sample of low IC quality client firms. In the full sample, the coefficient of audit delay variable (D) is 0.0036 (p-value = 0.5032), which is statistically insignificant. In the

Table 7. Parameter Estimation Results of PSTR Models for Firms with High Internal Control vs. Low Internal Control

	Full sample with high quality internal control Threshold (c): 24.44 Slope (γ): 33.74 Coefficient (*p*-value)	Positive DA sample with high quality internal control Threshold (c): 22.02 Slope (γ): 24.11 Coefficient (*p*-value)	Negative DA sample with high quality internal control Threshold (c): 23.91 Slope (γ): 33.82 Coefficient (*p*-value)
Panel A. High internal control quality client firms			
Intercept	0.2264***	0.1575***	0.2954***
	(0.0000)	(0.0000)	(0.0000)
D	0.0021	−0.0107*	0.0174***
	(0.3871)	(0.0556)	(0.0000)
FSS	0.0790*	0.1100	0.0045
	(0.0743)	(0.1383)	(0.9489)
DTA	0.0060	−0.0365	0.0212
	(0.8517)	(0.5225)	(0.6879)
ROE	−0.0236***	0.3819***	−0.0277***
	(0.0001)	(0.0092)	(0.0000)
TA	−0.0120***	0.0014	−0.0298***
	(0.0000)	(0.8003)	(0.0000)
INSTI	0.0449	0.0166	0.1144*
	(0.1973)	(0.7701)	(0.0645)
*D**G*(Dit; γ, c)*	−0.0021	0.0106*	−0.0173***
	(0.3843)	(0.0571)	(0.0000)
*FSS**G*(Dit; γ, c)*	−0.0787*	−0.1037	−0.0055
	(0.0758)	(0.1631)	(0.9365)
*DTA**G*(Dit; γ, c)*	0.0362	0.0434	0.0634
	(0.2573)	(0.4469)	(0.2324)
*ROE**G*(Dit; γ, c)*	0.0111*	−0.3506**	0.0144**
	(0.0608)	(0.0168)	(0.0280)
*TA**G*(Dit; γ, c)*	0.0023	−0.0076	0.0162***
	(0.3837)	(0.1691)	(0.0007)
*INSTI**G*(Dit; γ, c)*	0.0001	0.0447	−0.0929
	(0.9967)	(0.4311)	(0.1321)
F Statistics	31.395***	19.929***	25.618***
	(0.0000)	(0.0000)	(0.0000)
Year fixed effect	Yes	Yes	Yes
R-square	0.0346	0.0453	0.0682
N	31,753	17,134	14,619

	Full sample with low quality internal control Threshold (c): 24.82 Slope (γ): 41.27 Coefficient (*p*-value)	Positive DA sample with low quality internal control Threshold (c): 23.63 Slope (γ): 36.22 Coefficient (*p*-value)	Negative DA sample with low quality internal control Threshold (c): 21.50 Slope (γ): 32.83 Coefficient (*p*-value)
Panel B. Low Internal control quality client firms			
Intercept	0.0195	−0.0717	0.0494
	(0.7395)	(0.4386)	(0.5699)

(*continued*)

Table 7. Continued

	Full sample with low quality internal control Threshold (c): 24.82 Slope (γ): 41.27 Coefficient (*p*-value)	Positive DA sample with low quality internal control Threshold (c): 23.63 Slope (γ): 36.22 Coefficient (*p*-value)	Negative DA sample with low quality internal control Threshold (c): 21.50 Slope (γ): 32.83 Coefficient (*p*-value)
D	0.0036	0.0178*	0.0525*
	(0.5032)	(0.0922)	(0.0854)
FSS	−0.1344	−0.7918***	0.4147
	(0.2340)	(0.0045)	(0.4140)
DTA	0.0203	0.2912*	0.6546
	(0.7964)	(0.0542)	(0.2036)
ROE	−0.0543	−0.2584	0.1133
	(0.7564)	(0.2605)	(0.8999)
TA	0.0013	0.0009	−0.0532
	(0.8365)	(0.9291)	(0.1626)
INSTI	0.0575	0.2287*	−0.2606
	(0.4458)	(0.0659)	(0.2905)
D*G*(Dit; γ, c)*	−0.0035	−0.0178*	−0.0523*
	(0.5090)	(0.0920)	(0.0865)
FSS*G*(Dit; γ, c)*	0.1291	0.8012***	−0.4165
	(0.2521)	(0.0040)	(0.4123)
DTA*G*(Dit; γ, c)*	0.0291	−0.2607*	−0.5889
	(0.7111)	(0.0847)	(0.2526)
ROE*G*(Dit; γ, c)*	0.0410	0.2813	−0.1305
	(0.8146)	(0.2205)	(0.8849)
TA*G*(Dit; γ, c)*	−0.0006	0.0033	0.0534
	(0.9122)	(0.7378)	(0.1595)
*INSTI*G*(Dit; γ, c)*	−0.0069	−0.1650	0.2914
	(0.9269)	(0.1838)	(0.2363)
F Statistics	15.727***	5.742***	13.575***
	(0.0000)	(0.0000)	(0.0001)
Year fixed effect	Yes	Yes	Yes
R-square	0.0398	0.0339	0.0841
N	15,496	8,109	7,387

Note(s): We re-run the analysis by dividing the sample into high internal control (IC) quality client firms vs. low IC quality client firms. We calculate the Internal Control Index using the method described as follows: In the dimension of control environment, we include shareholding of directors, supervisors, and senior executives, proportion of independent directors, performance of supervisors, dual employment, corporate social responsibility, and negative events. In the risk assessment dimension, we include internal risk disclosure, external risk disclosure, and risk response. In the dimension of control activities, we include management and performance control, accident safety control. In the dimension of Information and Communication, we include information exchange, timeliness of information, and anti-fraud situation. In the Monitoring dimension, we include internal control disclosure, internal control deficiencies, and internal control audit status. Then we calculate an overall index score based on equal weights. Internal Control Index exceeding the industry average is considered High Internal Control firms; otherwise, it is considered Low Internal Control firms
*, **, *** significant at the 0.10, 0.05, and 0.01 levels (two tails), respectively
Source(s): Authors' own creation/work

positive DA sample, the coefficient of audit delay variable (D) is 0.0178 (*p*-value = 0.0045), which is statistically significant. This indicates that for the income-increasing (upward) earnings management non-Big 4 client firms, discretionary accruals will increase with audit delay. However, when audit delay further increases, the positive effect of audit delay on upward earnings management will weaken, as indicated by the significant and positive

coefficient of D*G(D_{it}; γ, c) (−0.0178, p = 0.0920). In the negative DA sample, the coefficient of audit delay variable (D) is 0.0525 (p-value = 0.0854), which is statistically significant. This indicates that for the income-decreasing (downward) earnings management low IC quality client firms, the discretionary accruals will increase with audit delay. However, when audit delay further increases, this deterring effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0523, p = 0.0865).

Table 7 Panel B shows that in the positive DA sample, as audit delay changes from 17 days to 23.63 days then to 120 days, the coefficient of audit delay (D) changes from 0.0178 to 0.0000 then to 0. This means as the audit delay increases, firms show an increasing tendency to manage their accrual-based earnings, and after certain point (D = 23.63 days), the deterring effect of auditors on positive earnings management becomes weaker. In addition, in the negative DA sample, as audit delay changes from 17 days to 21.50 days then to 120 days, the coefficient of audit delay (D) changes from 0.0525 to 0.0002 then to 0. This suggests that as the audit delay increases, companies first show a decreasing likelihood of managing their earnings downward, and after a certain point (D = 21.50 days), such a deterring effect of auditors on downward earnings management weakens.

4.5 SOE vs. non-SOE client firms

Finally, state-owned enterprises (SOEs) are less likely to engage in earnings management. We further perform additional analyses on SOE client firms vs. non-SOE client firms. Table 8 reports the results. Table 8 Panel A presents the nonlinear regression results in full sample, positive and negative DA samples of SOE client firms. In the full sample, the coefficient of audit delay variable (D) is −0.0978 (p-value = 0.4220), which is statistically not significant. In the positive DA sample, the coefficient of audit delay variable (D) is −0.0071 (p-value = 0.6398), which is statistically insignificant. And there is an insignificant and positive coefficient of D*G(D_{it}; γ, c) (0.0071, p = 0.6414). In the negative DA sample, the coefficient of audit delay variable (D) is 0.0238 (p-value = 0.0473), which is statistically significant. Again, this suggests the effect of auditor on deterring downward earnings management will increase with audit delay. However, as audit delay further increases, this deterring effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0236, p = 0.0501).

Table 8 Panel A shows that in the positive DA sample, the coefficient on audit delay remains insignificant. In the negative DA sample, as audit delay changes from 17 days to 24.29 days then to 120 days, the coefficient of audit delay (D) changes from 0.0238 to 0.0002 then to 0. This suggests that as audit delay length increases, companies first show a decreasing likelihood of managing their earnings downward, and after a certain point (D = 24.29 days), this deterring effect of audit delay on downward earnings management weakens.

Table 8 Panel B presents the nonlinear regression results in full sample, positive and negative DA samples of non-SOE client firms. In the full sample, the coefficient of audit delay variable (D) is 0.0018 (p-value = 0.0069), which is statistically significant. When we further divide the sample into positive and negative DA samples, we find that this is due to the negative DA sample of non-SOE client firms results. In the positive DA sample, the coefficient of audit delay variable (D) is −0.0163 (p-value = 0.0016), which is negative and statistically significant. However, as audit delay further increases, the positive effect of audit delay on upward earnings management will weaken, as indicated by the significant and positive coefficient of D*G(D_{it}; γ, c) (0.0162, p = 0.0017). In the negative DA sample, the coefficient of audit delay variable (D) is 0.0258 (p-value = 0.0035), which is statistically significant. Again, this suggests the effect of auditor on deterring downward earnings management will increase with audit delay. However, as audit delay further increases, this deterring effect of audit delay on downward earnings management will weaken, as indicated by the significant and negative coefficient of D*G(D_{it}; γ, c) (−0.0257, p = 0.0035).

Table 8. Parameter estimation results of PSTR models by SOE firms vs. non SOE firms

	Full sample with SOE (N = 9,841) Threshold (c): 17 Slope (γ): 27.88 Coefficient (p-value)	Positive DA sample with SOE Threshold (c): 18.61 Slope (γ): 5.07 Coefficient (p-value)	Negative DA sample with SOE Threshold (c): 24.29 Slope (γ): 47.67 Coefficient (p-value)
Panel A. SOE client firms			
Intercept	0.0391	−0.0158	0.1362*
	(0.3896)	(0.8061)	(0.0621)
D	−0.0978	−0.0071	0.0238**
	(0.4220)	(0.6398)	(0.0473)
FSS	1.8948***	0.4107	0.1761
	(0.0057)	(0.3367)	(0.3945)
DTA	0.9416***	−0.0071	0.1772
	(0.0015)	(0.9783)	(0.1267)
ROE	0.1213	4.9725***	0.0390
	(0.5993)	(0.0000)	(0.6388)
TA	0.0106	−0.0124	−0.0354***
	(0.9234)	(0.5107)	(0.0097)
INSTI	0.8563	−0.1649	0.1936
	(0.2648)	(0.6980)	(0.2258)
*D**G*(Dit; γ, c)*	0.0979	0.0071	−0.0236*
	(0.4219)	(0.6414)	(0.0501)
*FSS**G*(Dit; γ, c)*	−1.8901***	−0.4317	−0.1202
	(0.0059)	(0.3132)	(0.5608)
*DTA**G*(Dit; γ, c)*	−0.9029***	0.0132	−0.0950
	(0.0024)	(0.9600)	(0.4108)
*ROE**G*(Dit; γ, c)*	−0.1307	−4.9377***	−0.0504
	(0.5715)	(0.0000)	(0.5446)
*TA**G*(Dit; γ, c)*	−0.0122	0.0144	0.0263**
	(0.9119)	(0.4387)	(0.0470)
*INSTI**G*(Dit; γ, c)*	−0.7794	0.2430	−0.1121
	(0.3103)	(0.5683)	(0.4840)
F Statistics	7.589***	5.429***	6.623***
	(0.0000)	(0.0000)	(0.0000)
Year fixed effect	Yes	Yes	Yes
R-square	0.0303	0.0468	0.0665
N	9,841	5,339	4,502

	Full sample without SOE Threshold (c): 34.74 Slope (γ): 28.27 Coefficient (p-value)	Positive DA sample without SOE Threshold (c): 22.49 Slope (γ): 35.89 Coefficient (p-value)	Negative DA sample without SOE Threshold (c): 17.24 Slope (γ): 4.68 Coefficient (p-value)
Panel B. Non-SOE client firms			
Intercept	0.2177***	0.1787***	0.2472***
	(0.0000)	(0.0000)	(0.0000)
D	0.0018***	−0.0163***	0.0258***
	(0.0069)	(0.0016)	(0.0035)
FSS	0.0081	0.0165	−0.0618
	(0.7613)	(0.8152)	(0.7139)
DTA	0.0647***	−0.0088	−0.0433
	(0.0009)	(0.8708)	(0.7718)

(*continued*)

Table 8. Continued

	Full sample without SOE Threshold (c): 34.74 Slope (γ): 28.27 Coefficient (*p*-value)	Positive DA sample without SOE Threshold (c): 22.49 Slope (γ): 35.89 Coefficient (*p*-value)	Negative DA sample without SOE Threshold (c): 17.24 Slope (γ): 4.68 Coefficient (*p*-value)
ROE	−0.0179***	−0.0377	−0.0390***
	(0.0014)	(0.7386)	(0.0039)
TA	−0.0103***	0.0089*	−0.0297***
	(0.0000)	(0.0861)	(0.0019)
INSTI	−0.0045	−0.0037	0.0509
	(0.8197)	(0.9417)	(0.6993)
D*G*(Dit; γ, c)*	−0.0017***	0.0162***	−0.0257***
	(0.0083)	(0.0017)	(0.0035)
FSS*G*(Dit; γ, c)*	−0.0225	−0.0084	0.0303
	(0.3997)	(0.9056)	(0.8576)
DTA*G*(Dit; γ, c)*	−0.0182	0.0296	0.1211
	(0.3477)	(0.5824)	(0.4177)
ROE*G*(Dit; γ, c)*	0.0035	0.0634	0.0221
	(0.5381)	(0.5751)	(0.1048)
TA*G*(Dit; γ, c)*	0.0013	−0.0160***	0.0194**
	(0.2224)	(0.0016)	(0.0414)
*INSTI*G*(Dit; γ, c)*	0.0432**	0.0540	−0.0402
	(0.0291)	(0.2856)	(0.7606)
F Statistics	42.993***	17.323***	41.235***
	(0.0000)	(0.0000)	(0.0000)
Year Fixed Effect	Yes	Yes	Yes
R-square	0.0391	0.0333	0.0863
N	37,408	19,904	17,504

Note(s): We re-run the analysis by dividing the sample into State-Owned Enterprise (SOE) vs. non-SOE
*, **, *** significant at the 0.10, 0.05, and 0.01 levels (two tails), respectively
Source(s): Authors' own creation/work

Table 8 Panel B shows that in the positive DA sample, as audit delay changes from 17 days to 22.49 days then to 120 days, the coefficient of audit delay (*D*) changes from −0.0163 to −0.0001 then to 0. This means as the length of audit delay increases, firms show an increasing tendency to manage their accrual-based earnings, and after certain point (D = 22.49 days), the deterring effect of auditors on positive earnings management becomes weaker. In the negative DA sample, as audit delay changes from 17 days to 17.24 days then to 120 days, the coefficient of audit delay (*D*) changes from 0.0258 to 0.0001 then to 0. This suggests that as audit delay length increases, companies first show a decreasing likelihood of managing their earnings downward, and after a certain point (D = 17.24 days), such a deterring effect of auditors on downward earnings management weakens.

In sum, the non-linear relationship between audit delay and discretionary accruals is observed in client firms with non-Big 4, non-industry specialist, high IC quality, and non-SOE client firms. Further, it is more likely to be seen in the downward earnings management groups of Big 4, industry specialist, low IC quality and SOE client firms.

5. Conclusions

This study examines the association between audit delay and accrual-based earnings management in the emerging markets of China. Drawing on prior literature, we argue that audit delay can influence earnings management in two opposite directions. From the auditors'

perspective, spending more hours on auditing and having a longer audit delay would indicate a lower level of earnings management. From the managers' perspective, spending more time on report preparation and experiencing a longer audit delay would result in more "appropriate" accounting methods that firms could use to manipulate earnings. To capture these contrasting forces, we employ PSTR model proposed by Gonzalez *et al.* (2017) and Fok *et al.* (2005) to examine the association between audit delay and accrual-based earnings management.

Results of PSTR models show that (1) there is a nonlinear association between accrual-based earnings management and audit delay (2) the association between audit delay and accrual-based earnings management depends on whether the earnings management is income-increasing or income-decreasing. For firms managing their earnings upwards, the relationship is negative, and the magnitude of impact decreases with audit delay. However, for firms managing their earnings downwards, the relationship is positive, and the magnitude of the impact diminishes with audit delay. Further, the non-linear relationship between audit delay and discretionary accruals is observed in client firms with non-Big 4, non-industry specialist, high IC quality and non-SOE client firms. For Big 4, industry specialist, low IC quality and SOE client firms, it is only to be found in the downward earnings management groups.

Few studies examine the association between audit delay and accruals-based earnings management in the context of the Chinese market. Our empirical evidence will be of interest to Chinese standard setters, regulators, and investors as well as regulation bodies in other emerging capital markets. In particular, U.S. firms have a report filing period of 60–75 days after SEC rules 33–8128 and 33–8644 took effect. Lambert *et al.* (2017) find that these rules require mandatory reductions in audit delays for some firms, therefore leading to lower quality earnings. Contrast with Lambert *et al.* (2017), in the emerging market setting, we find that for firms managing their earnings upwards, the association is negative, and the magnitude decreases with audit delay. This suggests that audit time constraint is essential for the quality of annual reports and the rules in US requiring mandatory reductions in audit delay may have the same impacts on earnings management in emerging markets of China.

Our paper is not free of limitations. For instance, in the current paper, we focus on the association between audit delay and accrual-based earnings management. Future studies can investigate whether there is an association between audit delay and real earnings management. Although the literature (e.g. Pacheco-Paredes and Wheatley, 2021; Greiner *et al*., 2017) finds that more real earnings management is associated with longer audit report lag, it is not clear whether the non-linear association between accrual-based earnings management and audit report lag also exist in the setting of real earnings management. Future study can investigate and follow this line of research by examining whether the non-linear relationship also holds in the real earnings management setting.

Notes

1. CSMAR is the comprehensive database for Chinese business research. CSMAR covers stock market data, financial information and corporate governance data of publicly listed firms in the Chinese emerging markets.

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(The Appendix follows overleaf)

Appendix

Table A1. Variable definition

Variable	Definition
Dependent variable	
Discretionary accruals (*DA*)	Accrual-based earnings management is indicated with the difference between actual total accruals and predicted accruals from the modified Jones model, both are scaled by lagged total assets. The modified Jones model is estimated for industry-year combination
Variable of interest	
Audit delay (*D*)	Audit delay is defined as the length of time from a company's fiscal year-end to the date of the auditor's report
Control variables	
Ownership structure (*FSS*)	The ratio of primary shareholder's shareholding
Firm performance (*ROE*)	Return on equity
Operation stability *(DTA)*	Liability-Asset ratio
Firm size *(TA)*	Industry-adjusted log value of total assets
Institutional ownership *(INSTI)*	the proportion of institutional investor shareholding to shareholding equity

Source(s): Authors' own creation/work

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