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# Institutional ownership and earnings quality: Evidence from China

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ABSTRACT

We examine the impact of institutional ownership on earnings quality in China. We have employed two proxies of earnings quality: discretionary accruals and real earnings management. Using 19,743 firm-year observations from 2009 to 2017, we find that firms with higher institutional ownership are more likely to display higher earnings quality in lower discretionary accruals and lesser real activities manipulation. Our results are robust after controlling for endogeneity.

## 1. Introduction

Since the early 1990s, China has conducted a series of accounting, auditing, and stock market reforms to ensure convergence with IFRS, greater participation of home-grown audit firms in the audit market, liberalization of its stock markets and "…incentivize the development of institutional investors, including opening Chinese stock exchanges to qualified foreign institutional investors, social security funds, and insurance companies" (Lin and Fu, 2017, p. 17). All these reforms have resulted in a more vibrant stock market with greater participation of institutional investors. Institutional ownership of China's A-Shares market capitalization (18.7%) doubled in 2021 compared to 2014 and is over ten times higher than in 2003 (Lin and Puchniak, 2021). In spite of the reforms and growing institutional ownership, concentrated ownership, particularly the presence of state-owned enterprises (SOEs), remains a common feature of the Chinese stock market. Given its comparatively weaker institutional environment, we examine whether institutional investors influence earnings quality in Chinese A-share firms.

Prior research shows that good corporate governance plays an important monitoring role, which improves accounting quality (Becker et al., 1998; Francis and Krishnan, 1999; Xie et al., 2003). As part of corporate governance in this paper we examine whether institutional investors influence earnings quality in Chinese A-share firms. The active monitoring hypothesis suggests that institutional investors are likely to manage their investment due to their magnitude of investment actively. Such active monitoring has been shown to improve stock price performance (Jiambalvo et al., 2002) and firm profitability (Lin and Fu, 2017; Guo and Platikanov, 2019; Ding et al., 2020). In advanced economies, the quality of earnings increases with an increase in institutional ownership (Velury and Jenkins, 2006). However, earnings quality may be imperiled by institutional investors who predominantly focus on short-term gains, pressuring corporate managers to make accounting decisions that boost short-term earnings at the expense of long-term value (Graves and

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Waddock, 1990; Laverty, 1996; Porter, 1992). For example, Chen et al. (2015) find that higher institutional investment in Chinese firms is associated with less conservative financial reporting as institutional investors in the Chinese market have short-term investment incentives. However, no study has examined whether institutional ownership impacts the quality of accounting earnings proxied by accruals and real earnings management in China.

We test our research questions in the context of China for several reasons. First, the capital market is characterized as an insider economy with concentrated ownership, creating incentives for self-serving and opportunistic behaviors such as misuse of insider information and earnings management (Leuz et al., 2003; Liu et al., 2014b; He and Rui, 2016). Given the structure of the share market and successive waves of regulatory reform, China represents a more complex agency setting (Habib et al., 2019; Defond et al., 2020) where large shareholder incentives change according to periods of reform (Zhang et al., 2019). Second, in China some companies are owned by government or state while others not. There are two types of enterprises in China: SOE and non-SOE. Chen et al. (2011) argue that the government in China play a major role in firms activities because of it owns majority of the shares of SOEs and SOEs dominate capital markets. The government owns significant shares in SOEs to exercise control (An et al., 2016). The government in China favours SOEs and intervene their policies, control through selecting top executives. The political connection of SOEs is associated with government interventions rather than rent-seeking motivations (Chen et al., 2011). Chen et al. (2011) argue that since SOEs are politically connected, these firms negatively impact investment efficiency. However, it is unclear whether institutional investors make a difference in firms' earnings quality in state-owned enterprises (SOEs).

We employ two proxies of earnings quality: discretionary accruals and real earnings management. Using 19,743 firm-year observations from 2009 to 2017, we find that firms with higher institutional ownership are more likely to display higher earnings quality in the form of lower discretionary accruals and lesser real activities manipulation. After disaggregating state-owned enterprises (SOEs) into central government-controlled SOEs and local government-controlled SOEs, we find that higher institutional ownership lowers real activity manipulation in SOEs but not non-SOEs. In SOE firms, our results show higher institutional ownership is associated with lesser real activities manipulation across all three forms: discretionary production costs, discretionary cash flows from operations, and abnormally lower level of discretionary expenses.

Our study contributes to the literature in several ways. First, this is one of the few studies (see e.g., Zhang and Hongxi, 2011) that examines the issue of institutional monitoring from the perspective of the quality of financial reporting, represented by earnings quality in the Asia-Pacific region, especially in China. Second, since the institutional environment in China is quite different from other countries due to high state ownership dominance, we argue that institutional investor influence depends on whether the firm is state-owned or not. We suggest that institutional ownership benefits all types of listed companies in China in some way or another, so we examine whether institutional ownership influences earnings quality in SOEs and non-SOEs. Third, in measuring earnings quality, we examine both accrual-based earnings management and real earnings management by Chinese firms. As well as providing elements of novelty to the Chinese capital market setting, there is a feedback effect that academic research into the Chinese market informs such policy and regulatory activities.

The remainder of this paper is structured as follows. Section 2 reviews the prior research and develops hypotheses. Section 3 details the research methodology, Section 4 presents the results, and Section 5 describes robustness analyses. Section 6 concludes the paper.

## 2. Prior research and hypotheses development

In the context of China, several studies have examined the effect of ownership concentration on firms' earnings management practices and whether state-owned firms behave differently compared to privately owned firms, with mixed results. For example, Firth et al. (2007) report that ownership concentration and the type of dominant shareholders significantly affect earnings management practices in China, and the relationship is linear. However, Ding et al. (2007) find a significant non-linear relationship between ownership concentration and earnings management proxies, revealing that privately owned firms are more likely to engage in such practices than state-owned firms. Similar to Ding et al. (2007), Wang and Yung (2011) also report that earnings quality is higher among state-owned firms than among private firms. In contrast, Xu et al. (2012) and Liu et al. (2014b) document significantly lower earnings quality in state-owned firms than private firms. While these studies enhance our knowledge of earnings management practices in firms with different ownership structures, relatively little is known about the relationship between institutional investors and earnings quality in China, the focus of the current study.

There are alternate views on the relationship between institutional ownership and earnings quality. The active monitoring hypothesis suggests that institutional investors are active external monitors (Smith, 1996), which often translates into higher earnings quality. For example, Rajgopal et al. (1999) find that institutional ownership is negatively associated with earnings management. Chung et al. (2002) find that large institutional shareholdings inhibit corporate insiders from managing earnings using discretionary accrual choices. Similarly, Mitra and Cready (2005) and Velury and Jenkins (2006) find a significantly positive association between institutional ownership and different measures of earnings quality. Ajinkya et al. (2005) provide indirect but related evidence that firms with greater institutional ownership are more likely to issue a forecast and these forecasts tend to be more specific, accurate, and less opportunistically biased. Koh (2007) provides evidence that institutional investors put pressure on managers to limit their engagement in discretionary accruals' manipulations to meet or beat earnings forecasts. Farooq and El Jai (2012) document that firms with higher institutional investors are engaged in lower earnings management than other firms. Similarly, Roychowdhury (2006), Lin and Manowan (2012) and Lin et al. (2014) show that firms with low institutional ownership manage more earnings compared to firms with high institutional ownership. In their international study of 41 countries, Zhong et al. (2017) find strategic institutional investors to be positively associated with firm earnings quality.

However, contrary arguments suggest that institutional investors can pressure corporate managers into making accounting

decisions that boost short-term earnings at the expense of long-term value (Graves and Waddock, 1990; Porter, 1992; Laverty, 1996). Bushee (1998, p.306) notes that by "acting as 'traders' rather than 'owners', institutional investors allegedly place excessive focus on short-term developments, leading managers to fear that an earnings disappointment will trigger large-scale institutional investor selling and result in temporary undervaluation of the firm's stock price." This is particularly true when institutional investors have relatively low shareholdings and hence less incentive to monitor insiders' opportunistic behavior. Intense competition among institutional investors for client funds to invest and frequent performance evaluations also engender a quest for short-term performance (Graves and Waddock, 1990). In the literature, Bushee (1998) and Hsu and Koh (2005) find support for the notion that the short-term focus of institutional investors creates pressure for managers to focus on higher short-term earnings, which might result in upward accruals management.

Prior research argues that that earnings management is not limited to accruals management only and firms likely also involve real earnings management (Cohen et al., 2008; Zang, 2012). Roychowdhury (2006) conjectures that for real earning management managers involves manipulation of real activities to meet some earnings benchmark. The authors further argues that real earnings management is believed to be less susceptible to external scrutiny. Extant research posits and provides evidence that US firms engage more in real earnings management than accrual earnings management after post-Sarbanes-Oxley Act, 2002 (Cohen et al., 2008; Ge and Kim, 2014). Zang (2012) argues that accrual manipulation tends to occur at year end, while real activity manipulation occurs during the fiscal year.

Bushee (1998) shows that firms may manage real earnings management to increase profits through cutting research and development expenditures. Prior research (Roychowdhury, 2006; Alhadab and Nguyen, 2018; Liu and Tsai, 2015; Sohn, 2016; Sakaki et al., 2017; Garcia Lara et al., 2020; Li et al., 2016) find that institutional investors presence acts as a monitor and firms managers are engaged in lesser real activities manipulation. However, extant research for example, Wei and Chou (2018) find institutional investors have no influence on firms' involvement in real earnings management in Taiwanese firms. The outcomes of these studies suggest that the presence of institutional investors reduce both accruals and real earnings management.

Lin and Puchniak (2021) observed that institutional investors manage US$16 trillion asset in China, which is vital for the growth in the asset management industry. As a result, it is imperative to test accounting quality proxied by accrual and real earnings management in this context. Very few studies directly examine the link between institutional ownership and earnings quality in China. Analogous to our study, Chen et al. (2015) investigate the effect of institutional ownership on accounting conservatism. Using data from 2008 to 2011, they find that contrary to the conventional wisdom, higher institutional ownership, especially by institutions with long-investment horizons, is associated with more aggressive financial reporting. In contrast, in their recent study, Liu et al. (2018) document that institutional shareholders improve both corporate governance and accounting transparency in China. These results suggest that the effect of institutional ownership on earnings quality proxied by accruals and real earnings management is not straightforward and we empirically test this using the following hypothesis:

**Hypothesis 1**. **(H1):** *In China,* Ceteris paribus*, institutional ownership is associated with higher earnings quality (lower earnings management)*.

Since the 1980s, SOE has played an important role in the Chinese economy and the global market and the share owned by the government in SOEs impact their performance (Phung and Mishra, 2016). Lin et al. (2020a, 2020b) show that 27 SOEs were listed among Fortune Global 500 in 2000 and 102 in 2017, about one-fifth of the Fortune Global 500. They further mentioned that the revenues of all Fortune Global 500 SOEs were $6.1 trillion in 2017, indicating a substantial portion of Fortune Global 500 SOEs. In China, the government has the authority to select, employ and dismiss the top executives in SOEs; however, in non-SOEs, shareholders make such decisions (Cao et al., 2017.) Liu et al. (2018) argue that government ownership in the SOE firms helps these companies to their consistent competitive advantage. Chen et al. (2011) posit that different types of agency conflict exist between the government majority shareholding and outside shareholders in Chinese SOEs. Allen et al. (2005) document that SOEs have lower economic performance than non-SOEs due to lower production efficiency. They argue that government intervention is higher in SOEs, leading to lower productivity than in non-SOEs. Lin et al. (2020a, 2020b) argue that government intervention in SOEs help the economy by maximizing resource mobility in capital-intensive industries, maintaining social stability, and controlling firms in accordance with the government's interest. Prior research argues that politicians maximize their benefits by using their powers over SOEs (Shleifer and Vishny, 1994). Existing literature, for example, Piotroski et al. (2015) provide evidence that SOEs hide negative information due to their political connection with the government.

Chaney et al. (2011) show that compared to non-politically connected firms, politically connected firms' financial reporting quality is lower. Since SOEs are politically connected, their accounting quality is likely lower than non-SOEs. Chen et al. (2011) document that SOEs have higher earnings management than non-SOEs. Given the governance role played by the institutional investors, The above discussion leads to our following hypothesis:

**Hypothesis 2**. **(H2):** Ceteris paribus*, the effect of institutional ownership on earning quality is stronger for SOE firms than non-SOE firms.*

The central or the local governments control State-owned enterprises (SOEs) in China (Liao and Liu, 2014). The Chinese government introduced the State-owned Assets Supervision and Administration Commission (SASAC) in 2003, which is controlled by the national SASAC, and this organization is responsible for managing government ownership. Large firms in China are recognized as Central SOEs, which the central government manages. The central SOEs are directly controlled, and the national SASAC indirectly controls local SOEs. Local SOEs are considered smaller firms directly supervised by the local SASAC (Semba and Wu, 2023). It is argued that the agency conflict between the government where government minority shareholders is different from traditional agency conflict exists between managers and shareholders between managers and stakeholders (Jensen and Meckling, 1976). Liao and Liu (2014)

argue that there is a conflict of interest between the government and minority shareholders. Liao and Liu (2014) show a positive association between the extent of local SOEs' overinvestment and the fiscal distress of the corresponding local government. (Opie et al. (2019) find that in comparison to central SOEs, local SOEs have more government intervention. Guo et al. (2021) argue that local SOEs have a more complicated and time-consuming reporting process than central SOEs, which may inhibit efficient information transmission.

Chang and Lin (2022) show that central SOEs have stricter monitoring and supervision by the central government compared to local SOEs, while local SOEs are are supervised by local government and these firms may not be prosecuted by the local government for misusing the state assets because they receive local protection under the Chinese Judicial system. The authors further argue since local SOEs have less visibility to the media and judicial authorities, the managers of these firms have the opportunity to expropriate corporate assets. Extant research shows local SOEs have acute tunneling than central SOEs (Jiang et al., 2010) and minority shareholders have value losses from transferring resources to local SOEs while central SOEs have a beneficial advantage from transferring resources (Cheung et al., 2010). Chang and Lin (2022) posit that central SOEs have greater investor protection compared to local SOEs. Borisova et al. (2012) show that government ownership is related to lower governance quality.

The above discussion suggests that local SOEs have more government intervention and weaker corporate governance than central SOEs. Given the governance role played by the institutional investors, we formulate the following hypothesis:

**Hypothesis 3**. **(H3):** Ceteris paribus*, the effect of institutional ownership on earnings quality is stronger for local SOE firms than for Central SOE firms.*

## 3. Research design

Our research questions assess whether institutional ownership affects earnings quality in Chinese listed companies. We address these issues by constructing a sample of firms with A-share listing presence on either the Shanghai or Shenzhen Stock Exchange for each of the eight years from 2009 to 2017. We started with 2009 as this is the first year when the earnings quality measures can be calculated using the 2006 reform in accounting regulation in China. At the time of timing of writing this paper, 2017 was the most recent year in terms of data availability. As of December 2017, there were 3631 listed A-shares in China. Using this list, we started with an initial sample of 29,947 firm-year observations from 2009 to 2017 that are included in the Chinese Securities Markets and Accounting Research Database (CSMAR) and the WIND database.[1] We exclude firms in the financials, real estate, and utilities industries (2975 firm-year observations), consistent with the extant literature. Missing data for regression variables for Eq. (1) reduce the sample further by 7229 firm-year observations. Our final sample consists of 19,743 A-share firm-year observations (3144 distinct firms). Table 1 explains the sample selection process and provides information on industry distribution.

Panel B of Table 1 reports the industry distribution of the sample observations, with the Industrials, Materials, and Consumer Discretionary industries accounting for approximately 28%, 20%, and 15% of the firm-year observations, respectively. The yearly firm-level data ranges between 1379 (2009) and 3109 (2017). The final column shows that the yearly average institutional ownership remains relatively consistent over the sample period (33.69% in 2009 and 33.18% in 2017).

Discretionary accruals ratio and four aggregate measures of real earnings management are used as our earnings quality proxies. We calculate discretionary accruals, DACC, as the unsigned residuals from the modified Jones (1991) model (Dechow et al., 1995). We estimate the following Equation for all firms in the same industry with at least 10 observations in each year (using the SIC two-digit industry code) to obtain industry-specific parameters for calculating the non-discretionary component of total accruals:

$$\frac{TACC_{i,t}}{TA_{i,t-1}} = \alpha_1\left(\frac{1}{TA_{i,t-1}}\right) + \frac{\left(\Delta REV_{i,t} - \Delta REC_{i,t}\right)}{TA_{i,t-1}} + \alpha_1\left(\frac{PPE_{i,t}}{TA_{i,t-1}}\right) + \varepsilon_{i,t} \tag{1}$$

TACC is total accruals, measured as the difference between net income after tax less cash flow from operations, following Hribar and Collins (2002). In Eq. (1), TA is total assets; ΔREV is change in revenue from year *t-1* to year *t*; ΔREC is change in receivables from year *t-1* to year *t*; and PPE is gross property, plant, and equipment. Discretionary accruals is then calculated using the residual from Eq. (1), that is, DACC = TACC-NDACC. As both earnings overstatements and understatements are an indication of earnings management, we use the absolute value of discretionary accruals in line with prior literature (Allen and Woodland, 2010).

For real earnings management proxies, we first calculate the abnormal cash flow from operations, abnormal production costs (RMPROD), and abnormal discretionary expenses from the residual of the following individual regressions:

$$\frac{CFO_{i,t}}{Assets_{i,t}} = \alpha_0 + \alpha_1\frac{1}{Assets_{i,t-1}} + \alpha_2\frac{Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \varepsilon_{i,t} \tag{2}$$

$$\frac{PROD_{i,t}}{Assets_{i,t}} = \alpha_0 + \alpha_1\frac{1}{Assets_{i,t-1}} + \alpha_2\frac{Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3\frac{\Delta Sales_{i,t}}{Assets_{i,t-1}} + \alpha_3\frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t} \tag{3}$$

[1] CSMAR and WIND are the most commonly used databases for market-based research on the Chinese stock market and are widely used in the prior literature (see e.g., Liu et al., 2014a; McGuinness et al., 2017).

**Table 1**
Sample selection, industry distribution, and top audit firms' market share.

Panel A: Sample selection

| Selection criteria | Observations |
|---|---|
| Number of listed firm-year observations (2009–2017) | 29,947 |
| Less: Financials, Real Estate, and Utilities companies | 2975 |
| Less: Missing observations | 7181 |
| Final Sample (3144 firms) | 19,743 |

Panel B: Sample distribution across industry.

| Year | Consumer Discr. | Consumer Staples | Energy | Healthcare | Industrials | IT | Materials | Comm. Services | Total | INSTOWN |
|---|---|---|---|---|---|---|---|---|---|---|
| 2009 | 221 | 109 | 48 | 122 | 372 | 167 | 298 | 42 | 1379 | 0.337 |
| 2010 | 261 | 129 | 54 | 150 | 471 | 240 | 349 | 58 | 1712 | 0.362 |
| 2011 | 303 | 141 | 59 | 172 | 555 | 291 | 400 | 66 | 1987 | 0.370 |
| 2012 | 326 | 146 | 62 | 187 | 594 | 330 | 425 | 74 | 2144 | 0.356 |
| 2013 | 330 | 146 | 62 | 188 | 595 | 331 | 427 | 75 | 2154 | 0.380 |
| 2014 | 348 | 156 | 64 | 201 | 629 | 360 | 440 | 75 | 2273 | 0.374 |
| 2015 | 382 | 166 | 69 | 224 | 690 | 394 | 480 | 89 | 2494 | 0.381 |
| 2016 | 373 | 163 | 65 | 223 | 693 | 404 | 474 | 96 | 2491 | 0.365 |
| 2017 | 472 | 195 | 75 | 279 | 876 | 522 | 575 | 115 | 3109 | 0.332 |
| Total | 3016 | 1351 | 558 | 1746 | 5475 | 3039 | 3868 | 690 | 19,743 | |

$$\frac{DISX_{i,t}}{Assets_{i,t}} = \alpha_0 + \alpha_1 \frac{1}{Assets_{i,t-1}} + \alpha_2 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{i,t} \tag{4}$$

In the above equations, CFO is the cash flow from operations; PROD is the firm's production cost, which equals the sum of cost of goods sold plus changes in inventory from year *t–1* to year *t*; and DISX indicates discretionary expenses, which is the sum of selling, general, and administrative expenses and R&D expenses. We estimate the above equations for all firms in the same industry with at least 10 observations in each year (using the SIC two-digit industry code).

In order to capture the total effects of real earnings management, we combine the three individual measures to compute four aggregate measures of real earnings management activities. Following prior literature (e.g., Cohen and Zarowin, 2010), we multiply abnormal cash flow from operations and abnormal discretionary expenses by negative one before aggregating them into a single measure, so that the higher these amounts the more likely it is that the firm is engaging is sales manipulations and cutting discretionary expenses to manage reported earnings upwards. We denote these variables as RMCFO and RMDISX, respectively. Our four measures of real earnings management activities include: (i) RM1: sum of RMPROD and RMCFO; (ii) RM2: sum of RMCFO and RMDISX; (iii) RM3: sum of RMPROD, RMCFO, and RMDISX; and (iv) RM4: sum of RMPROD and RMDISX. These types of aggregate measures are widely used in prior literature (e.g., Cohen et al., 2008; Cohen and Zarowin, 2010; Kuo et al., 2014).

The relationship between institutional ownership and earnings management proxies is tested using the following Equation:

$$\begin{aligned} EM_{i,t} = {} & \alpha + \beta_1 INSTOWN_{i,t} + \beta_2 AUDITOR_{i,t} + \beta_3 SOE_{i,t} + \beta_4 LOSSDUM_{i,t} + \beta_5 LNMCAP_{i,t} + \beta_6 LEVERAGE_{i,t} + \beta_7 CURRATIO_{i,t} \\ & + \beta_8 BETA_{i,t} + \beta_9 EASTERN_{i,t} + \beta_{10} NEWISSUE_{i,t} + \beta_{11} LNAGE_{i,t} + \beta_{12} CROSSLIST_{i,t} + \beta_{13} GROWTH_{i,t} + \beta_{14} STDUM_{i,t} \\ & + \beta_{15} EMGT_{i,t} + \sum_j \lambda_j INDUSTRY_{jt} + \sum_k \lambda_k YEAR_{kt} + \varepsilon_{i,t} \end{aligned} \tag{5}$$

where EM refers to accruals and real earnings management proxies. The test variable is INSTOWN. Since larger values of EM imply more client discretion and lower earnings quality, we expect the coefficient on INSTOWN will be negative if institutional investors restrict firms from using higher discretion over the use of real and accruals earnings management. Larger firms are more likely to have higher earnings quality (Becker et al., 1998), so we include LNMCAP as a proxy for firm size. Menon and Williams (2004) report that growth opportunities is associated with earnings quality and we include one-year asset growth as a control (GROWTH). Firms with higher leverage and financial risk are expected to have greater incentives to manage earnings due to debt covenant requirements (Francis and Yu, 2009: Lawrence et al., 2011). Conversely, firms incurring accounting losses have lower incentives to manage earnings (Francis and Yu, 2009). Therefore, we include LEVERAGE, CURRATIO and LOSSDUM in the model to control for the effects of debt and financial distress. BETA is a measure of firm risk and is included to the model because capital market pressure can influence earnings management behavior (Francis and Yu, 2009). Considering the unique characteristics of Chinese capital markets and following Chen et al. (2011), we have included four variables, namely SOEDUM, STDUM, CROSSLIST, and EASTERN. As firms may engage in both accruals and real earnings management, we control from real (accruals) earnings management when the dependent variable is |DACC| (RM), following Zang (2012). All the variable definitions are available in Table 2.

**Table 2**
Variable definitions and acronyms.

| Variable Name | Label | Description |
|---|---|---|
| Institutional ownership | INSTOWN | Number of shares held by institutions ÷ Total tradeable A shares |
| Big 4 | Big4 | Dummy variable indicating the firm is audited by one of the international Big 4 audit firms in a given year, and 0 otherwise |
| Second Tier | SECOND_TIER | Dummy variable indicating the firm is audited by one of the domestic second-tier auditors, and 0 otherwise |
| State control | SOE | Dummy variable indicating the ultimate controlling owner is the State, and 0 otherwise |
| Central government | CENTRALSOE | Dummy variable indicating the ultimate controlling owner is the central government, and 0 otherwise |
| Local government | LOCALSOE | Dummy variable indicating the ultimate controlling owner is the local government, and 0 otherwise |
| Discretionary accruals | \|DACC\| | Discretionary accruals calculated using Modified-Jones model |
| Real Earnings Management | RMCFO | Abnormal discretionary expenditures, measured as the estimated residual from Eq. 4.1 multiplied by negative one |
| | RMPROD | Abnormal production cost, measured as the estimated residual from Eq. 4.2 |
| | RMDISX | Abnormal discretionary expenses, measured as the estimated residual from Eq. 4.3 multiplied by negative one |
| | RM1 | Aggregate real earnings management proxy, the sum of abnormal production costs and the additive inverse of abnormal cash flow from operations |
| | RM2 | Aggregate real earnings management proxy, the sum of the additive inverse of abnormal cash flow from operations and the additive inverse of abnormal discretionary expenses |
| | RM3 | Aggregate real earnings management proxy, the sum of abnormal production costs and RM2 |
| | RM4 | Aggregate real earnings management proxy, the sum of abnormal production costs and the additive inverse of abnormal discretionary expenses |
| Current ratio | CURRATIO | Current assets ÷ Current Liabilities |
| Loss dummy | LOSSDUM | Dummy variable indicating negative net profit, and 0 otherwise |
| Firm size | LNMCAP | Natural log of market capitalization |
| Leverage | LEVERAGE | Interest bearing liabilities ÷ Total assets |
| Cross Listing | CROSSLIST | Dummy variable indicating the firm has issued shares to foreign investors (e.g., B shares or H shares), and 0 otherwise |
| Eastern province | EASTERN | Dummy variable indicating the firm is from the eastern coastal area, and 0 otherwise |
| New Issue | NEWISSUE | Dummy variable indicating the firm has issued equity in current year, and 0 otherwise |
| Firm age | LNAGE | Natural log of number of years since listing |
| Firm Risk | BETA | Beta calculated using 52 weeks' return ending on the Balance Sheet date |
| Book-to-market | BMRATIO | Book value equity ÷ Market value of equity |
| ST/ST* Firms | STDUM | Dummy variable indicating the firm's special treatment listing status in the given year, and 0 otherwise |
| Growth | GROWTH | Asset growth from year t–1 to year t. |

**Table 3**
Descriptive statistics.

| Variable | N | Mean | Median | SD | Min | Max |
|---|---|---|---|---|---|---|
| \|DACC\| | 19,722 | 0.07 | 0.05 | 0.08 | 0.00 | 0.56 |
| RMCFO | 19,735 | 0.01 | 0.01 | 0.10 | −0.50 | 0.56 |
| RMPROD | 19,390 | 0.01 | 0.01 | 0.14 | −2.08 | 2.95 |
| RMDISX | 19,738 | −0.00 | 0.01 | 0.09 | −0.61 | 0.40 |
| RM1 | 19,390 | 0.02 | 0.02 | 0.20 | −2.45 | 3.10 |
| RM2 | 19,731 | 0.00 | 0.01 | 0.15 | −1.03 | 0.77 |
| RM3 | 19,390 | 0.01 | 0.03 | 0.26 | −2.94 | 3.09 |
| RM4 | 19,390 | 0.01 | 0.02 | 0.20 | −2.57 | 2.94 |
| BIG4 | 19,743 | 0.05 | 0.00 | 0.21 | 0.00 | 1.00 |
| SECONDTIER | 19,743 | 0.59 | 1.00 | 0.49 | 0.00 | 1.00 |
| LOSSDUM | 19,743 | 0.09 | 0.00 | 0.29 | 0.00 | 1.00 |
| LNMCAP | 19,743 | 22.50 | 22.41 | 0.95 | 20.06 | 28.44 |
| BMRATIO | 19,743 | 0.36 | 0.30 | 0.25 | 0.00 | 1.54 |
| LEVERAGE | 19,743 | 0.17 | 0.13 | 0.16 | 0.00 | 0.63 |
| LNAGE | 19,743 | 1.94 | 2.08 | 0.93 | 0.00 | 3.33 |
| BETA | 19,663 | 1.14 | 1.12 | 0.66 | −0.33 | 4.07 |
| EASTERN | 19,743 | 0.68 | 1.00 | 0.47 | 0.00 | 1.00 |
| SOE | 19,743 | 0.36 | 0.00 | 0.48 | 0.00 | 1.00 |
| CENTRALSOE | 19,743 | 0.12 | 0.00 | 0.33 | 0.00 | 1.00 |
| LOCALSOE | 19,743 | 0.24 | 0.00 | 0.43 | 0.00 | 1.00 |
| INSTOWN | 19,743 | 0.36 | 0.36 | 0.24 | 0.00 | 0.86 |
| CROSSLIST | 19,743 | 0.06 | 0.00 | 0.23 | 0.00 | 1.00 |
| GROWTH | 19,743 | 0.28 | 0.12 | 0.54 | −0.36 | 3.14 |
| STDUM | 19,743 | 0.03 | 0.00 | 0.17 | 0.00 | 1.00 |
| CURRATIO | 19,742 | 2.67 | 1.67 | 2.91 | 0.24 | 16.33 |
| NEWISSUE | 19,743 | 0.52 | 1.00 | 0.50 | 0.00 | 1.00 |

This table presents descriptive statistics. All variables are defined in Table 2.

## 4. Results

Table 3 provides descriptive statistics for the variables used in this study. The table reports that |DACC| has a mean of 7% of lagged total assets over the sample period. This is similar to mean of |DACC| of 6.76% reported in Guo and Ma (2015). The real earnings management proxies have mean values in the range of 0.4% and 2%. The mean and median of RM3, which is the sum of all three REM proxies, is 0.01 and 0.03 respectively. These values are not materially different from Eng et al. (2019) who report a mean and median of 0.02. About 4.7% of the firm-year observations are audited by one of the Big 4 auditors.[2] However, about 59% of the sample firms are audited by one of the second-tier auditors, implying that local audit firms audit the majority of the firms. A similar fig. (52% on average, with the maximum of 58.3% in 2012) is also reported by Leung et al. (2017. The local government controls 24% of the firm-year observations, while the central government is the ultimate controlling shareholder in 12% of cases. This means that about 64% of the sample is privately owned and controlled in China.

Table 4 reports the correlation analysis. The table shows that the correlations between INSTOWN and each of |DACC| and RM proxies are significant, confirming that firms with institutional ownership tend to have higher earnings quality. None of the correlations among the independent variables appearing on the same Equation exceeds 0.43 (the highest reported correlation is 0.43 between SOE and LNAGE), suggesting that there is no multicollinearity concern. We also conduct variance inflation factor (VIF) tests to check for any multicollinearity. Except for year and industry dummies, all the variance inflation factors (VIFs) are <1.87, implying that multicollinearity is not a serious problem in the estimation of the models.[3]

Table 5 presents the regression results for Eq. (1), which examines the effect of institutional ownership on earnings quality proxied by the absolute value of discretionary accruals (|DACC|). In line with prior literature, firms with large absolute DACC are assumed to have lower audit quality compared to firms with smaller discretionary accruals (Boone et al., 2010).

Models (1) and (2) show the overall sample results. Model (1) reveals a negative and significant coefficient on INSTOWN ($\beta = -0.009, p < 0.001$), suggesting that higher institutional ownership is associated with lower levels of |DACC| (higher earnings quality). This is consistent with Velury and Jenkins (2006), who report a significantly positive association between institutional ownership and earnings quality and support H1. Among other variables, the coefficient on SOE is also negative and significant ($\beta = -0.009, p < 0.001$), implying that SOEs engage less in accrual earnings management practices. Our results remain consistent when we replace SOE with CENTRALSOE and LOCALSOE. The coefficients on both CENTRALSOE ($\beta = -0.008, p < 0.001$) and LOCALSOE ($\beta = -0.009, p < 0.001$) are negative and significant, meaning that compared to non-SOE firms, the earnings quality of CENTRALSOEs and LOCALSOEs are significantly higher.

In order to test the prediction of H2, we re-run our baseline regression over SOE and non-SOE subsamples. The results presented in Columns 3 and 4 show that the coefficient on INSTOWN is negative and significant in non-SOE firms ($\beta = -0.017, p < 0.001$) but it is insignificant in SOE firms ($\beta = 0.005, p > 0.10$). The difference in coefficients on INSTOWN between SOE and non-SOE samples is statistically significant at the 1% level ($\chi^2 = 11.55, p < 0.001$), implying that the effect of INSTOWN on discretionary accrual is significantly more pronounced for non-SOE firms compared to the SOE firms. Therefore, H2 is not supported. This result is not surprising as SOE firms engage in less accruals management in Column 1.

We re-run the baseline regression in Columns 5–6 after further classifying SOE firms into CENTRALSOE and LOCALSOE. The coefficient of INSTOWN is not significant in any of the models. We do not find any significant difference in coefficients on INSTOWN between CENTRALSOE and LOCALSOE sub-samples ($\chi^2 = 0.07, p > 0.10$), implying that the effect of institutional ownership is not different between the two-subsamples when earnings management is proxied by absolute value of discretionary accruals. Therefore, H3 is not supported.

Table 6 presents the regression results for Eq. (1), which examines the effect of institutional ownership on earnings quality proxied by composite measures of real earnings management. Columns 1–4 show the result for the full sample while the results for non-SOE and SOE firms are presented in Column 5–8 and 9–12, respectively. For the full sample, the coefficient on INSTOWN is negative and statistically significant at the 1% level (RM1: $\beta = -0.044, p < 0.001$; RM2: $\beta = -0.026, p < 0.001$; RM3: $\beta = -0.054, p < 0.001$; RM4: $\beta = -0.037, p < 0.001$), suggesting that higher institutional ownership is associated with lower real activities manipulation in China. These results support H1.

For the non-SOE firms, the co-efficient on INSTOWN is negative but not statistically significant. In contrast, we find a statistically significant negative coefficient on INSTOWN for the SOE firms. We also find a statistically significant difference in coefficients on INSTOWN between SOE and non-SOE firms (RM1: $\chi^2 = 7.03, p < 0.01$; RM2: $\chi^2 = 7.37, p < 0.01$; RM3: $\chi^2 = 5.70, p < 0.05$; RM4: $\chi^2 = 3.13, p < 0.10$). This is consistent with H2 which predicts that the effect of institutional ownership on real earnings management is stronger for SOE firms than non-SOE firms.

In Table 7, we replicate the models in Table 6 using CENTRALSOE and LOCALSOE sub-samples. For the CENTRALSOE firms, the coefficient on INSTOWN is negative but not statistically significant. In contrast, we find a statistically significant negative coefficient on INSTOWN for the LOCALSOE firms. We also find a statistically significant difference in coefficients on INSTOWN between CENTRALSOE and LOCALSOE firms (RM1: $\chi^2 = 3.61, p < 0.10$; RM2: $\chi^2 = 3.63, p < 0.10$; RM3: $\chi^2 = 5.63, p < 0.05$; RM4: $\chi^2 = 7.81, p < 0.01$). This is consistent with H3, which predicts that the effect of institutional ownership real earnings management is stronger for LOCALSOE firms than CENTRALSOE firms.

[2] Leung et al. (2017) reported that over their 2003–2013 sample period, the market share of the Big 4 auditors declined from 8.8% in 2003 to 6.1% in 2013.

[3] It is commonly argued that multicollinearity becomes a serious problem when VIFs exceed 10 (Gujarati and Porter, 2009).

**Table 4**
Correlation matrix.

| | \|DACC\| | RM1 | RM2 | RM3 | RM4 | BIG4 | 2NDTIER | LOSSDUM | LNMCAP | LEV. | LNAGE |
|---|---|---|---|---|---|---|---|---|---|---|---|
| RM1 | 0.19* | 1.00 | | | | | | | | | |
| RM2 | 0.12* | 0.83* | 1.00 | | | | | | | | |
| RM3 | 0.12* | 0.95* | 0.92* | 1.00 | | | | | | | |
| RM4 | 0.04* | 0.82* | 0.79* | 0.94* | 1.00 | | | | | | |
| BIG4 | −0.04* | −0.08* | −0.06* | −0.06* | −0.04* | 1.00 | | | | | |
| SECONDTIER | −0.03* | −0.02* | −0.04* | −0.04* | −0.05* | −0.27* | 1.00 | | | | |
| LOSSDUM | 0.11* | 0.15* | 0.13* | 0.14* | 0.12* | −0.03* | −0.01 | 1.00 | | | |
| LNMCAP | −0.04* | −0.21* | −0.18* | −0.19* | −0.16* | 0.33* | −0.02* | −0.12* | 1.00 | | |
| LEVERAGE | 0.04* | 0.21* | 0.23* | 0.24* | 0.23* | 0.05* | −0.05* | 0.21* | 0.04* | 1.00 | |
| LNAGE | −0.05* | 0.08* | 0.10* | 0.12* | 0.15* | 0.07* | −0.07* | 0.16* | 0.17* | 0.31* | 1.00 |
| BETA | −0.03* | 0.00 | 0.02* | 0.01 | 0.01 | −0.01 | 0.04* | −0.03* | −0.04* | −0.01 | −0.12* |
| EASTERN | 0.00 | −0.02* | −0.03* | −0.03* | −0.04* | 0.06* | 0.03* | −0.09* | 0.04* | −0.12* | −0.17* |
| SOE | −0.05* | 0.02* | 0.05* | 0.05* | 0.08* | 0.15* | −0.07* | 0.08* | 0.16* | 0.20* | 0.43* |
| CENTRALSOE | −0.02* | 0.03* | 0.02* | 0.04* | 0.05* | 0.17* | −0.02* | 0.04* | 0.18* | 0.06* | 0.18* |
| LOCALSOE | −0.04* | 0.00 | 0.03* | 0.03* | 0.05* | 0.04* | −0.06* | 0.06* | 0.04* | 0.18* | 0.34* |
| INSTOWN | −0.07* | −0.09* | −0.06* | −0.06* | −0.03* | 0.20* | −0.05* | −0.02* | 0.37* | 0.14* | 0.39* |
| CROSSLIST | −0.02* | −0.02* | −0.01 | −0.01 | 0.01 | 0.42* | −0.10* | 0.01 | 0.23* | 0.07* | 0.17* |
| NEWISSUE | 0.03* | −0.04* | −0.08* | −0.08* | −0.10* | 0.04* | 0.04* | −0.13* | 0.25* | −0.05* | −0.22* |
| GROWTH | 0.30* | −0.05* | −0.23* | −0.16* | −0.18* | −0.04* | 0.01 | −0.16* | 0.09* | −0.11* | −0.32* |
| STDUM | 0.09* | 0.05* | 0.03* | 0.04* | 0.04* | −0.02* | −0.02* | 0.08* | −0.07* | 0.06* | 0.14* |
| CURRATIO | −0.01 | −0.12* | −0.09* | −0.12* | −0.12* | −0.09* | 0.03* | −0.13* | −0.12* | −0.47* | −0.41* |

| | BETA | EASTERN | SOE | CGSOE | LGSOE | INSTOWN | CROSSLIST | NEWISSUE | GROWTH | STDUM | CURRATIO |
|---|---|---|---|---|---|---|---|---|---|---|---|
| EASTERN | 0.01 | 1.00 | | | | | | | | | |
| SOE | 0.01 | −0.18* | 1.00 | | | | | | | | |
| CENTRALSOE | 0.02* | −0.06* | 0.50* | 1.00 | | | | | | | |
| LOCALSOE | −0.01 | −0.16* | 0.74* | −0.21* | 1.00 | | | | | | |
| INSTOWN | −0.12* | −0.05* | 0.38* | 0.22* | 0.26* | 1.00 | | | | | |
| CROSSLIST | −0.02* | 0.07* | 0.20* | 0.12* | 0.13* | 0.19* | 1.00 | | | | |
| NEWISSUE | 0.07* | 0.08* | −0.08* | −0.04* | −0.06* | −0.02* | 0.01 | 1.00 | | | |
| GROWTH | 0.00 | 0.05* | −0.15* | −0.07* | −0.12* | −0.11* | −0.06* | 0.31* | 1.00 | | |
| STDUM | −0.04* | −0.06* | 0.06* | 0.05* | 0.02* | −0.03* | 0.01 | −0.08* | 0.01 | 1.00 | |
| CURRATIO | 0.02* | 0.10* | −0.24* | −0.09* | −0.20* | −0.21* | −0.10* | 0.04* | 0.23* | −0.07* | 1.00 |

This table reports the Pearson correlation matrix. * indicates significance at the 5% level or better. All variables are defined in Table 2.

**Table 5**
Institutional ownership and discretionary accruals.

| | *Dependent Variable: \|DACC\|* | | | | | |
|---|---|---|---|---|---|---|
| | Overall | Overall | Non-SOE | SOE | CENTRAL | LOCAL |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| INSTOWN | −0.009*** | −0.009*** | −0.017*** | 0.005 | 0.007 | 0.004 |
| | (−2.94) | (−2.95) | (−4.48) | (0.89) | (0.75) | (0.66) |
| BIG4 | −0.008*** | −0.008*** | −0.014** | −0.004 | 0.001 | −0.009** |
| | (−2.63) | (−2.69) | (−2.48) | (−1.15) | (0.17) | (−1.98) |
| SECOND_TIER | −0.003** | −0.003** | −0.004** | −0.001 | 0.003 | −0.001 |
| | (−2.19) | (−2.21) | (−2.41) | (−0.29) | (0.93) | (−0.52) |
| LOSSDUM | 0.039*** | 0.039*** | 0.050*** | 0.029*** | 0.037*** | 0.025*** |
| | (14.78) | (14.74) | (12.04) | (9.12) | (6.66) | (6.50) |
| LNMCAP | 0.000 | 0.000 | 0.003* | −0.002* | −0.005** | −0.001 |
| | (0.15) | (0.09) | (1.70) | (−1.67) | (−2.29) | (−0.59) |
| SOE | −0.009*** | | | | | |
| | (−4.90) | | | | | |
| CENTRALSOE | | −0.008*** | | 0.002 | | |
| | | (−3.38) | | (0.63) | | |
| LOCALSOE | | −0.009*** | | | | |
| | | (−4.62) | | | | |
| LEVERAGE | 0.004 | 0.004 | 0.012 | 0.003 | −0.007 | 0.003 |
| | (0.73) | (0.75) | (1.33) | (0.38) | (−0.50) | (0.29) |
| CROSSLIST | 0.002 | 0.002 | 0.012 | −0.003 | 0.007 | −0.007* |
| | (0.47) | (0.49) | (1.33) | (−0.89) | (1.31) | (−1.87) |
| BETA | −0.001 | −0.001 | −0.001 | −0.001 | 0.002 | −0.004 |
| | (−1.39) | (−1.40) | (−0.97) | (−0.70) | (0.81) | (−1.54) |
| EASTERN | 0.002 | 0.002 | 0.002 | 0.003 | 0.009** | −0.001 |
| | (1.37) | (1.37) | (0.76) | (1.13) | (2.18) | (−0.26) |
| ASSETGROWTH | 0.054*** | 0.054*** | 0.052*** | 0.057*** | 0.050*** | 0.062*** |
| | (22.67) | (22.67) | (19.25) | (10.75) | (6.33) | (8.90) |
| LNAGE | 0.003** | 0.003** | 0.001 | 0.004** | 0.004 | 0.004* |
| | (2.42) | (2.44) | (0.77) | (2.39) | (1.24) | (1.95) |
| CURRATIO | −0.001*** | −0.001*** | −0.002*** | −0.001 | −0.001 | −0.001 |
| | (−5.46) | (−5.47) | (−5.14) | (−0.92) | (−0.77) | (−0.74) |
| NEWISSUE | −0.006*** | −0.006*** | −0.006*** | −0.007*** | −0.008** | −0.007*** |
| | (−5.28) | (−5.26) | (−3.76) | (−3.75) | (−2.39) | (−2.78) |
| STDUM | 0.032*** | 0.032*** | 0.041*** | 0.024*** | 0.022** | 0.026*** |
| | (5.81) | (5.79) | (4.62) | (3.58) | (2.20) | (2.85) |
| RM4 | 0.026*** | 0.026*** | 0.028*** | 0.020** | 0.024* | 0.020* |
| | (5.33) | (5.31) | (4.55) | (2.41) | (1.68) | (1.95) |
| Constant | 0.081*** | 0.083*** | 0.051 | 0.104*** | 0.177*** | 0.059 |
| | (3.68) | (3.68) | (1.50) | (3.46) | (3.44) | (1.61) |
| Year effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry effects | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted $R^2$ | 0.153 | 0.153 | 0.171 | 0.119 | 0.111 | 0.131 |
| *F*-statistic | 36.202 | 35.234 | 27.383 | 11.811 | 5.919 | 8.699 |
| Observations | 19,345 | 19,345 | 12,256 | 7,089 | 2,446 | 4,643 |

This table reports the OLS regressions of |DACC| on institutional ownership and other controls. Standard errors are clustered at the firm-level and are reported in parentheses below each coefficient. ***, **, * refer to significance at the 1%, 5% and 10% levels, respectively. All variables are defined in Table 2.

## 5. Robustness tests

Although the results discussed above are consistent with the conjecture that firms with higher institutional ownership exhibit higher earnings quality, the relationship's causal nature is unclear. It is possible that institutional ownership and each of the dependent variables are determined endogenously. In other words, not only may institutional ownership impact the dependent variable in the Equation, but the dependent variable may also trigger changes in institutional ownership. In this vein, prior research suggests that institutional ownership is endogenously determined by firm characteristics, and such endogeneity can confound our tests (Chung and Zhang, 2011; Ramalingegowda and Yu, 2012). To the extent that the economic determinants of institutional ownership also explain our dependent variable, they can introduce a spurious relation between the dependent and independent variables. We address this endogeneity concern using lagged independent variables, propensity score matching, and the instrumental variable approach.

First, we re-estimate the equations using the current period's values of the dependent variables and the prior period's institutional ownership and control variables. Our inferences remain qualitatively similar using the lag specification.[4] The signs of the lagged

[4] Results are not reported for brevity but are available upon request.

**Table 6**
Institutional ownership and real earnings management.

| | Full Sample | | | | Non-SOE | | | | SOE | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RM1 | RM2 | RM3 | RM4 | RM1 | RM2 | RM3 | RM4 | RM1 | RM2 | RM3 | RM4 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) | (12) |
| INSTOWN | −0.044*** | −0.026*** | −0.054*** | −0.037*** | −0.019 | −0.009 | −0.026 | −0.020 | −0.080*** | −0.053*** | −0.098*** | −0.064*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) | (0.02) | (0.02) | (0.01) | (0.02) | (0.02) |
| BIG4 | −0.012 | −0.014 | −0.015 | −0.003 | −0.050* | −0.047** | −0.077* | −0.057 | −0.001 | −0.001 | 0.003 | 0.009 |
| | (0.02) | (0.01) | (0.02) | (0.02) | (0.03) | (0.02) | (0.04) | (0.04) | (0.02) | (0.01) | (0.03) | (0.02) |
| SECOND_TIER | −0.010** | −0.011*** | −0.019*** | −0.016*** | −0.014** | −0.015*** | −0.024*** | −0.019** | −0.001 | 0.000 | −0.004 | −0.008 |
| | (0.00) | (0.00) | (0.01) | (0.01) | (0.01) | (0.00) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| LOSSDUM | 0.030*** | 0.003 | 0.021*** | 0.009* | 0.017** | −0.006 | 0.006 | 0.003 | 0.048*** | 0.014*** | 0.041*** | 0.020*** |
| | (0.01) | (0.00) | (0.01) | (0.00) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) | (0.01) | (0.01) |
| LNMCAP | −0.055*** | −0.033*** | −0.065*** | −0.044*** | −0.074*** | −0.047*** | −0.092*** | −0.066*** | −0.039*** | −0.018*** | −0.040*** | −0.023*** |
| | (0.00) | (0.00) | (0.01) | (0.00) | (0.01) | (0.00) | (0.01) | (0.01) | (0.01) | (0.00) | (0.01) | (0.00) |
| SOE | 0.017** | 0.013*** | 0.028*** | 0.026*** | | | | | | | | |
| | (0.01) | (0.00) | (0.01) | (0.01) | | | | | | | | |
| CENTRALSOE | | | | | | | | | 0.034*** | 0.010 | 0.033*** | 0.020** |
| | | | | | | | | | (0.01) | (0.01) | (0.01) | (0.01) |
| LEVERAGE | 0.249*** | 0.234*** | 0.394*** | 0.302*** | 0.312*** | 0.282*** | 0.479*** | 0.363*** | 0.181*** | 0.180*** | 0.299*** | 0.232*** |
| | (0.02) | (0.01) | (0.02) | (0.02) | (0.03) | (0.02) | (0.03) | (0.03) | (0.02) | (0.02) | (0.03) | (0.03) |
| CROSSLIST | 0.023 | 0.015 | 0.028 | 0.020 | 0.037 | 0.030* | 0.059 | 0.053 | 0.006 | −0.003 | −0.002 | −0.008 |
| | (0.01) | (0.01) | (0.02) | (0.02) | (0.03) | (0.02) | (0.04) | (0.03) | (0.02) | (0.01) | (0.02) | (0.02) |
| BETA | 0.000 | 0.000 | 0.002 | 0.003 | −0.007** | −0.004* | −0.007 | −0.003 | 0.022*** | 0.013*** | 0.029*** | 0.020*** |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.01) | (0.00) | (0.01) | (0.01) |
| EASTERN | 0.006 | 0.001 | 0.006 | 0.004 | −0.004 | −0.010** | −0.013 | −0.013 | 0.015* | 0.011* | 0.023** | 0.020** |
| | (0.01) | (0.00) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| GROWTH | −0.022*** | −0.080*** | −0.076*** | −0.054*** | −0.031*** | −0.076*** | −0.077*** | −0.052*** | 0.006 | −0.101*** | −0.073*** | −0.054*** |
| | (0.01) | (0.00) | (0.01) | (0.01) | (0.01) | (0.00) | (0.01) | (0.01) | (0.01) | (0.01) | (0.02) | (0.01) |
| LNAGE | 0.007* | 0.002 | 0.011** | 0.013*** | 0.001 | −0.002 | 0.004 | 0.010** | 0.020*** | 0.012** | 0.025*** | 0.019*** |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.01) | (0.00) | (0.01) | (0.00) | (0.01) | (0.01) |
| CURRATIO | −0.003*** | 0.003*** | 0.001 | 0.001 | −0.003** | 0.003*** | 0.001 | 0.001 | −0.004 | 0.004** | 0.000 | 0.000 |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| NEWISSUE | 0.019*** | 0.015*** | 0.017*** | 0.000 | 0.014*** | 0.011*** | 0.008 | −0.008 | 0.029*** | 0.021*** | 0.033*** | 0.017*** |
| | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) | (0.01) | (0.00) | (0.01) | (0.00) | (0.01) | (0.01) |
| STDUM | −0.001 | −0.005 | −0.004 | −0.004 | −0.011 | −0.005 | −0.006 | 0.002 | 0.012 | 0.003 | 0.005 | −0.007 |
| | (0.01) | (0.01) | (0.02) | (0.01) | (0.02) | (0.01) | (0.03) | (0.02) | (0.01) | (0.01) | (0.02) | (0.01) |
| \|DACC\| | 0.460*** | 0.328*** | 0.480*** | 0.173*** | 0.596*** | 0.422*** | 0.608*** | 0.184*** | 0.136** | 0.086** | 0.164** | 0.124** |
| | (0.04) | (0.02) | (0.04) | (0.03) | (0.04) | (0.03) | (0.05) | (0.04) | (0.07) | (0.04) | (0.07) | (0.05) |
| Constant | 1.183*** | 0.726*** | 1.388*** | 0.917*** | 1.638*** | 1.038*** | 2.050*** | 1.463*** | 0.829*** | 0.371*** | 0.846*** | 0.485*** |
| | (0.09) | (0.06) | (0.12) | (0.10) | (0.12) | (0.09) | (0.17) | (0.15) | (0.13) | (0.08) | (0.15) | (0.12) |
| Year and Industry Controls | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted $R^2$ | 0.151 | 0.188 | 0.159 | 0.130 | 0.190 | 0.220 | 0.193 | 0.152 | 0.141 | 0.198 | 0.152 | 0.126 |
| *F*-statistic | 35.752 | 46.394 | 35.442 | 29.942 | 29.085 | 36.809 | 27.725 | 22.331 | 15.222 | 16.795 | 14.357 | 11.292 |
| Observations | 19,345 | 19,675 | 19,345 | 19,345 | 12,256 | 12,522 | 12,256 | 12,256 | 7089 | 7153 | 7089 | 7089 |

***, **, * refer to significance at the 1%, 5% and 10% levels, respectively. All variables are defined in Table 2.

**Table 7**
Institutional ownership and forms of real earnings management.

| | Central SOE | | | | Local SOE | | | |
|---|---|---|---|---|---|---|---|---|
| | RM1 | RM2 | RM3 | RM4 | RM1 | RM2 | RM3 | RM4 |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| INSTOWN | −0.040 | −0.024 | −0.032 | −0.002 | −0.106*** | −0.071*** | −0.141*** | −0.104*** |
| | (0.03) | (0.02) | (0.03) | (0.03) | (0.02) | (0.02) | (0.03) | (0.02) |
| BIG4 | −0.014 | −0.009 | −0.013 | −0.002 | 0.006 | −0.004 | 0.006 | 0.010 |
| | (0.03) | (0.02) | (0.04) | (0.03) | (0.03) | (0.02) | (0.04) | (0.04) |
| SECOND_TIER | −0.005 | −0.004 | −0.012 | −0.014 | −0.001 | 0.001 | −0.003 | −0.006 |
| | (0.01) | (0.01) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| LOSSDUM | 0.042*** | 0.003 | 0.031** | 0.015 | 0.048*** | 0.019*** | 0.044*** | 0.022*** |
| | (0.01) | (0.01) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| LNMCAP | −0.033*** | −0.014** | −0.034*** | −0.022** | −0.042*** | −0.020*** | −0.043*** | −0.024*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) | (0.01) | (0.01) |
| LEVERAGE | 0.137*** | 0.149*** | 0.232*** | 0.174*** | 0.212*** | 0.200*** | 0.342*** | 0.267*** |
| | (0.04) | (0.03) | (0.06) | (0.05) | (0.03) | (0.02) | (0.04) | (0.03) |
| CROSSLIST | 0.005 | −0.010 | −0.007 | −0.009 | 0.007 | 0.003 | 0.003 | −0.004 |
| | (0.02) | (0.02) | (0.03) | (0.03) | (0.02) | (0.01) | (0.03) | (0.02) |
| BETA | 0.015 | 0.011 | 0.022* | 0.019** | 0.026*** | 0.015*** | 0.032*** | 0.020*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.00) | (0.01) | (0.01) |
| EASTERN | −0.002 | 0.002 | 0.007 | 0.012 | 0.026** | 0.015** | 0.033** | 0.025** |
| | (0.01) | (0.01) | (0.02) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| GROWTH | 0.017 | −0.112*** | −0.073*** | −0.054** | −0.004 | −0.095*** | −0.074*** | −0.055*** |
| | (0.02) | (0.02) | (0.03) | (0.02) | (0.02) | (0.01) | (0.02) | (0.02) |
| LNAGE | 0.009 | 0.001 | 0.011 | 0.011 | 0.028*** | 0.018*** | 0.035*** | 0.024*** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| CURRATIO | −0.005 | 0.001 | −0.004 | −0.004 | −0.002 | 0.007*** | 0.004 | 0.004 |
| | (0.00) | (0.00) | (0.01) | (0.00) | (0.00) | (0.00) | (0.00) | (0.00) |
| NEWISSUE | 0.029*** | 0.019*** | 0.032** | 0.016 | 0.030*** | 0.022*** | 0.035*** | 0.018** |
| | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) | (0.01) |
| STDUM | −0.016 | −0.025* | −0.030 | −0.019 | 0.034* | 0.024* | 0.034 | 0.006 |
| | (0.02) | (0.01) | (0.02) | (0.02) | (0.02) | (0.01) | (0.02) | (0.02) |
| \|DACC\| | 0.120 | 0.070 | 0.165 | 0.135* | 0.159* | 0.097** | 0.175** | 0.125** |
| | (0.10) | (0.08) | (0.12) | (0.08) | (0.08) | (0.05) | (0.09) | (0.06) |
| Constant | 0.738*** | 0.295** | 0.775*** | 0.453** | 0.806*** | 0.334*** | 0.792*** | 0.435*** |
| | (0.19) | (0.13) | (0.25) | (0.20) | (0.16) | (0.09) | (0.19) | (0.14) |
| Year and Industry FE | Yes | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| Adjusted $R^2$ | 0.114 | 0.189 | 0.123 | 0.111 | 0.162 | 0.215 | 0.175 | 0.142 |
| *F*-statistic | 5.841 | 6.696 | 5.540 | 4.400 | 11.855 | 13.165 | 11.271 | 9.224 |
| Observations | 2,446 | 2,449 | 2,446 | 2,446 | 4,643 | 4,704 | 4,643 | 4,643 |

***, **, * refer to significance at the 1%, 5% and 10% levels, respectively. All variables are defined in Table 2.

institutional ownership are in the expected direction and the coefficients are significant. These results provide additional support for our principal results.

Second, we employ the propensity score matching (PSM) technique to account for model misspecification and omitted variable bias. In the PSM, we form matched pairs of firm-years that are otherwise similar along all of their (observable) economic characteristics but most dissimilar in terms of institutional ownership. After matching on these variables, any difference in earnings quality can be more appropriately attributed to differences in institutional ownership rather than to differences in the other variables, regardless of the underlying structural form. For this, we first estimate the probability that a firm has high institutional ownership (*HIGHINST* equals one if the institutional ownership is higher than the sample median and zero otherwise). This probability (i.e., the propensity score) is the predicted value from a logit regression using the same controls as those includes in our baseline equation. The logit regression results are reported in Column (1) of Panel A of Table 8. The results show that most of the variables in the baseline regression significantly affect the presence of high institutional ownership. The pseudo-R-square for the regression is 0.177. Next, we adopt the nearest neighbour approach to ensure that firms with high institutional ownership (i.e., the treatment group) are sufficiently similar to the firms without high institutional ownerhsip (i.e., the control group). Specifically, each firm with high institutional ownership is matched to a firm without high institutional ownership using the closest propensity score. We further require that the maximum difference between the propensity score of each firm with high institutional ownership and that of its matched peer does not exceed 1% in absolute value.

To verify that firms in the treatment and control groups are indistinguishable in terms of observable characteristics, we conduct two diagnostic tests. The first test consists of re-estimating the logit model for the post-match sample. The results are shown in Column (2) of Panel A of Table 8. Except for BETA, None of the coefficient estimates is statistically significant, suggesting that there are no distinguishable trends between the two groups. Furthermore, the coefficients in Column (2) are generally much smaller in magnitude than those in Column (1), suggesting that the results in Column (2) are not simply an artefact of a decline in degrees of freedom in the restricted sample. Finally, the pseudo R-square drops substantially from 0.177 to 0.002 for the post-match sample. This suggests that

**Table 8**
Propensity score matching (PSM) estimator.

| Panel A: Pre-match propensity score regression and post-match diagnostic regression | | | | | |
|---|---|---|---|---|---|
| Dependent variable: | *HIGHINST* | | \|*DACC*\| | | |
| | Pre-Match | Post-Match | Full | SOE | Non-SOE |
| | (1) | (2) | (3) | (4) | (5) |
| INSTOWN | | | −0.010*** | 0.002 | −0.017*** |
| | | | (−2.98) | (0.31) | (−4.23) |
| BIG4 | 1.354* | 0.980 | −0.006 | −0.009* | −0.003 |
| | (0.23) | (0.18) | (−1.44) | (−1.65) | (−0.53) |
| SECOND_TIER | 1.030 | 1.015 | −0.003 | −0.000 | −0.004* |
| | (0.07) | (0.07) | (−1.58) | (−0.09) | (−1.79) |
| LOSSDUM | 0.702*** | 1.008 | 0.038*** | 0.030*** | 0.046*** |
| | (0.05) | (0.08) | (13.25) | (7.87) | (10.62) |
| LNMCAP | 1.792*** | 0.960 | −0.001 | −0.003 | −0.000 |
| | (0.08) | (0.04) | (−1.05) | (−1.56) | (−0.03) |
| LEVERAGE | 1.438 | 0.978 | 0.005 | −0.003 | 0.010 |
| | (0.32) | (0.23) | (0.65) | (−0.32) | (1.08) |
| CROSSLIST | 0.875 | 1.047 | −0.002 | −0.007 | 0.008 |
| | (0.15) | (0.18) | (−0.47) | (−1.32) | (0.87) |
| BETA | 0.742*** | 1.137*** | −0.003 | −0.002 | −0.003 |
| | (0.02) | (0.05) | (−1.59) | (−0.67) | (−1.41) |
| SOE | 2.858*** | 1.079 | −0.011*** | | |
| | (0.22) | (0.09) | (−5.43) | | |
| EASTERN | 1.099 | 1.005 | 0.001 | 0.003 | 0.000 |
| | (0.08) | (0.08) | (0.59) | (1.17) | (0.14) |
| ASSETGROWTH | 0.903** | 1.018 | 0.056*** | 0.051*** | 0.058*** |
| | (0.04) | (0.05) | (17.22) | (7.79) | (15.32) |
| LNAGE | 1.712*** | 0.944 | 0.004*** | 0.003* | 0.003* |
| | (0.07) | (0.04) | (3.01) | (1.69) | (1.90) |
| CURRATIO | 0.969*** | 1.011 | −0.001*** | −0.001 | −0.001** |
| | (0.01) | (0.01) | (−2.68) | (−1.59) | (−2.16) |
| NEWISSUE | 0.929 | 1.012 | −0.005*** | −0.004 | −0.006*** |
| | (0.04) | (0.05) | (−3.64) | (−1.64) | (−3.34) |
| STDUM | 0.504*** | 1.015 | 0.037*** | 0.027*** | 0.051*** |
| | (0.06) | (0.13) | (5.85) | (3.73) | (4.45) |
| RM4 | 0.666*** | 1.121 | 0.030*** | 0.038*** | 0.026*** |
| | (0.09) | (0.17) | (4.87) | (2.87) | (3.76) |
| CONSTANT | 0.000*** | 2.213 | 0.096*** | 0.132*** | 0.103*** |
| | (0.00) | (2.29) | (3.32) | (2.84) | (2.59) |
| Year Controls | Yes | Yes | Yes | Yes | Yes |
| Industry Controls | Yes | Yes | Yes | Yes | Yes |
| Pseudo/Adj $R^2$ | 0.177 | 0.002 | 0.155 | 0.111 | 0.177 |
| Wald *Chi/F* Stat | 1306.837 | 19.910 | 22.577 | 7.324 | 17.018 |
| Observations | 19,345 | 11,472 | 11,472 | 3851 | 7621 |

| Panel B: Differences in firm characteristics | | | | |
|---|---|---|---|---|
| | *HIGHINST* = 1 (*N* = 5736) | *HIGHINST* = 0 (N = 5736) | Difference | *t*-stat |
| BIG4 | 0.030 | 0.031 | −0.001 | −0.330 |
| SECOND_TIER | 0.601 | 0.598 | 0.003 | 0.300 |
| LOSSDUM | 0.104 | 0.104 | 0.000 | −0.030 |
| LNMCAP | 22.448 | 22.474 | −0.026 | −1.670 |
| SOE | 0.342 | 0.328 | 0.014 | 1.640 |
| LEVERAGE | 0.176 | 0.177 | −0.002 | −0.600 |
| CROSSLIST | 0.043 | 0.043 | 0.000 | 0.090 |
| BETA | 1.096 | 1.070 | 0.026 | 2.540** |
| EASTERN | 0.666 | 0.666 | 0.001 | 0.100 |
| ASSETGROWTH | 0.243 | 0.240 | 0.003 | 0.310 |
| LNAGE | 2.049 | 2.075 | −0.026 | −1.720 |
| CURRATIO | 2.429 | 2.359 | 0.070 | 1.490 |
| NEWISSUE | 0.491 | 0.490 | 0.001 | 0.070 |
| STDUM | 0.035 | 0.035 | −0.001 | −0.200 |

***, **, * refer to significance at the 1%, 5% and 10% levels, respectively. All variables are defined in Table 2.
***, **, * refer to significance at the 1%, 5% and 10% levels, respectively. All variables are defined in Table 2.

the propensity score matching removes all observable differences other than the difference in institutional ownership.

The second test consists of examining the difference for each observable characteristic between the treatment firms and the matched control firms. The results are presented in Panel B of Table 8. Again, with the exception of BETA, none of the differences in observable characteristics between the treatment and control firms is statistically significant at the 5% level. Overall, the diagnostic test results suggest that the propensity score matching removes all observable differences other than the difference in institutional ownership. Thus, this increases the likelihood that any difference in earnings management between the two groups is due to the difference in institutional ownership.

Finally, Columns 3–5 of Panel A of Table 8 report the re-estimation of our baseline regression using the propensity score-matched sample. Similar to the baseline regression in Table 5, the coefficient on INSTOWN is negative and significant for the full sample and non-SOE sub-sample. It is not significant for the SOE firms.

We further address the potential endogeneity bias due to reverse causality by using the three-stage least squares (3SLS) approach and instrumental variable regression. Prior literature generally supports the notion that the level of institutional ownership and stock liquidity are significantly correlated (Rubin, 2007; Dang et al., 2018). Therefore, we use stock's daily turnover ratio (TRNOVER) as a proxy for stock market liquidity and instrument for institutional ownership following prior literature (Hartzell and Starks, 2003; Elyasiani and Jia, 2008; Elyasiani and Jia, 2010; Lin and Fu, 2017). TRNOVER is measured as the ratio of daily trading volume to shares outstanding. Table 9 reports the results obtained using the framework of a 3SLS regression.

Columns 1 and 2 present the results of the simultaneous regressions using |DACC| and INSTOWN as the dependent variable, respectively. Columns 3 and 4 show the results of the simultaneous regressions using RM4 and INSTOWN as the dependent variable,

**Table 9**
Tests of endogeneity.

| | 3-SLS | | | |
|---|---|---|---|---|
| | \|DACC\| | INSTOWN | RM4 | INSTOWN |
| INSTOWN | −0.021*** | | −0.053*** | |
| | (0.01) | | (0.02) | |
| BIG4 | −0.008*** | 0.005 | 0.001 | 0.006 |
| | (0.00) | (0.01) | (0.01) | (0.01) |
| SECOND_TIER | −0.003*** | 0.006** | −0.016*** | 0.002 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| LOSSDUM | 0.039*** | −0.024** | 0.009* | −0.028*** |
| | (0.00) | (0.01) | (0.01) | (0.01) |
| LNMCAP | 0.001 | 0.045*** | −0.042*** | 0.032*** |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| SOE | −0.007*** | 0.093*** | 0.027*** | 0.101*** |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| LEVERAGE | 0.004 | 0.020** | 0.307*** | 0.102*** |
| | (0.00) | (0.01) | (0.01) | (0.03) |
| CROSSLIST | 0.001 | 0.005 | 0.019*** | 0.011 |
| | (0.00) | (0.01) | (0.01) | (0.01) |
| BETA | −0.002* | −0.004 | 0.002 | −0.003 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| EASTERN | 0.002* | 0.003 | 0.004 | 0.004 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| ASSETGROWTH | 0.054*** | 0.007 | −0.053*** | −0.017*** |
| | (41.08) | (0.31) | (0.00) | (0.01) |
| LNAGE | 0.003*** | 0.036*** | 0.015*** | 0.038*** |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| CURRATIO | −0.001*** | | 0.002*** | |
| | (0.00) | | (0.00) | |
| NEWISSUE | −0.007*** | −0.005* | 0.000 | −0.004 |
| | (0.00) | (0.00) | (0.00) | (0.00) |
| STDUM | 0.031*** | −0.086*** | −0.006 | −0.092*** |
| | (0.00) | (0.01) | (0.01) | (0.01) |
| TRNOVER | | −0.134*** | | −0.133*** |
| | | (0.00) | | (0.00) |
| \|DAC\| | | −0.223 | 0.170*** | |
| | | (0.21) | (0.02) | |
| RM4 | 0.028*** | | | −0.292*** |
| | (0.00) | | | (0.10) |
| Constant | Included | Included | Included | Included |
| Year Dummy | Yes | Yes | Yes | Yes |
| Industry Dummy | Yes | Yes | Yes | Yes |
| RMSE | 0.073 | 0.175 | 0.188 | 0.181 |
| Chi /Wald Chi Sq. | 3531.763 | 16,088.770 | 2915.290 | 15,020.679 |
| Observations | 19,335 | 19,335 | 19,335 | 19,335 |

This table presents the results of three-stage least squares estimates and instrumental variable Probit regressions. *t*-statistics are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table 2.

respectively. In general, Table 9 indicates a significantly negative correlation at the 1% level for total institutional ownership.

Finally, we examine the channel through which institutional ownership might affect earnings quality. For this, we investigate how institutional investors might affect analysts' following. Prior literature suggests that higher institutional ownership is likely to reduce information asymmetry (as measured by increased analyst following) and hence enhance earnings quality (Lin and Fu, 2017). However, a lower level of information asymmetry and better earnings quality may also attract institutional investment. To address the mutual independence and channel effects, we follow Elyasiani and Jia (2010) and Lin and Fu (2017) and employ a simultaneous equation system:

$$EM_{i,t} = \alpha + \beta_1 INSTOWN_{i,t} + \beta_2 EMGT_{i,t} + \beta_3 Controls_{i,t} + \sum_j \lambda_j INDUSTRY_{jt} + \sum_k \lambda_k YEAR_{kt} + \varepsilon_{i,t} \quad (6)$$

$$INSTOWN_{i,t} = \alpha + \beta_1 EM_{i,t} + \beta_2 LNANALYST_{i,t} + \beta_3 TRNOVER_{i,t} + \beta_4 Controls_{i,t} + \sum_j \lambda_j INDUSTRY_{jt} + \sum_k \lambda_k YEAR_{kt} + \varepsilon_{i,t} \quad (7)$$

$$LNANALYST_{i,t} = \alpha + \beta_1 INSTOWN_{i,t} + \beta_2 EM_{i,t} + \beta_3 Controls_{i,t} + \sum_j \lambda_j INDUSTRY_{jt} + \sum_k \lambda_k YEAR_{kt} + \varepsilon_{i,t} \quad (8)$$

**Table 10**
Institutional ownership and audit quality: Channel analysis.

| | (1) | | | (2) | | |
|---|---|---|---|---|---|---|
| | \|DACC\| | INSTOWN | LNANALYST | RM4 | INSTOWN | LNANALYST |
| BIG4 | −0.002 | −0.007 | 0.045 | 0.020* | −0.201*** | 0.124*** |
| | (0.00) | (0.01) | (0.04) | (0.01) | (0.03) | (0.03) |
| SECOND_TIER | −0.001 | 0.004 | 0.006 | −0.010** | −0.025** | 0.016 |
| | (0.00) | (0.00) | (0.02) | (0.00) | (0.01) | (0.01) |
| LNANALYST | −0.046** | 0.268*** | | −0.155*** | 1.644*** | |
| | (0.02) | (0.02) | | (0.05) | (0.17) | |
| LOSSDUM | 0.030*** | −0.083*** | 0.220*** | −0.022* | 0.286*** | −0.183*** |
| | (0.01) | (0.01) | (0.05) | (0.01) | (0.04) | (0.02) |
| LNMCAP | 0.025** | −0.101*** | 0.535*** | 0.041 | −0.758*** | 0.472*** |
| | (0.01) | (0.01) | (0.01) | (0.03) | (0.08) | (0.02) |
| SOE | −0.011*** | 0.130*** | −0.151*** | 0.015*** | 0.118*** | −0.036** |
| | (0.00) | (0.01) | (0.02) | (0.00) | (0.01) | (0.02) |
| LEVERAGE | 0.004 | 0.022* | −0.015 | 0.263*** | −0.292** | 0.212* |
| | (0.01) | (0.01) | (0.06) | (0.02) | (0.12) | (0.12) |
| CROSSLIST | −0.004 | 0.031*** | −0.097*** | 0.001 | 0.149*** | −0.087*** |
| | (0.00) | (0.01) | (0.04) | (0.01) | (0.03) | (0.02) |
| BETA | −0.005** | 0.024*** | −0.103*** | −0.012** | 0.140*** | −0.086*** |
| | (0.00) | (0.00) | (0.01) | (0.01) | (0.02) | (0.01) |
| EASTERN | 0.002 | −0.003 | 0.021 | 0.003 | −0.003 | 0.003 |
| | (0.00) | (0.00) | (0.02) | (0.00) | (0.01) | (0.01) |
| ASSETGROWTH | 0.050*** | −0.132*** | 0.509*** | −0.059*** | 0.193*** | −0.123*** |
| | (0.00) | (0.02) | (0.06) | (0.00) | (0.03) | (0.02) |
| RM4/\|DACC\| | 0.020* | | | 0.133*** | | |
| | (0.01) | | | (0.02) | | |
| LNAGE | −0.000 | 0.046*** | −0.046*** | 0.000 | 0.139*** | −0.071*** |
| | (0.00) | (0.00) | (0.01) | (0.00) | (0.01) | (0.01) |
| CURRATIO | −0.000 | | | 0.001** | | |
| | (0.00) | | | (0.00) | | |
| NEWISSUE | −0.001 | −0.018*** | 0.050*** | 0.018*** | −0.188*** | 0.113*** |
| | (0.00) | (0.00) | (0.02) | (0.01) | (0.02) | (0.01) |
| STDUM | 0.018** | −0.094*** | 0.038 | −0.054*** | 0.465*** | −0.315*** |
| | (0.01) | (0.01) | (0.06) | (0.02) | (0.06) | (0.03) |
| TRNOVER | | −0.130*** | | | −0.077*** | |
| | | (0.00) | | | (0.01) | |
| \|DACC\|/RM4 | | 2.746*** | −10.874*** | | 2.383*** | −1.548*** |
| | | (0.35) | (1.20) | | (0.47) | (0.38) |
| INSTOWN | | | 0.168* | | | 0.258*** |
| | | | (0.09) | | | (0.06) |
| Constant | −0.484* | 2.324*** | −10.751*** | −0.860 | 16.063*** | −9.888*** |
| | (0.26) | (0.24) | (0.27) | (0.61) | (1.73) | (0.38) |
| Year Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| Industry Dummy | Yes | Yes | Yes | Yes | Yes | Yes |
| RMSE | 0.078 | 0.301 | 1.016 | 0.201 | 1.100 | 0.677 |
| Chi Sq. | 5111.179 | 11,069.903 | 5559.168 | 2518.211 | 1236.239 | 12,352.594 |
| Observations | 19,335 | 19,335 | 19,335 | 19,335 | 19,335 | 19,335 |

This table presents the results of three-stage least squares estimates. *z*-statistics are shown in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All variables are defined in Table 2.

In these models, INSTOWN is assumed to affect earnings quality via increased analyst following (LNANALYST). Analyst following is measured as the natural log of one plus the number of analysts following the firm. The results of these systems of equations are presented in Table 10. In general, the results indicate a significantly positive effect of institutional ownership on analyst following and for analyst following on both accruals earnings management and real earnings management, respectively. These findings confirm that greater institutional ownership may deter earnings management activities through intensified analyst services, and are consistent with the findings by Chan et al. (2007) in the context of China.

[Insert Table 10 about here].

## 6. Conclusions

In this paper, we examine the impact of institutional ownership on earnings quality in China, a capital market characterized by SOEs and concentrated ownership, creating incentives for self-serving and opportunistic behaviors such as misuse of insider information and earnings management. Employing two proxies of earnings quality: discretionary accruals and real earnings management, and using 19,743 firm-year observations from 2009 to 2017, we find that firms with higher institutional ownership are more likely to display higher earnings quality both in the form of lower discretionary accruals and lesser real activities manipulation.

When we conducted a sub-sample analysis based on state ownership, the results showed that institutional ownership reduces |DACC| in the non-SOE subsample but not in the SOE subsample. In contrast, institutional ownership is associated with a significantly lower level of real activities manipulation in SOE firms but not in non-SOE firms. These results imply that higher institutional ownership is significantly associated with higher earnings quality in both SOE and non-SOE firms, but the channel of the effect is different. For SOE firms, it is via reduced real management activities, while in non-SOE firms, it is via improved accruals management. When we further classify SOE firms into local and central SOEs, we find that institutional ownership constrains real activity manipulation only in the local SOEs. Our results are robust after controlling for endogeneity.

These results have important policy implications for regulators, investors, and audit firms in China. For example, our findings will help external capital providers and other stakeholders assess the pervasiveness of earnings management and the integrity of the financial reporting of Chinese SOE and non-SOE firms. Our findings suggest that in SOE firms, institutional ownership can be instrumental in improving earnings quality, which is a major issue.

While this study provides insights into the association between institutional ownership and earnings quality in China, more research is necessary regarding the monitoring role of institutional investors. For example, future research could examine the types and composition of institutional investors and whether such classification affects this relationship in China. Similarly, whether institutional ownership affects the trade-off between accrual and real earnings management could be another avenue of future research. In a more recent paper, Chan et al. (2021) find that institutional investor inattention is associated with lower audit quality resulting in lower propensity to issue a going-concern opinion, among others, in the US. Given the unique institutional environment, it would be interesting to examine whether the relationship holds in the context of China.

## CRediT authorship contribution statement

**Muhammad Jahangir Ali:** Conceptualization, Writing – original draft, Writing – review & editing. **Pallab Kumar Biswas:** Conceptualization, Data curation, Formal analysis, Methodology, Software, Writing – original draft, Writing – review & editing. **Larelle Chapple:** Project administration, Resources, Supervision, Writing – original draft, Writing – review & editing. **Sriyalatha Kumarasinghe:** Writing – original draft, Writing – review & editing.

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