The Real and Accrual-based Earnings Management Behaviors: Evidence from the Split Share Structure Reform in China

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Abstract

This paper investigates the earnings management activities in Chinese listed firms and the impact of the split share structure reform (SSSREF). We demonstrate that Chinese listed firms exhibited a long-term positive relationship between real and accrual-based earnings management activities over the 2002–2011 period. This reflects the environment of weak investor protection and lack of effective corporate governance in China. Our results also indicate that the SSSREF in China has not fundamentally improved firms' quality of financial information. This may be because ownership concentration remains high. However, it is of interest that the reform has created an incentive alignment effect exogenously. We find that firms' use of discretionary accruals was constrained, and they have consequently shifted to less detectable and under-scrutinized real earnings activities after the reform. This shift is similar to that seen with the direct regulatory changes in accounting reporting rules on firms' earnings behaviors in developed countries where the investor protection environment is strong. We suggest that firms' shifting between the accrual and real-based earnings methods is an overlooked area for investors to consider in the emerging market context, and may require the attention of regulators.
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1. Introduction

Extensive research has well documented the positive effect of good corporate governance mechanisms on the information environment and quality of earnings. It can constrain managerial opportunistic behaviors and the expropriation of minority shareholders by controlling shareholders, thus mitigating information asymmetry and improving the *quality* of earnings (Armstrong, Balakrishnan, & Cohen, 2012; Beasley, 1996; Fan & Wong, 2002; Klein, 2002; Warfield, Wild, & Wild, 1995; Xie, Davidson, & DaDalt, 2003) (see Section 2.3 for details).[1] In the Chinese context, the Chinese stock market has featured a split structure, separating firms' stock into tradable (TS) and non-tradable shares (NTS). Nearly two-thirds of the A-shares were non-tradable and typically held by the state to retain control over listed firms in the early economic reform period (Li, Wang, Cheung, & Jiang, 2011; Yeh, Shu, Lee, & Su, 2009).[2] Severe corporate governance issues arose from this split structure as a result of a divergence of interests and incentives between controlling NTS principals and TS minority shareholders.

The split share structure reform (SSSREF) has exogenously created an incentive alignment effect, which strengthens corporate governance and improves the *quantity* of corporate financial information (see also Section 2.1 for more details).[3] For instance, Liu and Tian (2012) indicate that both tunneling and excess leverage by controlling shareholders with excess control rights have been reduced after the SSSREF in China. Beltratti, Bortolotti, and Caccavaio (2012) demonstrate a positive stock market reaction upon the announcement of the SSSREF as firms' profitability and returns are expected to increase with the improvement in corporate governance. Hou, Kuo, and Lee (2012) also indicate that this incentive alignment effect brought by the SSSREF has reduced the incentive for controlling shareholders to withhold price-sensitive information and thus effectively improves corporate transparency.

However, it might be premature to conclude that firms have simultaneously reduced their earnings manipulation behaviors even though the reform brought an increasingly widespread availability of information to market participants. We therefore question the previous literature that the reform may not fully improve the *credibility* (*quality*) of firms' increasing disclosure of financial information by examining the changes in earnings manipulation behaviors. Apart from studying both accrual and real-based earnings management activities in the Chinese market, we attempt to make a threefold contribution.

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[1] For example, some previous research uses empirical evidence from the U.S. market and demonstrates that accrual-based earnings management can be constrained by a larger number of independent board members and higher quality of audit committees (Beasley, 1996; Chang & Sun, 2009; Dechow, Sloan, & Sweeney, 1996; Klein, 2002; Xie et al., 2003). Hazarika, Karpoff, and Nahata (2012) also show that an effective board can restrain senior managers from pursuing aggressive earnings strategies to manipulate accruals. Similarly, Armstrong et al. (2012) find that the passage of antitakeover laws in the U.S. reinforces the external corporate governance mechanism, improving firms' financial statement informativeness (see also Section 2.3).

[2] China's listed shares (tradable) are classified into A shares for domestic investors to trade, and B, H, and N shares for foreign investors. A shares are quoted in Chinese Yuan and B shares are quoted in foreign currencies and both are listed in the Shanghai and Shenzhen Stock Exchanges. H shares are Chinese firms' shares listed in the Hong Kong Stock Exchange. N shares are traded in the U.S. stock markets in the form of American Depository Receipts (ADRs).

[3] It has converted NTS to TS and tied the wealth of non-tradable shareholders to share prices, thereby aligning both tradable and non-tradable shareholders' interests to profit maximization (see Section 2.1 for more details).

First, we study the Chinese SSSREF due to its two distinctive settings, an environment of weak investor protection and the nature of its regulatory change. In an emerging market context, the investor protection environment is often very weak compared to developed countries. For example, Allen, Qian, and Qian (2005) find that the development of the relevant Chinese law and institutions is far behind that of most countries in the sample used by the substantial literature produced by La Porta, López-de-Silanes, Shleifer, and Vishny (1997) and López-de-Silanes, La Porta, Shleifer, and Vishny (1998), particularly in the areas of investor protection systems, corporate governance, accounting standards, and quality of government. Firth, Fung, and Rui (2007) also point out that investor protection is weak in China due to a less developed legal system, market control mechanism, and managerial labor market, together with a concentrated ownership structure and two-tier board structure that affects earnings-informativeness.

In the absence of effective corporate governance and with weak investor protection, we would expect an increasing trend of simultaneous use of both accrual and real earnings management in Chinese firms. Therefore, there should be a positive relationship between these two activities that reflects the distorted earnings quality and indicates that firms engaging in either accrual or real-based earnings management are likely to also use the other method to supplement it at the same time. We also expect our result to differ from those studies conducted on developed markets. Developed market firms may find it difficult and costly to simultaneously increase the use of both approaches as they are constrained by an environment of strong investor protection. Previous studies show that there is a substitutive (negative) relationship between accrual and real earnings management in developed markets in general (Badertscher, 2011; Cohen, Dey, & Lys, 2008; Ge & Kim, forthcoming; Zang, 2012).

With regard to the nature of the SSSREF reform, the SSSREF does not impose direct regulatory requirements on financial reporting or information disclosure, as was the case under the Sarbanes–Oxley Act (SOX) and International Financial Reporting Standards (IFRS). Its purpose is to abolish the unique split share structure in Chinese listed firms by converting all NTS into TS. Previous to the reform, this split share structure often escalated the conflicts of shareholders' interests and induced corporate governance problems, especially given the weak minority shareholder protection environment in China. NTS shareholders' wealth was insulated from stock price movement before the reform and consequently the controlling shareholders have less incentive to disclose information and to maximize firm performance (Liu & Tian, 2012). As the NTS become tradable, the wealth and interests of their holders become linked to firms' stock performance, thus significantly increasing incentive alignment between NTS and TS shareholders. More importantly, the reform creates market-based incentives for firms to supply information in order to reap the benefits of capital allocation from outside investors and minimize their adverse stock pricing. The SSSREF therefore has *exogenously* created an incentive alignment effect, which strengthens corporate governance.

On the contrary, the SOX and SSSREF are direct regulatory changes in accounting reporting rules. The SOX act in the U.S. was promulgated in response to highly publicized accounting scandals to improve corporate transparency and the quality of financial reporting (Cohen et al., 2008). Similarly, the mandatory IFRS (formerly the IAS) adopted in many European countries was introduced with the aims of ensuring

comparability of financial reporting, improving corporate transparency, and enhancing the quality of financial statements to facilitate a lower cost of capital for E.U. firms (EC16/06/ 2002).[4] These regulatory changes in the developed country markets are associated with the heightened scrutiny of accounting practices as they took place after scandals were publicized or new reporting requirements were implemented.[5] This makes the SSSREF a more exogenous setting than that of IFRS and SOX. Cohen et al. (2008) and Ipino and Parbonetti (2011) have shown that these direct regulatory changes in accounting reporting, such as SOX and IFRS, can constrain accrual earnings activities. As a result, firms tend to use less accrual and more real-based earnings management methods to avoid detection of accrual-based earnings management.

We expect that the SSSREF strengthens corporate governance through exogenously creating an incentive alignment, which in turn impacts earnings management activities.[6] We therefore hypothesize that indirect regulatory change such as the SSSREF can lead to a shift from accrual to real-based earnings management activities, which are less detectable and less scrutinized in China where investor protection is weak. We have seen such a shift in the case of direct regulatory changes in accounting reporting rules such as SOX and IFRS in developed markets with strong investor protection. However, we do not expect this exogenous effect to be sufficient to fundamentally improve the *quality* of financial information in China, which would be expected to reduce the level of both accrual and real-based earnings management simultaneously. This is because ownership concentration remains high after the reform, making it possible for controlling shareholders to manipulate earnings in order to inflate share prices and camouflage their intentions for expropriation. Overall, the aforementioned two unique features, the weak environment for investor protection and exogenous setting, allow us to test the effect of the SSSREF on firms' earnings behaviors and draw inferences distinct from previous research based on the SOX and IFRS settings, thereby extending the earnings management literature in general.

Second, we contribute to the literature by studying the relationship between accrual and real-based earnings activities in the pre- and post-reform periods. As previous studies indicated that the reform has improved the *quantity* of firms' financial information and

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[4] Regulation (EC) No 1606/2002 of the European Parliament and of the Council of 19 July 2002.

[5] For instance, under the SOX, boards of directors and specifically audit committees need to include financial experts; financial reporting needs to include off-balance-sheet transactions, pro-forma figures, and stock transactions of corporate executives. It also requires firms to report material changes in financial condition in a timely manner and include specific enhanced reviews by the SEC or its agents. Under the IFRS, firms are required to remove allowable accounting alternatives and use "fair value measurements" to report financial assets that can reflect their financial positions and do not affect their intrinsic value. IFRS also requires the following: recognition of items as assets or liabilities only in accordance with IFRS; the disclosure of the fair value measurements, financial instruments, and financial settlements with corporate insiders or other parties; consolidated financial statements from the parent firms; interests of other entities included in subsidiaries, joint arrangements, or associations.

[6] As previous studies indicated that the reform has improved the quantity of firms' financial information and incentive alignment (see Section 2.3 for more details), it might be expected that Chinese listed firms have reduced their earnings management, including both accrual and real earnings management. However, such conclusions might be premature. Firms may simply change their mix preferences and switch from accruals earnings management to real activates, which is less detectable and scrutinized, to continue manipulating accounting information in the post-reform period.

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To test our hypotheses, we use a sample of all Chinese companies listed in Shanghai and Shenzhen Stock Exchange from 2002 to 2011. To detect accrual-based earnings management (AM), we employ a cross-sectional Jones model (Jones, 1991).[7] To identify real-based earnings management (RM), we first estimate abnormal cash flows from operations, abnormal production costs, and abnormal reduction of discretionary expenses, based on the work of Roychowdhury (2006). Following Cohen and Zarowin (2010) and Badertscher (2011), we then combine these three separate measures into three aggregate proxies to capture the total effect of RM. The focus of this research is to understand the earnings management behaviors and trends across the pre- and post-reform periods. In the multivariate regressions, we also control for corporate governance and firm specific variables that may affect the variations in earnings manipulation activities.

Our empirical results indicate that firms use both accrual and real-based earnings management in the Chinese context. As opposed to the negative relationship discovered by previous studies (Badertscher, 2011; Cohen et al., 2008; Ge & Kim, forthcoming; Zang, 2012), our results demonstrate that there is a long-run positive relationship between real and accrual earnings management throughout the sample period. This is consistent with our expectation and implies that Chinese listed firms, when engaging in either more real or accrual-based earnings management, are more likely to also use the other method to supplement it. This can result from the lack of effective corporate governance and weak investor protection. Our results further confirm our aforementioned expectations and show that Chinese firms shift their earnings activities from AM to RM after the SSSREF. This implies that there is an exogenous effect of the SSSREF that changes firms' earnings management behaviors. It has a similar effect to direct comprehensive regulatory changes in accounting reporting rules in developed countries where investor protection is strong, since Cohen et al. (2008) and Ipino and Parbonetti (2011) demonstrate that there is a shift from AM to RM after the SOX and IFRS.

However, we find that the SSSREF has not led to a fundamental improvement in the *quality* of financial information as it has not effectively reduced both accrual and real-based earnings management. This may be because ownership concentration remains high after the reform. The controlling shareholders still retain a large share ownership even though the shareholdings of the largest shareholders and state ownership are significantly reduced. In the post-reform period, they may be tempted to increase wealth by inflating stock prices as the incentive alignment has led the controlling shareholders to focus on stock performance (as we explained in the mechanism of the SSSREF). Firms' operating performance cannot be improved overnight; they are more likely to shift the focus of earnings management to less detectable real activities in order to manipulate

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[7] We also use the modified Jones model in our robustness test following Kothari, Leone, and Wasley (2005) and Cohen et al. (2008).

earnings and achieve a desired accounting performance in a short period to camouflage their intentions for expropriation. Our results suggest that firms choose to switch from AM to RM activities as the costs of manipulating accruals increase with the heightened scrutiny by the capital market after the reform.

Third, this paper yields additional policy implications related to the scope of the reform. Previous studies have examined the impact of direct regulatory changes in corporate disclosure on firms' earnings management behavior, such as the passage of the SOX and the IFRS adoption (Cohen et al., 2008). We extend the work of Cohen et al. (2008) by hypothesizing that the SSSREF has achieved an indirect exogenous effect on the trend of firms' earnings behaviors in the emerging market. However, despite an increasing availability of information, there is room for firms to continue manipulating earnings information as firms can switch from accrual to real-based earnings methods. This might be an overlooked area that regulators need to be aware of while improving accounting information and embarking on further reform for minority shareholder protection. Investors also need to consider this issue as an additional risk while making investments in the context of emerging markets.

We also consider the impact of accounting flexibility that may limit firms' ability to report discretionary accruals in our sample period (Barton & Simko, 2002; Wang & D'Souza, 2006; Zang, 2012). Our results indicate that a decrease in accounting flexibility induces a higher level of RM and reduces the use of discretionary accruals, but the effect of the SSSREF on the relationship between AM and RM remains unchanged after controlling for the impact of accounting flexibility. Other robustness tests using individual real earnings management proxies, bootstrapped medium regressions, suspect firm analysis and difference-in-difference design provide further support for our overall conjecture that indirect policy measures can have an exogenous effect on firms' earnings behaviors.

The remainder of this paper is organized as follows. It first provides a brief overview of China's SSSREF, then discusses the link between the reform and earnings management and explains how the research hypotheses are raised in light of the current literature in Section 2. Following this, this paper describes methodology, data sources, and summary statistics in Section 3. We then report our empirical results on the existence of the both RM and AM activities in the Chinese context, their relationship and robustness checks in Section 4. The last section concludes the paper.

2. Related literature and hypothesis development

2.1. China's split share structure reform

Central to China's economic reform is the corporate privatization and stock exchange listing of formerly state-owned enterprises. Due to the gradualist nature of the reform, the government retained controlling ownership stakes in the form of non-tradable shares immediately after the firms' listing in the 1990s early reform period. Only minorities of the shares was issued to domestic individuals and institutional investors and were freely tradable in the newly established Shenzhen and Shanghai stock exchanges. This two tier stock structure did not improve profitability and efficiency and even led to declines in these stocks after the firms' listing (Chen, Lee, & Li, 2008; Yu, Du, & Sun, 2006).

Therefore, the split share structure has emerged as a transitional process for share privatization.[8]

The predominance of NTS was recognized by the government as a major impediment to the growth and effective functioning of the stock market for two key reasons. First, the market for corporate control was nearly absent. Given the high concentration of non-tradable shares held by the state, minority shareholders had very little say in firm decision-making even though they had the same cash flow and voting rights. They also had to bear the risk of agency issues and value expropriation by the majority shareholders, and lacked the information required to monitor firms' operation and the incentive to do so. Managerial entrenchment remained pervasive when officials were appointed as firms' CEOs by the controlling shareholder, the state, to represent its interest. Second, incentive divergence between NTS and TS shareholders became very severe due to the tradability and pricing mechanisms of the two types of shares. TS are tradable and priced based on the market. They have higher price-earnings ratios than NTS, which cannot be traded on the stock market but can be transferred to other parties to hold with the permission of the state and at a negotiable price primarily based on the net asset value. The stock price movement had little impact on the value of NTS, and therefore there was very little incentive for controlling NTS shareholders to improve firms' operating performance and to maximize market based TS value (Chen, Firth, Xin, & Xu, 2008; Li et al., 2011).

In June 2001, the government launched an initiative to reduce government ownership by selling state-owned NTS directly on the stock markets. It was hoped that when NTS were subject to market forces, incentive alignment between TS and NTS shareholders could be achieved. This plan resulted, however, in share prices plummeting by over 30% as TS investors were concerned that an increasing supply of shares would decrease the value of their shareholdings. The government had to withdraw this plan in October 2002 in response to the strong adverse reaction from the holders of tradable shares. In April 2005, the China Securities Regulatory Commissions (CSRC) launched a pilot reform in an attempt to end the split share structure. Firms were selected in batches to complete a conversion from NTS to TS. Different from the initial approach, NTS shareholders were required to pay compensation to TS shareholders before their NTS could be traded on the stock markets. Compensation proposals made by NTS shareholders needed to be approved by at least two-thirds of total voting shares and two-thirds of TS shareholders who voted at the shareholders' meeting.

Several other measures were also introduced to facilitate the implementation of the reform. For example, to reduce stock price volatility, share trading was suspended prior to the public announcement of the agreed compensation plans. Firms were also allowed to repurchase their shares to stabilize stock prices. Additionally, due to the massive rise in share supply after the conversion of NTS, a 12-month "lockup" period for NTS shareholders was imposed to ease the possible impact of stock overhang on the holdings of TS shareholders. NTS shareholders with more than 5% of a firm's shares were further restricted from trading more than 5% and

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[8] The "Enterprise Reform" (corporatization of the state-owned enterprises) in China is indeed a complicated process. The government adopted a piecemeal reform approach as the state still aims to influence the market. The primary objective of the split share structure reform is to convert non-tradable shares to tradable shares. This involves selling off some state-owned shares and thus is considered as a privatization process (Li et al., 2011; Liu & Tian, 2012). Following Chang & Wong, 2009; Chen, Firth, & Xu, 2009; Firth, Fung, & Rui, 2006; Huyghebaert & Wang, 2012, the SSSREF can be considered as leading to partial privatization since the state still retains a significant ownership after the firms have been listed.

10% of the firm's total share capital within 12 and 24 months, respectively. By the end of 2007, 1254 Chinese listed firms, accounting for 97% of the A-share market capitalization, had completed the reform and begun to gradually release their NTS (Firth, Lin, & Zou, 2010; Li et al., 2011).

2.2. Real and accrual-based earnings strategies

The motivations for altering financial information vary from meeting regulatory thresholds and analysts' forecasts, to smoothing managerial compensation and obtaining desirable stock valuations in capital markets (Dechow & Skinner, 2000; Healy, Hutton, & Palepu, 1999; Lo, 2008). Firms manipulate accruals by exploiting the flexibility of accounting rules to temporarily 'mask' true firm performance (Boonlert-U-Thai, Meek, & Nabar, 2006; Dechow & Skinner, 2000). Accruals manipulation is not achieved by altering underlying operating activities with direct effect on cash flow, but rather via the exercise of managers' discretion and judgment regarding accounting choices (Gunny, 2010).

Extensive research has documented that Chinese listed firms use discretion in the accrual accounting process to manage their earnings information. For example, Aharony, Lee, and Wong (2000) report that firms manage earnings upwards using discretionary accruals to inflate earnings and skew stock market valuations prior to an IPO. The CSRC requires firms to report positive earnings (return on equity) for three consecutive years, and Chen and Yuan (2004) and Haw, Qi, Wu, and Wu (2005) show the use of discretionary accruals to meet this specific regulatory threshold for maintaining listing status, qualifying for IPOs and rights issues or avoiding delisting or trading restrictions (special treatment). Similarly, others (Chen et al., 2008; Cheng, Aerts, & Jorissen, 2010; Jian & Wong, 2010; Jiang & Wang, 2008; Liu & Lu, 2004; Yu et al., 2006) document that controlling shareholders tunnel resources or prop up earnings in the form of related party transactions, transfer pricing, or corporate loans and subsidies from the local governments to beat regulatory benchmarks.

However, in practice, firms are likely to employ real activities to manipulate earnings in addition to accruals. Previous research exclusively relies on aggregate accruals as a proxy to measure earnings management in China, as does most empirical research in other contexts (Fields, Lys, & Vincent, 2001). Unlike accruals manipulation, real activities manipulation departs from normal operational practice and occurs when managers alter the timing or structuring of transactions, investment, and allocation of resources to boost accounting earnings in the current periods (Dechow & Skinner, 2000; Roychowdhury, 2006). It has a direct effect on operating activities and cash flow.

Roychowdhury (2006) found evidence that firms avoid reporting losses and negative changes in earnings by manipulating real activities, such as price discounts or lenient credit terms to boost sales, overproduction to lower the cost of goods sold per unit, and reduction of discretionary expenses. Others reported the use of real-based methods such as alternations of shipment schedules or delaying or reducing R&D and advertising spending, securitization, etc. (Cohen & Zarowin, 2010; Cohen et al., 2008; Dechow, Myers, & Shakespeare, 2010). The survey evidence in Graham, Harvey, and Rajgopal (2005) also indicates extensive use of real activities manipulation among financial executives for meeting earnings targets and their willingness to do so even at the expense of future firm value. In a related research, Gunny (2010) further provides empirical evidence that real activities are associated with meeting

earnings benchmarks and will allow firms engaging in real earnings management to have relatively higher subsequent performance.

The split share ownership structure in China arguably gives entrenched controlling shareholders an incentive to manipulate earnings. In particular, the corporate governance and investor protection environment in China are much weaker than that in developed markets (Allen et al., 2005; Firth et al., 2007; La Porta et al., 1997; López-de-Silanes et al., 1998). As described earlier, controlling shareholders generally own NTS, which are determined by the net asset value. They are interested in raising more capital from IPO or SEO to increase the net asset value per share.[9] They are less concerned with the quality of public accounting information as firms' share price is irrelevant to their wealth (Chen et al., 2008). Conversely, minority TS shareholders rely on positive accounting information to invest and expect an increase in the market value of their TS shares. Controlling shareholders are motivated to overstate reported earnings in order to raise more capital and increase their wealth as minority shareholders are induced to pay inflated prices for TS (Fan, Wong, & Zhang, 2007). Chinese listed firms with higher debt have been found to be more likely to manipulate financial information when issuing new shares, leading to restatement of their "correct" earnings in the following years (Chan, Menkveld, & Yang, 2008). Moreover, given the highly concentrated ownership structures in Chinese listed firms, the controlling NTS shareholders have often gained control rights that exceed their cash flow rights. In such cases, firms are more likely to be motivated to adopt less informative accounting practices so as to camouflage their expropriation of value from minority TS shareholders (Fan & Wong, 2002).

To our knowledge, there has been minimal research to date addressing either real activities manipulation or the dynamic relationship between real and accrual-based earnings management in the emerging country context with weak investor protection. Building on the above work, the first objective of this paper is to examine whether both of the earnings management methods are used in Chinese firms and whether there is a positive relationship between the two earnings management activities in an environment of weak investor protection and the lack of effective corporate governance. This allows us to provide a more complete picture of the trends in earnings management activities during China's split structure reform. We thus test the following hypothesis:

H1. Chinese listed firms exhibit a long-term positive relationship between real and accrual-based earnings management activities.

2.3. Earnings management in the split share structure reform

Only a few studies have recently considered the dynamic relationship between the real and accrual-based earnings management methods. Notably, Cohen et al. (2008) document

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[9] Net assets per share is used as a base price for negotiation following the Promulgation of the Opinion on the Implementation and Regulations of the State Ownership Rights in Joint Stock Limited Companies in 1997. Some recent research has reported that Chinese listed firms engaged in opportunistic earnings manipulation previous to IPO, using related party transactions, transfer pricing, or corporate loans. Some parent firms have been found using these methods to prop up the earnings of their to-be-listed subsidiaries in order to raise more capital from minority shareholders, and then tunneling financial resources back in the post IPO period (Liu and Lu, 2004; Kao, Wu, & Yang, 2009; Aharony et al., 2000; Jian & Wong, 2010; Liu and Tian, 2012).

that after the passage of the Sarbanes–Oxley Act in 2002 following highly publicized accounting scandals, firms tended to use less accrual and more real-based earnings management methods to avoid detection of accrual-based management. Ipino and Parbonetti (2011) also find this tendency in the setting of the mandatory IFRS adoption in countries with strict enforcement regimes. A similar trend was reported by Cohen and Zarowin (2010) after firms made seasoned equity offerings (SEO) in order to achieve critical earnings benchmarks. Likewise, Badertscher (2011) shows that to sustain their overvalued equity, firms increasingly use real rather than accrual-based earnings management as the overvaluation period progresses. Zang (2012) also concludes that there is a substitutive relationship between real and accrual earnings manipulations. While recent literature shows that firms are not limited to accrual earnings management and firms in developed markets shift from accrual to real-based earnings management after direct regulatory changes in accounting reporting rules such as SOX and IFRS, the impact of the indirect and exogenous regulatory changes on firms' choice of real and accrual-based earnings strategies have not yet been fully understood in the emerging market context with an environment of weak investor protection.

With respect to the key factor constraining earnings management, extensive previous research suggests that good corporate governance can limit firms' opportunistic behaviors, improving the information environment and the quality of earnings. For example, several studies use a U.S. sample to show that both a greater proportion of independent boards, and higher audit committee quality, are more effective in preventing financial statement fraud and constraining earnings management measured by discretionary accruals (Beasley, 1996; Chang & Sun, 2009; Dechow et al., 1996; Klein, 2002; Xie et al., 2003). Others show that effective boards can discipline top management who pursue aggressive earnings strategies to manipulate accruals, thereby reducing possible costly external consequences (Hazarika et al., 2012). Managerial ownership has been found to reduce the magnitude of discretionary accruals and to be positively associated with informativeness of earnings (Warfield et al., 1995). In countries with high level of ownership concentration, such as many in East Asia, the entrenchment effect of controlling shareholders prevails and results in low earnings informativeness (Fan & Wong, 2002). For external corporate governance mechanisms, Armstrong et al. (2012) document an improvement in the information environment as evident in the decrease of information asymmetry and increased financial statement informativeness on the passing of anti-takeover laws, which has an exogenous effect on the corporate control market.

In the Chinese context, Gul, Kim, and Qiu (2010) show that a higher degree of ownership concentration reduces corporate transparency and share price informativeness in listed firms with higher state ownership, less foreign ownership, and poor auditor quality. They interpret their result as supporting the view that good corporate governance improves firms' information environment. Firth et al. (2007) illustrate that both ownership and board structure determine the extent that discretionary accruals are opportunistic, thereby affecting the quality of firms' financial information in China. Similarly, Liu and Lu (2007) document that inefficient corporate governance as a result of principal–principal agency conflicts increases earnings management in the form of tunneling. Both Ding, Zhang, and Zhang (2007) and Wang and Yung (2011) also find that listed firms with private controlling ownership demonstrate a higher level of accrual-based earnings management than state-controlled firms, since private-listed firms face a tougher

environment to raise capital and only have minimal state support. They are therefore more prone to manipulate accounting information in order to report positive earnings.

Similarly, the SSSREF should reduce earnings management as it creates an incentive alignment exogenously and strengthens corporate governance of Chinese listed firms in an environment of weak investor protection. As noted in previous research, the reform converted NTS into TS, thus linking controlling NTS shareholders' wealth to firms' stock performance after the reform. The incentive alignment between NTS controlling shareholders and TS minority shareholders for profit maximization was exogenous because the share conversion was implemented at full scale in all listed firms (Liu & Tian, 2012). Previous research has provided empirical evidence that the SSSREF improved many corporate governance related issues such as corporate transparency, external monitoring by outsiders, and information asymmetry (Hou et al., 2012; Liu & Tian, 2012; Yeh et al., 2009). Liu and Tian (2012) show an improvement in corporate governance after the SSSREF has reduced both tunneling and excess leverage by controlling shareholders with excess control rights. Beltratti et al. (2012) further demonstrate that the Chinese stock market reacted positively to the announcement of the SSSREF as investors expected firms' profitability and returns to increase with an anticipated improvement in corporate governance. The work of Hou et al. (2012) more specifically examines the effect of the SSSREF on share price informativeness. They suggest that the reform improves firms' incentive alignment exogenously, thereby reducing the incentive for controlling shareholders to withhold price-sensitive information. As such, the reform has led to the improvement in the quantity of corporate information.

However, it might be premature to conclude that firms reduce their earnings manipulation behaviors (i.e. an improvement in the quality of financial information) even though the reform brought an increasingly widespread availability of information to market participants given the dynamic relationship between real and accrual-based earnings strategies discussed earlier. In particular, ownership concentration still remains high after the SSSREF in China, making expropriation of minority shareholders possible. It might also be problematic to only rely on the magnitude of accruals to understand the fuller picture of earnings management activities influenced by the reform. Controlling shareholders may still have the incentive to increase their own wealth by inflating stock prices via earnings management activities. They can switch and combine real and accrual-based earnings methods to influence firms' value and earnings expectations, distorting earnings quality. Highly concentrated ownership makes it possible for them to continue manipulating earnings and disguising their expropriation of minority shareholders, especially if the dominant shareholders still retain a large share of ownership after the reform. Moreover, NTS controlling shareholders have the time to do so before being selected to complete the reform and the expiry of the lock-up period, as the reform was gradually rolled over to all listed firms.

Our conjecture is that in the absence of effective corporate governance and with weak investor protection, the reform should have reduced accrual-based earnings management activities because its incentive alignment effect led to improved corporate governance, an increased quantity of firms' financial information, and heightened scrutiny by the capital market, all of which increase the cost of using this method. Instead, firms switch to use more real activities manipulation, which is less scrutinized and detectable, to continue their earnings manipulation. This shift from accrual to real earnings management should be similar to the effect of direct regulatory changes such as the SOX and IFRS in the developed market where

investor protection is strong. In light of the above discussion and previous studies, we hypothesize:

H2. After the split share structure reform, Chinese listed firms tended to use less accrual and more real-based earnings management methods.

H3. After the split share structure reform, Chinese listed firms shift from accrual to real-based earnings management.

3. Empirical methodology

3.1. Earnings management measurement

3.1.1. Accrual-based earnings proxy

Following previous literature, we employ discretionary accruals to proxy for accrual-based earnings management. We first estimate the "normal" or expected level of accruals by using the cross-sectional Jones model as described by Jones (1991), Teoh, Welch, and Wong (1998), and Cohen and Zarowin (2010):

$$\frac{TA_{it}}{Assets_{i,t-1}} = k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{\Delta SALES_{it}}{Assets_{i,t-1}} + k_3 \frac{PPE_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \tag{1}$$

where, for each fiscal year t and firm i, TA is the total accruals (earnings before extraordinary items and discontinued operations less operating cash flows). We estimate the above regression for firms within each industry code classified by the CSRC. $Assets_{i,t-1}$ represents total assets, $\Delta SALES_{it}$ is the annual change in sales, PPE_{it} equals gross property, plant, and equipment. We then use the coefficient estimates from Eq. (1) to calculate the firm-specific normal accruals (NA_{it}) for the sample:

$$NA_{it} = \hat{k}_1 \frac{1}{Assets_{i,t-1}} + \hat{k}_2 \frac{\Delta SALES_{it}}{Assets_{i,t-1}} + \hat{k}_3 \frac{PPE_{it}}{Assets_{i,t-1}} \tag{2}$$

Discretionary accruals (DA_{it}) measured in this paper are the difference between total accruals and the fitted normal accruals (NA_{it}).

3.1.2. Real earnings proxies

Based on previous studies, three individual proxies are identified to measure real earnings management. We estimate all proxies with a minimum of 8 observations for each year. Following Dechow, Kothari, and Watts (1998), Roychowdhury (2006), and Cohen and Zarowin (2010), we first model cash flow from operations (CFO) and express this as a linear function of sales and changes in sales in the current year.

$$\frac{CFO_{it}}{Assets_{i,t-1}} = \alpha_1 + k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{Sales_{it}}{Assets_{i,t-1}} + k_3 \frac{\Delta Sales_{it}}{Assets_{i,t-1}} + \varepsilon_{it} \tag{3}$$

where CFO_{it} is cash flows from operations taken from the statement of cash flows for firm i in year t, $Asset_{i,t-1}$ represents total assets at the end of year $t-1$, $Sales_{i,t}$ is the net sales for firm i in year t, and $\Delta Sales_{it}$ is firm i's changes in net sales between year $t-1$ and year t. ε_{it} is the error term. The abnormal cash flow from operation equals the actual CFO minus the "normal" level of CFO calculated by using the estimated coefficient from Eq. (3) for each industry and year. As Roychowdhury (2006) and Cohen and Zarowin (2010) suggest, managers engage in sales manipulation through acceleration of timing of sales using price discounts or more lenient credit terms in the current period. The temporarily boosted sales volume is likely to diminish in the next fiscal year once the firm reverts to the original prices. Additional sales increase current period total earnings, but result in declines in margin due to price discount, lenient credit, and higher production costs relative to sales than the "normal" level. We therefore expect a lower abnormal CFO (ACFO) in the current period as a result of sales manipulation when firms participate in real earnings management according to Eq. (3).

The second individual proxy is the abnormally high production costs, expressed in the regression below:

$$\frac{PROD_{it}}{Assets_{i,t-1}} = \alpha_1 + k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{Sales_{it}}{Assets_{i,t-1}} + k_3 \frac{\Delta Sales_{it}}{Assets_{i,t-1}} + k_4 \frac{\Delta Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (4)$$

where $PROD_{it}$ is firm i's production costs in year t, which equals the sum of the cost of goods sold plus change in inventory. All other variables are defined previously. To manage earnings upward, firms can overproduce inventory in order to report a high operating margin as the fixed cost per unit declines with an increasing volume of production. We expect that a higher value of the residual (*APROD*) estimated from the above Eq. (4) indicates higher manipulation through overproduction.

The third proxy is abnormal discretionary expenses (*ADISX*), which is estimated by using the following equation:

$$\frac{DISX_{it}}{Assets_{i,t-1}} = \alpha_1 + k_1 \frac{1}{Assets_{i,t-1}} + k_2 \frac{Sales_{i,t-1}}{Assets_{i,t-1}} + \varepsilon_{it} \quad (5)$$

$DISX_{it}$ equals discretionary expenditures including selling, general and administrative expenses, R&D, and advertising for firm i in year t. As discretionary expenditures do not normally generate immediate revenues for firms, managers may choose to reduce such expenses to boost current earnings. If firms usually pay these expenditures by cash, they might experience a higher cash flow and an abnormal CFO effect in the current period (Roychowdhury, 2006). We therefore expect lower abnormal discretionary expenses (ADISX) when real earnings management is involved, according to Eq. (5).

Finally, consistent with Cohen and Zarowin (2010) and Zang (2012), we construct two aggregate proxies by summing the above individual proxies to capture the total effects of real earnings management.

Following the previous studies, our first aggregate real management proxy is expressed as:

$$RM\_1 = -\text{abnormal cash flow from operations} + \text{abnormal production costs} \quad (6)$$

We multiply abnormal cash flow from operations by -1, and then add abnormal production costs so that a higher level of *RM_1* indicates higher levels of real earnings management activities. We do not multiply abnormal production costs by -1 as it already implies higher levels of real activities.

The second aggregate measure is given as:

$$RM\_2 = -\text{abnormal cash flow from operations} - \text{abnormal discretionary expenses} \qquad (7)$$

We multiply abnormal cash flow from operations and abnormal discretionary expenses by -1 and sum them both. The larger value of *RM_2* suggests a greater use of sales manipulations and a reduction in discretionary expenses to manager earnings.

Following Cohen et al. (2008), we construct the third aggregate measure, *RM_3*, and it is given as:

$$RM\_3 = -\text{abnormal cash flow from operations} + \text{abnormal production costs} \\ -\text{abnormal discretionary expenses} \qquad (8)$$

Following Cohen et al. (2008) and Badertscher (2011), we view RM and AM as distinct to each other. The larger value of *RM_3* suggests a greater use of RM to manage earnings.

3.2. Regression models

We estimate the following two regressions with firm-year observations to test the impact of the reform on both earnings methods individually and their relationship over time. We first model a firm's decision to engage in accrual-based earnings management activities as the regression below:

$$DA = \alpha + \beta_1 SSSREF + \beta_2 RM\_PROXY \times SSSREF + \beta_3 RM\_PROXY + \beta_4 DUALITY \\ + \beta_5 BIND + \beta_6 PAY + \beta_7 TOP1 + \beta_8 STATE + \beta_9 TS + \beta_{10} BIG4 + \beta_{11} TOBINQ \\ + \beta_{12} LEVERAGE + \beta_{13} FIRMSIZE + \beta_{14} BM + \beta_{15} ROA + \beta_{16} IPO\_DUM + \beta_{17} ST\_DUM \qquad (9)$$

where the dependent variable, *DA*, is the discretionary accruals (DA). *RM_PROXY* is equal to either three individual real earnings proxies (*ACFO*, *APROD* and *ADISX*) or the three aggregate RM proxies. The indicator variable is *SSSREF* equal to 1 for the period commencing a year after a listed firm was chosen to complete the SSSREF, 0 otherwise.

We also test real-based earnings manipulation by the following regression:

$$RM_{PROXY} = \alpha + \beta_1 SSSREF + \beta_2 DA \times SSSREF + \beta_3 DA + \beta_4 DUALITY + \beta_5 BIND \\ + \beta_6 PAY + \beta_7 TOP1 + \beta_8 STATE + \beta_9 TS + \beta_{10} BIG4 + \beta_{11} TOBINQ \\ + \beta_{12} LEVERAGE + \beta_{13} FIRMSIZE + \beta_{14} BM + \beta_{15} ROA + \beta_{16} IPO\_DUM + \beta_{17} ST\_DUM \qquad (10)$$

where *RM_PROXY* is the individual and aggregate RM proxies, and *DA*SSSREF* is the interaction variable between *DA* and *SSSREF*. *RM_PROXY* (DA) and *RM_PROXY*SSSREF* (*DA*SSSREF*) capture the long-term relationship between the two earnings strategies and the

change in their relationship after the reform. For testing the positive relationship between these two earnings management strategies, we expect to find a positive *RM_PROXY* (DA) coefficient. If firms switch from one method to another in the post-reform period, we expect to observe a negative coefficient on the interactive terms in the Eqs. (9) and (10).

The focus of this study is the effect of the split structure reform on Chinese listed firms' earnings behaviors. In both Eqs. (9) and (10), we control for a number of corporate governance related and firm specific variables, some of which have been proved to have explanatory power for the choice of earnings management strategies. As discussed earlier, manipulation of accounting information can be more difficult for the controlling shareholders if the firm has effective corporate governance in place (Fan et al., 2007; Liu & Lu, 2004). Top executives have been found to be more prone to boost earnings information in order to avoid losses and smooth earnings (Warfield et al., 1995). We include CEO and top management compensation variables as they are based on firms' reported earnings in China (Firth et al., 2006). We use *PAY* as a proxy, which is the natural logarithm of the total cash compensation received by the top three executives. We do not include option-based compensations as they are uncommon in the Chinese context (Aharony et al., 2000).

Following Firth et al. (2007), we also control for CEO duality as managers taking both CEO and the board chairman positions can reduce the monitoring role of the board and increase the possibility for earnings management. Board independence and external audits by the Big 4 auditors are perceived to reduce controlling shareholders' earnings manipulation, and improve corporate transparency and accounting quality (Gul et al., 2010; Klein, 2002). BIG 4 is the dummy variable set to 1 if the annual report is audited by the Big 4 auditors or their joint ventures and 0 otherwise. Board independence is the ratio of independent directors on the board.

To account for the effect of ownership concentration, we include *TOP1*, the percentage of shares held by the largest shareholder.[10] Controlling NTS shareholders might have the incentive to increase earnings per share in order to maximize their wealth before their NTS become tradable. The cost of doing so depends on the number of tradable shares. To capture this manipulation effect on earnings strategies, we include *TS* in a similar fashion to Zang (2012) and Cohen and Zarowin (2010), who control for outstanding shares. It represents the natural logarithm of the number of firms' total tradable shares. The type of ownership also has effects on earnings management. State-owned enterprises are found to have less incentive than private firms to manipulate accruals due to state subsidies (Armstrong, Guay, & Weber, 2010; Ding et al., 2007). We include *STATE* as a dummy variable coded 1 if the largest shareholder is the government and 0 otherwise. Chinese firms are also more likely to engage in earnings management in the event of IPOs or during the procedure of removing the Special Treatment status (Aharony et al., 2000; Cheng et al., 2010). We include indicator variables *IPO_DUM* and *ST_DUM* respectively if the firms engage in such activities. The detailed definitions of variables employed in the regressions are reported in Appendix A.

We also control the following variables for firms' variations in size, capital structure, and performance that might affect earnings management, following Cohen and Zarowin

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[10] Chinese listed firms often have a dominant shareholder who has substantially more shares than any other blockholders and has effective control (Xie et al., 2003).

(2010), Fan et al. (2007), and Firth et al. (2007). Large established firms might find it very costly to manipulate earnings as they face more scrutiny by regulators and auditors than small rapidly growing firms whose business activities are hard to observe. *FIRMSIZE* is the natural logarithm of the total assets at the end of each fiscal year, *LEVERAGE* has been found to affect the earnings response coefficient and is defined as the total debt divided by total assets, and *BM* is the book to market ratio to control for firms' growth rate. *TOBINQ* is the proxy for investment opportunities and is the market value of assets divided by reproduction cost. Firms' profitability is measured by ROA. We also include industry dummies based on the CSRC classification to control for the impact of market-wide performance. We report t-statistics computed by firm clustering standard errors.

3.3. Sample selection and descriptive statistics

Our analysis is based on the annual financial and accounting information of Chinese listed companies extracted from the China Stock Market Accounting Research (CSMAR) database. The sample period spans 1998 to 2011. Although published cash flow statements have become compulsory for all Chinese listed firms since 1998, we require sales in t-2 and assets in t-1 year to calculate the real and accrual earnings management proxies, so these variables are included from 2000. We also restrict our sample to all non-financial firms with at least 8 observations in each CSRC industrial code grouping per year.[11] Our final sample period is from 2002 to 2011 for the regression analyses since controlled corporate governance variables become increasingly available from 2002 in the CSMAR database. After excluding firms with missing data for control variables and calculating the discretionary accruals, we identify 13,840 firm-year observations. Our observations for *RM_1(3)* and *RM_2* are 12,610 and 13,602 observations, respectively, due to the data requirements to calculate them.

Table 1 presents the descriptive statistics of our final sample in the period 2002–2011. Panel A reports the sample distribution of firm years from 2002 to 2011. The number of firms has increased steadily from 2002 to 2011, reflecting the rapid growth of China's capital market. Panel B provides the summary statistics of various accounting and financial variables of the sample firms. Despite the differences in the sample period, the median and means of most variables are broadly similar to those reported by Gul et al. (2010), Hou et al. (2012), and Firth et al. (2007). The mean ROE is 0.036 with a standard deviation of 0.596. Approximately 7% of firms use one of the international Big 4 auditors or their joint ventures. The mean and median values of book-to-market (BM) ratio are very close, accounting for 0.377 and 0.388 respectively.

As expected, on average the largest shareholder owns 38% of a firm's shares, and this confirms that the ownership structure is very concentrated in the Chinese listed firms compared to developed markets. The percentage is slightly lower than the figures of 41.9% and 42.8% reported by Ding et al. (2007) and Gul et al. (2010) respectively. This may be due to the differences in the sample periods and also reflects the decline in shares held by the controlling shareholders as they sell their NTS after the reform.[12] The mean of *STATE* in the

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[11] Following Hovakimian (2009), we exclude the financial industry as investment in the form of capital assets varies significantly between financial and other industries.
[12] Ding et al. (2007) include firms from 2001 using earnings management measures of 2002 and Gul et al. (2010) use a sample period from 1996 to 2003. These two sample periods are before the reform.

Table 1
Sample and summary statistics.

Panel A. Annual number of firm observation

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Observations	1048	1117	1198	1293	1285	1320	1432	1524	1620	2003

Panel B. Summary statistics

Variable	Observations	Mean	Standard deviation	25th Percentile	50th Percentile	75th Percentile
DA	13,840	0.001	0.092	−0.045	0.003	0.049
RM_1	12,610	−0.005	0.159	−0.086	0.013	0.094
RM_2	13,602	0.007	0.111	−0.059	0.012	0.076
RM_3	12,610	−0.003	0.205	−0.113	0.013	0.123
ACFO	13,840	−0.003	0.095	−0.054	−0.002	0.052
APROD	12,831	−0.010	0.128	−0.070	0.000	0.058
ADISX	13,602	−0.003	0.064	−0.045	−0.014	0.023
BSC	13,196	1.376	1.306	0.565	1.000	1.676
SSSREF	13,840	0.468	0.499	0.000	0.000	1.000
TOP1	13,840	0.380	0.161	0.254	0.358	0.502
PAY	13,840	13.372	0.928	12.780	13.430	13.998
BIND	13,840	0.348	0.062	0.333	0.333	0.372
DUALITY	13,840	0.152	0.359	0.000	0.000	0.000
BIG4	13,840	0.070	0.256	0.000	0.000	0.000
STATE	13,840	0.479	0.500	0.000	0.000	1.000
TS	13,840	19.012	1.067	18.264	18.915	19.619
LEVERAGE	13,840	0.522	0.290	0.353	0.507	0.645
TOBINQ	13,840	2.268	1.711	1.257	1.727	2.602
ROA	13,838	0.036	0.596	0.010	0.033	0.063
BM	13,840	0.377	0.279	0.200	0.338	0.525
FIRMSIZE	13,840	21.457	1.177	20.676	21.338	22.107
IPO_DUM	13,840	0.142	0.349	0.000	0.000	0.000
ST_DUM	13,840	0.064	0.245	0.000	0.000	0.000

Note: All variables are as defined in Appendix A. The sample period is between 2002 and 2011.

sample is 47.9%. This figure reveals that the state as the largest shareholder continues to play an important role in Chinese listed companies. Most importantly, Panel B also shows the descriptive statistics for our earnings management measures across quartiles. For the discretionary accruals, the mean value is 0.001, close to 0.002 as reported by Firth et al. (2007). Its median is 0.003, slightly higher than the mean. For the three individual RM proxies, the average of *APROD* is negative with a zero median in our sample. *ADISX* has a negative median and the largest magnitude among the three individual RM proxies. The median of the three aggregate real proxies are all positive and equal to 0.013.

Table 2 presents the matrix of Pearson pairwise correlations between the variables in the main tests in the period of 2002–2011. As expected, RM and DA are highly and positively correlated with each other. The correlations between *DA* and *RM_2* and between *DA* and *RM_3* are 0.492 and 0.309 respectively. These positive correlations indicate that firms use both real and accrual-based earnings strategies as a supplement for each other. The

Table 2
Correlation matrix.

	DA	RM_1	RM_2	RM_3	ACFO	APROD	ADISX	BSC	SSSREF	TOP1	PAY
DA	1										
RM_1	**0.106**	1									
RM_2	**0.492**	**0.655**	1								
RM_3	**0.309**	**0.911**	**0.871**	1							
ACFO	**−0.540**	**−0.331**	**−0.844**	**−0.681**	1						
APROD	**0.090**	**0.943**	**0.573**	**0.896**	**−0.399**	1					
ADISX	**−0.103**	**−0.734**	**−0.587**	**−0.601**	**0.081**	**−0.484**	1				
BSC	**−0.043**	**0.097**	**0.065**	**0.084**	−0.020	**0.081**	**−0.093**	1			
SSSREF	−0.012	0.002	**0.031**	0.012	−0.023	−0.005	−0.015	**0.037**	1		
TOP1	**0.068**	**0.030**	0.003	0.014	**0.022**	**0.022**	**−0.035**	**−0.129**	**−0.153**	1	
PAY	**0.107**	**−0.153**	**−0.088**	**−0.131**	0.024	**−0.135**	**0.129**	**−0.144**	**0.345**	**−0.067**	1
BIND	0.003	−0.011	**0.025**	0.004	**−0.030**	−0.014	−0.001	**0.018**	**0.256**	**−0.072**	**0.207**
DUALITY	0.004	**−0.055**	**−0.034**	**−0.047**	0.005	**−0.047**	**0.048**	**0.016**	−0.010	**−0.091**	**0.030**
BIG4	**0.019**	**−0.032**	**−0.046**	**−0.038**	**0.027**	**−0.023**	**0.045**	**−0.059**	**−0.078**	**0.088**	**0.117**
STATE	0.005	**0.071**	−0.004	**0.045**	**0.027**	**0.078**	**−0.030**	**−0.058**	**−0.174**	**0.310**	**−0.144**
TS	−0.013	**0.044**	**0.043**	**0.043**	−0.019	**0.032**	**−0.047**	**0.017**	**0.420**	−0.043	**0.438**
LEVERAGE	**−0.250**	**0.120**	**0.102**	**0.149**	**−0.130**	**0.164**	0.003	**−0.073**	0.022	**−0.107**	**−0.118**
TOBINQ	**−0.020**	**−0.206**	**−0.159**	**−0.210**	**0.124**	**−0.214**	**0.117**	**0.016**	**0.158**	**−0.114**	−0.011
ROA	**0.231**	**−0.111**	**−0.076**	**−0.144**	**0.135**	**−0.174**	**−0.052**	**−0.134**	**0.073**	**0.057**	**0.189**
BM	**0.116**	**0.161**	**0.120**	**0.147**	**−0.050**	**0.135**	**−0.149**	0.012	**−0.170**	**0.137**	0.007
FIRMSIZE	**0.072**	**0.081**	**0.047**	**0.075**	**−0.031**	**0.086**	**−0.033**	**−0.101**	**0.216**	**0.238**	**0.454**
IPO_DUM	**0.076**	**−0.059**	**−0.025**	**−0.049**	0.004	**−0.058**	**0.039**	**−0.064**	**−0.226**	**0.064**	0.013
ST_DUM	**−0.065**	0.009	−0.003	0.005	0.010	0.009	0.001	**0.061**	0.012	**−0.027**	**−0.144**

Note: All variables are as defined in Appendix A. The sample period is between 2002 and 2011. Bolded coefficients are statistically significant at the 0.1 level.

BIND	DUALITY	BIG4	STATE	TS	LEVERAGE	TOBINQ	ROA	BM	FIRMSIZE	IPO_DUM	ST_DUM
1											
0.062	1										
−0.031	−0.037	1									
−0.159	−0.116	0.081	1								
0.170	−0.049	0.204	−0.092	1							
0.036	0.003	−0.049	−0.057	−0.028	1						
0.051	0.084	−0.060	−0.164	−0.096	0.111	1					
0.040	−0.022	0.035	−0.013	0.084	−0.270	0.072	1				
−0.015	−0.077	0.053	0.183	0.118	−0.398	−0.591	0.083	1			
0.081	−0.103	0.235	0.117	0.732	−0.034	−0.402	0.130	0.342	1		
−0.016	0.065	−0.015	−0.019	−0.232	−0.135	0.017	0.045	0.014	−0.085	1	
0.029	0.050	−0.040	−0.037	−0.098	0.173	0.133	0.016	−0.170	−0.198	−0.074	1

correlations between the three aggregate RM proxies are high in a range from 0.655 to 0.911. This suggests that they are indicative of the RM activities and can be a substitute for each other. They are also highly correlated with the three individual RM measures, especially the correlations between *RM_3* and the three individual measures that are between 0.601 and 0.896. This is much higher than in the U.S. market, as reported by Cohen et al. (2008). For the three individual real proxies, *APROD* has a positive correlation with DA (Pearson correlation of 0.09) and the aggregated *RM_1* and *RM_3*. The correlations between ACFO and DA and between it and *RM_2* and *RM_3* are high and negative. This implies that firms attempt to achieve high earnings by manipulating production activities and related cash flows. Consistent with Firth et al. (2006), the compensation of the top three senior managers is positively correlated with DA, but negatively correlated with RM activities. A reverse relationship can be found for leverage. The number of TS has a positive correlation with RM but insignificant with AM. Overall, these preliminary results based on Pearson correlation are in line with previous studies and our expectation that Chinese firms may engage in both accrual-based and real earning strategies and their earnings management activities are correlated with firm characteristics and corporate governance features.

To understand whether the incentive alignment effect created by the SSSREF can improve firms' corporate governance in the Chinese market, we test the significance of differences in those corporate governance variables used in the study between pre- and post-reform regimes. Table 3 reports the mean values of the corporate governance variables and the results of *t* tests on the significance of the differences of the variables in the two regimes. In Table 3, we can find an improvement in these corporate governance proxies. For example, there is a significant decrease in the ownership concentration. The largest shareholders' holding declined by 5% from 40% to 35%. Similarly, there is also a significant decrease in state ownership, which declines from 54.3% to 40.5%. For board independence and CEO duality, respectively, we can observe an increase and decrease in their value (percentages) in our sample. These results indicate that the SSSREF has effectively improved the quality of firms' corporate governance in China, where the environment of minority shareholder protection is significantly weaker than in the developed countries. Therefore, in the multivariate regression model, we incorporate these variables to account for their impact on earnings management activities. However, the largest shareholders' holding is still high compared to the standards in developed countries. Therefore, we may not expect the SSSREF

Table 3
The difference in corporate governance between pre- and post-reform regimes.

Variable	Pre-reform	Post-reform	Difference (post-pre)	P value
TOP1	0.403	0.354	−0.050	0.000
PAY	13.105	13.674	0.568	0.000
BIND	0.335	0.362	0.027	0.000
DUALITY	0.165	0.137	−0.028	0.000
BIG4	0.078	0.061	−0.017	0.000
STATE	0.543	0.405	−0.138	0.000
TS	18.588	19.492	0.904	0.000

Note: All variables are as defined in Appendix A. The sample period is between 2002 and 2011.

to effectively improve the quality of financial information since the dominant shareholders have the incentive to manipulate earnings so as to increase their own wealth by inflating the share price after their NTS are converted into TS.

4. Empirical results

4.1. Main tests of hypotheses for accrual-based earnings activities

Table 4 first reports the results of the multivariate regression analyses of the accrual-based earnings management behavior in Chinese listed firms. Models 1, 2 and 3 are the regressions when we use RM_1, RM_2 and RM_3 as the aggregate RM proxies respectively. We control for the industry effect across all models and present the regression results with firm clustering standard errors. The coefficients on the aggregate RM proxies are positive and statistically significant at the 1% level across all models in Table 4. This suggests that there is a positive association between real and accrual earnings management activities over the whole sample period. We interpret the results as evidence that Chinese listed firms with a higher level of real-based earnings management tend to engage in more accrual-based earnings management. The results support our H1 that Chinese listed firms exhibit a long-term positive relationship between real and accrual-based earnings management. This may be a reflection of weak minority shareholder protection in China.

As discussed earlier, we postulate a decline in the level of AM activities following the SSSREF as a result of the incentive alignment effect between NTS and TS shareholders. Consistent with our expectation, we find a significantly negative coefficient on the *SSSREF* across all three models in Table 4. This suggests that after the reform, firms reduced their AM activities, although they may also engage more in RM simultaneously (see further discussion in 4.2). This finding is consistent with our H2 and indicates that accrual-based earnings management in emerging markets with weak corporate governance mechanisms and weak investor protection can be effectively constrained by improving firms' incentive alignment rather than their accounting reporting rules directly. The results are similar to the findings of Cohen et al. (2008) and Ipino and Parbonetti (2011) that there is a significant decrease in AM on the passing of the SOX and mandatory adoption of the IFRS in developed markets. The main distinction between the findings of Cohen et al. (2008) and Ipino and Parbonetti (2011) and this paper is that the SSSREF has created an incentive alignment effect rather than imposing a direct comprehensive regulatory change in firms' reporting practices and related corporate policies. Moreover, unlike the SOX and IFRS reforms, the SSSREF took place in a market with weak corporate governance and investor protection. It has, however, exhibited a similar effect on constraining firms' AM activities. H3 predicts a shift from AM to RM after the reform. Consistent with this conjecture, we find a negative and significant coefficient on *RM*SSSREF* across all regressions with different RM proxies. This empirical evidence indicates that the positive relationship between RM and AM is reduced after the reform, possibly because firms are more likely to replace AM with less detectable and scrutinized RM activities after the reform.

The results in Table 4 are robust to the control of corporate governance variables, firm characteristics, and the industry effect. Discretionary accruals are significantly negatively associated with the number of tradable shares (*TS*) while the coefficient on the salary of top

Table 4
The impact of the SSSREM on accrual-based earnings management (DA) with aggregate real earnings proxies.

	Model 1	Model 2	Model 3
SSSREF	−0.005**	−0.007***	−0.008***
	(−2.340)	(−3.992)	(−3.892)
*RM_PROXY*SSSREF*	−0.032**	−0.094***	−0.049***
	(−2.568)	(−6.150)	(−5.015)
RM_PROXY	0.123***	0.522***	0.215***
	(12.174)	(40.869)	(25.422)
TOP1	−0.004	−0.010*	−0.006
	(−0.640)	(−1.673)	(−0.915)
PAY	0.009***	0.011***	0.012***
	(6.539)	(9.475)	(9.092)
IND	0.012	−0.012	0.006
	(0.810)	(−0.897)	(0.382)
DUALITY	0.001	0.001	0.002
	(0.528)	(0.641)	(0.965)
BIG4	−0.005	0.003	−0.002
	(−1.255)	(0.721)	(−0.425)
STATE	−0.005***	−0.001	−0.005**
	(−2.644)	(−0.368)	(−2.554)
TS	−0.020***	−0.022***	−0.022***
	(−11.219)	(−14.390)	(−12.612)
LEVERAGE	−0.095***	−0.107***	−0.112***
	(−22.255)	(−25.815)	(−24.394)
TOBINQ	0.005***	0.008***	0.008***
	(6.236)	(11.082)	(9.697)
ROA	0.002	0.005	0.002
	(0.635)	(1.444)	(0.714)
BM	−0.029***	−0.032***	−0.037***
	(−7.915)	(−9.879)	(−10.409)
FIRMSIZE	0.019***	0.021***	0.020***
	(9.893)	(12.114)	(10.716)
IPO_DUM	0.002	−0.006***	0.001
	(0.805)	(−2.835)	(0.182)
ST_DUM	−0.004	−0.002	−0.003
	(−0.866)	(−0.436)	(−0.776)
Intercept	−0.081***	−0.111***	−0.097***
	(−3.482)	(−4.947)	(−4.145)
R-squared	0.119	0.401	0.245
Observations	12,524	13,402	12,524

Note: All variables are as defined in Appendix A. The sample period is between 2002 and 2011. The dependent variable is DA. Models 1, 2 and 3 are the regressions when we use *RM_1*, *RM_2* and *RM_3* as the aggregate RM proxies respectively. We use industry dummies to control for the industry effect according to the CSRC industrial codes. t-statistics from clustered (by firm) standard errors are in parentheses. *, **, and *** denote statistical significance at the 10, 5 and 1% levels, respectively.

management (*PAY*) is significant and positive. The significant negative coefficient on *TS* is similar to the finding of Cohen and Zarowin (2010). It implies that the larger the number of tradable shares, the greater the monitoring effects from minority shareholders. Additionally, the cost of earnings management to improve earnings per share depends on the number of

tradable shares. The positive coefficient on *PAY* implies that top managers are more likely to assist the use of discretionary accruals as their salary is closely linked to reported earnings. Our results on firm characteristics also indicate that large firms (*FIRMSIZE*) or firms with lower book to market ratio (*BM*), lower leverage ratio (*LEVERAGE*), and higher Tobin's Q (*TOBINQ*) are more likely to have a high tendency to manage accruals.

4.2. Main tests of hypotheses for real earnings management

Table 5 presents the results of the effects of the SSSREF on firms' real earning management behavior. We estimate the regression Eq. (10) with three aggregate RM proxies as the dependent variables in models 1, 2 and 3 respectively. Consistent with our prediction in H1, the empirical results in both Table 4 and 5 indicate a positive and significant association between real and accrual-based earnings management (at the 0.01 level). The DA coefficients in Table 5 are all positive and significant for all aggregate RM proxies. The magnitude of the *DA* coefficient is the greatest when using the measure of *RM_3*, which is the combination of *ACFO*, *APROD* and *ADISX*, and is the smallest for *RM_1*. This result of the RM activities further confirms H1 and our finding drawn from the AM behaviors discussed in 4.1 that there is a positive relationship between RM and AM in Chinese listed firms over the whole sample period. Together with the results in Table 4, these show that when engaging in either more real or accrual-based earnings management, Chinese listed firms are more likely to also use the other method to supplement it. Again, this may result from the lack of corporate governance and weak investor protection in China.

Different from our analysis for AM in Table 4, the signs of the *SSSREF* coefficients with three aggregate RM proxies as dependent variables are all positive and significant at the 0.01 level. This implies the increasing use of RM to manage earnings after the reform. Together with the result obtained for AM in Table 4, which shows a significantly negative *SSSREF* coefficient, the above finding provides additional evidence to support our H2 that Chinese listed firms use more RM and less AM after the reform. More importantly, the coefficient on the interactive term between *DA* and *SSSREF* dummy is significantly negative for all the aggregate RM proxies. This implies that firms are more likely to switch from AM to RM activities after the reform and thus supports our H3. Although previous studies indicate that the quantity of firms' information and incentive alignment for profit maximization has been improved through the reform, our results show that the earning quality has not been fundamentally changed, and this may be caused by high ownership concentration after the SSSREF. Firms take advantage of the dynamic relationship between the two earnings strategies to avoid detection and scrutiny by the capital market and regulators.

The coefficient estimates on our control variables in Table 5 have the opposite signs to those from the regressions with DA as the dependent variables in Table 4. This lends further support to the consistency of our analysis. Taking into account the results presented in Table 4, our results indicate top managers with higher salaries tend to use more AM rather than RM. The positive and significant coefficients on *TOP1* in Table 5 imply that ownership concentration is more likely to allow controlling shareholders to engage in more RM and camouflage their expropriation of the value of minority shareholders. Moreover, the significantly negative *BIG4* coefficient in Table 5 also indicates that firms are less likely to manipulate real earnings given the presence of the international Big 4 audit firms

Table 5
The impact of the SSSREM on aggregate real earnings management proxies (aggregate RM).

	Model 1	Model 2	Model 3
SSSREF	0.022***	0.014***	0.030***
	(4.869)	(5.598)	(5.545)
*DA*SSSREF*	−0.110***	−0.160***	−0.155***
	(−2.972)	(−7.680)	(−3.680)
DA	0.366***	0.800***	0.992***
	(13.927)	(57.392)	(33.441)
TOP1	0.023	0.018*	0.024
	(1.274)	(1.860)	(1.151)
PAY	−0.034***	−0.016***	−0.039***
	(−11.054)	(−9.679)	(−10.626)
IND	0.014	0.034*	0.035
	(0.434)	(1.784)	(0.903)
DUALITY	−0.009	−0.004	−0.010
	(−1.414)	(−1.284)	(−1.434)
BIG4	−0.018	−0.015**	−0.024*
	(−1.541)	(−2.353)	(−1.722)
STATE	0.009*	−0.004	0.007
	(1.944)	(−1.518)	(1.284)
TS	0.021***	0.024***	0.037***
	(5.126)	(10.402)	(7.393)
LEVERAGE	0.118***	0.114***	0.220***
	(11.855)	(20.302)	(17.434)
TOBINQ	−0.019***	−0.014***	−0.029***
	(−10.801)	(−14.155)	(−13.425)
ROA	−0.002	−0.007**	−0.005
	(−0.530)	(−2.192)	(−0.823)
BM	0.072***	0.040***	0.097***
	(10.451)	(9.732)	(11.574)
FIRMSIZE	−0.009*	−0.019***	−0.026***
	(−1.958)	(−8.008)	(−4.909)
IPO_DUM	0.004	0.018***	0.012*
	(0.768)	(5.761)	(1.781)
ST_DUM	0.009	−0.001	0.004
	(1.247)	(−0.359)	(0.508)
Intercept	0.119*	0.127***	0.186**
	(1.858)	(3.544)	(2.467)
R-squared	0.143	0.387	0.264
Observations	12,524	13,402	12,524

Note: All variables are as defined in Appendix A. The sample period is between 2002 and 2011. The dependent variables are aggregate RM proxies. Models 1, 2 and 3 are the regressions when we use *RM_1*, *RM_2* and *RM_3* as the aggregate RM proxies respectively. We use industry dummies to control for the industry effect according to the CSRC industrial codes. t-statistics from clustered (by firm) standard errors are in parentheses. *, **, and *** denote statistical significance at the 10, 5 and 1% levels, respectively.

or their joint ventures. In contrast to our results for accruals, the aggregate RM is lower in large firms (*FIRMSIZE*) or in firms with lower *BM*, lower *LEVERAGE*, and higher *TOBINQ*. Moreover, we also observe that firms with more tradable shares (TS) prefer to use more RM as AM is more likely to be detected.

To sum up, as discussed in Section 2, previous research suggests that the reform has improved the incentive alignment exogenously between NTS and TS shareholders. Both now focus on improving firms' performance for profit maximization as the stock held by NTS controlling shareholders becomes tradable and linked to stock performance. They may have the incentive to supply information to reap the benefits of market-based capital allocation and to avoid adverse stock pricing. The need for controlling shareholders to withhold or manipulate stock price sensitive information should also be reduced (Hou et al., 2012).

However, controlling shareholders may be tempted to increase wealth by inflating stock prices in the post-reform period. This is highly likely to be the case as Chinese listed firms still display high ownership concentration after the SSSREF. As firms' operating performance cannot be improved overnight, they are more likely to turn to manipulating accounting performance and camouflage their intentions for expropriation. Our results imply that firms choose to switch from AM to RM activities as the costs of manipulating accruals increase with the heightened scrutiny by the capital market after the reform. This finding is consistent with the results of Zang (2012), who suggests that managers treat the RM and AM earnings management strategies as substitutes. Tables 4 and 5 show that similar to the direct regulatory changes of SOX and IFRS in developed markets with strengthened investor protection, the incentive alignment brought by the SSSREF has a positive impact on Chinese listed firms' earnings behavior in terms of the accrual-based earnings management. However, it is not sufficient enough to fundamentally improve the quality of their financial information as the dominant shareholders still retain a large share ownership even though the shareholdings of the largest shareholders and state ownership are significantly reduced.[13]

4.3. Robustness checks

4.3.1. Individual real earnings proxies

We also estimate Eq. (9) by using three individual real earnings proxies, *ACFO*, *APROD*, and *ADISX* when the dependent variable is DA, and compare the results with those in Table 4.[14] The results are similar to those in Table 4 and support the predictions of our three main hypotheses. The negative coefficients on *ACFO* and *ADISX* and positive coefficient on *APROD* are all significant at the 0.01 level, indicating a positive relationship between RM and AM activities. This is because a higher APROD and a lower ACFO and ADISX indicate the use of real earnings management as discussed in Section 3.1.2. Furthermore, the coefficients on *SSSREF* remain negative, and the interaction terms of *SSSREF*ACFO*, and *SSSREF*ADISX* are significantly positive. These further confirm the prediction that firms shift from AM to RM after the reform that we present in Table 4. For the two sets of control variables we find significant in Table 4, the signs and magnitude of the coefficients and the level of their significance remain consistent.

Similarly, we replicate our analysis of Table 5 by replacing the aggregate RM proxies with their three components. The results still support our hypotheses and are similar to those in Tables 5. Consistent with H1, the coefficient on DAs for *ACFO* and *ADISX* is significant and

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[13] We also test the changes in the Herfindahl index, which is the sum of squared ownership of the top 10 shareholders. Similarly, the result shows that the Herfindahl index has significantly decreased from 0.208 to 0.162.
[14] For brevity, the results are available upon request.

negative and APROD is significantly positive, indicating a positive relationship between DA and individual RM proxies. The coefficients on *SSSREF* are significant and have similar signs as the above, implying a greater use of RM after the reform and support our H2. The positive coefficients on *DA* SSSREF* for *ACFO* and *ADISX* show a significant reduction in the long-term positive association between AM and RM after the reform and further confirm our H3.

4.3.2. Accounting flexibility

Previous studies suggest that managers do not have unlimited discretion to manipulate earnings upwards due to the reversing nature of accrual accounting and the flexibility within firms' internal accounting systems. The extent to which firms manage earnings is constrained by their accounting choices in previous periods, and the net asset values on the balance sheet reflect the level of past earnings management (Barton & Simko, 2002). Firms with a higher level of overstated net assets relative to sales will have less ability to engage in further accrual earnings management. Wang and D'Souza (2006) build on this research and show that firms are more likely to engage in real earnings manipulation through reducing R&D expenditure when accounting flexibility is low. We follow Barton and Simko (2002) and use the net operating assets scaled by sales at the beginning of the year to proxy for accounting flexibility. We then incorporate the accounting flexibility proxy and its interactive term with *SSSREF* in Eqs. (11) and (12) to test whether our empirical results on earnings management are induced by the changes in accounting flexibility or by the effect of the split share structure reform. We estimate the following two regressions:

$$
\begin{aligned}
DA = {}& \alpha + \beta_1 SSSREF + \beta_2 BSC + \beta_3 BSC \times SSSREF + \beta_4 RM\_PROXY \times SSSREF \\
& + \beta_5 RM\_PROXY + \beta_6 DUALITY + \beta_7 BIND + \beta_8 PAY + \beta_9 TOP1 + \beta_{10} STATE \\
& + \beta_{11} TS + \beta_{12} BIG4 + \beta_{13} TOBINQ + \beta_{14} LEVERAGE + \beta_{15} FIRMSIZE + \beta_{16} BM \\
& + \beta_{17} ROA + \beta_{18} IPO\_DUM + \beta_{19} ST\_DUM
\end{aligned}
\tag{11}
$$

$$
\begin{aligned}
RM_{PROXY} = {}& \alpha + \beta_1 SSSREF + \beta_2 BSC + \beta_3 BSC \times SSSREF + \beta_4 DA \times SSSREF + \beta_5 DA \\
& + \beta_6 DUALITY + \beta_7 BIND + \beta_8 PAY + \beta_9 TOP1 + \beta_{10} STATE + \beta_{11} TS \\
& + \beta_{12} BIG4 + \beta_{13} TOBINQ + \beta_{14} LEVERAGE + \beta_{15} FIRMSIZE + \beta_{16} BM \\
& + \beta_{17} ROA + \beta_{18} IPO\_DUM + \beta_{19} ST\_DUM
\end{aligned}
\tag{12}
$$

where the dependent variable is either discretionary accruals (DA) in Eq. (11) or the aggregate real proxies in Eq. (12). For the independent variables, *BSC* is computed by the ratio of the firm's $NOA_{t-1}/Sales_{t-1}$. We then divided this ratio by its corresponding industry median value to account for its high dependence on industry (Defond, 2002). All other variables are defined previously.

Similar to the findings of Wang and D'Souza (2006), Barton and Simko (2002), and Zang (2012), our results show that the *BSC* coefficient has a significant and negative correlation with

accruals.[15] This indicates that firms with low accounting flexibility tend to have a lower level of discretionary accruals. Its coefficients with the aggregate real earning proxies are positive and significant. These results imply that firms are more likely to use more real earnings manipulation when the option of using accruals is constrained by a lower level of accounting flexibility. However, the coefficients on the interactive term between *BSC* and *SSSREF* are all insignificant when DA is used as the dependent variable, while they are significantly positive when RM is employed as the dependent variable. These results suggest that the changes in accounting flexibility have a similar effect on accrual-based earnings manipulation both before and after the reform. A decrease in accounting flexibility is more likely to induce a higher level of real earnings management, and this was seen to increase after the reform.

After controlling for the effect of accounting flexibility, the results for our main hypotheses are consistent with our previous findings that there is a positive long-term relationship between the accrual and real activities; in the post-reform period the use of discretionary accruals declines while real earnings management activities increase, and the positive relationship between the two is reduced after the reform. All signs of the control variables remain unchanged and the variations in their magnitudes are all small.

4.3.3. Difference-in-difference design

We employ the difference-in-difference design and separate the sample firms into two groups with and without non-tradable shares so as to compare them under the same market conditions. For the group of firms without non-tradable shares, the reform would not improve the incentive alignment between shareholders and they are treated as the control group. We do not expect changes in their earnings management activities. Contrarily, the group of firms with non-tradable shares is the treatment group, and we expect the SSSREF to have a significant effect on their earnings management behaviors.

Table 6 reports the results when we regress the DA on the SSSREF dummy, real earnings proxies, the interaction term between these two, and the same set of control variables used in our main tests.[16] Consistent with our expectation, Table 6 shows that for the treatment group the coefficients on SSSREF are still significantly negative. This indicates that DA is lower after the reform. Furthermore, the RM coefficient is still positive and significant, while the interaction term coefficient is still significantly negative. This shows that the long-term positive relationship between DA and RM is lower after the

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[15] For brevity, the results are available upon request.
[16] For consistency, we incorporate the IPO dummy in the regression for the treatment group. The IPO dummy is not included for the control group because its value is all zero due to the fact that the Chinese firms have non-tradable shares within the first 36 months of their IPOs as CSRC requires firms not to trade or transfer their existing shares issued prior to the IPOs in this 36-month period, according to the Detailed Implementation Rules for the Non-public Issuance of Stocks by Listed Companies promulgated by the CSRC in 2007. When the IPO dummy is excluded from the regression for the treatment group, the results remain very similar.

Table 6
Difference in difference design for the accrual-based earning management (DA).

	Model 1		Model 2		Model 3	
	Non-tradable	Tradable	Non-tradable	Tradable	Non-tradable	Tradable
SSSREF	−0.004*	0.004	−0.006***	−0.001	−0.007***	0.002
	(−1.701)	(0.772)	(−3.231)	(−0.247)	(−3.239)	(0.402)
RM_PROXY*SSSREF	−0.035***	0.014	−0.092***	0.087*	−0.052***	0.044
	(−2.666)	(0.384)	(−5.613)	(1.925)	(−5.054)	(1.496)
RM_PROXY	0.124***	0.088***	0.527***	0.339***	0.217***	0.131***
	(12.032)	(2.608)	(40.415)	(8.430)	(25.122)	(4.688)
TOP1	−0.000	−0.026	−0.006	−0.019	−0.002	−0.020
	(−0.011)	(−1.645)	(−1.026)	(−1.348)	(−0.338)	(−1.326)
PAY	0.009***	0.006	0.011***	0.008**	0.012***	0.008**
	(6.509)	(1.463)	(9.482)	(2.286)	(8.981)	(2.296)
IND	0.021	−0.053	−0.008	−0.058	0.012	−0.047
	(1.306)	(−1.223)	(−0.576)	(−1.386)	(0.784)	(−1.109)
DUALITY	−0.001	0.016**	−0.000	0.015**	0.001	0.015**
	(−0.276)	(2.420)	(−0.163)	(2.403)	(0.185)	(2.455)
BIG4	−0.004	−0.013	0.003	−0.005	−0.001	−0.006
	(−1.061)	(−1.180)	(0.880)	(−0.521)	(−0.321)	(−0.623)
STATE	−0.007***	0.066	−0.003	0.049	−0.007***	0.048
	(−3.154)	(0.956)	(−1.590)	(1.528)	(−3.289)	(0.980)
TS	−0.020***	−0.004	−0.022***	−0.014***	−0.022***	−0.008*
	(−10.484)	(−0.868)	(−12.637)	(−3.177)	(−11.495)	(−1.898)
LEVERAGE	−0.095***	−0.095***	−0.104***	−0.124***	−0.111***	−0.116***
	(−21.012)	(−8.117)	(−24.197)	(−11.799)	(−23.362)	(−10.126)
TOBINQ	0.004***	0.005***	0.008***	0.009***	0.007***	0.008***
	(5.538)	(2.596)	(10.150)	(4.562)	(8.865)	(3.668)
ROA	0.001	0.088***	0.004	0.102**	0.002	0.110***
	(0.596)	(2.923)	(1.456)	(2.174)	(0.677)	(2.639)
BM	−0.028***	−0.040***	−0.030***	−0.047***	−0.035***	−0.052***
	(−7.275)	(−3.006)	(−9.091)	(−3.912)	(−9.608)	(−4.067)
FIRMSIZE	0.018***	0.015***	0.020***	0.018***	0.020***	0.015***
	(8.976)	(3.265)	(11.064)	(4.280)	(9.805)	(3.545)
IPO_DUM	0.002	–	−0.006***	–	0.000	–
	(0.565)		(−2.752)		(0.028)	
ST_DUM	−0.005	0.009	−0.003	0.010	−0.004	0.007
	(−1.182)	(0.621)	(−0.780)	(0.874)	(−1.023)	(0.570)
Intercept	−0.082***	−0.252***	−0.092***	−0.147**	−0.118***	−0.189***
	(−3.261)	(−3.772)	(−3.964)	(−2.423)	(−4.684)	(−2.994)
R-squared	0.123	0.111	0.412	0.339	0.251	0.228
Observations	11,019	1505	11,896	1506	11,019	1505

Note: All variables are as defined in Appendix A. The sample period is between 2002 and 2011. The dependent variable is DA. Models 1, 2 and 3 are the regressions when we use *RM_1*, *RM_2* and *RM_3* as the aggregate RM proxies respectively. We use industry dummies to control for the industry effect according to the CSRC industrial codes. t-statistics from clustered (by firm) standard errors are in parentheses. *, **, and *** denote statistical significance at the 10, 5 and 1% levels, respectively.

reform. These results imply that these firms shift from DA to the less detectable RM activities. These are in line with our main results in Table 4. On the contrary, for the control group, both the SSSREF and the interaction term coefficients are insignificant. This

Table 7
Difference in difference design for real-based earning management (RM).

	Model 1		Model 2		Model 3	
	Non-tradable	Tradable	Non-tradable	Tradable	Non-tradable	Tradable
SSSREF	0.022***	−0.008	0.013***	0.005	0.029***	0.004
	(4.914)	(−0.403)	(5.132)	(0.383)	(5.394)	(0.154)
*DA*SSSREF*	−0.110***	−0.213	−0.157***	−0.126	−0.161***	−0.189
	(−2.849)	(−1.431)	(−7.139)	(−1.055)	(−3.603)	(−1.086)
DA	0.359***	0.520***	0.797***	0.786***	0.985***	1.100***
	(13.550)	(3.941)	(57.458)	(6.477)	(33.106)	(6.393)
TOP1	0.026	0.001	0.017*	−0.001	0.026	−0.017
	(1.385)	(0.023)	(1.676)	(−0.044)	(1.221)	(−0.360)
PAY	−0.035***	−0.028***	−0.017***	−0.013***	−0.039***	−0.033***
	(−10.885)	(−3.700)	(−9.699)	(−2.909)	(−10.388)	(−3.566)
IND	0.024	−0.024	0.037**	0.043	0.047	0.001
	(0.755)	(−0.249)	(1.964)	(0.665)	(1.217)	(0.006)
DUALITY	−0.010	0.004	−0.004	−0.005	−0.011	−0.006
	(−1.562)	(0.257)	(−1.072)	(−0.566)	(−1.385)	(−0.353)
BIG4	−0.015	−0.040**	−0.015**	−0.017	−0.021	−0.046*
	(−1.224)	(−1.993)	(−2.180)	(−1.291)	(−1.437)	(−1.778)
STATE	0.011**	0.109***	−0.001	0.018	0.011*	0.105*
	(2.096)	(5.507)	(−0.194)	(0.382)	(1.884)	(1.698)
TS	0.019***	0.024**	0.021***	0.031***	0.033***	0.042***
	(4.340)	(2.289)	(8.519)	(5.058)	(6.250)	(3.258)
LEVERAGE	0.111***	0.180***	0.108***	0.160***	0.212***	0.282***
	(11.109)	(7.006)	(19.141)	(12.125)	(16.809)	(9.507)
TOBINQ	−0.018***	−0.019***	−0.013***	−0.016***	−0.028***	−0.028***
	(−10.590)	(−3.714)	(−13.569)	(−5.428)	(−13.160)	(−4.351)
ROA	−0.001	−0.205*	−0.006**	−0.117	−0.004	−0.303*
	(−0.480)	(−1.941)	(−2.257)	(−1.223)	(−0.796)	(−1.781)
BM	0.068***	0.122***	0.038***	0.064***	0.091***	0.163***
	(9.456)	(6.476)	(8.926)	(4.626)	(10.469)	(6.297)
FIRMSIZE	−0.008*	−0.009	−0.018***	−0.018***	−0.025***	−0.017
	(−1.716)	(−0.883)	(−7.503)	(−2.796)	(−4.687)	(−1.331)
IPO_DUM	0.004	–	0.017***	–	0.011	–
	(0.639)		(5.241)		(1.519)	
ST_DUM	0.008	0.010	−0.001	−0.006	0.003	0.006
	(1.081)	(0.439)	(−0.258)	(−0.418)	(0.318)	(0.197)
Intercept	0.195***	−0.045	0.134***	−0.129	0.329***	−0.213
	(2.868)	(−0.299)	(3.713)	(−1.460)	(4.128)	(−1.169)
R-squared	0.143	0.190	0.394	0.384	0.265	0.308
Observations	11,019	1505	11,896	1506	11,019	1505

Note: All variables are as defined in Appendix A. The sample period is between 2002 and 2011. The dependent variables are aggregate RM proxies. Models 1, 2 and 3 are the regressions when we use *RM_1*, *RM_2* and *RM_3* as the aggregate RM proxies respectively. We use industry dummies to control for the industry effect according to the CSRC industrial codes. t-statistics from clustered (by firm) standard errors are in parentheses. *, **, and *** denote statistical significance at the 10, 5 and 1% levels, respectively.

implies that the SSSREF has no impact on the control group (firms without non-tradable shares) as they are not affected by the aforementioned incentive alignment effect. In Table 7, we can also find that the SSSREF has an impact on the treatment group and not

the control group when we regress the real earnings on the three main explanatory variables and the same set of control variables.[17]

4.3.4. The suspect firm analysis

To test whether those proxies capture firms' earnings activities, we follow Cohen et al. (2008) suspect firm analysis using incentive variables proposed by Roychowdhury (2006) and Graham et al. (2005). We construct two groups of suspect firms from the sample since they may be more likely to adopt earnings management according to these benchmarks: one for firms that managed their earnings to avoid reporting a loss, and the other for those that managed their earnings to maintain the same level as or slightly higher than the prior year's earnings. For the former group, we consider those firms that have the value of net income divided by total assets in the interval [0, 0.005), while for the latter, we include those firms with a change in net income divided by total assets in the interval [0, 0.005). The results are reported in Table 8. It is apparent that firms in these two suspect groups manifest significant changes in their AM and RM. Consistent with our main hypothesis, the accrual earnings management activities are significantly reduced after the SSSREF. RM increased significantly after the reform as shown in all three alternative measures. This suspect firm analysis further confirms our main results and demonstrates that those firms that engaged in earnings management shifted from AM to RM after the reform.

4.3.5. The market wide reform effect

As described in Section 2, the CSRC made the split share reform announcement and conducted a policy pilot in 2005. It also made a specific timeline for the majority of the firms to complete the reform. Hou et al. (2012) suggest that firms would start preparing for the reform and instruct managers to focus on share return performance before the firm was actually chosen to start the NTS share conversion process in a different time period, and thus the reform may have a market wide effect. In our regression Eqs. (9)–(12), we replace the firm level reform variable with the market wide reform variable, which takes the value of 1 from 2006 onwards. The results show that our findings are robust and consistent.[18] This implies that the effects of the reform on firms' earnings management activities, and the relationship between the real and accrual earnings management are not exclusive to either the firm or market level.

4.3.6. Sensitivity tests

We conduct a number of sensitivity tests to further check the robustness of our empirical results shown in previous tables. First, following Kothari et al. (2005) and Cohen et al. (2008), we employ the alternative modified Jones model and compute the discretionary accruals with the denominator in the second term of the Eq. (3) to be replaced with the difference between the changes in sales revenue and changes in account receivables. Our findings still remain

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[17] The coefficient of the control group is −0.213 (t-stat = −0.821) for DA*SSSREF. It is larger in magnitude than the coefficient of the treatment group. We have thus estimated the bootstrapped coefficients. We randomly reduce the sample of the treatment group to be the same as the control group and repeat this procedure 1000 times. The results are materially unchanged.

[18] For brevity, the results are available upon request.

Table 8
Suspect firm analysis.

Variable	Pre-reform	Post-reform	Difference (post-pre)	P value
Panel A. Just avoid				
DA	0.004	−0.010	−0.013	0.013
RM1	0.061	0.075	0.014	0.088
RM2	0.047	0.063	0.016	0.011
RM3	0.079	0.111	0.032	0.003
Panel B. Meet or beat				
DA	0.009	−0.001	−0.010	0.004
RM1	0.011	0.027	0.016	0.025
RM2	0.011	0.027	0.017	0.001
RM3	0.008	0.040	0.032	0.000

Note: All variables are as defined in Appendix A. The sample period is between 2002 and 2011. We construct two groups of suspect firms from the sample since they may be more likely to adopt earnings management according to these benchmarks: "Just avoid" are those firms that managed their earnings to avoid reporting a loss, and "Meet or beat" are those that managed their earnings to maintain the same level as or slightly higher than the prior year's earnings. For the former group, we consider those firms that have the value of net income divided by total assets in the interval [0, 0.005), while for the latter, we include those firms with a change in net income divided by total assets in the interval [0, 0.005).

unchanged. Second, we exclude firms with IPOs after 2005 since these firms have no NTS to convert in the post-reform period. We find similar results and that the magnitudes of the coefficients on our main independent variables are even higher, showing a stronger impact of the reform. Third, we consider an additional confounding effect of the mandatory adoption of the International Financial Reporting Standards (IFRS) in China. This requirement for all listed firms might partially influence the impact of the SSSREF on earnings management. In the multivariate regression analysis, our results are materially unchanged after controlling for the impact of the adoption of IFRS.[19] Fourth, we add another two control variables, changes in GDP and changes in sales, as they might indicate the changes in the market-wide condition and firms' performance, and the results are still consistent. Furthermore, ROE can indicate firms' incentive for earnings manipulation to meet regulatory requirements for listing or right issues (Ding et al., 2007). Similar results are also found when replacing *ROA* with *ROE*. The results of these sensitivity tests corroborate the empirical results presented in Tables 3–8.[20] In addition, we apply the bootstrapped medium regressions to eliminate the influence of outliers and the results remain materially unchanged. Finally, we estimate the regressions with time trend, and the results are consistent with our main hypotheses.

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[19] In order to control for the confounding IFRS effect, we adopted two methods. First, in order to avoid the problem of multi-collinearity, we follow Hou et al. (2012) and include the observations between 2002 and 2007 as the effect of the IFRS is expected to take place from 2008. The second method we used is to incorporate an IFRS dummy variable, which is set to one after 2007 and zero otherwise. The results are consistent and for brevity, the results are available upon request.

[20] For brevity, the results are available upon request.

5. Conclusion

This paper contributes to the earnings management literature by examining the impact of the SSSREF on firms' real and accrual-based earnings behaviors in China. The distinctive settings of the SSSREF allow us to draw new inferences. First, this study is conducted in an emerging country context with weak investor protection. Second, the exogeneity of incentive alignment effect given by China's split share structure reform allows us to compare the results with previous studies looking at the impact of the direct regulatory changes in accounting reporting rules such as SOX and IFRS on earnings management in developed markets where corporate governance mechanisms and investor protection are stronger.

We also contribute to the earnings management literature by providing empirical results on the relationship between real and accrual-based earnings management activities before and after the SSSREF. Our results delineate a long-term positive relationship between the two earnings management activities throughout our sample period from 2002 to 2011. This may result from the weaker environment for investor protection in China than in developed countries. The Chinese SSSREF has strengthened firms' incentive alignment exogenously as the interest and wealth of NTS shareholders are linked to firms' stock performance after the reform. Therefore, the SSSREF is distinguished from the SOX and IFRS in that it does not impose a direct comprehensive regulatory change in firms' accounting reporting practice. It is of interest that our results show a tendency for firms to use more real and less accrual-based earnings management in the post-reform period and that the long-term positive relationship between the two earnings activities is significantly reduced.

These results suggest that firms, while continuing to employ both earnings methods, may have shifted their focus from accrual to real earnings activities to avoid detection and scrutiny by the capital market after the reform. Although previous studies show that the incentive alignment effect created by the reform has improved the *quantity* of financial information, our results suggest that it may not fundamentally and automatically increase the *quality* of the earnings information that firms make progressively available to the market. This may be because dominant shareholders still maintain large shareholdings after the reform. Our results thus suggest that the reform has an exogenous effect on firms' earnings behaviors in a country with weak investor protection.

The key policy implication from this paper is that in an emerging market context, policy design that improves the incentive alignment can have a similar effect to a direct regulatory change in accounting reporting rules in effectively constraining the use of discretionary accruals in developed country markets. At the same time, our findings provide a vital caveat for researchers, investors, and regulators when they interpret the increasingly widespread availability to market participants of information either induced by legal requirements or voluntary disclosure as a reduction of manipulation of earnings information. Firms' operating performance cannot be improved overnight, while desired accounting performance can be achieved through earnings manipulation in a short period. As the incentive alignment has led the controlling shareholders to focus on stock performance, such incentives for earnings manipulation may increase.

Firms may simply shift the focus of earnings management to less detectable real activities that can be costly and difficult to monitor for outside investors. Increasing scrutiny or costs for accounting discretion does not eradicate earnings management activities, but merely alters

controlling shareholders' preference for different earnings management strategies that camouflage their expropriation of minority shareholders. Investors need to consider these earnings behaviors as additional risks when making investment decisions. In emerging markets such as China, protecting minority shareholders does not simply stop at increasing firms' information quantity. Regulators need to be aware of both forms of earnings activity, and tackle such opportunistic behaviors by introducing mechanisms that curb the power of controlling shareholders. Our study represents an important extension to the current literature on the earnings management behaviors in fast-growing emerging markets like China.

Appendix A. Variable definition

DA	Discretionary accruals estimated using the cross-sectional Jones model
RM_1	Aggregate real earnings management proxy 1, the sum of abnormal production costs and the additive inverse of abnormal cash flows from operations
RM_2	Aggregate real earnings management proxy 2, the sum of the additive inverse of abnormal cash flows from operations and the additive inverse of abnormal discretionary expenses
RM_3	Aggregate real earnings management proxy 3, the sum of RM_2 and abnormal production costs
ACFO	Level of abnormal cash flows from operations
APROD	Level of abnormal production costs, where production costs equals the sum of costs of goods sold and the change in inventories
ADISX	Level of abnormal discretionary expenses, where discretionary expenses are the sum of R&D, advertising, selling, general and administrative expenses
BSC	Accounting flexibility calculated as the industry median adjusted ratio of the net operating assets over sales
SSSREF	Dummy variable equal to 1 for the period commencing a year after a listed firm was chosen to complete the SSSREF, 0 otherwise
TOP1	Percentage of shareholdings held by the largest shareholder
PAY	Natural logarithm of total compensation received by top three executives
BIND	The ratio of independent directors on the board
DUALITY	A dummy variable equal to 1 if the CEO is also chairman of the board and 0 otherwise
BIG4	A dummy variable assigned to 1 if a listed firm is audited by one of the international Big 4 audit firms or their joint ventures in China, and 0 otherwise
STATE	A dummy variable equal to 1 if the state shareholder is the largest shareholder, and 0 otherwise
TS	Natural logarithm of total number of tradable shares
LEVERAGE	Leverage calculated as total debt divided by total assets
TOBINQ	Market value of assets over book value of assets
ROA	Return on assets: earnings before interests and tax divided by total assets
BM	Book-to-market ratio calculated as book value of common equity over market capitalization
FIRMSIZE	Firm size computed as the natural logarithm of total assets
IPO_DUM	A dummy variable set to 1 for the year of IPO and the subsequent 2 years, and 0 otherwise
ST_DUM	A dummy variable equal to 1 in the year in which a firm has its "special treatment" status removed and in the preceding year, 0 otherwise

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