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Signaling, auditing fees, and earnings surprise before and after split-share structure reform in China

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In China, the split-share structure reform (SSR) has many benefits in helping decrease agency costs and normalise the stock markets. This paper explores the specific effects of this policy on firms' signalling behaviour, audit fee charges and the meeting or beating earnings expectation (MBE) strategy through empirical research into the relations of these three subjects, combined with a cross-sectional analysis of their deeper influences. The outcomes of this study demonstrate that after the SSR, firms have more incentive to convey inside information and signal earnings, the audit fee charged for firms is reduced and firms are more willing to meet earnings expectations.

Key words: Split-share structure reform; earnings signalling; audit fees; earnings surprise; management disclosure.

INTRODUCTION

The split-share structure reform (SSR), requiring all listed companies to convert non-tradable shares into tradable shares, is one of the most important reforms in China stock market, which stipulates the structure and adjustment of non-tradable shares. Historically, most of the companies listed in China's stock market were state-owned and the shares in the market split into two categories: tradable and non-tradable. The split-share structure imposed on the Chinese listed firms for which tradable shares are heavily restricted in the market has been criticized as defective for three reasons: 1) It results in weak corporate governance since firms within a group can easily engage in related-party transactions to conceal any undesirable performance results of firms within the same group; 2) It creates a very volatile domestic market and hinders free trading, resulting difficulties in ascertaining firm worth and management performance; 3)

The controlling shareholders do not indeed concern about and bear the consequence of firm (in)efficiency. To solve the problems, the government implemented a split-share structure reform program in 2005 and 2006, which aimed to convert non-tradable shares into tradable shares to ease the interest conflicts and prevent the expropriate from controlling shareholders. SSR does ease the problems to a certain extent. However, the reform changes the earnings behaviour of firms, especially the controlling shareholders, which will affect firms' series of actions, including signalling earnings, audit fee charges, and earnings surplus.

In general, firms need to survive by balancing value and the self-interest of shareholders. The specific developments and high agency costs in the Chinese market enable majority shareholders to earn profits mainly from non-tradable shares, which will have a

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detrimental effect on running a business. However, the split-share structure reform (SSR) has changed the status quo by stipulating the structure and adjustment of non-tradable shares and decreasing agency costs.

Thus, it is extremely important that the Chinese stock market reform not only normalise the market as a Western-style free market but also improve corporate governance behaviour. Exploring the changes and the motivations after the SSR is also significant for researchers.

Numerous studies have been developed in areas such as the tunnelling effect between large and small shareholders, IPO behaviour and cash dividend policies. However, researchers have seldom examined the changes in agency costs to identify the developments and possible results after the SSR. According to agency theory, listed firms need to provide more information answering the increasing demands of shareholders. Therefore, the SSR will decrease agency costs efficiency and effectively since it will push firms to publish more information as positive signalling due to the adding requests from financial market. Decreasing agency costs will also reduce the risks of auditing, thus lowering the audit fees charged. Low agency costs have changed how profits are earned and raised public attention in terms of stock market performance, which will motivate firms to engage in the earnings surprise strategy. This paper thus begins by focusing on the agency cost in my research, as this will decrease after the SSR. We explore the earnings management strategy, audit fees charged and earnings surprises to explore the changes in signalling behaviour, audit fees and the meeting or beating earnings expectation (MBE) strategy before and after the SSR and extend the research scope to cross-sectional analysis. The findings in this paper contribute to supplementing related studies, which demonstrates that after the SSR, firms have more incentive to convey inside information and signal earnings, the audit fee charged for firms is reduced and firms are more willing to meet earnings expectations.

The remainder of this paper is organised as follows: Section 2 reviews previous literature on earnings management, audit fees charged and MBE strategies; Section 3 proposes the research hypotheses; Section 4 describes the samples and data and develops the empirical models; Section 5 presents and discuss the principal empirical analysis, robustness tests and cross-sectional tests; and Section 6 concludes the paper.

LITERATURE REVIEW

Discretionary accruals, agency theory and earnings management

Earnings management is a major focus of research for many years. International researchers describe earnings management through four country-level measurements that capture the various dimensions by which managers can exercise their discretion to manage reported earnings (Leuz et al., 2003). By using these four measurements, firms can achieve the results of earnings management activities and avoid announcing real financial reports to the public (Ball et al., 2003).

The high level of personal interest is also an incentive. The power of this is enormous, but the governance and protection of minority shareholders are weak (Liu and Lu, 2004). As mentioned, the control of listed firms is meaningful for controlling shareholders, but to achieve private benefits from control, the controlling shareholders have a strong incentive to manage earnings and may even harm the interests of minority shareholders (Healy and Wahlen, 1999).

An increasing volume of literature has examined the earnings management behaviour of the Chinese stock market. Aharony et al. (2000) identify the earnings manipulation of Chinese listed firms before the initial public offering (IPO). Chen and Yuan (2004) find that the earnings management of listed firms in China meets the return on equity (ROE) rights requirements and suggest that such earnings management behaviour is related to the misallocation of capital resources.

The value of accrual accounting enables stakeholders to understand and hence evaluate the firm's underlying economic realities and periodic performance accurately, through appropriate matching of correctly recognised revenue and its associated expense. Theoretically, through the use of discretionary accruals, which are a component of accrual accounting, managers are able to distribute information relevant to the market and increase the value relevance of earnings (Dechow et al., 1995; Dechow and Dichev, 2002).

However, discretionary accruals are most often handled by managers in a way contrary to the original intent of enhancing value relevance. For example, self-interested managers may selectively define and disclose accounting measures through the use of discretionary accruals to fulfil performance benchmarks such as external debt contract requirements (DeAngelo et al., 1994) and earnings targets in management remuneration packages (Balsam, 1998; Shuto, 2007), thereby using market expectations to enhance firm value (Barth et al., 1999; DeAngelo et al., 1996).

Meanwhile, other studies demonstrate the possibility of using discretionary accrual to signal insider information and increase corporate transparency. For example, Subramanyam (1996) illustrates that the predictability and persistence of earnings can be improved through the use of income smoothing techniques. Krishnan (2003) recognises the ability of accrual accounting to inform stakeholders of the firm's underlying economics through managers sharing private information.

The agency theory framework provides a theoretical basis for examining earnings management within a

country. For example, archival research documents that Western managers' discretionary accrual decisions are associated with incentives such as short-term bonuses, disclosure quality and IPOs (Chung et al., 2005). Chinese managers are also sensitive to earnings management in terms of return on equity (ROE) and discretionary accruals (Kao et al., 2009). They often manipulate discretionary accruals as a method of managing earnings under certain circumstances.

Audit fees, litigation risk and corporate governance

Audit fees is one of crucial issues in reducing agency costs since the audit process is an essential mechanism for monitoring the opportunistic behaviour of managers and there is an increasing volume of related literature. Simunic (1980) models audit fees as a linear combination of the marginal cost of auditing plus expected losses from litigation. While effort increases the cost of performing the audit, it decreases the expected litigation losses. Palmrose (1988) also suggests that litigations arising from audit failures may badly affect the reputations of auditing firms. Willenborg (1999) indicates that IPO audit fees increase the amount of money the IPO raises. The practice of auditing can help companies adopt appropriate accounting policies and reduce the agency costs resulting from a situation of information asymmetry (Francis and Wang, 2008).

The audit fee denotes the standard of audit quality. High-quality auditing may be regarded as requiring higher audit fees (Defond et al., 1999; Ireland and Lennox, 2002; Wang et al., 2009; Wang et al., 2011). Danielsen et al. (2007) conclude that audit lawsuits and the litigation environment may also be factors influencing the charges of auditing fees. Large audit firms, particularly the Big-4 firms, provide these services to maintain their brand names and reputations (DeAngelo, 1981). The legal environment also plays an important role in deciding audit fees. In the Chinese market, the developing litigation of firms and audit law also influence audit fee amounts.

After the SSR, more case lawsuits and legal acts have been imposed on the Chinese market, and thus the law environment and audit quality increase the auditing fees. Shareholders also focus more on financial reports and trades in a free market after the SSR, which may further increase the auditing requirements to ensure effective operations. This, therefore, leads to higher auditing fees after the SSR than before.

Expectation management and earnings management

Brown (1998) finds cases with earnings per share slightly higher than analysts' expectations, in addition to the pattern of actual earnings per share being exactly on target. Burgstahler and Eames (2006) provide evidence that a revised forecast is more frequently used to avoid the unexpected side effects of negative earnings, suggesting that managers have an effect on analysts' forecast revisions. They conclude that the earnings behaviour of the time series is consistent with the firm's management revenue behaviour in meeting analysts' expectations. Kasznik (1999) and Payne and Robb (2000) also provide consistent evidence of the use of earnings management to meet earnings forecasts.

However, Soffer et al. (2000) indicate that firms are increasingly inclined to warn investors of impending adverse returns, and thus the MBE policy is implemented through expectation management. Whether through earnings manipulation, expectation management or both, the benefits of the MBE strategy are not apparent unless MBE can be used to predict the future of the firm. The net return of MBE is also problematic in terms of managing earnings expectations. Pre-empting anticipated adverse earnings expectations by suppressing them will lead to negative price effects, offsetting the returns gained from positive announcements, thus leaving total returns unchanged over the same period.

In fact, past research (Kasznik and Lev, 1995; Soffer, 2000) suggests that the share prices of firms in which investors were warned of upcoming adverse information disclosures (reducing investors' earnings) fell sharply. And Kasznik and McNichols (2002) find that MBE leads to higher firm valuations and higher projected earnings. Actually, a significant market premium has been found for firms that have achieved or exceeded expectations in the former year. Lopez and Rees (2001) find that when controlling for the margin of unexpected earnings, the return on earnings after the earnings announcement is influenced by whether analysts predict it will be met, thus providing a premium for MBE. Bartov et al. (2002) examine how management accomplish the task of MBE. They also distinguish the use of the two tools of earnings and expectations management to achieve the MBE strategy. Finally, they examine the relationship between the premium for MBE and the presence of expectation and earnings management.

Hypotheses development

Discretionary accrual can have positive or negative effects on earnings management. It can overcome the limitations of current accounting standards and present more useful information, but it may also be artificially constructed to fulfil the self-interest of managers by compromising the value relevance of the accounting data (Leuz et al., 2003). The dominant tendency in guiding managers' policies on discretionary accruals must therefore be identified. The main determinants are the general market context, the agency cost among shareholders and the demand for value relevance from the financial statements, as these factors will be significant in regulating the financial information presented.

The historical context in which SSR has been implemented in the Chinese economy is ideal for demonstrating the particular nature of this double-edged sword. Before the SSR, the controlling shareholders, who are typically the state and its agents holding non-tradable shares, were less sensitive to firm performance than free market participants, because their non-tradable shares were

mainly held to own or control the firms rather than to make a profit. The demand for value relevance of the financial statements is comparatively weaker because the controlling shareholders do not have to engage in decisions such as further buying or selling their non-tradable shares. The asymmetric information between shareholders and managers also leads to high agency costs. Thus, there is a higher tendency for managers to use discretionary accruals to further their interests. However, since the implementation of the SSR, non-tradable shares will become gradually tradable according to a specific timetable, and the demand for value relevance of the financial statements will be stronger. The shareholders, now being participants of the competitive free market, must rely on the financial statements and other financial news when making investment decisions. Under this condition, the increased transparency of symmetric information between shareholders and managers will decrease the agency costs. Thus, managers are no longer free to use discretionary accruals for their self-interest. They must handle discretionary accruals in the financial statements more faithfully; convey more inside information and signal earnings more efficiently. Therefore, the following hypothesis can be formulated.

H1: A firm displays a higher tendency to signal earnings through discretionary accruals after the SSR than before.

On the one hand, audit fees are expected to decrease after SSR due to the increased demand for value relevance and the lower agency costs, which also influence the charging of audit fees. Controlling shareholders will align their interests more with those of minority shareholders, as both will focus on earnings in the firm's return. Unlike the former owners, whose interest in holding was mainly to have control, this approach is aimed at maximising returns and therefore is closer to the approach of the manager, whose main interest is also in returns. When this reduced agency cost is viewed from the auditing perspective, the inherent audit will be reduced. In turn, the chargeable audit fees are expected to be reduced, as these fees represent the work that an auditor must do to reduce their risk to an acceptable level (Choi and Wong, 2007; Venkataraman et al., 2008). Consistent with the finding that there is a significant positive association between agency problems and audit fees (Simunic and Stein, 1996), once the inherent risk from the agency problem is reduced, the risk borne by the auditors is alleviated, and thus the audit fee is lowered.

On the other hand, audit fees can increase after SSR because managers may pay more attention to maximizing accounting profits and stock prices due to SSR. The outside investors also know this changed incentive of managers and want to be sure that the reported accounting profits represent the true business fundamentals faithfully because investors are now more actively trading these firms' stocks. Therefore, managers may have incentives to increase the audit quality to meet this shareholders' demand. As a result, audit fees may increase after SSR. Therefore, the relationship between SSR and audit fees is ultimately an empirical question. Accordingly, the following is hypothesized:

H2$_0$: There is a significant difference between audit fees charged to the firm before and after SSR implementation.

However, the implementation of the SSR also makes the firm more ready to improve firm value, as the flotation of shares causes the market to be more competitive. The major shareholders are no longer holding shares solely for the purpose of controlling or owning the firm, but also to make profits from their investments. Achieving a higher firm value is thus becomes more desirable through a variety of methods such as the fulfilment of external earnings expectations.

Extensive research finds associations between the fulfilment of earnings expectations and the market valuation of firms. According to Barth et al. (1999) and DeAngelo et al. (1996), positive firm valuation implication is associated with the meeting of external targets. This association is further confirmed by Bartov et al. (2002), who find evidence of a valuation premium in meeting analysts' current earnings expectations in sample data between 1983 and 1997, irrespective of whether meeting earnings expectations is genuine or deliberately orchestrated. Meeting these expectations will effectively increase the market confidence in the firm and improve the firm's stock price, thus enhancing the firm value. Chinese listed firms should thus have greater incentives to increase firm value by meeting earnings expectations. The equity transfer and pricing policy of controlling shareholders also changed after the SSR, as their focus gradually shifted from net assets to share prices. In the securities market, companies will get a negative reaction if they do not meet the analysts' expectations of a surplus, which will result in a massive loss for the companies. Thus, it is important for a firm to consider analysts' earnings forecasts and ensure they meet or exceed analyst expectations. After the reform, companies are more motivated to achieve the profit forecasts of analysts. We therefore propose the following hypothesis.

H3: A firm is more likely to meet earnings expectations after the SSR than before.

Research design

The first step in testing H1 is to identify the discretionary accruals (DA) (that is, the abnormal accruals) from the normal accruals. Specifically, we need to decompose total accruals into the expected, normal portion and abnormal portion and then use an abnormal portion of total accruals as the proxy for the discretionary accruals. By following the models of Kothari et al. (2005), to control for possible effects of performance (ROA of the current and prior periods), we use the following modified Jones model.

$$TA_{it} = \beta_0 + \beta_1(1/AT_{it-1}) + \beta_2(\Delta REV_{it} - \Delta AR_{it}) + \beta_3 PPE_{it} + \beta_4 ROA_{it} + \varepsilon_{it} \#(1)$$
$$NDA_{it} = \beta_0 + \beta_1(1/AT_{it-1}) + \beta_2(\Delta REV_{it} - \Delta AR_{it}) + \beta_3 PPE_{it} + \beta_4 ROA_{it-1} \#(2)$$

Where: TA_{it} = the difference between income before extraordinary items and operating cash flows for period t for the firm i; NDA_{it} = nondiscretionary total accruals, AT_{t-1} = the total opening assets, ΔREV_t = the change in sales revenue from period t-1 to t, ΔAR_{it} = the change in accounts receivable from period t-1 to t, PPE_t = the opening property, plant, and equipment, ROA_t = return of asset for the period t, defined as income before extraordinary items at period t divided by opening total asset at period t.

The variables TA, ΔREV, ΔAR and PPE are scaled by AT_{it-1}. In these two models, the predicted values in the model (2) according to the estimated coefficients obtained from the linear regressions in the model (1) will be counted as normal accruals, and the subtracting NDA from the TA will be considered DA. For the purpose of obtaining the coefficients, the regression for each combination of the reporting period and 2-digit SIC (Standard Industrial Classification) code will be based on at least 10 observations obtained from the CSMAR (China Stock Market and Accounting Research) database.

After selecting the discretionary accruals, which are estimated using semi-annual and third quarters' financial statement data, with the modified Jones model, they are used to identify observations with earnings signalling. For a given observation, when the performance of the period is forecasted to be lower (higher) than that of the last period, earnings are said to have been signalled if negative (positive) discretionary accruals are detected in the semi-annual or third-quarter reports (STQ). In identifying observations with earnings signalling, we do not consider the first-quarter reporting, because it is doubtful whether managers can acquire sufficient data and observations to enable them to reasonably

forecast the financial performance of the whole period at the time when the first-quarter report is being prepared. Following prior studies (that is, DeAngelo et al., 1996), the model (3) will be used to support or refute H1:

$$ES = \alpha_0 + \alpha_1 SSR + \alpha_2 CEOCHR + \alpha_3 INDDIR + \alpha_4 CROLIS + \alpha_5 LnASSET + \alpha_6 ROA$$
$$+ \alpha_7 LEV + \alpha_8 MB + \alpha_9 BIG4 + \alpha_{10} AF + \alpha_i YEARDUM + \alpha_k INDDUM + \varepsilon \quad \#(3)$$

Where: **ES =** 1 if a firm uses discretionary accruals in its STQ to foretell the trend of yearly earnings correctly; 0 otherwise. That means ES equals to 1 if not only the earnings per share in the current year is higher/lower than the previous year, but also the discretionary accruals within STQ are positive/negative; 0 otherwise, **SSR =** 1 if the period falls after the stock split reform; 0 otherwise. That means SSR equals to 1 if the split-share structure reform is implemented by firm; 0 otherwise. The data is collected from CSMAR database, **CEOCHR =** 1 if the CEO and the chairman of the board of directors are held by the same individual; and 0 otherwise, **INDDIR =** the percentage of independent directors on the board, **CROLIS =** 1 if a firm is cross listed, **LnASSET =** natural logarithm of total assets, **ROA =** return of asset, defined as income before extraordinary items at period t divided by opening total asset at period t, **LEV =** leverage, measured as total liabilities divided by total assets, **MB =** market to book ratio, defined as the market value of the equity divided by its corresponding book value, **BIG4 =** 1 if the firm's auditor is one of the Big4 auditing firms; 0 otherwise, **AF =** number of analysts following /covering the firm at the beginning of the year, **INDDUM =** industry dummies, based on CSMAR industry classification.

To control for other factors that may affect earnings signalling, we include the following control variables. CEO-Chairman duality (CEOCHR) is included, as earnings informativeness has been found to be negatively correlated with the same individual being CEO and board chairman (Chang and Sun, 2009). The percentage of independent directors on the board (INDDIR) is included because a higher earnings informativeness has been found to be associated with a higher percentage of independent directors on the board (Firth et al., 2007) The occurrence of cross-listing (CROLIS) is included as Cabán-García (2009) finds that the quality of earnings is positively correlated with the regulatory rigidity of the stock exchange. The variables firm size (LNASSET), profitability (ROA), market to book ratio (MB), audit quality (Big-N) and number of analysts following (AF) are also used as control variables, as we expect firms that are sizeable with considerable market value and profitability, are followed by higher quality auditors, are monitored by more analysts and are more likely to signal a greater amount of private information to external users.

To test H2, the following model was used to develop a previous audit fee model (Lennox, 2005; Cahan et al., 2008), with the modifications of incorporating corporate governance variables as control variables:

$$LnFEE = \alpha_0 + \alpha_1 SSR + \alpha_2 BODM + \alpha_3 CEOCHR + \alpha_4 AC + \alpha_5 AUD_{SW} + \alpha_6 LnASSET$$
$$+ \alpha_7 BUSSEG + \alpha_8 GEOSEG + \alpha_9 AR/I + \alpha_{10} BIG4 + \alpha_{11} AUD_{EXP} + \alpha_{12} CUR \quad \#(4)$$
$$+ \alpha_{13} LEV + \alpha_{14} ROE + \alpha_{15} AUD_{OPI} + \alpha_i YEARDUM + \alpha_k INDDUM + \mu$$

Where: **LNFEE=** natural log of audit fees, **SSR=**1 if the period falls after the stock split reform; 0 otherwise. That means SSR equals to 1 if the split-share structure reform is implemented by firm; 0 otherwise. The data is collected from CSMAR database, **BODM=** the number of board meetings in a year, indicating the activeness of BOD in overseeing management performance, **CEOCHR=**1 if the positions of CEO and BOD chairman falls within the same individual; 0 otherwise, **AC=**1 if any audit committee(s) are found to exist in the firm; 0 otherwise, **AUD_SW=**1 if there is a change in auditor in the current period; 0 otherwise, **LNASSET=** natural log of total assets, **BUSSEG=** number of business segments of the firm, **GEOSEG=** number of geographical segments, **AR/I=** the sum of inventories and accounts receivables divided by total assets, **BIG4=**1 if the auditor is a Big4 one; 0 otherwise, **AUD_EXP=**1 if the auditor is an industry expert; 0 otherwise, **CUR=** current ratio, defined as current assets divided by current liabilities, **LEV=** leverage ratio, equal to total liabilities divided by total assets, **ROE=** profitability, equal to net income before extraordinary items divided by owners' equity, **AUD_OPI=**1 if the firm was issued a modified audit opinion in the prior year; 0 otherwise, **INDDUM=** industry dummies, based on CSMAR industry classification.

To test H3, we follow Bartov et al. (2002) and use the model (5) establishing the association between the occurrence of meeting or beating earnings expectation and the advent of SSR:

$$MBE = \alpha_0 + \alpha_1 SSR + \alpha_2 HOR + \alpha_3 ANLY + \alpha_4 FSTD + \alpha_5 ASSET + \alpha_6 \Delta EPS + \alpha_7 LEV$$
$$+ \alpha_i YEARDUM + \alpha_k INDDUM + \varepsilon \quad \#(5)$$

Where: **MBE=**1 if the forecast error is non-negative; 0 otherwise. That means MBE equals to 1 if the difference between the most recent consensus forecast and actual earnings per share (actual EPS - forecast EPS) is non-negative; 0 otherwise, **SSR =**1 if the period falls after the stock split reform; 0 otherwise. That means SSR equals to 1 if the split-share structure reform is implemented by firm; 0 otherwise. The data is collected from CSMAR database, **HOR =** forecast horizon, equals to the number of months between the most recent consensus earnings forecast of a particular period and the earnings announcement of that particular period within one year, **ANLY=** number of analysts following the firm, **FSTD=** standard deviation of earnings forecasts made by analysts following the firm, **LnASSET=** natural log of total closing assets, Δ**EPS=**1 if earnings per share in the current year is greater than that of the last year, **LEV=** total outstanding debt divided by total closing assets, **INDDUM=** industry dummies, based on CSMAR industry classification.

In the regression equation, the occurrence of meeting or beating earnings expectations is the dependent variable, which is quantified by the forecast error. Control variables commonly used in forecast accuracy research are also included to control for factors unrelated to SSR. Studies (e.g., O'Brien, 1988) have shown that the forecast error is positively correlated with the time between the earnings forecast and earnings announcement. Therefore, HOR (the period between the most recent consensus earnings forecast and the earnings announcement) is included as a control variable.

We also include the number of analysts following a firm (ANLY), the dispersion of the forecasts (FSTD) and firm size (ASSET) to control for the cross-sectional variations in the information environment, as the number of analysts monitoring the firm and firm size have been found to be positively associated with forecast accuracy, while the dispersion of the forecasts has been shown to have a negative impact on forecast accuracy (Brown, 1997).

Researchers find that firms with continuous growths in earnings are more likely to engage in meeting or beating the earnings forecasts, so we include a dummy variable (ΔEPS) for firms whose current earnings per share are greater than those of the previous period as a control variable. The leverage ratio (debt-to-asset ratio, LEV) is also included as a control variable; as it has been found that a highly geared firm is more likely to meet analysts' expectations to avoid close monitoring by creditors. Finally, to control for potential industry-specific effects, we also include industry dummies (INDDUM) as per the CSMAR classification, as represented in the sample.

In collecting the samples to be used to test hypotheses 1, 2 and 3, we use information of listed firms in China between 2002 and 2015, using the following sample selecting process. (1) We exclude firms without the complete data required to measure the variables and firms in the financial industry. (2) To alleviate the effect of outliers, we winsorized the top and bottom 1% of the distribution for all the continuous variables including the dependent variables. All related data for the listed firms are taken from the CSMAR database and the final sample size for each regression is listed in each table.

We cover this period for the following reasons. (1) Quarterly financial statements became more publicly assessable from 2002. (2) The period is sufficiently long enough before and after the SSR, thus providing numerous observations to confirm the hypotheses. (3) 2002 is the earliest year to include the data relevant to hypotheses 1, 2 and 3 from the CSMAR database. We aim to balance the sample period and thus make it as convincing as possible.

Other models for extracting discretionary accruals, such as the performance matched discretionary accruals model, enhance the validity of the results. Different measurements were also used for earnings signalling before claiming that an observation carries valid earnings signalling quality. For example, we include the additional condition that the magnitude of the changes in the discretional accruals deduced from STQ reporting must be greater than that of the annual discretional accruals. We thus have greater confidence in claiming that managers do have the intention to signal annual earnings in those observations. The implementation of the SSR was a long, gradual and continuous process. Therefore, it is unlikely that the previously restricted shares became tradable immediately, or that the controlling shareholders became suddenly sensitive to firm performance and earnings signalling. In response to this concern, we replace a simple cut-off of the SSR with yearly dummies as part of the robustness tests.

EMPIRICAL RESULTS AND DISCUSSION

Descriptive statistics

Table 1 gives the descriptive results of the dependent variable, independent variables and control variables for hypotheses 1, 2 and 3, which are shown in panels A, B and C, respectively. Each panel provides the summary statistics for variables in the full period and in each period before and after the split-share structure reform.

In panel A, for the whole period outcome of hypothesis 1, the mean of earnings signalling (ES) is 0.308, and its standard deviation is 0.462. It can be seen that almost 30% of firms demonstrate the tendency to conduct earnings signalling since ES equals 1 if a firm uses discretionary accruals in its STQ to foretell the trend of yearly earnings correctly and 0 otherwise. After the split-share structure reform, the proportion of signalling increases, which may confirm the proposed influence of the split-share structure reform. The mean of SSR is 0.519, and its standard deviation is 0.500. Over the whole period, the mean of the duality of CEO and chairman (CEOCHR) is 0.212, and its standard deviation is 0.409. It can be seen that nearly 20% of firms are in the situation where the CEO and chairman are the same person since CEOCHR equals 1 if the positions of CEO and BOD chairman falls within the same individual and 0 otherwise. After the SSR, CEOCHR decreases from 0.303 to 0.145, suggesting that the share reform reduces the duality. Over the whole period, the mean of the independent directors' portion (INDDIR) is 0.359, and its standard deviation is 0.057. It can be seen that most firms reach the basic requirement of the proportion of independent directors in China with 33.3%, and after the SSR this proportion increases slightly. The mean of cross-listed firms (CROLIS) is 0.0769, and its standard deviation is 0.266. The mean of hiring Big-4 audit firms (BIG4) is 0.059, and its standard deviation is 0.236. This shows a low hiring rate for Big-4 audit firms in China, which may be due to legal issues or financial limitations. After the SSR, BIG4 increases by 20%[1], but it is still relatively low.

In panel B, for the whole period outcome of hypothesis 2, the mean of auditing fee (LnFEE) is 13.26, and its standard deviation is 0.578, which represents the charge level of firms in terms of auditing fees. After the SSR, the LnFEE increases from 13.16 to 13.35, which confirms the influence of the SSR? It shows the auditing fee charged is more than that before the SSR. In the whole period, the means of board meeting times (BODM) is 8.891, and its standard deviation is 3.350. It is found that firms hold board meetings nearly nine times a year. After the SSR, BODM increases from 8.535 to 9.233. This infers that the share reform improves the supervision of the board, as firms may then care more about the business and financial reports. The CEOCHR shows a similar variation tendency and decreases after the SSR from 0.314 to 0.143. In the whole period, the mean of the audit committee (AC) is 0.824, and its standard deviation is 0.381. It can be seen that about 82% of total firms have an audit committee, and after the SSR the proportion increases slightly to 89.5%. Over the whole period, the mean of switch on auditors (AUD_SW) is 0.661, and its standard deviation is 0.473, which shows that about 66% of the firms changed auditors in a given year. The portion decreases slightly after the SSR from 0.687 to 0.641. For the whole period, the mean of expert auditors (AUD_EXP) is 0.516 and its standard deviation is 0.500, and the announcement of modified opinion by auditors (AUD_OPI) is 0.063 and its standard deviation is 0.244. About 6% of the firms thus have modified auditing reports. The proportion decreases after the SSR from 0.071 to 0.056, which confirms the healthy effect of SSR. BIG4 also shows a similar variation tendency as in hypothesis 1, as

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[1]The calculation is listed as follow: (0.064-0.054)/0.054×100%=20%

Table 1. Descriptive statistics.

Panel A hypothesis 1

Variable	Mean	Std.Dev.	Min	Max	SSR=0 Mean	SSR=1 Mean
ES	0.308	0.462	0	1	0.302	0.313
SSR	0.519	0.500	0	1		
CEOCHR	0.212	0.409	0	1	0.303	0.145
INDDIR	0.359	0.057	0.182	0.556	0.353	0.365
CROLIS	0.077	0.266	0	1	0.061	0.091
LnASSET	21.71	1.284	12.31	27.70	21.39	22.00
ROA	0.035	0.054	-0.275	0.206	0.037	0.032
LEV	0.473	0.211	0.051	1.330	0.413	0.527
MB	3.721	3.194	-1.865	28.83	3.769	3.678
BIG4	0.059	0.236	0	1	0.054	0.064
AF	8.622	9.115	1	41	8.275	8.858

Panel B hypothesis 2

Variable	Mean	Std.Dev.	Min	Max	SSR=0 Mean	SSR=1 Mean
LnFEE	13.26	0.578	11.92	15.35	13.16	13.35
SSR	0.511	0.500	0	1		
BODM	8.891	3.350	3	22	8.535	9.233
CEOCHR	0.218	0.413	0	1	0.314	0.143
AC	0.824	0.381	0	1	0.749	0.895
AUD_{SW}	0.661	0.473	0	1	0.687	0.641
LnASSET	21.68	1.194	18.93	25.59	21.32	22.02
BUSSEG	3.200	2.265	1	13	2.940	3.448
GEOSEG	3.605	2.446	1	13	3.837	3.384
ARI	0.269	0.166	0.005	0.770	0.276	0.262
BIG4	0.061	0.239	0	1	0.056	0.064
AUD_{EXP}	0.516	0.500	0	1	0.512	0.519
CUR	2.131	2.236	0.19	18.09	2.691	1.601
LEV	0.463	0.214	0.047	1.359	0.400	0.523
ROE	0.063	0.121	-0.955	0.563	0.064	0.063
AUD_{OPI}	0.063	0.244	0	1	0.071	0.056

Panel C hypothesis 3

Variable	Mean	Std.Dev.	Min	Max	SSR=0 Mean	SSR=1 Mean
MBE	0.212	0.409	0	1	0.147	0.269
SSR	0.533	0.499	0	1		
HOR	14.30	5.763	1	31	14.62	14.04
ANLY	8.998	9.101	1	65	8.877	9.104
FSTD	0.261	0.276	0	6.914	0.291	0.235
LnASSET	22.04	1.281	13.76	28.51	21.66	22.37
ΔEPS	0.477	0.500	0	1	0.392	0.552
LEV	0.448	0.269	0.007	16.55	0.365	0.522

Source: The data used are from the CSMAR Database for the 2002-2015 periods.

it increases from 0.056 to 0.064, but it is still somewhat increased compared with the whole sample. The descriptive statistics are consistent with Ni et al. (2017) and Feng and Liang (2010).

In panel C, for the whole period outcome of hypothesis 3, the mean of MBE is 0.212, and its standard deviation is 0.409. This indicates that nearly 21% of the firms exhibit MBE behaviour. MBE increases sharply after the SSR, from 0.147 to 0.269. This near-double increase shows the effect of split-share structure, which is

consistent with my hypothesis. The mean of forecast horizontal (HOR) is 14.30 and its standard deviation is 5.763. The mean of the number of analysts following the firm (ANLY) is 8.998 and its standard deviation is 9.101, which means that a general firm would have nine analysts. In the whole period, the mean of the standard deviation of earnings forecast (FSTD) is 0.261 and its standard deviation is 0.276. The FSTD decreases from 0.291 to 0.235 after the SSR, which suggests that the forecasts are less dispersed than before the SSR.

The descriptive statistics provided a preliminary analysis of each variable, and we can also see their changes before and after SSR. However, the influence of SSR should be further studied and they are introduced in following sections.

Correlation and regression results

To provide convincing results, we use both Pearson and Spearman correlation tests and Table 2 presents the correlation matrices for the full sample data of listed firms in China from 2002 to 2015 for hypotheses 1, 2 and 3, which are shown in panels A, B and C, respectively. Each panel provides the Pearson correlation in the lower triangular matrix and the Spearman correlation in the upper triangular matrix. To avoid biased results caused by outliers, all of the variables are Winsorized at the 1% and 99% levels and *, ** and *** represent significance at the 10, 5 and 1% levels, respectively.

In panel A, the correlation of SSR in hypothesis 1 is significantly related to ES, which indicates that the relationship between earnings signalling, and split-share reform is worth exploring overall. The results indicate that considering the influence of SSR, ES shows a positive significant variation tendency, and its coefficient is 0.012 for both correlation coefficients.

In panel B, it can be seen that when the SSR is included, nearly all of the variables are significantly related to LnFEE except for ARI, which is the sum of inventories and accounts receivable divided by total assets. The coefficient of SSR in hypothesis 2 is 0.172 for the Pearson coefficient and 0.163 for the Spearman coefficient, which means that the variation tendency of auditing fees and the SSR is the same; the audit fees increase after the SSR. The board meeting times (BODM), the existence of an audit committee (AC), firms that hired Big-4 auditing firms (BIG4) and the existence of expert auditors (AUD_EXP) show the same positive correlation with LnFEE; the Pearson coefficients are 0.206, 0.166, 0.307 and 0.297 and the Spearman coefficients 0.205, 0.175, 0.231 and 0.291, respectively. The duality of CEO and chairman (CEOCHR), the switch of auditors (AUD_SW) and the given modified auditing opinions (AUD_OPI) show a negative correlation with LnFEE; the Pearson coefficients are -0.058, -0.059 and -0.088 and the Spearman coefficients are -0.054 -0.060

and -0.088, respectively.

In panel C, all of the variables are highly significantly related to meeting or beating earnings expectations (MBE). First, the Pearson coefficient of SSR in hypothesis 3 is 0.149, and the Spearman coefficient is 0.148, which are both highly positively related to MBE. After the SSR, firms are more likely to meet or beat earnings expectations, which is consistent with hypothesis 3. Negative correlations are then found between forecast horizon (HOR) or standard deviation of forecast earnings (FSTD) and MBE. The correlations are -0.146 and -0.203, respectively (Spearman correlations are -0.147 and -0.286). The number of analysts following the firm (ANLY) has a positive relationship with MBE, and its Pearson correlation is 0.028.

The authors have checked the regression assumptions for each model and Table 3 reports the regression results of hypotheses 1, 2 and 3, which are shown in panels A, B and C, respectively.

In panel A, SSR is highly positively related to ES at the 5% level, its coefficient is 0.027 and the p-value is 0.029. This indicates that SSR has a positive relation with ES, as firms conduct more signalling for future earnings after the SSR than before. The regression results are consistent with hypothesis 1; a firm displays a higher tendency to signal earnings through discretionary accruals after the SSR. CEOCHR is not significantly related to ES and its coefficient is 0.002 positive. The sign of the coefficient shows the positive effect of earnings signalling, although the p-value (0.866) does not support the correlation. A significant negative relationship is then found between the independent directors' portion (INDDIR) and earnings signalling (ES) (the coefficient of INDDIR is -0.221, significant at 5%), mainly due to the overseeing of independent directors. Habbash et al. (2014) suggest that independent directors play an important role in constraining earnings management, regardless of the characteristics of earnings management. In this study, earnings signalling are a healthy type of management that firms conduct to convey transparent information to the shareholders and the public. However, this management behaviour is still constrained by the overseeing of independent directors, which leads to the negative significance of the regression. CROLIS is not significantly correlated with ES, and its coefficient is 0.015 negative. The sign of the coefficient shows the negative effect of earnings signalling, although the p-value (0.521) does not support the correlation. A significant positive relationship is then found between the firms that hired Big-4 audit firms (BIG4) and earnings signalling (ES) (the coefficient of BIG4 is 0.081, significant at 1%), mainly due to the synergistic effect of Big-4 auditing firms, which encourages the release of more transparent information to the public and decreases the opportunity for fraud behaviour. Big-4 audit firms will thus increase the tendency to signal earnings through discretionary accruals.

Table 2. Pearson and Spearman correlation matrix.

Panel A hypothesis 1

	ES	SSR	CEOCHR	INDDIR	CROLIS	LnASSET	ROA	LEV
ES	1	0.012*	-0.008	-0.024***	-0.009	-0.033***	0.041***	0.002
SSR	0.012*	1	-0.190***	0.087***	0.057***	0.266***	-0.085***	0.275***
CEOCHR	-0.008	-0.191***	1	0.095***	-0.055***	-0.149***	0.063***	-0.144***
INDDIR	-0.019***	0.103***	0.103***	1	0.017**	0.070***	0.018***	-0.017
CROLIS	-0.009	0.057***	-0.055***	0.016**	1	0.184***	0.001	0.081***
LnASSET	-0.033***	0.235***	-0.143***	0.089***	0.227***	1	0.039***	0.352***
ROA	0.059***	-0.049***	0.046***	0.035***	-0.001	0.084***	1	-0.404***
LEV	0.002	0.271***	-0.141***	-0.025***	0.082***	0.316***	-0.383***	1
MB	0.019***	-0.014**	0.092***	0.049***	-0.016**	-0.283***	0.073***	-0.022***
BIG4	0.002	0.021***	-0.063***	0.015**	0.410***	0.316***	0.066***	0.043***
AF	0.001	0.031***	0.043***	0.090***	0.106***	0.384***	0.330***	-0.061***

	MB	BIG4	AF
ES	0.025***	0.002	-0.004
SSR	-0.030***	0.020***	0.032***
CEOCHR	0.122***	-0.063***	0.062***
INDDIR	0.046***	0.009	0.087***
CROLIS	-0.051***	0.410***	0.076***
LnASSET	-0.320***	0.256***	0.336***
ROA	0.205***	0.072***	0.377***
LEV	-0.105***	0.045***	-0.073***
MB	1	-0.099***	0.130***
BIG4	-0.076***	1	0.123***
AF	0.115***	0.142***	1

Panel B hypothesis 2

	LnFEE	SSR	BODM	CEOCHR	AC	AUD SW	LnASSET	BUSSEG
LnFEE	1	0.163***	0.205***	-0.054***	0.175***	-0.060***	0.633***	0.065***
SSR	0.172***	1	0.097***	-0.205***	0.192***	-0.048***	0.298***	0.137***
BODM	0.206***	0.104***	1	0.000	0.137***	-0.017**	0.208***	0.058***
CEOCHR	-0.058***	-0.206***	-0.006	1	0.019***	-0.007	-0.156***	-0.093***
AC	0.166***	0.192***	0.130***	0.020***	1	-0.048***	0.126***	-0.107***
AUD SW	-0.059***	-0.048***	-0.013*	-0.007	-0.049***	1	-0.042***	0.004
LnASSET	0.660***	0.291***	0.227***	-0.152***	0.127***	-0.045***	1	0.130***
BUSSEG	0.078***	0.112***	0.069***	-0.081***	-0.100***	-0.003	0.131***	1
GEOSEG	0.033***	-0.093***	0.026***	0.029***	0.007	-0.004	-0.003	0.012*
ARI	-0.005	-0.042***	0.060***	0.033***	-0.028***	0.014**	-0.038***	0.009
BIG4	0.307***	0.017***	0.019***	-0.070***	-0.008	-0.023***	0.279***	0.120***
AUD EXP	0.297***	0.007	0.065***	0.035***	0.119***	-0.039***	0.175***	-0.076***
CUR	-0.143***	-0.244***	-0.079***	0.150***	0.062***	0.006	-0.246***	-0.169***
LEV	0.177***	0.286***	0.151***	-0.145***	-0.029***	-0.008	0.341***	0.169***
ROE	0.083***	-0.003	0.005	0.021***	0.074***	-0.006	0.120***	-0.004
AUD OPI	-0.088***	-0.031***	-0.013**	0.021***	-0.070***	0.009	-0.167***	-0.007

	GEOSEG	ARI	BIG4	AUD EXP	CUR	LEV	ROE	AUD OPI
LnFEE	0.041***	-0.017**	0.231***	0.291***	-0.117***	0.181***	0.104***	-0.088***
SSR	-0.096***	-0.070***	0.016***	0.007	-0.260***	0.292***	-0.004	-0.030***
BODM	0.036***	0.031***	0.013**	0.070***	-0.055***	0.140***	0.016**	-0.010
CEOCHR	0.028***	0.044***	-0.069***	0.034***	0.159***	-0.148***	0.016**	0.020***

Table 2. Contd.

AC	0.001	-0.033***	-0.008	0.119***	0.072***	-0.026***	0.086***	-0.070***
AUD SW	-0.002	0.019***	-0.023***	-0.039***	0.008	-0.007	-0.009	0.009
LnASSET	-0.008	-0.070***	0.232***	0.158***	-0.255***	0.364***	0.149***	-0.164***
BUSSEG	0.032***	-0.006	0.107***	-0.084***	-0.197***	0.193***	-0.012*	-0.009
GEOSEG	1	0.111***	-0.042***	-0.021***	0.101***	-0.028***	0.033***	-0.039***
ARI	0.078***	1	-0.074***	-0.011*	0.181***	0.199***	-0.002	0.005
BIG4	-0.042***	-0.063***	1	0.245***	-0.086***	0.050***	0.096***	-0.035***
AUD EXP	-0.023***	-0.006	0.246***	1	0.066***	-0.041***	0.071***	-0.041***
CUR	0.084***	-0.069***	-0.076***	0.047***	1	-0.740***	0.134***	-0.106***
LEV	-0.044***	0.236***	0.047***	-0.043***	-0.642***	1	-0.066***	0.102***
ROE	0.023***	0.012*	0.067***	0.060***	0.082***	-0.133***	1	-0.080***
AUD OPI	-0.032***	0.011*	-0.035***	-0.041***	-0.048***	0.136***	-0.110***	1

Panel C hypothesis 3

	MBE	SSR	HOR	ANLY	FSTD	LnASSET	dEPS	LEV
MBE	1	0.148***	-0.147***	-0.007	-0.286***	0.129***	0.389***	0.101***
SSR	0.149***	1	-0.046***	-0.009	-0.136***	0.322***	0.160***	0.369***
HOR	-0.146***	-0.051***	1	-0.060***	0.090***	0.006	-0.140***	-0.004
ANLY	0.028***	0.012	-0.040***	1	0.231***	0.299***	0.004	-0.073***
FSTD	-0.203***	-0.101***	0.057***	0.191***	1	0.090***	-0.195***	-0.037***
LnASSET	0.134***	0.279***	-0.003	0.339***	0.091***	1	0.085***	0.517***
dEPS	0.389***	0.160***	-0.138***	0.021**	-0.140***	0.075***	1	0.105***
LEV	0.072***	0.291***	-0.004	-0.046***	-0.035***	0.329***	0.082***	1

Source: The data used are from the CSMAR Database for the 2002-2015 periods.

Panel B shows that SSR is highly positively related to LnFEE at the 1% level, its coefficient is 0.034 and the p-value is very small at near to zero. This indicates that SSR has the same variation tendency as LnFEE, which means that firms tend to be charged more audit fees after the SSR than before. It proves that the firms' and investors' needs of high-quality auditing are increased after SSR. And the managers have more incentives to increase the audit quality to meet this demand.

BODM is highly positively related to LnFEE at the 5% level, its coefficient is 0.004 and its p-value is 0.000. This indicates that board meeting times increase the audit fees charged by improving the overseeing of the board and the audit quality. CEOCHR is not significantly correlated with LnFEE and its coefficient is 0.002 negative. The sign of the coefficient shows the negative effect of auditing fees charged, consistent with the Pearson correlation, although the p-value (0.785) does not support the correlation. A significant positive relationship is then found between the existence of an accounting committee (AC) and auditing fees charged (LnFEE) (the coefficient of AC is 0.038, significant at the 1% level). The synergistic committee oversight increases the legal reaction and litigation within firms, and thus causes an increase in the auditing fees charged. AUD_SW is significantly correlated with LnFEE and its coefficient is 0.009 negative, significant at the 5% level.

The sign of the coefficient shows the negative effect of auditing fees charged, consistent with the Pearson correlation. A significant positive relationship between firms that hired Big-4 audit firms (BIG4) and audit fees charged (LnFEE) (the coefficient of BIG4 is 0.311, significant at the 1% level) is then found. The reputation and audit quality of Big-4 audit firms represents a higher standard and quality level, and stricter requirements than those of other audit firms, which in turn requires the firms to pay higher fees. AUD_EXP is also highly positively related to LnFEE. The coefficient of AUD_EXP is 0.122, and its p-value is very small at near zero. Considering the similar influences from the expert auditor and Big-4 audit firms, both will increase the audit quality and the firms must pay more for the higher standard of audit reports. Therefore, an audit expert would also increase the auditing fees charged. A significant positive relationship between the given modified auditing opinions (AUD_OPI) and audit fees charged (LnFEE) (the coefficient of AUD_OPI is 0.036, significant at the 1% level) is then found. The given audit opinion reveals the problems or potential warnings for the firm, which warrants higher consultancy payments for the increased level of work involved.

Panel C shows that the SSR is highly positively related to MBE at the 1% level, its coefficient is 0.049 and the p-value is very small at near zero. This indicates that the

Table 3. Regression result.

Panel A hypothesis 1		Panel B hypothesis 2		Panel C hypothesis 3	
Variable	ES	Variable	LnFEE	Variable	MBE
SSR	0.027** (0.029)	SSR	0.034***(0.000)	SSR	0.049***(0.000)
CEOCHR	0.002(0.866)	BODM	0.004***(0.000)	HOR	-0.000***(0.000)
INDDIR	-0.221**(0.032)	CEOCHR	0.002(0.785)	ANLY	0.002***(0.000)
CROLIS	-0.015(0.521)	AC	0.038***(0.000)	FSTD	-0.180***(0.000)
LnASSET	-0.033***(0.000)	AUD_SW	-0.009**(0.027)	LnASSET	0.044***(0.000)
ROA	0.465***(0.001)	LnASSET	0.365***(0.000)	ΔEPS	0.248***(0.000)
LEV	0.098***(0.008)	BUSSEG	-0.003*(0.064)	LEV	-0.100***(0.000)
MB	0.002(0.497)	GEOSEG	-0.004**(0.025)	Constant	-0.375***(0.001)
BIG4	0.081***(0.001)	ARI	0.083***(0.001)	Sample size	9548
AF	0.001(0.323)	BIG4	0.311***(0.000)	R-squared	0.251
Constant	1.025***(0.000)	AUD_EXP	0.122***(0.000)		
Sample size	9814	CUR	-0.012***(0.000)		
R-squared	0.030	LEV	-0.181***(0.000)		
		ROE	-0.210***(0.000)		
		AUD_OPI	0.036***(0.007)		
		Constant	5.389***(0.000)		
		Sample size	9760		
		R-squared	0.517		

To avoid biased results caused by outliers, all of the variables are Winsorized at the 1 and 99% levels. *, ** and *** represents significance at the 10, 5 and 1% levels respectively. P-values are shown in parentheses.
Source: The data used are from the CSMAR Database for the 2002-2015 periods.

SSR has the same variation tendency as MBE, which means that firms are more likely to meet or beat the earnings expectations made by analysts after the SSR than before. The regression result is consistent with hypothesis 3, as a firm is more likely to fulfil earnings expectations after the SSR. A significant negative relationship between forecast horizon (HOR) and the probability of meeting or beating earnings expectations (MBE) (the coefficient of HOR is -0.000, significant at the 1% level) is then found. This result is consistent with the Pearson correlation. According to previous studies, the forecast error is positively correlated with the time between the earnings forecast and earnings announcement. In this study, I use MBE as the dependent variable instead of the forecast error (FE); as such, the relationship between HOR and MBE is significant and negative, which infers that firms are likely to fulfil earnings expectations when the timespan is short. The forecast accuracy increases with the small timespan, as firms have the ability to manage the earnings. ANLY is highly positively related with the MBE and its correlation is 0.002. This indicates that the higher the number of analysts monitoring a firm, the more likely the firm is to meet or beat earnings expectations. This follows the synergistic function of HOR, as a large number of analysts will increase the forecast accuracy and thus the ability to meet or beat earnings expectations. A significant negative relationship between the dispersion of the forecasts (FSTD) and MBE (the coefficient of FSTD is -0.180, significant at the 1% level) is then found. This shows the similar synergistic function in forecast accuracy with the smaller dispersion of forecast errors, as a more accurate forecast increases the likelihood of meeting or beating earnings expectations.

Robustness test

For each hypothesis mentioned, a robustness test was conducted to verify its reliability. In the history of Chinese economic development, the financial crisis of 2008 had a huge influence on firms' behaviour and survival circumstances. To avoid the effects of the financial crisis, we drop the 2008 data to eliminate the unpredictable risks and rerun the regression model to establish differences from the previous results. The regression results are shown in Table 4, and columns 1, 2 and 3 correspond to hypotheses 1, 2 and 3, respectively.

In column 1, the coefficient of SSR is highly positively related to the dependent variable (ES) at the 1% level, its coefficient is 0.026 and the p-value is 0.040; in column 2, the coefficient of SSR is highly positively related with the dependent variable (LnFEE) at the 1% level, its coefficient is 0.082 and the p-value is 0.000; and in column 3, the coefficient of SSR is highly positively related with the dependent variable (MBE) at the 1% level, its coefficient

Table 4. Robustness test on financial crisis in 2008.

Variable	Model 1	Model 2	Model 3
SSR	0.026**(0.040)	0.082***(0.000)	0.053***(0.000)
CEOCHR	0.005(0.718)	-0.013(0.114)	
INDDIR	-0.256**(0.019)		
CROLIS	-0.004(0.875)		
BIG4	0.069***(0.002)	0.256***(0.000)	
BODM		0.002***(0.007)	
AC		0.024***(0.001)	
HOR			-0.001***(0.000)
ANLY			0.002***(0.000)
FSTD			-0.228***(0.000)
ΔEPS			0.256***(0.000)
LnASSET	-0.033***(0.000)	0.375***(0.000)	0.036***(0.000)
LEV	0.109***(0.005)	-0.151***(0.000)	-0.063***(0.001)
AUD_SW		-0.007(0.136)	
BUSSEG		-0.003(0.149)	
GEOSEG		-0.008***(0.000)	
ARI		0.069**(0.015)	
AUD_EXP		0.099***(0.000)	
CUR		-0.013***(0.000)	
AUD_OPI		0.044***(0.002)	
ROA	0.528***(0.000)		
ROE		-0.205***(0.000)	
MB	0.001(0.534)		
AF	0.001(0.268)		
Constant	1.022***(0.000)	5.130***(0.000)	-0.455***(0.000)
Sample size	9021	8973	8722
R-squared	0.024	0.525	0.221

To avoid biased results caused by outliers, all of the variables are winsorized at the 1 and 99% levels. *, ** and *** represents significance at the 10, 5 and 1% levels respectively. P-values are shown in parentheses.
Source: The data used are from the CSMAR Database for the 2002-2015 periods.

is 0.053 and the p-value is 0.000. All of the results are consistent with the previous regression outcomes, so it can be inferred that the effect of the financial crisis would not change the results or conclusions of the hypotheses. Thus, robustness is confirmed.

Cross-sectional test

Under the cross-sectional analysis, the sample was splited into two groups based on five criteria to test the influence and outcome based on each criterion. We also use Fisher's permutation test and the Chow test to explore whether the difference of coefficients is significant. The five criteria are:

1. SOE (State Owned Enterprises) vs. non-SOE;
2. Firms with a percentage of restricted shares as total shares of more than median vs. firms with the percentage

of restricted shares as total shares of less than the median;
3. Firms with SSR completed before the median completion date vs. firms with SSR completed after the median completion date;
4. Firms with the percentage of management shares as total shares of above the median vs. firms with the percentage of management shares as total shares of below the median: and
5. Big-4 audit firms vs. Non-Big-4 audit firms.

Table 5 reports the cross-sectional analysis of hypotheses 1, 2 and 3 in panels A, B and C, respectively. The difference in coefficients of SSR and its p-values between the two groups are reported as ΔCoef/P-var.

Before the SSR, both SOE and non-SOE firms face the issues of tradable and non-tradable shares. In panel A, within the group of SOE and non-SOE firms, the coefficient of SSR in non-SOE firms is highly positively

Table 5. Cross-sectional analysis - Regression result under five groups.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
					Panel A hypothesis 1					
Variable	Non-SOE firm	SOE firm	Percentage of restricted shares to total shares less than median	Percentage of restricted shares to total shares more than median	Before the median completion date	After the median completion date	Below median of management shares portion	Above median of management shares portion	Non-Big4	Big4
SSR	0.038**(0.039)	0.011(0.537)	-0.010(0.791)	-0.001(0.966)	-0.027(0.380)	0.036(0.252)	0.022(0.249)	0.035**(0.035)	0.033***(0.009)	-0.024(0.591)
ΔCoef/P-var	0.027*	0.060	-0.009	0.460	-0.063*	0.070	-0.013*	0.090	0.057	0.240
CEOCHR	0.002(0.872)	0.015 (0.531)	-0.006(0.820)	0.027(0.342)	-0.026(0.319)	0.050*(0.086)	0.023(0.331)	-0.010(0.588)	0.005(0.719)	-0.027(0.685)
INDDIR	-0.118(0.459)	-0.330** (0.019)	-0.573***(0.004)	-0.089(0.584)	-0.113(0.494)	-0.427**(0.030)	-0.197(0.180)	-0.270*(0.066)	-0.244**(0.026)	-0.068(0.836)
CROLIS	-0.045(0.346)	-0.019 (0.471)	-0.062(0.219)	-0.005(0.860)	-0.032(0.327)	0.014(0.711)	-0.024(0.427)	-0.003(0.942)	-0.044(0.115)	0.042(0.312)
LnASSET	-0.041***(0.001)	-0.033***(0.000)	-0.035**(0.014)	-0.026**(0.023)	-0.031***(0.002)	-0.0500***(0.000)	-0.021**(0.024)	-0.050***(0.000)	-0.034***(0.000)	-0.041*(0.051)
ROA	0.404*(0.057)	0.527***(0.003)	1.076***(0.000)	0.139(0.490)	0.442**(0.034)	0.654***(0.005)	0.682***(0.000)	0.240(0.225)	0.469***(0.001)	0.383(0.466)
LEV	0.074	0.119**	0.092	0.078	0.144**	0.036	0.090*	0.110**	0.095**	0.126(0.410)
	(0.185)	(0.018)	(0.186)	(0.208)	(0.018)	(0.602)	(0.086)	(0.041)	(0.013)	
MB	-0.002(0.496)	0.004(0.132)	-0.000(0.903)	0.008**(0.016)	0.0032(0.386)	0.003(0.365)	0.004(0.193)	-0.001(0.733)	0.002(0.495)	-0.002(0.844)
BIG4	0.049(0.273)	0.096***(0.001)	0.009(0.870)	0.077**(0.011)	0.054*(0.082)	0.094**(0.049)	0.091***(0.003)	0.058(0.109)	-	-
AF	0.001(0.452)	0.001(0.384)	-0.001(0.409)	0.002*(0.057)	0.001(0.538)	0.002(0.106)	-0.000 (0.880)	0.002*(0.071)	0.001(0.206)	-0.000(0.858)
Constant	1.157***(0.000)	1.047***(0.000)	1.234***(0.000)	0.819***(0.001)	0.969***(0.000)	1.449***(0.000)	0.739***(0.000)	1.404***(0.000)	1.037***(0.000)	1.255***(0.006)
Sample size	6410	3404	4901	4913	4898	4916	4906	4908	9234	580
R-squared	0.024	0.046	0.052	0.040	0.026	0.073	0.016	0.023	0.023	0.032
					Panel B hypothesis 2					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variable	Non-SOE firm	SOE firm	Percentage of restricted shares as total shares less than median	Percentage of restricted shares as total shares more than median	Before median of SSR completion date	After median of SSR completion date	Below median of management shares portion	Above median of management shares portion	Non-Big4	Big4
SSR	0.085***(0.000)	0.087***(0.000)	0.046***(0.000)	0.127***(0.000)	0.091***(0.000)	0.092***(0.000)	0.080***(0.000)	0.083***(0.000)	0.065***(0.000)	0.360***(0.000)
ΔCoef/P-var	-0.002	0.440	-0.081***	0.000	-0.001	0.390	-0.003	0.380	-0.295***	0.000
BODM	0.003(0.150)	0.002(0.217)	0.003**(0.030)	0.001(0.417)	0.001(0.486)	0.002(0.130)	0.000(0.800)	0.002(0.106)	0.002**(0.032)	0.006(0.252)
CEOCHR	0.036**(0.049)	-0.043***(0.001)	-0.010(0.444)	-0.017(0.332)	0.016(0.295)	-0.032**(0.024)	-0.016(0.246)	-0.017*(0.090)	-0.009(0.243)	0.049(0.324)
AC	0.026(0.118)	0.030***(0.003)	0.022*(0.066)	0.036***(0.005)	0.023*(0.069)	0.023*(0.058)	0.024**(0.032)	0.004(0.636)	0.018***(0.010)	0.053(0.176)
AUD_SW	-0.010(0.373)	-0.007(0.311)	-0.016**(0.037)	0.004(0.609)	0.005(0.552)	-0.015*(0.057)	-0.016**(0.018)	-0.004(0.479)	-0.006(0.141)	0.008(0.696)
LnASSET	0.379***(0.000)	0.360***(0.000)	0.368***(0.000)	0.361***(0.000)	0.422***(0.000)	0.317***(0.000)	0.340***(0.000)	0.420***(0.000)	0.376***(0.000)	0.370***(0.000)
BUSSEG	-0.003(0.380)	-0.004(0.121)	-0.006**(0.050)	-0.000(0.892)	-0.001(0.660)	-0.001(0.744)	-0.005*(0.078)	0.003(0.181)	-0.001(0.566)	-0.006(0.336)
GEOSEG	-0.012***(0.007)	-0.004(0.176)	-0.007**(0.031)	-0.004(0.285)	-0.004(0.282)	-0.003(0.480)	-0.004(0.254)	-0.009***(0.001)	-0.009***(0.000)	0.020(0.154)
ARI	0.010(0.858)	0.088**(0.023)	0.067(0.106)	0.020(0.690)	0.059(0.268)	0.020(0.625)	0.043(0.294)	0.055(0.166)	0.072***(0.009)	-0.070(0.725)

Table 5. Contd.

BIG4	0.453***(0.000)	0.227***(0.000)	0.215***(0.000)	0.296***(0.000)	0.344***(0.000)	0.206***(0.000)	0.299***(0.000)	0.262***(0.000)	-	-
AUD_EXP	0.105***(0.000)	0.102***(0.000)	0.106***(0.000)	0.098***(0.000)	0.111***(0.000)	0.091***(0.000)	0.105***(0.000)	0.075***(0.000)	0.105***(0.000)	-
CUR	-0.004(0.512)	-0.019***(0.000)	-0.015***(0.002)	-0.010*(0.053)	-0.012**(0.019)	-0.015***(0.002)	-0.011***(0.003)	-0.010***(0.000)	-0.013***(0.000)	-0.012(0.543)
LEV	-0.161***(0.004)	-0.171***(0.000)	-0.213***(0.000)	-0.097***(0.032)	-0.197***(0.000)	-0.156***(0.000)	-0.144***(0.000)	-0.139***(0.000)	-0.176***(0.000)	0.011(0.945)
ROE	-0.183***(0.000)	-0.239***(0.000)	-0.248***(0.000)	-0.201***(0.000)	-0.235***(0.000)	-0.187***(0.000)	-0.207***(0.000)	-0.143***(0.000)	-0.216***(0.000)	-0.174(0.257)
AUD_OPI	0.055**(0.031)	0.026(0.203)	-0.012(0.574)	0.081***(0.000)	0.072***(0.006)	0.000(0.982)	-0.001(0.969)	0.077***(0.000)	0.033**(0.017)	0.177(0.340)
Constant	5.025***(0.000)	5.348***(0.000)	5.279***(0.000)	5.251***(0.000)	3.971***(0.000)	6.320***(0.000)	5.824***(0.000)	4.200***(0.000)	5.119***(0.000)	5.278***(0.000)
Sample size	6534	3226	4880	4880	4872	4988	4868	4892	9165	595
R-squared	0.552	0.512	0.563	0.484	0.566	0.492	0.464	0.519	0.513	0.507

Panel C hypothesis 3										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variable	Non-SOE firm	SOE firm	Percentage of restricted shares as total shares less than median	Percentage of restricted shares as total shares more than median	Before median of SSR completion date	After median of SSR completion date	Below median of management shares portion	Above median of management shares portion	Non-Big4	Big4
SSR	0.089***(0.000)	-0.006(0.596)	-0.097***(0.001)	-0.122***(0.000)	0.098***(0.000)	-0.171***(0.000)	0.009(0.000)	0.069***(0.000)	0.057***(0.000)	-0.026(0.370)
ΔCoef/P-var	0.095***	0.000	0.025	0.262	0.269**	0.022	-0.060***	0.000	0.083**	0.030
HOR	-0.001***(0.000)	-0.001***(0.000)	-0.001***(0.000)	-0.001***(0.000)	-0.001***(0.000)	-0.001***(0.000)	-0.001***(0.000)	-0.001***(0.000)	-0.001***(0.000)	-0.001***(0.002)
ANLY	0.002***(0.001)	0.003***(0.000)	0.002*(0.066)	0.003***(0.000)	0.002***(0.002)	0.004***(0.000)	0.003***(0.000)	0.002***(0.000)	0.001***(0.000)	0.003***(0.009)
FSTD	-0.165***(0.000)	-0.244***(0.000)	-0.114***(0.000)	-0.246***(0.000)	-0.200***(0.000)	-0.188***(0.000)	-0.251***(0.000)	-0.193***(0.000)	-0.207***(0.000)	-0.307***(0.000)
LnASSET	0.014***(0.004)	0.038***(0.000)	0.003(0.674)	0.041***(0.000)	0.031***(0.000)	0.026***(0.002)	0.036***(0.000)	0.030***(0.000)	0.028***(0.000)	0.010(0.466)
ΔEPS	0.186***(0.000)	0.334***(0.000)	0.293***(0.000)	0.364***(0.000)	0.342***(0.000)	0.327***(0.000)	0.323***(0.000)	0.218***(0.000)	0.252***(0.000)	0.454***(0.000)
LEV	-0.038*(0.076)	-0.099***(0.003)	0.030(0.402)	-0.217***(0.000)	-0.141***(0.000)	-0.074*(0.097)	-0.090***(0.007)	-0.047**(0.033)	-0.043**(0.017)	0.040(0.691)
Constant	0.023(0.836)	-0.506***(0.000)	0.591***(0.001)	-0.484***(0.006)	-0.168(0.274)	0.099(0.613)	-0.545***(0.000)	-0.297***(0.004)	-0.304***(0.001)	0.239(0.483)
Sample size	6159	3389	4764	4784	4770	4778	4774	4774	8975	573
R-squared	0.185	0.229	0.219	0.265	0.247	0.249	0.231	0.218	0.207	0.352

To avoid biased results caused by outliers, all of the variables are winsorized at the 1 and 99% levels. *, ** and *** represents significance at the 10, 5 and 1% levels respectively. P-values are shown in parentheses. Source: The data used are from the CSMAR Database for the 2002-2015 periods.

significantly correlated with the dependent variable at the 5% level, but the coefficient of SSR in SOE firms is not significantly correlated. Considering the p-value of coefficient difference in criterion 1 (0.060), it appears that the coefficient difference between the two subgroups is significant at the 10% level. This demonstrates the more prominent effect of non-SOE firms. The higher motivation to earn profits for non-SOE firms will raise the likelihood of signalling information to the public. In the SSR completion date group, the coefficients are not significant with the dependent variable. However, the p-value of coefficient difference in criterion 3 (0.070) is significant at the 10% level. Statistically, this shows the significance of SSR coefficient differences. Within the management shares group, the coefficient of SSR in the above median portion is highly positively significantly correlated with the dependent variable at the 5% level, but in the low median portion it is not significantly correlated. The p-value of

coefficient difference in criterion 4 (0.090) suggests that the coefficient difference between the two subgroups is significant at the 10% level. This shows the more prominent effect of the above median of management shares portion. As the agency costs will decrease when the proportion of management shares is larger, the empirical results indicate that the lower agency costs will increase the tendency to signal information to improve the firms' performances.

In panel B, in the group of the percentage of restricted shares to total shares, both coefficients are highly positively related to the dependent variable at the 1% level, which confirms that both levels of restricted shares affect the audit fee. This is consistent with the previous regression result. The p-value of coefficient difference in criterion 2 (0.000) suggests that the coefficient difference of SSR is statistically significant at the 1% level. The coefficient of over median restricted shares (0.127) is larger than that of under median restricted shares (0.046), which show the more prominent effect of the larger restricted shares portion. In general, the larger restricted shares portion suggests lower transparency inside the firms. Interested parties and report users need higher quality audit reports under this circumstance to disclose the firms' financial information to them, which will improve their confidence and increase the firm value. Within the group of Big-4 and non-Big-4 audit firms, both coefficients of SSR are highly positively significantly correlated with the dependent variable at the 1% level. The p-value of coefficient difference in criterion 5 (0.000) suggests that the coefficient difference between the two subgroups is significant at the 5% level. This shows the more prominent effect of Big-4 firms. Firms are concerned more about accounting information users and focus on increasing value in the more transparent market after the SSR by hiring Big-4 audit firms. Thus, the high-quality services provided by Big-4 audit firms will cost more.

In panel C, within the group of SOE and non-SOE firms, the coefficient of SSR in non-SOE firms is highly positively significantly correlated with the dependent variable at the 1% level, but the coefficient of SSR in SOE firms is not significantly correlated. The p-value of coefficient difference in criterion 1 (0.000) suggests that the coefficient difference of SSR is statistically significant at the 1% level. This shows the more prominent effect of non-SOE firms. Non-SOE firms have a higher motivation to make profits, so they need to achieve the analysts' forecasts to prove the value of the firms and attract investors. Within the group of SSR completion date, the coefficient of below median completion date is highly positively correlated with the dependent variable, but the coefficient of over median completion date is highly negatively correlated with the dependent variable at the 1% level, which shows that for the over median group, firms do not tend to meet or beat the forecast earnings. This is not consistent with the previous regression result. The negative reactions under the SSR mainly cause this, inferring that the reform will negate the

firms' existing earning system. Within the group of management shares portion, the coefficient of SSR in the above median of management shares portion is highly positively significantly correlated with the dependent variable at the 1% level, but the coefficient of SSR in the below median of management shares portion is not significantly correlated. The p-value of coefficient difference in criterion 4 (0.000) suggests that the coefficient difference of SSR is significant at the 1% level. This demonstrates the more prominent effect of the above median of management shares portion. The lower agency costs will increase the motivation to earn and enhance the value of the firms, and thus lead to a higher tendency to meet or beat forecast earnings. Furthermore, within the group of Big-4 and non-Big-4 audit firms, the coefficient of SSR in non-Big-4 audit firms is highly positively significantly correlated with the dependent variable at the 1% level, but the coefficient of SSR in Big-4 audit firms is not significantly correlated. The p-value of coefficient difference in criterion 5 (0.030) suggests that the coefficient difference between the two subgroups is significant at the 5% level. This shows the more prominent effect of non-Big-4 firms. Considering the influences of auditing quality, it can be supposed from the previous conclusion that high quality auditing decreases the motivation and opportunity to meet or beat forecast earnings. High quality auditing firms such as the Big-4 firms will suffer more losses in terms of both finances and reputation if auditing fails in this process. In general, the firms hiring non-Big-4 audit firms will reduce competitiveness and the trust of the public, so they have a higher tendency to implement the MBE strategy to improve and earn profits.

Throughout Table 5, the p-values of coefficient differences in the subsamples of percentage of restricted shares to total shares in panels A and C, the subsamples of SOE and non-SOE firms, the subsamples of SSR completion dated, the subsamples of management shares portion in panel B and the subsamples of Big-4 and non-Big-4 audit firms in panel A are not significant, which infers that these indexes do not have significance in the statistics.

Conclusions

To align its practice with international standards and to enhance global competitiveness, China has increasingly opened up its stock market. Since the SSR, the stock market has been developed and geared towards a Western-oriented model combined with the traditional economic form. The focus was on the three main factors of signalling, audit fees and meeting and beating earnings expectations by testing with three models. The results of the empirical tests are as follows.

First, firms display a higher tendency to signal earnings through discretionary accruals after the SSR than before. Other factors also influence signalling behaviour. For

example, the overseeing by independent directors can constrain the signalling, as can the surveillance of Big-4 audit firms. Second, the audit fees charged to the firms increase after the SSR. Unlike the suppositions made in agency theory, the legal effect and the high requirements of audit quality combined with the reputation concern and risk avoidance of audit firms plays a dominant role in the Chinese market, creating an opposite influence on that suggested by agency theory. Also, the increased managerial incentives to maximise stock prices through the higher accounting profits may create outside shareholders' demand for more objectively verified accounting reports, thereby increasing audit quality and audit fees. Additionally, the setting of audit committee, board meeting times, the surveillance of Big-4 audit firms and other factors affect the audit fees. Third, firms are more likely to meet or beat earnings expectations after the SSR than before. In addition, factors such as forecast horizon, total number of analysts followed, and dispersion of forecasts can also influence meeting the earnings expectation from the perspective of expectation accuracy.

Research implications

The findings can serve as a reminder for both firms and shareholders, and may reveal firms' behaviour, investment opportunities and operations since the implementation of the SSR in 2005. The study provides insights for financial report users such as researchers, investors and analysts, enabling them to better understand why they should adopt accrual accounting to improve the informative value of reported earnings, by combining both internal governance methods and external audit surveillance. In addition, the necessity of high-quality auditing under a competitive market is inferred, and evidence is provided on meeting earnings expectations, giving broad guidance to investors in the open market.

Limitations and future research

The study focuses on the revolution in the Chinese market in 2005 and 2006. However, the empirical research is limited by the unbalanced panel data from the database. Furthermore, in the research section, we do not select as many control variables as we could to verify the hypothesis, due to the cost and time limits. Thus, although other institutional factors inevitably affect the Chinese stock market, the utmost effort was made to consider related factors. In future research, we hope to examine related factors and provide a more comprehensive understanding of this topic.

CONFLICT OF INTERESTS

The authors have not declared any conflict of interests.

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