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The quality of financial reporting in China: An examination from an accounting restatement perspective

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ABSTRACT

This study uses restatements to reveal the poor quality of past accounting information reported within China's capital market. We show that up to a quarter of listed firms in mainland China explicitly admitted the poor quality of their financial information by restating their previous financial reports between 1999 and 2005. Many of these firms managed their earnings mainly via below-the-line items to avoid losses and promote survival, rather than to support refinancing goals. Such poor-quality financial reporting is more likely among firms that have weaker profitability and a shareholder base that is state-controlled, with diffused ownership and a relatively low proportion of shares held by institutional investors. Furthermore, we find the market to be relatively insensitive to such admissions. Investors' reactions capture only the earnings information of the current reported year, rather than also reflecting the concurrently revealed correction of past financial

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¹ The views expressed herein are those of the author and do not necessarily reflect the views of Morgan Stanley or its affiliates.



reporting. However, the equity market does not completely ignore the earnings information. Investors' reliance on earnings is merely low relative to the mature US market. These findings demonstrate that accounting credibility in China has low value; providing poor-quality financial information bears little cost because various market mechanisms fail to deter such behavior. Nevertheless, regulators' ongoing efforts to enhance the quality of financial information and disclosure among listed firms are still fruitful. The frequency of restatements decreased over our sample period, which reinforces the current regulatory prospects and strategies for further improving China's capital markets.

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1. Introduction

Efficient capital markets reward high-quality financial reporting, which facilitates the efficient raising and allocation of corporate capital and thus creates benefits for investors. In the past decade, China's stock market has become very popular among domestic investors, as the stock market is one of a very limited number of investment vehicles open to them. The total market value of equity invested in the Chinese stock market grew by an order of magnitude during the 1999–2007 period.² In less than three years, from mid-2005 to late-2007, the Shanghai and Shenzhen Stock Exchange Composite Index experienced a sixfold increase, after a decade of quietness. These gains generated euphoria among investors, at least until the stock market started to correct by as much as 70% a year from the end of 2007. This rise and fall of the stock market highlighted general concerns over the quality of financial reporting in China.

The negatively perceived turn of events in the Chinese market appears to parallel that of the US market during the same period. It is noted that an increasing number of US firms in recent years have had to restate their previous years' financial reports, either voluntarily or when forced to do so by regulators (Scholz, 2008; Wu, 2002). The number of firms restating their previous financial reports reached almost 300 in 2005, amounting to roughly two percent of all public companies in the United States. This number was high enough to draw appreciable attention from the media, regulators and academics. In mainland China, a similar yet more pronounced phenomenon recently emerged. We find that a significant proportion of listed companies on the Shanghai and Shenzhen Stock Exchanges restated their annual reports for the years from 1999 to 2005. Interestingly, in contrast to the enormous publicity received by US earnings restatements, in China restatements have received scant coverage in the Chinese media, despite the problem being more pronounced.

Restatements represent clear-cut violations of accounting rules and hence an explicit admission of the poor quality of companies' past financial reporting. Research shows that

² From 821 billion Chinese Yuan (approximately USD99.2 billion at USD1 = CNY8.2768) by the end of 1999 to 8555 billion Yuan (approximately USD1171.9 billion at the USD1 = CNY7.30) by the end of 2007.

in the United States, the announcement of a firm's earnings restatement usually triggers a severe decline in the stock price, thus harshly penalizing the restatement firm (Palmrose et al., 2004; Wu, 2002; Turner et al., 2001). US research also finds that after a restatement, the market relies less on earnings information to determine a firm's stock price, reflecting investors' loss of confidence in the company's financial reports (Wu, 2002; Andersen and Yohn, 2002), and the company is forced to pay a higher cost for equity capital (Hribar and Jenkins, 2004). These effects reflect the damage to the credibility of a firm's future financial reports in the wake of previously released low-quality financial information. In an emerging market such as China, however, it is highly uncertain whether the same market reaction exists, because investors' confidence in firms' financial reports may be low at the outset. The question also arises whether earnings restatements will reduce investors' reliance on accounting earnings for setting stock prices, or increase the firm's cost of equity capital, as found in the US research. Furthermore, it is possible that many of the restatements in China could be the result of opportunistic behavior, although with different motivations than in the United States, given the different institutional setting. Thus, China's restatements provide an opportunity to examine the value ascribed by an emerging market to the quality and credibility of financial reports, relative to the value assigned by a mature market.

Our first objective in this paper is to explore the characteristics of poor-quality firms—defined as firms that issue restatements—relative to control firms. We also investigate the incentives to report poor-quality financial information previously released by such firms. In addition, we examine the consequences, in terms of the stock market reaction, of admitting the publication of such information. Finally, we rationalize why Chinese companies so frequently provide poor-quality financial reporting, only to subsequently correct it. We hope this study will offer insights to regulators on how to detect poor-quality companies and suggest aspects that may improve the quality of listed firms. As with many other studies on issues concerning mainland China, this study also aims to remind readers that the regulatory and financial reporting environment is vastly different in China, as are the motivations and consequences for firms and for the market as a whole.

This study offers academic researchers, regulators and investors—both domestic and international—insights into the overall quality of China's accounting information and a further understanding of China's increasingly important capital markets. This is perhaps the first empirical study that directly examines the issue of accounting quality in China—a nation whose capital markets are becoming increasingly important and hence cannot be ignored in the global capital market. This study complements the broad research literatures on China, earnings quality and restatements.

Previous literature (Wu, 2002; Anderson and Yohn, 2002) on the US market argues that earnings restatements are indicators of the poor quality of prior financial reporting. Poor accounting quality is generally penalized by the capital market, and such penalties serve as a deterrent to companies' delivery of poor accounting quality via accounting manipulation and similar means. The results of our study imply that such penalties do not yet exist in China. Along with the Ministry of Finance (MOF), which sets accounting standards, China's regulatory body, the Chinese Securities and Regulatory Commission (CSRC), has been making efforts since 1996 to enhance the regulatory environment of the nation's capital market. Accounting regulation is an important part of this process and there have been significant and gradual economic improvements since 1978. Meanwhile, we also realize that such efforts must be persistently carried into the future. For example, our study shows

that in the absence of an effective penalty system in the market, investors generally do not distinguish between good and poor accounting quality. Hence, our study also suggests the establishment of an effective penalty system through government regulation, which appears to be a necessary step for China's emerging market to become a complete capital market.

Following this introduction, the paper consists of six sections. Section 2 offers a detailed, topic-relevant background to China's accounting and regulatory environment. Section 3 conducts a literature review on restatements and other related areas. Section 4 develops our hypotheses and outlines the empirical models. Section 5 describes the details of restatements in China. Section 6 provides the empirical tests and interprets the results. Section 7 concludes.

2. Accounting standards and regulatory background in China

The securities regulator in the People's Republic of China (PRC) is the CSRC, which is equivalent to the US Securities and Exchange Commission (SEC). Established in October 1992, the CSRC is an institution of the PRC State Council and is authorized to regulate China's securities and futures markets. Although it did not issue its first version of *Procedure for Inspecting Listed Companies* until December 21, 1996 (*the 1996 Procedure*), it became effective immediately. *The Procedure* covered the scope and procedures, and the CSRC's responsibilities during inspections. The scope emphasized the truthfulness, completeness, accuracy and timeliness of disclosures by listed companies.

In the 1990s, companies followed the old PRC accounting standards, which failed to specify how to deal with accounting errors and irregularities. Accounting treatments therefore varied widely among companies and across industries. China's accounting reform of the late 1990s introduced the first accounting standard: *The Standard of Changes in Accounting Policies and Estimates, and Corrections of Material Accounting Errors*³ (*the 1999 Standard*). It was issued in June 1998 by the MOF, PRC's accounting standard setter and came into effect on January 1, 1999. Section 3 of *the 1999 Standard* described the restatement methods and required disclosure of the reason(s) for and total amount of the restatement. *The 1999 Standard* was modified slightly in January 2001, with one item added: Any abuse of changes in accounting policies or accounting estimates will be treated as material accounting mistakes and therefore restated. *The 1999 Standard* only required a restatement to be disclosed in the company's forthcoming annual report. For several years, the Accounting Standards of Business Enterprises (ASBE) were adopted in parallel with the Companies Accounting System, which mentioned the correction of errors in its tenth chapter and provided technical treatments that were consistent with those of *the Old Standard*.

Issued in October 1999, the CSRC's *Notice on Improving Financial Information Disclosure of Listed Companies* (*the 1999 Notice*) states that: (1) listed companies should make proper loss estimates of accounts receivable, inventories, investments, etc., and should not change the method of provision and percentage of provision within the same reporting period at the companies' will and (2) listed companies should disclose any change in accounting policies or estimates.

In 2001, there was still no rule that explicitly required listed companies to disclose accounting irregularities or mistakes publicly in a timely fashion. Unlike the common

³ This Standard was a chapter in the Accounting Standards of Business Enterprises (ASBE), which was completed in 2002; thus, it is also called China's 2002 ASBE.

US practice of public disclosure of a restatement upon first discovery by the media, China's press remained largely silent. Hence, investors were first informed of a restatement upon the public release of a company's annual report in major Chinese business newspapers and the website⁴ designated by the CSRC.

Unlike the practices of US listed firms, in which a restatement will revise any affected line items in all relevant quarter(s)' and year(s)' income statements and balance sheets, restatements in China under *the Old Standard* are not required to tabulate the corrected financial statements of all affected years. In most cases, where only the financial statements of the previous year ($t - 1$) are corrected, the corrected financial statements will be found in the current year's (t) annual report for comparison purposes. If the corrected year(s) reaches beyond the previous year ($t - 1$), then the correction will not be made in the earlier released reports, but will instead bypass the profit and loss statement for year $t - 1$ and directly hit the corrected balance sheet. The overall cumulative effect would, of course, be adjusted in the beginning balance of retained earnings and other affected items on the balance sheet in the annual report of year t . Because of the subtle difference between the accounting treatments required by the US Generally Accepted Accounting Principles (GAAP) and the International Financial Reporting Standards (IFRS), we cautiously call our event "restatements" rather than "earnings restatements" because not all the affected earnings would be restated during the sample period, only the previous year's earnings. Note also that *the Old Standard* required the detailed reasons for and amount of the restatement to be disclosed in the footnotes, but in practice such disclosures, especially regarding the reasons for restatement, were generally rather brief and opaque.

On March 19, 2001, the CSRC issued the revised *Procedure for Inspecting Listed Companies (the 2001 Procedure)*, which superseded the original *1996 Procedure*. With the new release came a CSRC announcement that it would strengthen the inspection of listed companies' financial reports, corporate governance structures and independence from related parties. *The 2001 Procedure* required companies to correct any irregularities found in the inspection and to disclose them publicly within 30 days of an official notice.

The two years following the release of *the 2001 Procedure* witnessed a tremendous effort by the CSRC, resulting in the issue of 19 chapters of Rules on Information Disclosure for Listed Companies. Chapter 19: *The Correction of Financial Information and its Disclosure (Rule 19)* was issued at the end of 2003. *Rule 19* demands that listed companies immediately file an official report with the CSRC regarding any material events, including the correction of financial statements, and submit a revised and audited annual report within 45 days if the most recent annual report is incorrect. However, due to a loophole, *Rule 19* did not include a scenario for change-of-accounting estimates, and thus it had little real effect on disclosure patterns. Because a change-of-accounting estimate was not defined as a material event, it did not require timely disclosure. Many companies intentionally misclassified the correction of mistakes as a change-of-accounting estimate and routinely disclosed them in the forthcoming annual report rather than providing an immediate disclosure in the form of a change-of-accounting estimate.⁵

⁴ The CSRC designates the following four newspapers for listed companies to disclose their financial information: *China Securities Journal*, *Shanghai Securities Journal*, *Securities Time*, and *Securities Daily*. The CSRC-designated website is www.cninfo.com.cn.

⁵ Note that a change-of-accounting estimate does not change past accounting numbers, only future ones. The true accounting practice to ameliorate a false claim is, however, a restatement.

On January 6, 2004, just one day after a press conference offering explanations for both the substantial number of companies that received a qualified auditor's opinion and the increased number of restatements in 2002, the CSRC issued the *Notice on Further Improving Financial Information Disclosure of Listed Companies (the 2004 Notice)*. By emphasizing the 1999 Notice, the 2004 Notice clearly states that listed companies should not abuse asset impairments, change-of-accounting estimates or correction of material mistakes to manipulate financial results. Any company doing so would be held responsible. However, the 2004 Notice did not specify the scope of responsibility that a company would bear for committing a violation.

On February 15, 2006, the MOF announced that starting from 2007 annual reports, all publicly traded companies would adopt the new Accounting Standards of Business Enterprises (2006 ASBE), representing a major convergence towards the IFRS. The 2006 ASBE, Changes in Accounting Policies and Estimates and Corrections of Accounting Errors, fully adopted the practices of the IFRS, which are consistent with US GAAP. That is, from 2007 annual reports and thereafter, a restatement will revise any affected line items in income statements and balance sheets for all relevant quarter(s) and year(s).

Table 1 summarizes the development of accounting regulations related to this specific issue.

Table 1
Regulatory timeline.

Date of issuance	Effective date	Issuer	Name of document	Abbreviation
December 21, 1996	December 21, 1996	CSRC	Procedure for Inspecting Listed Companies	1996 Procedure
June 25, 1998	January 1, 1999	MOF	ASBE: Changes in Accounting Policies, Estimates and Corrections of Material Accounting Errors	The 1999 Standard
October 10, 1999	October 10, 1999	CSRC	Notice on Improving Financial Information Disclosure of Listed Companies	1999 Notice
December 29, 2000	January 1, 2001	MOF	Companies' Accounting System 2001, Chapter 10: Accounting Adjustment; Section 3: Corrections of Accounting Errors	Accounting System
January 18, 2001	January 1, 2001	MOF	ASBE: Changes in Accounting Policies and Estimates and Corrections of Material Accounting Errors (Revised)	The 1999 Standard (revised)
March 19, 2001	March 19, 2001	CSRC	Procedure for Inspecting Listed Companies (Revised)	2001 Procedure
December 1, 2003	December 1, 2003	CSRC	Rules on Information Disclosure for Listed Companies #19: The Correction of Financial Information and its Disclosure	Rule 19
January 8, 2004	January 8, 2004	CSRC	Notice on Further Improving Financial Information Disclosure of Listed Companies	2004 Notice
February 15, 2006	January 1, 2007	MOF	New ASBE #28: Changes in Accounting Policies, Estimates and Corrections of Material Accounting Errors	New Standard

Notes: CSRC: China's Securities Regulatory Commission. MOF: Ministry of Finance, People's Republic of China.

3. Literature review

3.1. Earnings restatements in the United States

Using a sample of 73 firms that corrected previously reported quarterly earnings, Kinney and McDaniel (1989) find that the sample firms were smaller and less profitable, had a higher level of debt and lower level of growth, and faced more serious uncertainties due to the receipt of more qualified audit opinions. Analyzing 224 SEC accounting and auditing enforcement releases between 1982 and 1989, Feroz et al. (1991) find that the SEC most often pursued overstatements of accounts receivable and inventories due to premature revenue recognition and delayed write-offs. They also find that the disclosure of these reporting violations changed expectations of the target firm's future earnings, as reflected in financial analysts' reduced earnings estimates after the disclosures. DeFond and Jambalvo (1991) examine 44 earnings restatements and find that 41 of them involved overstatement, consistent with an income-increasing motivation. They find that earnings overstatements are negatively correlated with growth in earnings and are more likely when firms have diffuse ownership and few income-increasing GAAP alternatives available. They also find that restating firms are less likely to have audit committees. Dechow et al. (1995) find that an important motivation for earnings manipulation is the desire to attract external financing at a lower cost. Firms that manipulate earnings are more likely to have: (1) boards of directors dominated by management, (2) a CEO who simultaneously serves as the chairman of the board, and (3) a CEO who is also the firm's founder. In addition, these firms are less likely to have an audit committee and an outside blockholder. Firms that manipulate earnings experience a significant increase in their cost of capital after the manipulation is made public.

Enron's accounting scandal in 2001 and Worldcom's in 2002 spawned a large volume of research on earnings restatements. This research can be broadly classified into three categories: (1) descriptive and market reaction studies around restatement announcements, (2) investigation of the motivations that lead to restatements, and (3) examination of the consequences of restatements. In the first category, Wu (2003) documents the characteristics of more than 1200 US restatements announced between 1977 and 2001. She shows that there has been a significant increase in the number of restatements since the late 1990s and finds a significant market reaction of more than –11% over a three-day window—a reaction that can be explained by both qualitative and quantitative information carried in the restatement announcements. Concurrent research by Palmrose et al. (2004) and Turner et al. (2001) also find similar market reactions to the announcements. Furthermore, Lev et al. (2008) find that restatements that eliminate or shorten the history of earnings growth or positive earnings have significantly more adverse effects for investor valuations and the likelihood of lawsuits than other restatements.

In the second category of studies, Richardson et al. (2003) suggest that capital market pressures motivate restatement companies to adopt aggressive accounting policies; that is, the typical restatement firm has been attempting to maintain a string of consecutive quarters of positive earnings growth and consecutive positive quarterly earnings surprises. In addition, top executives at these firms receive a larger portion of their compensation from equity relative to leaders of non-restating firms. Richardson et al. (2003) also find the information in accruals to be a key indicator of the earnings manipulation that leads to the restatements. Griffin (2003) investigates the patterns of insider trading in restating

firms and implies that profiting from insider trading is one of the incentives for managers to overstate earnings. Agrawal and Chadha (2005) find that the incidence of independent directors with a background in accounting or finance on the board or audit committee is negatively related to the probability of restatements. However, unlike Burns and Kedia (2006), they do not find significant deficiencies in other aspects of corporate governance.

In the third category, several studies explore the consequences of restatements. Wu (2003) finds that the earnings response coefficient (ERC) dropped dramatically following restatement, which could be interpreted as a loss of confidence among investors. Hribar and Jenkins (2004) find that accounting restatements lead to both decreases in expected future earnings and increases in the firm's cost of equity capital. Srinivasan (2005) shows that outside directors, especially audit committee members, bear reputational costs for failures in financial reporting.

3.2. *Earnings management and restatements in China*

China research often focuses on earnings management, which offers a rich background for the restatement issue. Typical incentives that are found in the United States to manipulate earnings are almost nonexistent in China. For example, demand for financing, especially equity financing, is huge in China, whereas incentives to meet or beat analysts' expectations are minimal. The compensation plans of China's listed companies are rarely incentive-based, thus managers cannot manipulate earnings to inflate stock prices with intent to benefit their own compensation. Chinese companies also do not face pressure from debt covenant constraints. Earnings management, nevertheless, usually occurs when companies are conducting their IPOs. Aharony et al. (2000) suggest that state-owned enterprises in unprotected industries may manage accounting accruals to boost earnings and/or list those business units with temporarily high profits resulting from high accounting accruals during the process of financial packaging. Earnings management also takes place when listed companies conduct secondary issuances or rights issuances. Given that listed companies are required to achieve a minimum average return on equity (ROE) of 10% for the three years prior to secondary issuances or rights issuances, and given the reality that the CSRC has limited resources to monitor all applicants closely, Chen and Yuan (2004) show that many firms were able to gain approval for rights issues through earnings management and subsequently performed worse than those that did not employ such practices. Thus, capital resources might have been better allocated had the regulators examined the management of earnings more closely. Listed companies also massage earnings to avoid consecutive losses, which would result in them being tagged with "special treatment"⁶ (ST) (Lu, 1999) or, worse, "particular transfer"⁷ (PT). In addition,

⁶ Special Treatment (ST) has been adopted since April 22, 1998, as a signal for listed companies experiencing any of the following abnormal financial or other abnormal situations: (1) two consecutive years of losses; (2) stockholders' equity falling below the nominal value in the most recent year (in China, the nominal value per share is stipulated as 1 Yuan for all listed companies); (3) independent auditor issuance of a qualified opinion or refusal of issuing opinion; (4) stockholders' equity, net of the auditor fee and unrecognized portion by concerned parties, falling below the nominal value by the end of the most recent year; (5) two consecutive years of losses following the restatement of a previous year's result in the most recent year's annual report; or (6) any financial situation the CSRC deems abnormal. Other abnormal situations include discontinuation of operations due to natural disaster or other significant event, possible punitive and compensatory damages from lawsuits exceeding net assets, etc. A cap of 5% of the stock price movement (increase or decrease) applies to ST stocks.

⁷ Particular Transfer (PT), effective since July 9, 1999, is designed for listed companies that experience three consecutive years of losses. The daily trading will be suspended and substituted with once-a-week special transfers among investors. A cap of 5% will be imposed on increasing stock prices, but no stop limit for declining price.

earnings management is commonly conducted through “below-the-line” non-operating items (Chen and Yuan, 2004). Finally, work by Wang and Zhang (2004) shows that an increasing number of firms issued restatements between 1999 and 2002.

4. Hypotheses and empirical models

Having elaborated on China’s unique institutional background on companies’ incentives to manipulate earnings in Section 3, we first offer the following two hypotheses on the two major incentives for Chinese companies. The first addresses financing needs, whereas the second concerns survival.

Hypothesis 1. Restatement firms tend to be those with strong financing incentives during or before the restated year. Specifically, restatement firms tend to be those that offered secondary or rights issues during or before the restated year.

Hypothesis 2. Restatement firms tend to be those under delisting pressure during or before the restated year.

Note that these two hypotheses cannot co-exist in the same firm, because the previously mentioned 10% profitability requirement for refinancing is far above the break-even point, and companies meeting this criterion are in little danger of delisting.

Next, we examine which factors collectively influence companies to issue restatements in China’s A-share market. Our testing variables consist of three categories: corporate governance, motivations and firm performance. The reform of Chinese state-owned enterprises (SOE) has been relatively successful in solving short-term but not long-term managerial incentive problems, and has also failed to adequately address the issue of management selection. The latter problem arises from the fact that managers of SOEs are selected by bureaucrats rather than capitalists. Bureaucrats have the authority to select managers but do not need to bear the consequences of that selection. Thus, they have no proper incentives to find and appoint high-caliber managers, which negatively affects the quality of financial reporting (Zhang, 1999). Highly concentrated ownership, which is common in East Asia, can lead to an entrenchment effect and reduce the rights of minority shareholders. Decisions made by controlling owners are often not contestable under the region’s weak legal systems or by ineffective corporate governance mechanisms, such as boards of directors and the market for corporate control (Shleifer and Vishny, 1997; La Porta et al., 1999). Consequently, controlling owners are perceived to report accounting information for self-interested purposes, causing the reported earnings to lose credibility with outside investors in East Asia (Fan and Wong, 2002). Additionally, involvement by institutional investors will enhance corporate governance. In Chinese research, return on assets (ROA) is widely adopted as the prime performance indicator, rather than ROE, as ROE is often manipulated due to the CSRC basing various thresholds on it. Hence, we propose the following hypothesis.

Hypothesis 3. Restatements tend to occur more frequently among firms with poor governance, more concentrated ownership and poorer financial performance.

We propose the following model to test our first three hypotheses:

$$\begin{aligned} \text{Restatement}_i = & \alpha + \beta_1 \text{SOE}_i + \beta_2 \text{L_Share}_i + \beta_3 \text{IIH} + \beta_4 \text{LOSS} + \beta_5 \text{LOSS_ST} + \beta_6 \text{RSI} \\ & + \beta_7 \text{DA} + \beta_8 \text{ROA} + \beta_9 \text{LEV} + \beta_{10} \text{Size}_i + \varepsilon_i \end{aligned} \quad (1)$$

Here, Restatement_i is a dummy variable for firm i , which takes on the value 1 for restatement firms and 0 for other listed companies. For the sake of parsimony, we use three variables as proxies for corporate governance. The first variable, SOE, is a dummy variable that indicates whether a company is an SOE or not. The second variable is the largest shareholder's ownership proportion, L_Share. Given that the Chinese government is usually the largest shareholder of a China-listed firm, we adopt a third variable, the proportion of top-10 institutional investors' share-holding, IIH. Motivating factors for firm i are represented by the delisting pressure (LOSS and LOSS_ST) and the need for equity financing (RSI). Corporate performance and financial characteristics are represented by discretionary accruals (DA), ROA and leverage (LEV). Firm size (Size) is our control variable.

It is surprising to observe that the considerable number of restatements that occurred in China attracted so little attention. We conjecture that it may be because the market is suspicious of the credibility of financial reports and attaches an almost-independent value to listed companies. Stock prices in China rarely reflect the value of companies, and stock price changes are rarely an effective reflection of the change in available information. Market irregularities were not uncommon among fledgling companies during our sample period and include such practices as insider trading and institutional manipulation of stock prices (CSRC, 2008). Accounting reporting does not serve as central a role in China's capital market as it does in a mature market, and financial reports that overstate or poorly state a Chinese firm's true status may have limited effect on the firm's stock valuation. Hence, we arrive at Hypotheses 4 and 5, along with their corollaries:

Hypothesis 4. The stock market fails to punish the poor quality of financial reports.

Within this general hypothesis, we construct the three following corollaries.

Hypothesis 4a. The stock market fails to punish the poor quality of financial reports following restatement announcements.

We conjecture that the stock market does not react significantly to the announcement of earnings restatements, which means there is no penalty for restatements. For this hypothesis, we focus on the short-term stock price reaction to the restatement announcements. In our analysis, we examine various windows up to two weeks before and after the announcements for any information leakage or delay to the stock market: $(-10, -6)$, $(-5, -2)$, $(-1, +1)$, $(+2, +5)$ and $(+6, +10)$ days around the restatement dates (disclosure dates for enforced restatements and annual report announcement dates for voluntary restatements). Buy-and-hold market-adjusted cumulative abnormal returns (CARs) are used as the return metric.

Hypothesis 4b. The stock market does not anticipate the poor quality of financial reports before the restatement announcements.

We conduct a long-term event study, which is designed to examine the year preceding the restatement announcements. The purpose of this hypothesis is to detect whether any information has been leaked to the stock market, either through insider trading or

analysts' warnings, during the period of the financial report being restated. Again, buy-and-hold market-adjusted CARs are used as the return metric.

Failure to reject the first two null hypotheses would indicate that the stock market in China does not punish poor financial reporting.

Hypothesis 4c. The stock market does not penalize the poor quality of accounting that is uncovered by regulatory inspection.

As mentioned earlier, the restatements disclosed according to the regulatory inspection outcomes represent required restatements. We test whether the market penalizes enforced restatements by examining the market reaction around the disclosure date of the enforced restatements. We examine a window of $(-6, +6)$ months around the disclosure date to allow a reasonable period for routine regulatory procedures before and after the formal announcement.

Hypothesis 5. The stock market attaches minimal value to financial information.

We extend this general hypothesis into two detailed sub-hypotheses, as follows.

Hypothesis 5a. Stock price changes poorly reflect revelations of low-quality earnings.

We conduct two sets of returns/earnings tests on both the level of and change in earnings information.

$$CAR_i = a_0 + a_1 EPS_t + a_2 AdjEPS_{t-1} + \varepsilon_i \quad (2)$$

$$CAR_i = a_0 + a_1 UnEPS_t + a_2 Mag_{t-1} + a_3 \text{Control variables} + \varepsilon_i \quad (3)$$

In Eq. (2), CAR_i is $(-11, +1)$ months for a restating company. EPS_t is the earnings per share in the reported year t . $AdjEPS_{t-1}$ is the adjusted earnings for the previous year $t - 1$; that is, the true earnings per share according to the restatement. We use Eq. (2) to test whether the market comprehensively reflects the value of the company by reacting to both current annual earnings and past earnings, which can be naïvely adjusted by the given corrected amount. We conjecture that the market does not react significantly, at least to the adjusted past earnings.

In Eq. (3), CAR_i is $(-11, +1)$ months for a restating company. $UnEPS_t$ is the surprise reported year t 's earnings per share, which is measured by the difference between the current year's earnings and the expected earnings, represented by the originally reported earnings of $t - 1$, given that barely any systematic analyst's forecasts exist in China so far. Mag_{t-1} is the surprise of the past year, $t - 1$'s, earnings, which is the per-share scaled restated magnitude. We use Eq. (3) to test whether the market reacts fully to the change in the accounting information setting, which includes two surprises: the surprise of current earnings and the surprise of past earnings. We calculate the surprise—or the unexpected part—of the current earnings as the scaled difference between current earnings and one-year-prior earnings, taking into account the limited scope of analysts' forecasting in China. We represent the surprise of past earnings by the scaled magnitude of the restatement. We conjecture that, at minimum, the market does not react significantly to the surprise of past earnings.

Hypothesis 5b. The equity market's reliance on earnings information is minimal.

To test this hypothesis, we conduct the following tests on our sample, using the ERC as a measure of reliance.

$$CAR_i = \alpha + \beta UE_i + \varepsilon_i \quad (4)$$

$$CAR_i = \alpha + \beta_1 UE_i + \beta_2 UE_i T_i + \varepsilon_i \quad (5)$$

Eq. (4) is tested separately before and after the sample firms revealed their poor quality. Eq. (5) is the pooled test with a dummy variable T_i representing the period after restatement. We expect all β s in both (4) and (5) to be insignificant.

5. Description of restatements in China

5.1. Data selection

Due to the absence of a restatement database, we manually collected our sample from domestic companies that issued A-shares⁸ on the Shanghai Stock Exchange and/or the Shenzhen Stock Exchange. We searched the annual reports of these listed companies and collected information from the *Correction of Material Accounting Mistakes* section in the footnotes. Our sample period runs from January 1, 1999, when the *Old Standard* for restatements became effective, to December 31, 2005, just weeks before the announcement of the 2006 ASBE. As such, the 2005 annual reports were the last annual reports filed by listed companies under the 2002 ASBE.

Excluding restatements due to mergers and acquisitions, dividend distributions and changes in accounting policies and accounting estimation, 1092 restatement announcements were identified due to accounting misrepresentation, irregularities, fraud or errors during the study period.

Market and accounting data are from the CSMAR database. Institutional investors' information is from the Genius database.

5.2. Data description

Table 2 shows that during 1999–2000, 21 companies each year restated their financial reports, representing approximately 2% of listed companies. However, the number of restating firms soared in 2001 and 2002 to 282 and 250, respectively, amounting to 24.96% and 20.85% of public companies. Such a dramatic increase is perceived to be a natural delay following the adoption of the *Old Standard*. The number of restating firms dropped in subsequent years, but still comprised more than 10% of listed companies. The reduction may be a direct reflection, not only of the restatements of previous years, but also of the 2001 Rules and the CSRC's intensive and extensive inspection throughout all provinces after observing the increase in qualified auditors' reports. What is striking and puzzling is the large proportion of firms that issued restatements in China. In the United States, although the number of restatements increased during the time frame of our study, the proportion remained low and steady at around 2% by the end of 2005 (Wu, 2003).

On April 4, 2001, the CSRC issued the *Index of Listed Companies' Industry Classification*, which serves as the industry classification standard. The information in Table 3 adopts this standard for the distribution of restatement companies by industry.

⁸ Two types of shares of domestic companies are traded on the Shanghai and Shenzhen stock exchanges: A-shares and B-shares. A-shares are traded in Chinese Yuan and B-shares are traded in US dollars. The stock market is dominated by A-share trading. Only 106 B-shares were traded in January 1999; since the beginning of December 2005 the number has been steady at 109.

Table 2
Yearly restatement characteristics by stock exchange: 1999–2005.

Annual report year (<i>t</i>)	Number of restatement firms listed on Shenzhen Stock Exchange	Number of A-shares listed on Shenzhen Stock Exchange	Percentage (%)	Number of restatement firms listed on Shanghai Stock Exchange	Number of A-shares listed on Shanghai Stock Exchange	Percentage (%)	Total number of restatements	Total number of A-Shares	Percentage (%)
1999	14	450	3.11	7	471	1.49	21	921	2.28
2000	13	451	2.88	8	559	1.43	21	1010	2.08
2001	139	494	28.14	143	636	22.48	282	1130	24.96
2002	112	494	22.67	138	705	19.57	250	1199	20.85
2003	92	491	18.74	106	770	13.77	198	1261	15.70
2004	84	526	15.97	71	827	8.59	155	1353	11.46
2005	76	534	14.23	89	824	10.80	165	1358	12.15
Total	530			562			1092		

Note: *t* + 1 is the year when the annual report for year *t* is released, in which the restatement of earlier year(s) is disclosed.

Table 3
Industry distribution.

		Number of firm observations	Percentage of total firms (%)
Agriculture, Forestry, Fishing and Hunting	A	36	3.30
Mining	B	11	1.00
Manufacturing	C	610	55.84
Food, Beverage	C ₀	50	4.56
Textile, Apparel, Leather	C ₁	36	3.28
Wood Product	C ₂	3	0.27
Paper, Printing	C ₃	23	2.10
Petroleum, Chemical Product, Rubber, Plastics	C ₄	123	11.22
Electronic Equipment	C ₅	31	2.83
Metal, Nonmetallic Mineral Product	C ₆	93	8.49
Machinery, Equipment, Meter	C ₇	163	14.93
Medicine, Biologic Products	C ₈	77	7.05
Other manufacturing	C ₉	11	1.00
Electricity, Gas, Water Supply	D	64	5.84
Construction	E	22	2.01
Transport, Storage	F	28	2.55
Information, Technology	G	61	5.57
Wholesale and Retail Trade	H	80	7.30
Real Estate	J	38	3.47
Social Services	K	29	2.66
Transmission, Culture	L	8	0.73
Conglomerate	M	105	9.58
Total		1092	100

Note: The classification is based on the *Index of Industrial Distribution of Listed Companies*, issued by the CSRC on April 3, 2001.

More than half of the restatements were from firms in the manufacturing sector, with Machinery, Equipment and Meter, Petroleum and Chemical Products, and Rubber and Plastics making double-digit contributions to the percentage of all restatement firms.

Following its issuance of *the 2001 Rules*, the CSRC started to inspect listed companies' financial reports, corporate governance structures and independence from related parties. The *Rules* require companies to correct any irregularities found in the inspection and to disclose them publicly within 30 days of official notice. Because an accounting restatement is one possible result of the tightened regulatory inspection, such disclosure makes it possible for us to identify the restatements initiated by the inspection versus those disclosed by firms voluntarily. Table 4, Panel A, shows the number of enforced restatements disclosed by firms each year as a result of the inspection findings, along with those resulting from voluntary disclosure, from 1999 to 2005.

The enforced restatements comprise only 6% of the sample and are largely concentrated in the 2001–2003 period. This is a much lower proportion than in the US, where roughly one-quarter of restatements were instigated by the SEC or other regulators. However, the number of voluntary restatements also increased in China during those years, which could be interpreted as a perception by firms of the serious intent of the *2001 Rules*, leading them to clean up voluntarily rather than be caught by the CSRC. Nevertheless, we do not exclude the possibility that we may have failed to identify a complete set of enforced restatements due to the simple, possibly incomplete, disclosure by listed companies in general. From what we read of companies' statements, no firm ever mentioned that the restatement was suggested by its auditor.

Table 4

Description of restatements, by year of annual report (*t*).

		1999	2000	2001	2002	2003	2004	2005	Total
Panel A: Enforcement by year									
Number of Voluntary Restatements		19	20	265	231	185	146	159	1025
Percentage (%)		90.48	95.24	93.97	92.40	93.43	94.19	96.36	93.86
Number of CSRC-enforced Restatements		2	1	17	19	13	9	6	67
Percentage (%)		9.52	4.76	6.03	7.60	6.57	5.81	3.64	6.14
Total		21	21	282	250	198	155	165	1092
		1	2	3	4	5	6	Total number of firms	
Panel B: Frequency of restatements, by number of years restatements occurred									
Number of Firms	354	170	67	34	11	1	637		
Percentage (%)	55.57	26.69	10.52	5.34	1.73	0.16	100.00		
		Year $t - 1$ only		Years before $t - 1$ only		Both year $t - 1$ and previous years		No disclosure	Total
Panel C: Distribution of restated years									
Number of observations	494	125		451		22		1092	
Percentage (%)	46.17	11.68		42.15		2.01		100.00	
Reason for classification		Number of restatements in annual report year (t)							
		1999	2000	2001	2002	2003	2004	2005	Total
Panel D: Reasons for restatements by year									
1	Mistakes from Subsidiaries	2 10%	7 33%	86 30%	83 33%	85 42%	62 39%	78 47%	403 38%
2	Tax Miscalculation	3 14%	5 24%	87 31%	93 37%	72 36%	57 36%	52 32%	369 34%
3	Costs and Expenses	11 52%	5 24%	80 28%	51 20%	30 15%	26 17%	21 13%	224 20%
4	Depreciation and Provisions	2 10%	3 14%	61 22%	37 15%	36 18%	23 15%	27 16%	189 17%
5	Revenue Recognition	2 10%	1 5%	21 7%	12 5%	11 5%	13 8%	13 8%	73 7%
6	Subsidies Revenue and Tax Refunds	0 0	1 5%	17 6%	10 4%	7 3%	3 2%	5 3%	43 4%
7	Other Mistakes and Misclassifications	10 48%	12 57%	113 40%	74 29%	56 28%	45 29%	49 30%	359 33%
		Downward restatements		Upward restatements		No impact	No disclosure	Total	
Panel E: Restatement effect on retained earnings									
Number of observations	838	181		51		22		1092	
Percentage (%)	76.74	16.58		4.67		2.01		100	
		Obs.	Mean	Min.	25%	Median	75%	Max.	Std Dev
Panel F: Restated amount (in millions of Chinese Yuan, USD1 = CNY8.2768)									
Restated Amount	1068	−13.811	−815.467	−11.147	−2.383	−0.172	863.188	62.267	
Scaled Restated Amount	1063	−0.023	−7.768	−0.008	−0.002	−0.000	0.158	0.250	

(continued on next page)

Table 4 (continued)

	1999	2000	2001	2002	2003	2004	2005	Total
<i>Panel G: Change of external auditors, by year (t) of annual report</i>								
Number of Firms with Auditor Change in year t	6	5	84	20	33	29	33	210
Percentage (%)	29	24	30	8	16	18	20	19
Number of Firms with Auditor Change in year $t + 1$	6	4	29	21	14	24	19	117
Percentage (%)	29	19	10	9	7	16	12	11

Notes: Panel D: The sum of the percentage numbers could exceed 100% in each year as most restatements involve more than one reason.

Panel F: *Restated amount*: the amount of change in retained earnings. If the restatement decreased retained earnings, the amount is negative; if it increased, the amount is positive.

Scaled restated amount: scaled by total assets at the beginning of year t .

Panel G: We lost 14 observations in year $t + 1$; they are not included in the percentage calculation. In annual reports, there is no disclosure of whether the audit firm quit or was fired.

Table 4, Panel B, reports that 637 companies produced a total of 1092 restatements from 1999 to 2005. More than half of the sample companies restated just once during the sample period, although some restated several times. One firm, astonishingly, restated six times in seven years. In all, 494 (46.17%) of the restatements were to correct the prior-year's filing,⁹ and 451 (42.15%) of the restatements were to revise the filings of both the prior-year's filing and that of earlier year(s) (Panel C). However, we cannot discern the number of years these firms restated, as such information was not provided in their annual reports. The remainder of the 1092 restatements (147) were to correct mistakes made before the most recent year. Twenty-two observations did not disclose which year(s) they restated.

We notice that the reasons for restatements are quite different from those in the United States. We classify reasons for restatements into eight categories in Table 4, Panel D. Most restatements involved more than one reason; therefore, the sum of each column exceeds the annual sample size.

The correction of mistakes in subsidiaries when consolidated financial reports are prepared tops our list. This type of restatement is more technical, because parent companies cannot fully control the subsidiaries' financial reports to the same extent to which they control their own. The more subsidiaries a parent company has, the more difficult the process of management may be and the greater the likelihood of error and subsequent restatement. Unfortunately, no database contains such information, so we do not have the opportunity to test this hypothesis. Without detailed disclosure, we are unable to measure its effect on the magnitude of overall restatements.

Incorrect tax estimation, which is a rarity among US firms, is frequently observed in China. Approximately three-quarters of companies in this category underestimated the tax paid, which led us to suspect that such underestimation is more intentional than unintentional.

Misstating, mostly under-misstating, the cost of goods sold or operating expenses is quite common in China, whereas manipulation of recognized revenue is not a major vehicle: only 7% of restatements involve inflating revenue or recognizing revenue earlier (in the United States, nearly 40% of the restatements are due to the revenue recognition problem).

⁹ Chinese companies' fiscal year is stipulated to be the same as the calendar year.

During our sample years, as many as 17% of restatements were to correct depreciation or various provision estimates, which is not particularly surprising considering the existence of many types of provisions in China. In 1999, four types of provisions required estimation: bad-debt reserve, provision for inventory impairment, provision for short-term investment impairment and provision for long-term investment impairment. Later in 2001, four more types of provisions were added: provision for fixed-assets impairment, provision for intangible-assets impairment, provision for construction-in-progress impairment and provision for entrusted-loans impairment. The estimation of such provisions demands significant professional judgment and becomes quite a challenge to accounting professionals with limited experience¹⁰ in a fledging capital market. Meanwhile, various kinds of provisions also offer room for manipulation, which is reflected in the CSRC's 2004 Notice, emphasizing that listed companies should not abuse asset impairments, change-of-accounting estimates or correction-of-material mistakes for the purpose of manipulation.

For many years, a tax refund policy has served as a major incentive to encourage export in mainland China. In July 2000, the MOF issued the *Rules of Accounting Treatments for Tax Refunds*, etc., which clearly demanded the adoption of cash accounting, rather than accrual accounting, for income from subsidies and tax refunds to prevent companies from manipulating earnings via such vehicles. However, a few listed companies continue to openly violate the tax refund rules and adopt homemade recognition practices.

Because the simple and general disclosures in one-third of the observations make these restating companies difficult to categorize, we combine this large fraction into a single category that includes unspecified mistakes, oversights and reclassifications.

Table 4, Panels E and F, shows that more than three-quarters of the events are related to an earlier overstatement of retained earnings; the remaining quarter are either underreported or had no effect on retained earnings. The amount of restatements varies widely, from reducing retained earnings by CNY815 million (USD98.43 million) to increasing retained earnings by CNY863 million (USD104.23 million), with an average decrease of 2.3% of total assets, which is comparable to US percentages.

Table 4, Panel G, shows that almost 20% of the firm-observations changed auditors during the annual report year and 11% during the event year when restatements were disclosed. However, with limited disclosure in annual reports, we are unable to distinguish whether such changes were due to the auditing firm leaving the employment of the client company voluntarily or under duress.

6. Empirical analysis

6.1. Firm characteristics and potential motivations

We now analyze the characteristics of our sample and seek the potential motivations for these companies to file incorrect financial reports.

Table 5, Panel A, reveals that restatement firms have slightly lower mean total assets compared with other listed companies, but most observations fall within the comparable size range.

Table 5, Panel B, compares various company characteristics in the restated year (year $t - 1$) of the restatement sample to the control sample. As a control, we used the full set

¹⁰ China only embarked on the development of the CPA profession in the early 1980s. The Chinese Institute of Certified Public Accountants (CICPA) was established in November 1988, and the first CPA exam was conducted in 1991.

Table 5

Restatement firm characteristics.

	Obs.	Mean	Min.	25%	Median	75%	Max.	Std Dev
Panel A: Firm size (in millions of Chinese Yuan)								
Restatement Firm Size	1086	1994.15	42.01	725.51	1217.12	2315.29	31426.19	2471.01
Firm size of all A-share Companies	8242	2611.84	21.51	748.89	1270.47	2413.29	520,572	11,635
	Mean			Median				
	Restatement sample N = 911	Control sample N = 3058	t-Stat	Restatement sample N = 911	Control sample N = 3058	Wilcoxon Z-stat		
Panel B: Comparison between the restatement sample and control sample								
E/P	0.000	0.022	−7.39***	0.012		0.022		−13.60***
B/P	0.502	0.558	−7.46***	0.498		0.562		−7.43***
Income	0.010	0.046	−9.61***	0.027		0.050		−13.08***
OpInc	0.009	0.043	−10.33***	0.022		0.045		−13.60***
EPS	0.055	0.198	−7.58***	0.119		0.210		−13.92***
EG	−0.013	0.002	−2.12**	−0.003		0.002		−7.84***
LEV	0.552	0.440	7.35***	0.506		0.429		10.87***
UI	−0.005	0.006	−3.32***	0.002		0.003		−3.03***
Age	5.850	5.290	5.48***	6.000		5.000		6.31***
L_Share	40.450	45.970	−8.60***	37.920		46.230		−8.73***
SOE	0.670	0.650	0.87	1.000		1.000		0.87
II	0.368	0.436	−3.70***	0.000		0.000		−3.70***
IIH	0.005	0.008	−5.07***	0.000		0.000		−4.55***
TA	−0.035	−0.019	−3.43***	−0.022		−0.014		−3.70***
DA	−0.016	−0.002	−3.04***	−0.002		0.004		−3.34***
ROA	−0.001	0.027	−5.07***	0.022		0.037		−11.27***
CROA	0.007	0.033	−5.92***	0.022		0.039		−9.94***
ROE	−0.019	0.021	−2.02**	0.048		0.066		−9.14***
LOSS_ST	0.068	0.022	5.62***	0.000		0.000		7.27***
LOSS	0.162	0.081	6.15***	0.000		0.000		7.17***
RSI	0.290	0.303	−0.76	0.000		0.000		−0.76

Notes: Panel A: Firm size: the total assets at the end of year t .

Firm size of all A-share companies: the size of A-share listed companies across the board from 1999 to 2005.

Panel B: All are measured at the end of year $t - 1$, the restated year).

E/P: Fiscal Operating Earnings/Market Capitalization.

B/P: Book Value/Market Capitalization.

Income: Net income before Extraordinary Items/mean Total Assets.

OpInc: Operating Income/mean Total Assets.

EPS: Earnings per share.

EG: Earnings Growth, $(\text{Net Income}_{t-1} - \text{Net Income}_{t-2})/\text{Total Assets}$.

LEV: Leverage, Total Debt/Stockholders' Equity.

UI: Below-the-line items, $(\text{income from investment} + \text{non-operating income} + \text{subsidiaries})/\text{Total Assets}$.

Age: The number of years firms have been listed on the stock exchange.

L_Share: The percentage stock holding by the largest stakeholder.

SOE: Dummy variable. State = 1 if a state-owned enterprise, and 0 otherwise.

II: Institutional investor among top 10 shareholders. If there is an institutional investor, II = 1, and 0 otherwise.

IIH: Institutional investor's holding proportion among top 10 shareholders.

TA: Total accruals = $(\text{Operating Income} - \text{Cash Flow from Operation})/\text{Total Assets}$.

DA: Discretionary accruals, calculated with modified Jones Model.

ROA: Return on Assets = $(\text{EBIT} - \text{Tax})/\text{Total Assets}$.

CROA: Return of Operating Income on Assets.

ROE: Return on Equity = $\text{Net Income}/\text{Shareholders' Equity}$.

LOSS: Dummy variable. LOSS = 1 when there was a loss in year $t - 1$, and 0 otherwise.

LOSS_ST: Dummy variable. LOSS_ST = 1 when there was a loss in both years $t - 1$ and $t - 2$, and 0 otherwise.

RSI: Dummy variable. RSI = 1 if rights or secondary issuance occurred in $t - 1$, $t - 2$, or $t - 3$, and 0 otherwise.

*Statistical significance at the 10% level for two-tailed tests.

** Statistical significance at the 5% level for two-tailed tests.

*** Statistical significance at the 1% level for two-tailed tests.

of listed companies that did not file restatements and relied on their test year's information to calculate the results. The reason for such a "naïve" matching method is the relatively small number of companies listed on either the Shanghai or Shenzhen stock exchanges by the end of 2005 (just over 1300 in all). If we adopted the conventional method of matching by industry and firm size among the non-restatement companies, then there would be very few comparable companies and we would be unable to construct an effective matched sample.

Table 5, Panel B, shows that the restatement companies generally have lower valuations, poorer performance, higher leverage and greater losses compared with the control sample. The largest shareholders of the sample firms hold a lower proportion of shares than those of the control sample. There is no significant difference between the two samples in terms of the number of SOEs.

Notably, we observe that restatement firms have been listed significantly longer on the stock exchange, with a mean age of almost 6 years compared with 5.29 years for control firms. Their ROA, core ROA and ROE are all significantly lower than those of the control sample. Meanwhile, the benchmark for determining whether a firm can offer rights or a secondary issue, ROE, is far from the 10% threshold. The mean ROE is slightly below 0. This result contradicts our expectation in Hypothesis 1. Restatement companies have a higher frequency of single-year losses and consecutive losses, consistent with our expectation in Hypothesis 2. Although Table 5, Panel B, shows that approximately 29.6% of the sample had rights or secondary issuances in the two years prior to and in the most-recent restated year, combining all of the results, we would not claim that companies' manipulation during the restated year is aimed principally at achieving equity financing needs, but is more likely to be associated with a struggle against poor performance and delisting pressures.

Consistent with the China research literature, we find that both total accruals and discretionary accruals are generally negative during the most recent restated year. Perplexingly, however, we also observe that both types of accruals in the test sample are significantly lower than in the control sample. No explanation for this finding comes to mind.

6.2. Determinants of restatements

Here, we examine whether the company characteristics during the corrected year ($t - 1$) can collectively explain the restatement phenomenon in China. These characteristics may offer some guidance to regulators on which aspects to explore when seeking out poor-quality firms.

Table 6 provides the Pearson correlations for all of the potential test variables. The performance variables are highly correlated with one another. We leave ROE in the table, as it is an important threshold in China's capital market. However, ROE is widely manipulated in the Chinese market due to its role as a threshold. We omit it from our official empirical model (Eq. (2)) and adopt only ROA in the final test. We similarly omit earnings growth from our official empirical tests. Naturally, ROA is highly correlated with LOSS, LOSS_ST and LEV, which we will control for in the regressions.

Table 7 examines the company characteristics and incentives that collectively lead to a restatement. The final regression is conducted on the complete sample and includes all variables. It shows that companies with lower profitability, higher leverage, lower holdings by institutional investors, lower ownership concentration and SOEs are more likely to be restatement firms. Because the incentive variables for delisting pressure, LOSS and

Table 6

Pearson correlations.

	R	DA	ROA	ROE	EG	LOSS-ST	LOSS	LEV	L_Share	SOE	RSI	Size
R	1											
DA	-0.048***	1										
ROA	-0.086***	0.679***	1									
ROE	-0.027*	0.356***	0.569***	1								
EG	-0.017	0.322***	0.453***	0.377***	1							
LOSS_ST	0.080***	-0.382***	-0.472***	-0.291***	-0.092***	1						
LOSS	0.114***	-0.354***	-0.498***	-0.332***	-0.257***	0.533***	1					
LEV	0.138***	-0.150***	-0.348***	-0.195***	-0.023***	0.172***	0.219***	1				
L_Share	-0.135***	0.058***	0.121***	0.085***	0.003	-0.079***	-0.128***	-0.134	1			
SOE	0.014	0.000	0.030*	0.024	-0.007	-0.009	-0.032**	0.013	0.268***	1		
RSI	-0.012	0.093***	0.072***	0.045***	-0.029*	-0.084***	-0.115***	-0.108***	-0.001	0.038**	1	
Size	-0.059***	0.046***	0.146***	0.077***	-0.002	-0.140***	-0.173***	0.171***	0.213***	0.142***	0.143***	1
IIIH	-0.069***	0.062***	0.108***	0.048***	0.026	-0.062***	-0.115***	-0.043***	0.011	-0.025	0.030*	0.171***

Notes: See Table 5 notes for variable definitions.

R: A dummy variable, R = 1 if restatement, otherwise 0 for all listed companies.

* Statistical significance at the 10% level.

** Statistical significance at the 5% level.

*** Statistical significance at the 1% level.

Table 7
Determinants of restatements.

Dependent Variables (predicted sign)	Model 1			Model 2			Model 3			Model 4			Model 5			Model 6		
	Coefficient	Pr > Chi		Coefficient	Pr > Chi		Coefficient	Pr > Chi		Coefficient	Pr > Chi		Coefficient	Pr > Chi		Coefficient	Pr > Chi	
Intercept	0.208	0.829		-0.442	0.635		-0.196	0.833		0.151	0.876		0.178	0.854		0.098	0.919	
SOE (+)	0.320	0.000		0.296	0.001		0.293	0.000		0.321	0.000		0.322	0.000		0.322	0.000	
L_Share (+)	- 0.017	< 0.000		- 0.019	< 0.000		- 0.019	< 0.000		- 0.017	< 0.000		- 0.016	< 0.000		- 0.017	< 0.000	
IIH (-)	- 8.440	0.003		- 9.252	0.001		- 9.873	0.000		- 7.968	0.005		- 7.926	0.004		- 7.916	0.005	
LOSS (+)	0.365	0.013		0.534	< 0.000											0.165	0.354	
LOSS_ST(+)	-0.053	0.839					0.469	0.039					-0.107	0.686		-0.161	0.549	
RSI (+)	0.055	0.534		-0.038	0.665		-0.057	0.509		0.044	0.624		0.043	0.629		0.047	0.600	
DA (+)	-0.142	0.747		0.218	0.602		0.270	0.523		0.221	0.641		0.205	0.667		0.203	0.183	
ROA (-)				-0.501	0.201		- 0.843	0.045		- 2.031	0.002		- 2.142	0.002		- 1.714	0.039	
LEV (+)	1.579	< 0.000								1.447	< 0.000		1.449	< 0.000		1.452	< 0.000	
Size (?)	-0.078	0.105		-0.006	0.896		-0.014	0.762		-0.069	0.154		-0.069	0.147		-0.068	0.163	
Chi-square	162.63			130.91			120.07			165.98			166.15			166.99		
Number of observations										3928								

Notes: All variables are for year $t - 1$.

Bold numbers indicate statistical significance at the 5% level.

See Table 5 for variable definitions.

LOSS_ST, are highly positively correlated with the performance variables, ROA and leverage, we test the model alternatively with and without ROA or LEV. The results imply that the delisting pressure is an incentive to manipulate earlier years' earnings and contributes to later restatement. All tests fail to demonstrate that firms' financing needs serve as an incentive for manipulation in our sample.

We are surprised to find that our test produces the opposite sign from that expected for ownership concentration; that is, the lower the proportion of the largest shareholder's stake, or the lower the ownership concentration, the higher the probability that a listed company will restate. We interpret this result as follows: in China, the "shell" of a listed company is a very valuable and limited resource due to the slow CSRC approval process. When a company faces profitability stress or potential losses, the largest shareholder will pump profits into the company by arranging, for example, related-party transactions, a very common practice in China. However, companies with lower ownership concentration will not benefit from their largest shareholders when experiencing the same pressure, as the largest shareholders have insufficient incentive to rescue the ailing company. Such companies then either face being delisted, or resort to accounting manipulation, which is later reversed through restatement. Such conjecture is supported by the significant negative correlation between ownership concentration and the delisting pressure variables, LOSS and LOSS_ST.

Our control variable of firm size is negatively but not significantly related to restatements.

We also conduct extra tests within subsamples, limiting the observations to downward restatements and core earnings related to restatements. The results, which we do not include in the tables, are consistent with our primary tests.

Combining all factors, one can understand why a large SOE, whose largest shareholder is the government, will remain above the financial fray and avoid the need to restate: it is simply because the government will not let that happen.

Table 8

Cumulative Abnormal Returns (CAR) around restatement announcements. Full sample 1999–2005.

Period	N	Mean	Median	Std Dev	t-Stats	P-value	Signed rank P-value
<i>Panel A: Short-term CAR with available return data</i>							
Day (−10, −6)	1088	−0.0034	−0.0058	0.0572	0.1361		<.0001
Day (−5, −2)	1087	−0.0039	−0.0051	0.0468	0.0124		0.0009
Day (−1, +1)	1087	−0.0001	−0.0048	0.0573	0.7802		0.0003
Day (+2, +5)	1087	0.0008	−0.0031	0.0537	0.4227		0.3721
Day (+6, +10)	1085	0.0037	−0.0002	0.0558	0.0361		0.1314
<i>Panel B: Long window—periods leading up to the announcement</i>							
Day (−251, −211)	1007	−0.0104	−0.0126	0.1053	0.0024		0.0011
Day (−210, −170)	1012	−0.0107	−0.0147	0.1049	0.0013		<.0001
Day (−169, −128)	1020	−0.0057	−0.0113	0.1183	0.1275		0.0041
Day (−127, −86)	1023	−0.0114	−0.0176	0.1189	0.0022		<.0001
Day (−85, −44)	1030	−0.0162	−0.0164	0.1188	<.0001		<.0001
Day (−43, −22)	1089	−0.0048	−0.0017	0.0821	0.0714		0.4887
Day (−21, −11)	1089	−0.0018	−0.0059	0.0713	0.3442		0.0001

Notes: Significance levels are for two-tailed tests. A market-adjusted returns model is adopted. We obtained our data from the CSMAR database. Individual stock's daily abnormal return is calculated as $AR_{it} = R_{it} - R_{mt}$. R_{mt} is the market return, represented by the A-share composite index daily return. Sample daily abnormal returns are calculated as $\overline{AR}_t = \frac{1}{N} \sum_i^N AR_{it}$. Portfolio CARs are calculated as $CAR_{BE} = \sum_{t=B}^E \overline{AR}_t$. B and E, respectively, represent the beginning and ending days around event day 0.

6.3. Consequences of revealing poor earnings quality

Even though financial restatements in China have become a prevailing phenomenon, it remains largely below the radar, which seems perplexing. We now test Hypothesis 4 and offer explanations.

Following most research on restatements in the US, we conduct event tests and let their results tell the story. Table 8, Panel A, shows the short-term CARs for our restatement sample. Contrary to the strikingly negative results from US data (CARs of approximately -11%), China's stock market reacts very weakly, barely registering any reaction to restatement announcements. The mean CAR values for the 3-day period around the announcement ($-1,+1$) are not significant, although the median CARs are significant, with a market reaction of -0.48% . During the week ahead of the annual report release, however, the market reacts in a significantly negative way, a drop of roughly half of one percent. These results show that investors in China's stock market fail to punish the poor quality of financial reports following restatement announcements as severely as investors in the US stock market.

Nevertheless, investors may perceive such poor-quality accounting ahead of the restatements due to possible information leakage. Hence, we look back over a longer period prior to the release of the annual report and find that the results are quite mixed. We divide the timeframe into several periods for examination. We find there is a slight decline one year before the release of the report. However, the CARs of some timeframes are significantly negative, whereas others are not. Some are significant for the median, but not the mean. Overall, the magnitude is limited and the mixed results do not permit us to reject Hypothesis 5, which states that investors do not anticipate the poor quality of financial reports.

Long-term tests up to six months before the restatement announcements are presented in Table 9, Panel C; these fail to reveal a post-announcement drift, which implies that the poor quality of financial reports negates the potential for the market to digest the information and eventually react in a rational, albeit delayed, fashion.

Table 9

Cumulative Abnormal Returns (CAR) around restatement announcements. CSRC-enforced subsample 1999–2005.

Period	N	Mean	Median	Std Dev	t-Stats P-value	Signed rank P-value
<i>Panel A: Short-term CAR with available return data</i>						
Day ($-10,-6$)	67	0.006	0.000	0.047	0.289	0.666
Day ($-5,-2$)	67	-0.001	-0.004	0.039	0.776	0.384
Day ($-1,+1$)	67	-0.011	-0.010	0.042	0.028	0.014
Day ($+2,+5$)	67	0.007	-0.004	0.055	0.273	0.482
Day ($+6,+10$)	67	-0.008	0.000	0.058	0.237	0.955
Day ($+11,+21$)	67	0.013	0.012	0.074	0.134	0.085
<i>Panel B: Long window—periods leading up to the announcement</i>						
Day ($-251,-211$)	63	-0.008	-0.012	0.067	0.231	0.024
Day ($-210,-170$)	64	-0.009	-0.017	0.062	0.189	0.018
Day ($-169,-128$)	65	-0.005	-0.010	0.110	0.127	0.026
Day ($-127,-86$)	67	-0.002	-0.013	0.098	0.767	0.000
Day ($-85,-44$)	67	-0.014	-0.015	0.109	0.000	0.000
Day ($-43,-22$)	67	0.003	-0.001	0.076	0.712	0.879
Day ($-21,-11$)	67	-0.009	-0.018	0.059	0.177	0.017

Notes: Refer to those for Table 8.

Our analysis also indicates that the stock market only slightly penalizes the poor quality of accounting uncovered by the CSRC's inspection following restatement announcements. In Table 10, Panel A, the CARs of -1% are significant both for the mean and the median only for the $(-1, +1)$ period around the event date. Usually, the regulatory inspection will take a few months to conclude, leading us to look back over a longer period preceding the CSRC's decision. During the six months preceding the restatement in Table 10, Panel B, the CAR values (mean -1.4% , median -1.5%) are significant only between the fourth month and the second month. The CARs from the remaining time frames are mostly negative and insignificant.

Overall, the stock market reaction offers an ambiguous and different picture of restatements from that of the US stock market. We can claim that the stock market in China either fails to punish poor financial reporting or does not punish it enough.

6.4. Usefulness of accounting information

Puzzled by the market's failure to react to the restatement phenomenon, we suspect that investors may attach a different value to accounting information in China, and thus may partially or completely ignore such information. Restatements are disclosed in firms' annual reports, which also offer a great deal of other information, mainly relating to the current reported year. Buried within, the revealing of restatements may simply be missed by investors. Hence, we test two dimensions of the return/earnings relationship: the level of and the change in information.

Table 11, Panel A, shows how the stock market reacts to the current year's earnings and the past year's corrected earnings. We obtain the latter by adding the restated amount back onto the originally reported earnings for those sample firms that restate at least the previous year's results. The results show that the market does respond to accounting information: its reaction is clearly and significantly related to the current year's earnings. However, it ignores the corrected past year's earnings, which is also new information re-

Table 10

Cumulative Abnormal Returns (CAR) around restatement announcements. Subsample of core earnings reasons 1999–2005.

Period	N	Mean	Median	Std Dev	t-stats	P-value	Signed rank P-value
<i>Panel A: Short-term CAR with available return data</i>							
Day $(-10, -6)$	376	-0.004	-0.005	0.054	0.169		0.029
Day $(-5, -2)$	375	-0.003	-0.005	0.053	0.214		0.089
Day $(-1, 1)$	375	-0.004	-0.006	0.057	0.164		0.004
Day $(+2, +5)$	374	0.003	-0.001	0.063	0.367		0.765
Day $(+6, +10)$	372	0.005	0.000	0.061	0.131		0.104
Day $(+11, +21)$	369	0.007	0.004	0.075	0.083		0.156
<i>Panel B: Long window—periods leading up to the announcement</i>							
Day $(-251, -211)$	362	0.000	-0.002	0.046	0.432		0.284
Day $(-210, -170)$	362	-0.011	-0.015	0.107	0.061		0.019
Day $(-169, -128)$	365	-0.014	-0.019	0.125	0.032		0.011
Day $(-127, -86)$	365	-0.020	-0.036	0.187	0.038		0.000
Day $(-85, -44)$	364	-0.026	-0.025	0.117	<0.000		<0.000
Day $(-43, -22)$	376	0.006	-0.002	0.088	0.216		0.592
Day $(-21, -11)$	376	0.001	-0.005	0.087	0.898		0.205

Notes: Refer to those for Table 8.

leased to the market. These results imply that accounting information is partially useful to the equity market. Investors seem to pay attention, naïvely, only to the current year's accounting information while ignoring information about the past.

Table 11, Panel B, presents the test results on the market reaction to the change in information. Such change has two components in our tests: the change in the current year's earnings, proxied by unexpected earnings, and the change in past earnings, represented by the magnitude of the restatement. We use a dummy variable, Loss, to control for the major characteristics of the current year's earnings, along with variables describing the restatement characteristics, and find the marginal significance of the magnitude disap-

Table 11
Usefulness of earnings information.

CAR _i = a ₀ + a ₁ EPS _t + a ₂ AdjEPS _{t-1} + ε								
	Coefficient						t-Stat	
Panel A: Returns on earnings								
Intercept	−0.007						−0.98	
EPS _t	0.142						9.23	
AdjEPS	−0.010						−0.93	
R ²							9.18%	
F value							43.33	
Number of observations							838	
CAR _i	Model 1		Model 2		Model 3		Model 4	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Panel B: Returns on earnings surprises								
Intercept	−0.006	−0.86	−0.066	−0.70	−0.061	−0.65	−0.079	−0.83
Un_EPS	0.051	4.94	0.030	2.82	0.031	2.87	0.030	2.83
Magnitude	0.051	1.87	0.027	0.98	0.031	1.12	0.027	0.95
Loss			−0.105	−5.82	−0.107	−5.92	−0.103	−5.70
CSRC			−0.017	−0.61	−0.017	−0.62	−0.015	−0.54
Tax							0.013	0.86
Subsidiary							−0.011	−0.75
Revenue					0.035	−1.23		
Core			0.006	0.41			0.006	0.41
Firm_Size			0.007	0.89	0.007	0.84	0.008	1.01
R ²	2.57%		5.73%		5.86%		5.70%	
F value	14.38		11.02		11.26		8.48	
Number of observations	1015		989		989		989	

Notes: CAR_i: Cumulative abnormal returns of (-5,+1) months around the restatement event date.

EPS_t: EPS for year *t*.

AdjEPS_{t-1}: True EPS for year *t* - 1, naively adjusted by restated amount.

Un_EPS: Unexpected earnings per share (EPS): the reported EPS subtracts' expected EPS, which is last year's EPS.

Magnitude: Restated amount per share.

Loss: A dummy variable. Loss = 1 if the company experienced a loss in year *t*, and 0 otherwise.

CSRC: A dummy variable. CSRC = 1 if the restatement is CSRC-enforced, and 0 otherwise.

Tax: A dummy variable. Tax = 1 if the restatement is tax related, and 0 otherwise.

Subsidiary: A dummy variable. Subsidiary = 1 if the restatement is a mistake from a subsidiary, and 0 otherwise.

Revenue: A dummy variable. Revenue = 1 if the restatement is revenue recognition related, and 0 otherwise.

Core: A dummy variable. Core = 1 if the restatement reason(s) is/are related to revenue, cost & operating expenses, and/or depreciation and provision, and 0 otherwise.

Firm size: The log form of total firm assets.

Table 12

Earnings credibility – earnings response coefficients.

	$CAR_i = \alpha + \beta UE_i + \varepsilon_i$		$CAR_i = \alpha + \beta_1 UE_i + \beta_2 UE_i T_i + \varepsilon_i$			
	$t - 1$		t		Pooled	
	Coefficient	t-Stat	Coefficient	t-Stat	Coefficient	t-Stat
Intercept	−0.001	−0.14	0.058	5.25	0.028	4.14
UE	0.376	8.21	0.244	5.71	0.392	7.11
UE \times T					−0.136	−2.04
F value	67.44		32.61		48.63	
Adj R^2	0.072		0.036		0.053	
Number of observations	857		857		1715	

Notes: CAR_i : Cumulative returns for $(-11, +1)$ months around annual report date.

UE_i : Unexpected earnings of year i : the difference between the reported earnings and the expected earnings, i.e., the prior-year's earnings, scaled by the stock price of the day before the announcement date.

T_i : Dummy variable. $T = 1$ if UE_i is for year t , and $T = 0$ if UE_i is for year $t - 1$.

pears. The change in the current year's earnings and the loss character of its earnings are captured significantly by investors, whereas the change in the previous year's earnings information via outright admission of poor-quality earnings for the previous period is completely ignored. These results are consistent with those in Table 11, Panel A.

Next, we test the credibility of accounting information to investors using annual data. The dependent variable is unexpected annual earnings, which we compute by subtracting the prior year's earnings per share from the current year's earnings per share. The independent variable is the corresponding CAR for $(-11, +1)$ months around the annual report date. As demonstrated in Table 12, before the restatement, the ERC of β_1 is significantly positive (0.356), and after the restatement it drops to 0.231. The drop is significantly negative at the 10% level, as shown by $\beta_2 = -0.127$ for dummy \times UE in the pooled sample. This can be interpreted as the market's acknowledgement that revealing poor accounting quality is bad news, although the ERCs in China are low. Our tests show that they are below 0.4, which is much lower than in the United States, where they are above 1. Such a contrast implies that investors in China generally attach much lower value to accounting information.

6.5. Robustness tests

We also conduct robustness tests by taking out observations due to miscalculations, typos and postings by mistake due to human error. All statistical results remain consistent with earlier tests.¹¹ The CARs for the year-long window leading up to the annual report announcement increase slightly from around -6% to around -10% , which again indicates that investors do not punish poor financial reporting as much as they should.

7. Conclusion

China's capital market has been rapidly improving since the end of the 1970s, however it has yet to mature and become as efficient as developed markets. Our accounting-based research yields a variety of test results that collectively indicate that low-quality accounting

¹¹ We do not list these tables in the paper. They are available upon request.

reporting persists in China. Moreover, accounting reporting has yet to play the significant role in investment behavior and philosophy that it does in mature markets.

Various aspects of capital markets can offer insights into our test results on market reaction. We now examine these in turn.

Short-selling, an important stock market mechanism, was not available either directly or indirectly to investors during our sample period.¹² Investors' inability to sell short deters a stock's ability to approach an efficient price in a timely manner.

The investor structure is disproportionate relative to that in mature markets. The scale of institutional investors is small. Individual investors, especially medium and small investors, account for a significant proportion of trading accounts and trading turnover. Short-term speculation dominates long-term investment (CSRC, 2008). Our test results imply that accounting information has yet to play a significant role in investment behavior and philosophy. Developing institutional investment and improving investors' education are suggested to be crucial tasks for the government and regulators.

We call for effective regulation on the disclosure of financial reporting. Poor disclosure causes market inefficiency in China. Throughout our research, our attention was caught by the limited amount of information disclosed. For example, when a restatement involves more than one year, there is no indication of the number of prior years that it affects, and when there is more than one reason for restatement, there is no guidance on the relative weight of the reasons. Although the *2004 Notice* defined the need for timely and separate disclosure of significant events, including restatements, the specification is not reliably followed.

We also call for more vigorous regulatory and administrative enforcement. The CSRC does not have the power to determine appropriate monetary penalties for regulation-violating corporate behavior. The executor of the justice system, the court, is legally equipped with the power to decide the size of monetary penalties, based on the Law of the People's Republic of China on Administrative Penalty¹³ and the Securities Law of the People's Republic of China.¹⁴ Nevertheless, the penalty's cap is so low—CNY 600,000¹⁵—that it cannot act as a real financial deterrent to violating companies. Alternative punishments come from the regulatory body of the CSRC, which could either exert pressure on a listed company's future application for rights or secondary issuances, or publicly criticize violating companies on the stock exchange. Disallowing refinancing would be a substantial discouragement to a company with financing needs. However, as our tests show, the financial status of companies that issue restatements generally forbids them from effectively applying for equity financing. Financing needs may not even appear in their timetable because survival has a higher priority than financing. As for the option of public criticism, it does not inflict much real imme-

¹² Investors still cannot short-sell stocks directly, but can do so via put options on a limited number of companies. The first (call) option in China was of Baosteel Co., Ltd., listed and traded on the Shanghai Stock Exchange on August 22, 2005, whereas the first put option was not issued until May 30, 2006, on China Kweichow Maotai Distillery Co., Ltd. By the end of 2007, there were only 27 options issued in total, 21 of which had already expired with six still outstanding; 10 of the 27 were put options. (Shanghai Stock Exchange: <http://www.sse.com.cn>)

¹³ The Law was passed at the fourth Session of the Eighth National People's Congress and promulgated by Order No. 63 of the President of the People's Republic of China on March 17, 1996. It became effective on October 1, 1996.

¹⁴ The Securities Law was passed at the sixth Meeting of the Standing Committee of the Ninth National People's Congress on December 29, 1998, revised at the 18th Meeting of the Standing Committee of the Tenth National People's Congress of the People's Republic of China on October 27, 2005, according to the Decision on Revising the Securities Law of the People's Republic of China made at the 11th meeting of the Standing Committee of the Tenth People's Congress on August 28, 2004.

¹⁵ CNY600,000 \approx USD72,464 during our sample period.

diate damage. There are insufficient regulatory and administrative penalties in China and they need to be enforced and substantiated.

Class action lawsuits, a commonly practiced US legal vehicle to inflict damage, are a rarity in China. First, from our tests on stock market reaction, a company that reveals mistakes in previously released financial reports incurs little if any damage. In fact, there is hardly any damage to seek. Second, although there is damage from the decline in the individual stock price, China's courts simply will not accept damage cases as, to the courts, such cases are not as important as numerous other civil lawsuits. Implicitly, such reality encourages companies to report poor-quality financial statements because later discovery and restatement will be virtually costless. The introduction of a legal procedure for processing cases, along with a punitive legal system to deal with violations of accounting rules, should provide a valuable complement to the current structure of China's capital market.

China's credit market falls far behind the mature markets worldwide. The scale of the credit market, especially the corporate bond market, is quite small¹⁶ (CBRC, 2006). Bank loans are the major form of corporate debt. The process of introducing a free lending rate into the market from the People's Bank of China (PBOC) offers a few crucial implications for the debt capital market. As with reforms in many other aspects of the economy, the introduction of a free lending rate is also a gradual process. The floating range of financial institutions' lending interest rate is completely regulated by the PBOC. Before January 1, 2004, the ceiling was capped at 10% above the base rate.¹⁷ It was relaxed to 70% for the next nine months before being totally freed. Under the regulated lending system, the rate a company received did not necessarily reflect the rate it should have received according to the company's overall risk—risk that includes accounting quality as a crucial component. Specifically, poor accounting quality was not penalized fairly with an appropriately higher lending rate. The low additional cost from loan borrowings cannot effectively prevent companies from providing low-quality financial reports. Unfortunately, we are unable to test this hypothesis directly, because interest expense is combined with other operating expenses in all existing databases. During most of our sample period, commercial banks did not have sufficient incentive to distinguish clearly among companies with different credit levels until the big four state banks and top-tier banks were listed on the Hong Kong Stock Exchange. This began only in mid-2005 after shaking off a significant amount of non-performing loans, following international banking rules and accounting standards, and offering executive stock option plans.

From examining accounting restatements in our sample of China's A-share listings, we conclude that companies with weak profitability, a state-controlled shareholder and diffused ownership tend to report poor financial statements and later restate. In an emerging market such as China's, however, we find that the stock market does not react significantly to restatements forced by low-quality accounting. The stock market is only able to digest partial accounting information and accounting credibility is low. These findings, together with the inefficient debt market, weak regulatory system and legal punitive system discussed above, underscore why restatements were such a widespread phenomenon during our sample period. We show that in China, accounting credibility has lower value and an

¹⁶ By the end of 2006, the total value of the credit market was 28.7% of GDP, compared to 188% in the United States. The value of corporate bonds was 1.44% of GDP versus 125.72% in the United States.

¹⁷ In 1998, the ceiling was increased to 20% above the base rate for small enterprises, and to 30% for medium and small enterprises in 1999. The floor lending rate has remained steady at 10% below the base rate. For example, on January 1, 2004, the PBOC's one-year base lending rate was 5.31%; the range of lending rates would therefore be 4.78–9.03%.

accounting misstatement is much less costly than in a mature market, such as that of the United States, because the market mechanism fails to deter firms' misstatement behavior. We advocate the reinforcement of market regulation and supervision, strengthening of the legal system, further improvement of free-market mechanisms and continuous investor education in China's capital markets.

We believe our study to be very timely, given that it echoes the recent spirit and reforms of the Chinese government and regulators. The release of the *Opinions of the State Council on Promoting the Reform, Opening and Steady Growth of Capital Markets (the Opinions)* on January 31, 2004, sees the role of capital markets as sovereign and strategic for national economic development. The CSRC concurrently implemented a series of reforms to refine market infrastructure and functionality—reforms that include improving the quality of listed companies and facilitating institutional investors' entrance into the capital market.¹⁸ Interestingly, we find that our sample size starts to decrease during the final two to three years of our 1999–2005 sample period. This coincides with: (1) the CSRC's adoption of a decentralized supervision system in 2004, a measure intended to improve the quality of listed companies and whose regulatory efficiency was immediately evident (CSRC, 2008); (2) the CSRC's *Rule 19*, introduced at the end of 2003, and the 2004 *Notice on Further Improving Financial Information Disclosure of Listed Companies*; (3) the CBRC's introduction of a free lending-rate system in 2004; and (4) the listing of big banks in Hong Kong since 2005, following various international industry standards. Accounting quality is improving, in terms of the decreasing number of firm restatements, as a result of regulatory efforts and a more extensive free-market mechanism. We also expect that when China's capital market achieves maturity in the near future, investors' behavior will change commensurately towards that of investors in mature markets. Specifically, in relation to our studied cases, investors will effectively differentiate bad accounting quality from good practices.

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¹⁸ Other measures include the initiation of the non-tradable share reform, restructuring of securities companies, reform of the share issuance system and the introduction of a free market for investment funds.

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Do dividend tax cuts lead firms to increase dividends: Evidence from China

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ABSTRACT

Dividend taxation is an important component of investors' taxes and has attracted the attention of policymakers and financial economists. However, the theory of dividends and the reform of dividend taxation remain a puzzle. This paper analyzes the effect of dividend taxation on firms' dividend policies. Using a natural experiment and difference-in-difference estimation, we find that China's dividend tax cut in 2005 led firms to increase their dividend payments. Companies with higher proportions of tradable individual shares or investment fund shares were more likely to increase their dividend payments. However, opportunistic behavior also exists, where companies with higher proportions of shares held by executives were also more likely to increase their dividend payments. These findings support the existence of a causal relationship between China's tax

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cut and firms' increased dividend payments and imply that the reform of dividend taxation in 2005 achieved its goal.
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1. Introduction

Dividend taxation is an important component of investors' taxes and has attracted the attention of policymakers and financial economists. Recently, many countries have begun to focus on capital market taxation reforms. In China, the State Council promulgated 'Some Opinions of the State Council on Promoting the Reform, Opening and Steady Growth of Capital Markets' (hereinafter referred to as the 'Nine Opinions') in 2004, which stressed that tax policy in relation to capital markets should be refined to encourage public investment. On 13 June, 2005, the Ministry of Finance and the State Administration of Taxation issued the document, 'Notice on Policies Relating to Individual Income Tax on Dividends and Bonuses', which stated that taxes on individual investors' income from dividends and bonuses of listed companies should be levied in accordance with the current tax laws after temporarily deducting 50% of an individual's taxable income. Therefore, since 13 June, 2005, individual investors' dividend income has been taxed at a rate of 10%, rather than 20%. The objectives of the dividend tax cut were to increase the likelihood of companies making dividend payments, ease the conflict of interest between large and minority shareholders, protect the interests of minority shareholders and encourage public investment. As a result, this paper examines whether the lower dividend tax rate has led firms to increase their dividend payments.

There has been fierce theoretical debate over whether a reduction in the dividend tax rate would lead firms to increase their dividend payments. The main dispute is between the 'new theory' or 'tax capitalization view,' and the 'traditional view' of whether reductions in dividend tax rates affect the financial behavior of companies. Proponents of the 'traditional view' stress that if a company mainly relies on external equity financing then, under classical taxation, higher dividend taxation will tend to raise the cost of capital. As the capital gains tax rates on retained earnings are generally lower than dividend tax rates, shareholders may benefit from decreased dividend payments. Conversely, a decrease in dividend tax can limit the ability of firms to engage in inter-temporal tax arbitrage and may, therefore, lead companies to increase their dividend payments. The 'new theory' developed by King (1977) argues that in cases where companies mainly rely on retained earnings, mature companies are able to keep all of their profits to meet their equity financing needs and then distribute the remaining profits as dividends, even when there is double taxation. Dividend taxes will thus be irrelevant to the companies' dividend policies. In this case, a decline in dividend tax may not affect a company's financial behavior and, thus, its dividend payout.

The results of recent empirical research in this area are not entirely consistent. Chetty and Emmanuel (2005) analyze the impact of the 2003 dividend tax cut in the United States on firms' payout behavior and find that, consistent with the 'traditional view', the tax cut induced companies to increase their dividend payments and created the possibility for an

initial dividend payout. The same result is also found in Dhaliwal and Oliver (2007), Brown et al. (2007), and Blouin et al. (2004). Surveying 384 financial executives and conducting in-depth interviews, Brav et al. (2005) find that dividend tax is not a dominant concern for the majority of firms and, with respect to the 2003 dividend tax cut, only 28% of financial managers felt that it might increase their company's dividend payout, while the other 70% of financial managers believed the decline in dividend tax might not or would not affect their dividend policy. In addition, La Porta et al. (2000) analyze the effects of dividend taxes around the world, but do not find any conclusive results.

Different theories have completely different views on the reform of dividend taxation policies. Recently, many countries have begun to focus on dividend tax reforms. A number of developed countries, including the United States, Britain and Germany, have adjusted their dividend tax rates. However, what is confusing is that the direction of the changes in dividend taxation has been different. Some countries, such as Britain and Germany, have increased their dividend tax rates, while others, such as the United States, have reduced their dividend tax rates. In the United States, the Jobs and Growth Tax Relief Reconciliation Act was enacted in 2003 by President Bush. One of the main provisions of the act was to reduce the tax on individual dividend income to 15%, instead of the top rate of 35%. However, the reforms in the United Kingdom and Germany were different. From 1973, shareholders in the United Kingdom were credited for a portion of the taxes they paid at the corporate level, through what is known as an imputation-style corporate tax system. However, in 1997, the amount deductible was reduced from 20% to 10%, thereby effectively increasing shareholders' dividend tax rates. This reform brought the UK tax system more into line with classical taxation. Similarly, Germany's nearly 30 year old imputation-style corporate tax system, which was one of the lightest dividend tax systems in the world, was abolished in 2000, which also led to an increased dividend tax rate.

Therefore, whether declines in dividend tax rates lead firms to increase their dividend payments, which then eases the conflict of interest between large and small shareholders, is an important empirical question. However, little large sample empirical research has been conducted on this important issue in China. In a previous study based on a unique sample of 86 listed companies releasing A and B shares, Zhang (2007) finds that, consistent with the 'traditional view', China's dividend tax cut affected the price of equity capital. Because the dividend tax rate is higher than the capital income tax rate in China, investors expect a higher return from companies that make high dividend payments. Although Zhang's (2007) research design is ingenious, the study has some deficiencies. Leaving aside the small sample size, there is a systematic difference between the A-share and B-share markets. In a study of the short-term market reaction to the dividend tax cut, Zeng and Zhang (2005) find that cumulative abnormal returns are positively correlated with dividend payments. They argue that, in China, dividend tax affects asset prices in line with the 'traditional view'. However, not all investors were beneficiaries of the dividend tax cut. For example, corporate shares were not subject to the reduced dividend tax rate. Zeng and Zhang (2005) fail to acknowledge this difference. This paper focuses on the causal relationship between the dividend tax cut and increased dividend payments, and evaluates the effects of China's dividend taxation reform.

To examine this causal relationship and evaluate the reform of dividend taxation, this paper uses a sample of A-share listed companies between 2003 and 2007 for the empirical tests. In addition, a 'natural experiment' and difference-in-difference estimator methods are used to estimate the impact of the dividend tax cut on companies' dividend policies.

We find that the 2005 dividend tax cut led firms to increase their dividend payments. Companies with higher proportions of tradable individual shares or investment fund shares were more likely to increase their dividend payments. However, opportunistic behavior was also detected, where companies with higher proportions of shares held by executives were more likely to increase their dividend payments. These findings support the existence of a causal relationship between dividend tax cuts and increased dividend payments and suggest that China's reform of dividend taxation in 2005 achieved its goal.

2. Institutional background and hypotheses

2.1. Institutional background

In China, there is variation in the dividend taxes paid by different investors. Dividend taxation in China is based on a classical tax system, where the company and the individual are treated as separate entities and pay separate income taxes. The result is that income is taxed twice. In the Chinese stock market, only individual shareholders and funds pay dividend taxes. According to the Individual Income Tax Law of the People's Republic of China, interest, dividends, bonuses, contingent income and other income are taxed at the rate of 20%. According to the "Notice on the Tax Policies Relating to Mutual Funds" (coded Cai Shui Zi [2002] No. 128) issued by the Ministry of Finance and the State Administration of Taxation in 2002, investment funds are required to pay tax on income from dividends, bond interest and interest on savings at a rate of 20%. However, social security funds are tax-free. According to Article 26 of the Enterprise Income Tax policy, an enterprise's following sources of income are tax-free: (a) dividends, bonuses and other equity investment gains generated between qualified resident enterprises; and (b) the dividends, bonuses and other equity investment gains that non-resident enterprises obtain from resident enterprises, where the non-resident enterprise has organs or establishments inside the territory of China and has actual connections with such organs or establishments. In these cases, the dividend income obtained from these enterprises is tax-free.

To promote the healthy and stable development of capital markets, the Nine Opinions state that the tax policy for capital markets should be refined to encourage public investment. Since 13 June, 2005, individual dividend income has been taxed at a rate of 10%, rather than 20%. On 13 June, 2005, the Ministry of Finance and the State Administration of Taxation issued a document coded Cai Shui [2005] No. 102, which stated that the tax on individual investors' income from dividends and bonuses of listed companies should be levied in accordance with current tax laws after temporarily deducting 50% of an individual's taxable income. On the same day, the Ministry of Finance and the State Administration of Taxation issued a document coded Cai Shui [2005] No. 107, which stated that the income that investment funds receive from dividends and bonuses of listed companies should also be levied after temporarily deducting 50% of taxable income.

2.2. Hypotheses

As the objective of the 2005 tax reform was to encourage public investment, individual income tax payers received preferential policies. The policymakers were concerned whether individual shareholders would benefit from the reduction in dividend taxes and whether it would encourage companies with higher proportions of individual shares to increase their dividend payments. At the same time, financial economists were con-

cerned whether the reduction in shareholders' dividend tax would lead to firms increasing their dividend payments and, in the context of China, whether 'new theory' is more powerful than the 'traditional view'. The answers to these basic propositions will provide a theoretical basis for the subsequent tax reform in capital markets in China. Therefore, we propose the following hypothesis:

Hypothesis 1. Following the reduction in the dividend tax rate, companies with higher proportions of individual shares increased their dividend payments.

Investment funds have also benefited from the dividend tax cut. Moreover, in recent years, funds have had an increasingly powerful influence on companies' financial policies. Therefore, companies with higher proportions of investment fund shares are more likely to increase their dividend payments. In addition, the executives of listed companies are individual income tax payers and the financial policymakers of their companies. Executives may also increase their companies' dividend payments for reasons of self-interest. Thus, we propose the following hypotheses:

Hypothesis 2. Following the reduction in the dividend tax rate, companies with higher proportions of investment fund shares were more likely to increase their dividend payments.

Hypothesis 3. Following the reduction in the dividend tax rate, companies with higher proportions of shares held by their top executives were more likely to increase their dividend payments.

3. Research design and sample selection

3.1. Research design

This paper uses the 'natural experiment' and difference-in-difference estimator methods to estimate the impact of the dividend tax cut on companies' dividend policies. Compared with similar policies abroad, the tax cut on 13 June, 2005 was very clean,¹ because the code stated there was to be no change in other dividend tax provisions and there was also no change in other related taxes.² In general, the tax cut affected companies with shares held by individuals, investment funds and executives, while companies with corporate holdings and social security fund holdings were not affected. We use the companies that were subject to the change in dividend tax as the treatment group, while the companies that were not affected by the dividend tax reform are the control group. We then compare the changes in companies' dividend policies before and after the dividend tax cut to estimate the effect of the tax cut on corporate dividend policies. This methodology uses the exogenous dividend tax change to estimate the time series and cross-sectional differences in companies' dividend policies. As the introduction of the tax cut is an unpredictable event, we assume that listed

¹ The 2003 tax reform in the United States also included a capital gains tax cut. In addition, the 1986 dividend tax change in the United States comprised a package of tax reforms.

² At the same time, the Ministry of Finance and the State Administration of Taxation issued a notice on the Issue Concerning the Tax Policies Relating to the Pilot Reform of Share-trading, document code Cai Shui [2005] No. 103, which stated that the individual income tax on stock transfers occurring during the course of the pilot reform of share-trading, where a holder of non-tradable shares gives consideration to a holder of tradable shares or cash, shall be temporarily exempt. We believe that this did not affect companies' normal dividend policies.

companies are randomly assigned to the treatment group and the control group. After the introduction of the policy, there are limited endogenous concerns about changes in the shareholdings of various groups. The exchange of executives' shares is subject to numerous restrictions and securities laws. Moreover, it can have a negative impact on the company. Exchange of investment fund shares and individual shares are affected by numerous factors, of which the reduction in dividend taxes is just one of many. We use the following model to estimate the impact of the dividend tax cut on companies' dividend policies.

$$\begin{aligned} \log it(increase_{it}) = & \beta_0 + \beta_1 tax_{it} + \beta_2 individual_{it} + \beta_3 individual_{it} * tax_{it} \\ & + \beta_4 Nshare_{it} + \beta_5 inde_{it} + \beta_6 ceo_{it} + \beta_7 tobinq_{it} + \beta_8 meet_{it} \\ & + \beta_9 level_{it} + \beta_{10} cash_{it} + \beta_{11} size_{it} + \beta_{12} state_{it} + industry \end{aligned} \quad (1)$$

$$\begin{aligned} \log it(increase_{it}) = & \beta_0 + \beta_1 tax_{it} + \beta_2 director_{it} + \beta_3 director_{it} * tax_{it} + \beta_4 Nshare_{it} \\ & + \beta_5 inde_{it} + \beta_6 ceo_{it} + \beta_7 tobinq_{it} + \beta_8 meet_{it} + \beta_9 level_{it} \\ & + \beta_{10} cash_{it} + \beta_{11} size_{it} + \beta_{12} state_{it} + industry \end{aligned} \quad (2)$$

$$\begin{aligned} \log it(increase_{it}) = & \beta_0 + \beta_1 tax_{it} + \beta_2 fund_{it} + \beta_3 fund_{it} * tax_{it} + \beta_4 Nshare_{it} \\ & + \beta_5 inde_{it} + \beta_6 ceo_{it} + \beta_7 tobinq_{it} + \beta_8 meet_{it} + \beta_9 level_{it} \\ & + \beta_{10} cash_{it} + \beta_{11} size_{it} + \beta_{12} state_{it} + industry \end{aligned} \quad (3)$$

The left-hand side variable, *increase*, is a dummy variable. If the dividend in that year is greater than in the prior year, the variable *increase* equals 1 and 0 otherwise. In addition, we specifically consider the effect of the regulation issued in May 2001, 'Administration of Offerings of New Shares by Listed Companies Procedures', which focuses on cases where 'a company did not distribute any dividends or bonuses during the most recent 3 years and the board of directors failed to provide a reasonable explanation of the same'. Some companies made trivial dividend payouts to meet this provision. Accordingly, we revise the *increase* variable. Specifically, if the dividend payments in this year are more than those in the previous year, but the pre-tax dividend is less than 0.1 Yuan per share, the increase equals 0 (the same study design also appears in Deng and Zeng (2005) and Wu et al. (2003)). Furthermore, a regulation issued in May 2006 stated that, 'Profits distributed accumulatively in the latest 3 years in cash or stocks shall be no less than 20% of annual distributive profits of the latest 3 years'. We also revise the increase variable to capture the effect of this regulation.³ Specifically, if the accumulative profits distributed in the latest 3 years in cash or stocks are more than 20% and less than 25% of the annual distributive profits of the latest 3 years, the increase equals 0.

The right-hand side variable, *Tax*, is also a dummy variable. We define the event date of the tax cut as the announcement date of the document coded Cai Shui Zi [2005] No. 102. If a company's dividend declaration date is after 13 June, 2005, the variable *Tax* equals 1 and 0 otherwise. In China, the provisions for dividend payments do not change after the

³ Administration of Offerings of New Shares by Listed Companies Procedures Article 8 (e), issued on May 8, 2006, states that the accumulative profits distributed in the last three years in cash or stocks shall be no less than 20% of annual distributive profits of the last 3 years. This was also amended on October 9, 2008 to the accumulative profits distributed in the last 3 years in cash shall be no less than 30% of annual distributive profits of the last 3 years.

Table 1

Definitions of main variables.

Variable	Definition
<i>Individual</i>	The sum of shares held by the top 10 individual tradable shareholders/total number of shares
<i>Fund</i>	The sum of shares held by securities investment funds/total number of shares
<i>Director</i>	Natural logarithm of the sum of shares held by executives
<i>Nshare</i>	Total non-tradable shares/total number of shares
<i>Inde</i>	The number of independent directors/the number of members of the board of directors
<i>Ceo</i>	Dummy that equals 1 if the chairman and general manager is the same person and 0 otherwise
<i>Tobinq</i>	(the number of tradable shares * this year closing price + non-tradable shares * net assets per share book value + debt)/total book value
<i>Meet</i>	Dummy that equals 1 if the rate of return on net assets (ROE) is between 6% and 7%, and 0 otherwise
<i>Level</i>	Total liabilities/total assets
<i>Cash</i>	Net cash flow from operating activities/total assets
<i>Size</i>	Natural logarithm of total assets
<i>State</i>	Dummy that equals 1 if the controlling shareholder is the state and 0 otherwise
<i>Industry</i>	According to the CSRC industry standard, manufacturing industry classification at the second level and removing the financial industry, we define 21 dummy variables and the benchmark is <i>M</i> , comprehensive industry

Table 2

Descriptive statistics.

Variables	Mean	Std.	Minimum	Median	Maximum
<i>Increase</i>	0.171	0.377	0	0	1
<i>Tax</i>	0.525	0.499	0	1	1
<i>Individual</i>	0.011	0.01	0	0.009	0.078
<i>Fund</i>	0.023	0.051	0	0	0.454
<i>Director</i>	6.187	5.66	0	8.623	19.291
<i>Nshare</i>	0.57	0.131	0	0.593	0.826
<i>Inde</i>	0.342	0.052	0	0.333	0.75
<i>Ceo</i>	0.113	0.316	0	0	1
<i>Tobinq</i>	1.261	0.335	0.947	1.166	4.94
<i>Meet</i>	0.072	0.259	0	0	1
<i>Level</i>	0.495	0.18	0.081	0.508	0.909
<i>Cash</i>	0.053	0.078	−0.197	0.053	0.27
<i>Size</i>	21.247	0.934	18.322	21.145	26.978
<i>State</i>	0.593	0.491	0	1	1

declaration date. Therefore, we use the dividend declaration date to determine the effect of the tax cut on a company's dividend policy.

The explanatory variables of primary interest are *Individual*, which is measured by the percentage of shares held by the top 10 tradable individual shareholders; *Fund*, which is measured by the percentage of shares held by investment funds; and *Director*, which is measured by the percentage of shares held by executives.

The control variables include the profitability of a company, company size, debt ratio and firm growth, which have important influences on dividend policies (Allen and Michaely, 2003; Baker et al., 2001; Leithner and Zimmermann, 1993; Kato and Loewenstein, 1995; Li et al., 2006). In addition, we also include measures of corporate governance, the nature of the enterprise, and the chairman and general manager being the same person, which are likely to affect companies' dividend policies (Yuan and Su, 2004). The definitions of the main variables are presented in Table 1.

Table 3
Correlation coefficients.

	Increase	Tax	Individual	Fund	Director	Nshare	Inde	Ceo	Tobinq	Meet	Level	Cash
Increase	1											
Tax	-0.041***	1										
Individual	-0.188***	0.187***	1									
Fund	0.217***	0.151***	-0.320*	1								
Director	0.027*	-0.012	-0.01	0.059***	1							
Nshare	0.071***	-0.218***	-0.200***	-0.115***	-0.218***	1						
Inde	-0.027*	0.147***	0.053***	0.029**	-0.027*	-0.059***	1					
Ceo	-0.032**	0.011	0.041***	-0.015	0.021	-0.016	0.038***	1				
Tobinq	0.073***	-0.023	0.036**	0.290***	-0.019	-0.098***	0.013	0.022	1			
Meet	0.028*	-0.047***	-0.002	-0.056***	0.005	0.016	0.008	-0.003	-0.032***	1		
Level	-0.143***	0.083***	0.090***	-0.051***	-0.011	-0.087***	0.058***	0.011	-0.155***	-0.052***	1	
Cash	0.203***	0.059***	-0.151***	0.237***	0.025*	0.021	0.001	-0.014	0.100***	-0.013	-0.166***	1
State	0.043***	-0.099***	-0.151***	-0.017	-0.076***	0.115***	-0.069***	-0.068***	-0.067***	0.030*	-0.049***	0.038***

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

Table 4
Individual shareholders.

Variables	(1) Increase	(2) Increase
<i>Tax</i>	−0.419*** (0.001)	−0.444*** (0.000)
<i>Individual</i>	−108.643*** (0.000)	−75.779*** (0.000)
<i>Tax * individual</i>	53.998*** (0.001)	48.674*** (0.001)
<i>Nshare</i>		0.842** (0.021)
<i>Inde</i>		−1.303 (0.130)
<i>Ceo</i>		−0.146 (0.332)
<i>Tobinq</i>		0.635*** (0.000)
<i>Meet</i>		0.356** (0.017)
<i>Level</i>		−1.706*** (0.000)
<i>Cash</i>		4.658*** (0.000)
<i>Size</i>		0.266*** (0.000)
<i>State</i>		0.009 (0.925)
<i>Constant</i>	−1.633*** (0.000)	−7.799*** (0.000)
<i>Industry</i>	Included	Included
Observations	4592	4313
Log likelihood	−1935	−1723
Pseudo R ²	0.0803	0.128

p-Values calculated according to the robust standard error by Petersen (2008) are reported in parentheses.

* *p* < 0.1.

** *p* < 0.05.

*** *p* < 0.01.

3.2. Sample selection

The sample comprises 4605 listed companies with A-shares in China's stock market between 13 June, 2003 and 13 June, 2007 to test the effects of the dividend tax cut.⁴ The selected companies must have been listed since 2003, which ensures 2 years before the dividend tax cut for paired comparison. In addition, we remove ST and PT companies, financial institutions and companies with missing variables. All financial indicators and equity structure data is obtained from the CSMAR database. Data on the securities investment fund shares and profits distributed accumulatively in cash or stocks in the last 3 years are from the Wind database, and dividend data is from the China Center for Economic Research (CCER) database.

4. Descriptive statistics

Table 2 presents descriptive statistics. We winsorized the top and bottom 1% of observations for all the continuous variables to reduce the impact of extreme observations. In Table 2, we find that 17.1% of companies increased their dividend payments and the proportion of shares held by the top 10 individual tradable shareholders is, on average, about 1%. The mean value of *director* is 6.187, the mean value of *fund* is 2.3% and the mean value of *Nshare* is 57%. The proportion of independent directors is, on average, about 34%. These results are consistent with the basic characteristics of A-share listed companies in China, indicating that sample selection bias is not a major concern.

⁴ Because the 2006 dividends may have been allocated in 2007 and some companies also paid dividends in mid-2007, we use the date of the announcement of dividends to identify the specific dividend year.

Table 3 presents the correlation coefficients. In Table 3, we find that the proportion of shares held by individual shareholders (*individual*) and the likelihood of an increase in dividend payments (*increase*) are highly negatively correlated (-0.188), which suggests that

Table 5
Investment funds.

Variables	(1) <i>Increase</i>	(2) <i>Increase</i>
<i>Tax</i>	-0.296^{***} (0.001)	-0.170^* (0.081)
<i>Fund</i>	11.454^{***} (0.000)	9.554^{***} (0.000)
<i>Tax * fund</i>	3.956^{**} (0.012)	4.350^{***} (0.007)
<i>Nshare</i>		1.562^{***} (0.000)
<i>Inde</i>		-1.285 (0.147)
<i>Ceo</i>		-0.168 (0.284)
<i>Tobinq</i>		0.375^{***} (0.007)
<i>Meet</i>		0.422^{***} (0.004)
<i>Level</i>		-1.965^{***} (0.000)
<i>Cash</i>		4.156^{***} (0.000)
<i>Size</i>		0.353^{***} (0.000)
<i>State</i>		0.043 (0.660)
<i>Constant</i>	-2.634^{***} (0.000)	-10.272^{***} (0.000)
<i>Industry</i>	Included	Included
Observations	4591	4313
Log likelihood	-1944	-1714
Pseudo R^2	0.0758	0.133

p-Values calculated according to the robust standard error by Petersen (2008) are reported in parentheses.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

Table 6
Managerial ownership.

Variables	(1) <i>Increase</i>	(2) <i>Increase</i>
<i>Tax</i>	-0.379^{***} (0.001)	-0.359^{***} (0.004)
<i>Director</i>	0.006 (0.612)	0.002 (0.858)
<i>Tax * director</i>	0.024^* (0.068)	0.025^* (0.079)
<i>Nshare</i>		1.415^{***} (0.000)
<i>Inde</i>		-1.131 (0.173)
<i>Ceo</i>		-0.165 (0.266)
<i>Tobinq</i>		0.735^{***} (0.000)
<i>Meet</i>		0.343^{**} (0.021)
<i>Level</i>		-1.941^{***} (0.000)
<i>Cash</i>		4.941^{***} (0.000)
<i>Size</i>		0.451^{***} (0.000)
<i>State</i>		0.067 (0.495)
<i>Constant</i>	-2.555^{***} (0.000)	-12.778^{***} (0.000)
<i>Industry</i>	Included	Included
Observations	4591	4313
Log likelihood	-2024	-1747
Pseudo R^2	0.0378	0.117

p-Values calculated according to the robust standard error by Petersen (2008) are reported in parentheses.

*** $p < 0.01$.

** $p < 0.05$.

* $p < 0.1$.

there is a serious conflict of interest between large shareholders and small shareholders. In addition, higher proportions of shares held by executives are positively related to increased dividend payments and companies with higher proportions of investment fund shares are positively related to increased dividend payments, indicating that both have an important effect on companies' dividend policies.

5. Empirical results

Tables 4–6 present the empirical results of Models (1)–(3), respectively.

Table 4 presents the results of Model (1). In columns (1) and (2) of Table 4, we find that the proportion of shares held by individual shareholders (*individual*) has a negative and significant relationship with increased dividend payments, -108.643 ($p = 0.000$) and -75.779 ($p = 0.000$), which indicates that there is an apparent conflict of interest between large shareholders and small shareholders. However, the coefficients of the interaction between the tax cut and individual shareholders in Table 4 columns (1) and (2), *tax * individual*, are positive and significant, 53.998 ($p = 0.001$) and 48.674 ($p = 0.001$), thus indicating that following the dividend tax cut, the companies with higher proportions of shares held by individual shareholders were more likely to increase their dividend payments. Deng et al. (2007) argue that dividend payments represent the shared interests of large and small shareholders; therefore the dividend tax cut has alleviated the conflict of interest between the two classes of shareholders to some extent.

Table 5 presents the results of Model (2). Cash dividends are an important revenue source for securities investment funds. Especially during times of market downturn, securities investment funds prefer to invest in listed companies that offer cash dividends. We find the coefficients of *Fund* in Table 5 columns (1) and (2) are positive and significant, 11.454 ($p = 0.000$) and 9.554 ($p = 0.000$), which suggest that companies with higher proportions of shares held by investment funds are more likely to increase their dividend payments. Moreover, after the dividend tax cut, this increasing tendency is more obvious. Without including the other control variables, the coefficient of *Tax * Fund* in Table 5 column (1) is positive and significant; while with all the control variables, the coefficient of *Tax * Fund* in Table 5 column (2) is also positive and significant.

Table 6 presents the results of Model (3). The coefficients of the interaction between the tax cut and shares held by executives in Table 6 columns (1) and (2), *Tax * Director*, are positive and significant, 0.024 and 0.025 , thus indicating the existence of opportunistic behavior arising from executives' self-interested motivation to increase dividend payments.

6. Robustness tests

A number of robustness checks were undertaken. First, the observation window was modified to $(-2, 3)$ years, i.e. between 13 June, 2003 and 13 June, 2008,⁵ but this does not alter the main conclusions.

Second, we ignore the effects of the regulations, 'Administration of Offerings of New Shares by Listed Companies Procedures' and 'Profits distributed accumulatively in the latest 3 years in cash or stocks shall be no less than 20% of annual distribu-

⁵ Because some indicators in the CSMAR database are obtained after 2003, the window of the robustness test is only $(-2, 3)$.

tive profits of the latest 3 years' issued in May 2001 and the main conclusions do not change.

Third, during the sample period the shares held by funds increase year by year. Therefore, even without the dividend tax cut, companies with higher proportions of shares held by funds are also likely to have increased their dividend payments. We also consider this fact in a robustness test. As the number of shares held by funds changes little between 2004 and 2005, we use the 2004 and 2005 samples to re-estimate the results and find that all conclusions are still robust.

7. Conclusion

Dividend taxation is an important component of the taxes of individual investors and has attracted the attention of policymakers and financial economists. Recently, numerous countries have focused on capital market taxation reforms. However, what is confusing is that the dividend tax reforms in different countries have been in completely different directions. Some countries, such as Britain and Germany, have increased their dividend tax rates, while other countries, such as the United States, have decreased their dividend tax rates. Moreover, there are also different theoretical arguments concerning dividend taxes. The 'traditional view' argues that reduced dividend tax rates increase companies' dividend payments, while the 'new theory' states the contrary.

This paper investigates a causal relationship between the 2005 dividend tax cut in China and increased dividend payments, in order to evaluate China's dividend taxation reforms. We use the natural experiment and difference-in-difference estimator methods to estimate the impact of the dividend tax cut on companies' dividend policies. We find that the 2005 dividend tax cut led firms to increase their dividend payments. Companies with higher proportions of tradable individual shares or investment fund shares were more likely to increase their dividend payouts. However, opportunistic behavior is also found to occur, where companies with higher proportions of shares held by executives were more likely to increase their dividend payments. These findings support a causal relationship between the tax cut and increased dividend payments and imply that the reform of dividend taxation in 2005 achieved its goal. However, due to this study's short observation window, the long-term effects of the dividend tax cut still require further study.

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Timing earnings

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ABSTRACT

Since the opening of China's securities market, there have been a number of bull and bear cycles. This paper discusses how executives use the market timing approach to manage earnings in different cycles to maximize firm value. We find that Chinese listed companies choose to release more earnings during bull markets and this phenomenon is more evident in companies that are more profitable and have higher valuations. We also find that executives who do not release more earnings during bull markets are more likely to be dismissed.

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1. Introduction

Earnings management has long been criticized because it causes conflicts of interest between parties to economic contracts. The negative results of these conflicts appear as

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management fraud, accounting information distortion, business failures and loss of investors' trust in capital markets. However, the concept of earnings management derived from Western theories is neutral. Professional judgment is important during the production process of earnings information. Poor judgment leads to adverse economic consequences, whereas reasonable judgment can provide more useful earnings information (Wang and Zhao, 2003). Two main ideas have emerged from empirical studies of earnings management: opportunistic behavior and efficient contracting perspectives. Based on John Rawls' principles of justice and the assumption of individual rationality, Chen (2009) uses contracts as the starting point of analysis and proposes that the efficient contracting perspective (efficient perspective) is not empirically researchable, and the opportunistic behavior perspective is not a necessary concept in empirical research. He further suggests that moral judgment should be excluded from empirical research into earnings management. Instead, it is important to develop theories of earnings management based on a contracting perspective.

Currently, there is considerable interest in earnings management research, especially in the motivation for earnings management, such as bonus plans (Healy, 1985; DeAngelo, 1988; Dechow and Sloan, 1991), contract-based motivations (Healy and Palepu, 1990; Sweeney, 1994; DeAngelo et al., 1994), political costs motivations (Cahan, 1992; Key, 1997) and capital market-based motivations (Healy and Wahlen, 1999; Dechow and Skinner, 2000). However, previous studies report that motivations of earnings management concentrate on firm-specific factors and few studies have investigated the effect of periodic fluctuations in the stock market on earnings management. Does the market-timing phenomenon that is widely observed in investment and finance also exist in the release of accounting earnings information by listed companies?

In the long run, the stock market experiences periodic cycles of boom and bust, or bull and bear markets, under the combined effects of economic cycles and policy cycles. Under the bull cycle, supply falls short of demand in the stock market, market participants generally hold high expectations of the future earnings of companies and low uncertainty of firm values, and information asymmetry is low. However, under the bear cycle, supply exceeds demand, market participants hold lower future earnings expectations and high uncertainty of firm values, and information asymmetry increases. Listed companies, as micro-economic subjects and suppliers of stocks (i.e., security market products) and accounting information, may show different characteristics in the production of accounting information based on adverse selection, supply and demand relations, and market reactions, and decide to release earnings under different market cycles. Thus, this paper provides preliminary evidence on the timing of earnings under different market cycles.

We find that Chinese listed companies choose to release more earnings during bull markets. This phenomenon is more evident in high-profit enterprises and companies with higher valuations. Finally, we find that executives who do not release more earnings during bull markets are more likely to be dismissed.

Few studies have evaluated the relationship between stock market cycles and earnings management. This is one of the first studies to examine how firms manage earnings in different market situations. These findings enrich the literature on market timing and earnings management and increase our understanding of interactions between the stock market and firm behavior.

The remainder of this paper is organized as follows: Section 2 reviews the related literature and discusses the institutional background and theoretical analysis. Section 3

describes the sample and variables, and provides descriptive statistics. Section 4 details the empirical models and provides results of the empirical analysis. Conclusions and limitations of this study are presented in Section 5.

2. Literature, theory and background

2.1. Market timing

Market timing theory originated in the field of capital structure research, following trade-off and pecking order theories, and is used to explain corporate finance decision-making and capital structure formation. Previous studies have found evidence of market timing in corporate finance decision-making. Companies are more likely to issue equity instead of debt in expansionary phases of the business cycle and issue debt in contractionary phases (Hickman, 1953; Moore, 1980). Taggart (1977) and Marsh (1982) report that companies tend to issue equity when stock prices are high (generally in expansionary periods) and issue debt when bond prices are high or interest rates are low (generally in contractionary periods).

Different theories exist to explain the market timing phenomenon. Shiller (2004) describes the stock market in the 1990s as “an irrational, self-driven, self-expansion foam,” in which optimism rather than corporate profit led to a stock market boom in the United States. Mispricing is used to explain this phenomenon in behavioral finance: when the optimism of irrational investors propels the stock price, the stock price is overvalued; and when the pessimism of irrational investors pushes the stock price down, the stock price is undervalued. Rational managers issue equity when they believe their stock is overvalued and the cost is irrationally low; they issue debt or repurchase equity when their stock is undervalued in order to avoid losses due to the high cost of equity (Stein, 1996; Baker and Wurgler, 2002).¹

As the national economy’s “barometer”, the stock market reflects the market’s expectations of future economic activity. The economic cycle is one of the most important factors affecting stock market fluctuations. Periodic fluctuations in the stock market (boom and bust) are influenced by the economic cycle, the national macroeconomic policy cycle and other external factors. The boom and bust cycle boosts investors’ optimism and pessimism, but is not determined by investors’ optimism and pessimism. From the perspective of market valuation, when the market is in a bull cycle, investors believe that companies are more likely to be profitable and uncertainties regarding the value of companies are relatively low. Thus, demand for stocks increases and stock prices generally rise as a result. When the market enters a bear cycle, companies’ future earnings are expected to decrease and uncertainties regarding the value of companies increase. As a result, demand for stocks decreases and stock prices drop. Therefore, high and low stock prices are due to investors’ rational pricing of company value based on economic conditions and the information environment.

¹ Baker and Wurgler (2002) found that when firm valuations are high companies always have low leverage; whereas when firm valuations are low, companies always have high leverage. Past market valuations have large effects on capital structure. Whether book value or market value is used to measure leverage, or other variables are controlled for, this relationship is obvious and persistent. Market timing affects firm capital structure through equity financing; capital structure is largely the cumulative outcome of past attempts to time the equity market. Although results based on book leverage are unable to detect that the capital structure affected by market timing is due to mispricing or dynamic information asymmetry, Baker and Wurgler (2002) document that when market leverage is considered, the results further support investors’ mispricing patterns (i.e., rational managers issue equity when irrational investors cause the stock price to be overvalued) and market timing will affect the capital structure for a long time as a result.

Defining the stock price as overvalued or undervalued afterwards may be not appropriate. However, from the real options perspective (Carlson et al., 2006), equity issuances by companies transform real options into actual assets. Although risks still exist with actual assets, they are much smaller than the risks of real options, i.e. the characteristics of the risks have changed systematically. The stock price decreases with lower risk; therefore, the high stock price before issuance is not market mispricing.

Lucas and MacDonald (1990) established the asymmetric information dynamic model, with the hypothesis that both investors and managers are rational, but dynamic information asymmetry exists between them, such that managers know more about a project's real value than anyone else. Managers want to announce promising investment projects to increase company value and signal their effort, however, adverse selection causes stock valuations to be less than equilibrium prices without information asymmetry. Managers prefer to issue equity when the degree of information asymmetry is low. This information asymmetry changes over time in different macrocycles (Choe et al., 1993). During a macroeconomic expansion, companies are more likely to have valuable investment projects, uncertainties about company value decrease, the level of market information asymmetry is low and companies prefer to issue equity. During a macroeconomic contraction, the adverse selection problem is serious and fewer companies issue equity.

Currently, the market timing theory has been applied to financial decision making in initial public offering (IPO) research (Loughran and Ritter, 1995; Pagano et al., 1998; Liu and Li, 2005; Wang and Li, 2009), seasoned equity offering (SEO) research (Taggart, 1977; Marsh, 1982; Jung et al., 1996; Cai and Liu, 2006) and repurchase research (Ikenberry et al., 1995). The question posed by this study is: Does the market-timing phenomenon also exist in earnings management? Few studies in the market timing and earnings management fields have investigated this issue. However, the earnings management literature based on the capital market motivation has provided insights into IPO motivations (Teoh et al., 1998a; Lin and Wei, 2000), SEO motivations (Teoh et al., 1998b; Rangan, 1998; Chen et al., 2000; Lu and Wei, 2006), loss reversal motivations (Burgstahler and Dichev, 1997; Degeorge et al., 1999; Lu, 1999; Sun and Wang, 1999) and expected earnings motivations (Burgstahler and Eames, 2006; Wei, 2005). However, stock market cycles, as a potential motivation for capital market-based earnings management, require further study.

2.2. *Timing earnings*

In the long term, earnings management does not increase or decrease actual profit, but changes the profit distribution in different fiscal periods.² With the growth of the economy, the Chinese stock market has been through several bull and bear cycles since its opening 20 years ago. In the different market phases, differences are apparent in the areas of information asymmetry, supply and demand, market valuation and market response. Thus, earnings management has different characteristics during these different phases.

First, information asymmetry shows dynamic differences under the different macrocycles (Choe et al., 1993). During the bull cycle, the adverse selection problem is lower because expectations of the profitability of new investments rise, whereas uncertainty

² Besides accruals, Chinese listed companies also manage their earnings through below-the-line items such as related party transactions and asset disposals (Chen and Yuan, 2004). In the long run, earnings management of below-the-line items may have no obvious reserve characteristics like accruals, but it may appear periodically with market cycles. This means that the company's choice of market opportunity determines when to carry out related party transactions and when to dispose of assets to increase earnings.

concerning the value of the company falls. When the market enters a bear market cycle, the adverse selection problem increases because expectations of the profitability of new investments fall, whereas uncertainty concerning the value of the company rises. To maximize market value, and based on future career concerns, rational managers are more likely to release good news about profits during bull markets, as earnings information is reflected in stock prices in a more timely and accurate manner. If managers release good news about profits during bear markets, the stock price effects may be discounted by investors because increased information asymmetry leads to higher adverse selection costs, which does not reflect the intrinsic value of the company.

Second, during different market situations there are different supply and demand structures. In a bull market, investor demand and participation are higher. Therefore, the supply of stocks falls short of demand, which always increases stock prices. In addition, the market value of every dollar of company earnings (PE) and the market value of every dollar of net assets (PB) are generally higher during bull markets. The more earnings the company releases at this time, the higher the market value it will achieve, so rational managers tend to release more earnings in these periods. Conversely, in a bear market, stocks are oversupplied and investor participation is low. The market valuation of every dollar of earnings (PE) or every dollar of net assets (PB) is generally lower,³ so rational managers tend to transfer earnings to be released during bull markets.

Finally, the market response to good or bad news in different market situations shows a significant asymmetric information effect (Lu and Xu, 2004; He and Li, 2007). When the stock market is in a period of prosperity, with good news investors expect the stock price to rise continuously, which results in higher stock prices. When the stock market is in a period of contraction, the stock index follows a downward trend. With good news, investors think that it may be a random change, which produces a small market response. The market's asymmetric reaction to good earnings news gives managers a strong motivation to release gains during bull markets.

This analysis of adverse selection costs, supply and demand relationships and market response shows that listed companies take advantage of market opportunities to release earnings under different market situations. For every firm, cross-sectional differences in firm characteristics may have different effects on the timing of earnings. On the one hand, market valuation of most stocks is high during bull markets, although some stocks have low market valuations. Companies with high estimated firm values are more motivated to release earnings during bull markets, because the market value for every dollar of earnings or net assets is higher. Although some stock prices are also high during bear markets, these companies may not release earnings at this time because of adverse selection costs and small market responses to good news.⁴ On the other hand, with other conditions unchanged, high-profit companies can release more earnings stored previously and further propel stock prices to maximize market value when entering bull markets. However, low-

³ In a bear market stock prices are generally low, however, some stocks have high prices for various reasons. For those stocks, the higher market price motivates companies to release earnings from the supply and demand perspective. However, in a bear market, information asymmetry is higher. Therefore, companies may not choose to release profits at that time given the high adverse selection cost. Furthermore, even if a company with a high stock price supplies more earnings in a bear market, the market response is relatively small. Although the good news of profitability in a bear market improves investor expectations for future earnings, it may also increase investor concerns about the uncertainty of the current market situation. Thus risk-averse investors will ask for a higher expected rate of return. Finally the increased expectation of future earnings brought by good news will be offset by the effect of a high discount rate.

⁴ Footnote 3 analyzes two reasons from aspects of information asymmetry and market response in different market cycles.

profit companies may not be able to supply more earnings, even though they have the same motivation during bull markets. Therefore low-profit companies have only limited ability to choose the market opportunity to release earnings.

2.3. Institutional background in China

The two-part analysis above illustrates the importance of the market value or share price of listed companies. However, do companies in China's capital market really care about the share price and want the share price to rise? Companies listed in developed markets are subject to more pressure from analyst predictions; when firm performance fails to meet predictions, market value plummets, which can ruin managers' reputations. However, stock options play a vital role in compensation contracts; therefore, fluctuating stock prices may result in potential gains and losses for managers. In China, the stock market analyst industry is still in an early stage of development, the labor market has not fully developed and the use of stock options is also quite limited.

However, the stock price reflects the inherent value of the company and is thus important to both listed companies and their stakeholders. The structure of China's capital market is "big government" and "small market." The healthy development of the stock market plays a vital role in China's economic transition and in improving the efficiency of resource allocation. The government is concerned about the stock market; therefore, if the stock index is too low, the government tends to put forward a series of stimulus policies.⁵

From the perspective of major shareholders, in contrast to the IPO system in developed markets, in the China IPO market access and pricing mechanisms in the primary issue market are strictly regulated.⁶ Companies require different levels of approval to be listed, and compete with many other companies. Listing information must be evaluated by audit firms, law firms and assets evaluation agencies authorized by the China Securities Regulatory Commission. Underwriting of stocks should be conducted by authorized underwriters. Information should be released via the three designated securities news agencies. These strict regulations tend to generate considerable economic rent at each step (Liu and Xiong, 2005), which incurs huge costs for companies going public. In addition, limited resources and the various levels of approval may result in prolonged waiting periods for listed companies. The uncertainty will lead investors to discount the issue price, which can further increase the company's listing costs. The huge cost of becoming a listed company is likely to be compensated for in the secondary market. Consequently, the stock's performance in the secondary market is extremely important.

⁵ In 2008, the stock market suffered a sharp downturn. Authorized by the State Council, the Ministry of Finance and Administration of Taxation decided to adjust the stamp duty rate of the stock market from April 24, from 0.3% to 0.1%. For the sale, inheritance, or gift of stock transfer books of A shares or B shares, the dealers pay a stamp duty at the rate of 0.1% according to the deed. Stimulated by these favorable policies of stamp duty adjustment, Shanghai and Shenzhen stock markets soared; the Shanghai Composite Index and Shenzhen Component Index both had showed an increase that exceeded 9%.

⁶ A quota system on IPO issuance is used in China; that is, the number of new issued shares is decided by the Security Commission. The provinces and ministries allocate shares listed by companies. In July 1999, the Securities Act was implemented, which abolished the quota system and advocated an approval system in which companies that meet certain requirement can be listed; however, the size and price can still be regulated by the SFC. Since 2000, the number of the companies that met the listing requirements increased suddenly. As a result, the market faced an enormous capacity increase. In 2001, the Commission started to stipulate the number of channels of all integrated securities firms and the IPO issues reported. IPO issuance is still under strict control by the regulatory department. The earliest issue price is decided by the fixed price to earnings ratio. Later, the Securities Act tried attempted a market-based pricing approach. However, due to various drawbacks, the pricing mechanism returned to the controlled price-earnings ratio method after 2001.

Nevertheless, going public is the major direction for China's state-owned enterprise (SOE) reform. The market performance of listed companies is one of the most important criteria to measure the efficiency of SOE reform. High stock prices and market value indicate improved efficiency. If stock prices suffer from a long-term slump and poor market performance, major shareholders may need to provide explanations to higher authorities. Because implicit contracts are relatively common in China, the poor market performance of a listed company can affect the reputations of senior executives and their political promotion.

Although most listed companies do not use stock prices for performance evaluation in compensation contracts, major shareholders and other stakeholders do focus on market performance; therefore, market value is likely to be a hidden criterion used to evaluate managers. Further, in different market situations, major shareholders who are concerned about stock prices may have different expectations. During bull markets, major shareholders are especially concerned with share prices and market value, primarily because important differences exist in the price of every dollar of earnings (PE) and every dollar of net assets (PB) in different market situations, and a one dollar difference in net profit or net asset can make a tremendous difference for shareholders.⁷ When the economy as a whole is performing well, managers will be under pressure to report positive results. In a bull market, the stock market reflects prosperity with lower adverse selection costs; stock prices are generally high and the market constantly meets expectations of price increases. Based on concerns about future career or political promotions, rational managers should release more earnings at this time to maximize the market value of their company. Managers who perform worse than their peers will be penalized by the capital markets if their reported earnings fail to meet expectations. So in a bull market, executives who do not choose to release earnings are more likely to be punished or dismissed by major shareholders.

Based on the this theoretical analysis and institutional background, we put forward the following hypotheses: (1) Listed companies choose to release more earnings during bull markets. (2) During bull markets, companies with higher valuations release more earnings. (3) During bull markets, high-profit companies release more earnings. (4) The less earnings a manager releases during bull markets, the more likely he will be replaced.

3. Sample, data and descriptive statistics

3.1. Sample and data

The data used in this study was obtained from the China Center for Economic Research (CCER) economic and financial research database and Wind Datafeed Service (WIND database). Financial data from 1994 to 2008 was obtained from the CCER financial database of general listed companies (missing data was obtained from the WIND database, including information on listed companies that were suspended or delisted); the stock market index was obtained from the CCER stock market index database; fixed assets data from 2007 and 2008 was obtained from the WIND database.

⁷ For example, after controlling for other conditions, company A earns \$1 per share, Company B earns \$2 per share. The market valuation is generally low in a bear market. Assuming that the price-earnings ratio of both company A and company B is 10, then the difference in shareholder wealth between Company A and Company B to earn \$1 per share is \$10. In a bull market, stocks tend to have a high PE/PB; assuming that the price-to-earnings ratio of both company A and company B is 30, then the difference in shareholder wealth between Company A and Company B to earn \$1 per share is \$30. Thus, in a bull market, releasing one more dollar of earnings can have a tremendous influence on shareholder wealth and market value.

Table 1
Sample by year and market.

Year	Shenzhen market	Shanghai market	Sample size	Percentage
1995	54	64	118	1.33
1996	55	118	173	1.94
1997	110	173	283	3.18
1998	186	234	420	4.72
1999	220	273	493	5.54
2000	256	306	562	6.31
2001	296	384	680	7.64
2002	297	449	746	8.38
2003	298	511	809	9.09
2004	298	572	870	9.77
2005	298	628	926	10.40
2006	297	632	929	10.43
2007	295	646	941	10.57
2008	294	659	953	10.70
Total	3254	5649	8903	

To thoroughly study earnings management behavior during different market cycles, we selected all of the 15,367 observations of A-share listed companies from 1994 to 2008 on the Shanghai Stock Exchange and Shenzhen Stock Exchange from the CCER financial database (except finance and insurance companies). To ensure the validity of the study, sample selection was carried out as follows.

1. We excluded 700 observations from the mid- and small-cap market.
2. To calculate the 1995–1997 operating cash flow, we used data from previous years; data from the previous year was matched with the year studied. We removed IPO companies from the current year that had no prior-year data and removed companies that were delisted and had only prior year data without current year data. As a result, 1371 observations were removed from the remaining sample.
3. We excluded companies that were delisted or suspended in the study year, resulting in 1297 observations being removed from the remaining sample.
4. We excluded companies that had been given or were at the time being given special treatment in the study year, resulting in 3032 observations being removed from the remaining sample.
5. We excluded companies with leverage ratios >1 (two observations) and PB ratios <0 (two observations).
6. We excluded companies where sales data was missing (two observations) and net value of accounts receivable data was missing (58 observations);

The final sample includes 8903 observations. To eliminate extreme values, all continuous variables were winsorized at the 1% and 99% levels. The final sample period in this study is from 1995 to 2008. Table 1 shows the distribution by year and stock exchange of the sample observations.

This study measures several aspects of earnings management, including discretionary accruals. We use a cross-sectional approach to estimate accrual models. According to the China Securities Regulatory Commission (CSRC) industry classification published in 2001, all companies were divided into 21 industry categories. The manufacturing sector

Table 2
Industry distribution.

Code	Industry	Sample size	Percentage
A	Agriculture, forestry, livestock farming, fishery	177	1.99
B	Mining	131	1.47
C0	Food and beverage	413	4.64
C1	Textiles and apparel	358	4.02
C3	Paper and printing	141	1.58
C4	Petrochemicals	1042	11.7
C5	Electronic	302	3.39
C6	Metals and nonmetals	814	9.14
C7	Machinery	1291	14.5
C8	Pharmaceuticals	563	6.32
C9	Other manufacturing	123	1.38
D	Utilities	503	5.65
E	Construction	189	2.12
F	Transportation	406	4.56
G	Information technology	427	4.8
H	Wholesale and retail trade	790	8.87
J	Real estate	392	4.4
K	Social services	307	3.45
L	Communication and culture industry	56	0.63
M	Comprehensive	478	5.37
Total		8903	100

was given two types of classification codes, whereas the other sectors were given only one code. As there were few observations in C2 (wood, furniture) they were combined with C9 (other industries). The industry distribution of the sample is shown in Table 2.

3.2. Definition of variables

3.2.1. Earnings management

The main variables used in this study are defined in Table 3. As we refer to previous studies that measure earnings management, for comparable results, we use *DAadj*, *Daks*, *BL*, and *EI* as the four measurements. We used the cross-sectional modified Jones model (Dechow et al., 1995) to calculate discretionary accruals 1(*DAadj*), by regressing estimated industry characteristic parameters as follows:

The first step is to calculate total accruals TA_t/A_{t-1}

$$TA_t/A_{t-1} = (OI_t - CFO_t)/A_{t-1}. \quad (1)$$

TA_t/A_{t-1} is total accruals in year t adjusted by total assets in year $t-1$, which excludes below-the-line items, OI_t is operating income in year t , and CFO_t is net cash flow from operating activities⁸ in year t . A_{t-1} is total assets in year $t-1$.

The second step estimates industry characteristic parameters $\alpha_1, \alpha_2, \alpha_3$

$$TA_t/A_{t-1} = a_1(1/A_{t-1}) + a_2(\Delta REV_t/A_{t-1}) + a_3(PPE_t/A_{t-1}) + \varepsilon_t. \quad (2)$$

⁸ Since listed companies in China began to disclose cash flow statements in 1998, we use the adjustment method of Lu (1999) to calculate cash flow data prior to 1998: Cash flow from operating activities = Net income + Depreciation of fixed assets + Amortization of intangible assets, Deferred assets, and Other assets + The amount of net fixed assets inventory shortage + Net loss of disposal of fixed assets + Deferred tax credits + Financial expenses – Investment income – (Amount of increase in current assets – the Amount of monetary capital increase – Increase in short-term investments – Increase in long-term bond investments due within 1 year) + (Amount of increase in current liabilities – Increase in short-term loans – Increase in unpaid dividends – the Amount of long-term debt due within 1 year increase).

Table 3

Definitions of the main variables.

Variable name	Symbol	Variable definitions
Discretionary accruals 1	<i>DAadj</i>	Used cross-sectional version of the modified/Jones model to calculate discretionary accruals, calculation is shown below
Discretionary accruals 2	<i>DAks</i>	Used cross-sectional modified/KS model to calculate discretionary accruals, calculation is shown below
Below-the-line items	<i>BL</i>	(Total income – operating income)/total assets at $t - 1$, adjusted by industry median
Extraordinary items	<i>EI</i>	Extraordinary profit and loss ^a /total assets at $t - 1$, adjusted by industry median
Bull market	<i>Market</i>	Market is 1 if the observation is in a bull market, otherwise 0; a detailed diagnosis of the bull and bear markets is shown below
Profitability	<i>HPI</i>	Core return on net assets, operating income/net assets, adjusted by industry median
Market valuation	<i>HPB</i>	Price-to-book, end closing price/book value of net assets per share, adjusted by industry median
Management change	<i>Change</i>	Change is 1 if the chief executive officer or chairman change in the year t , otherwise 0
CEO change	<i>CEO</i>	CEO is 1 if the chief executive officer changes in the year t , otherwise 0
Size	<i>Size</i>	Natural logarithm of total assets
Financial leverage	<i>Lev</i>	Total liabilities/total assets
Property characteristics	<i>State</i>	State is 1 if the actual controller of the sample company is private or other, state is 0 if the actual controller of the sample company is state-owned
Equity issue	<i>PG</i>	PG is 1 if the company refinanced in year $t + 1$, otherwise 0
Region	<i>Region</i>	Region is 1 if the company is located in the eastern region, otherwise 0
Operating performance	<i>ROA</i>	Net income/total assets

^a Because the annual reporting of extraordinary items only began in 1999, extraordinary items for 1995–1998 are measured by total income minus operating income instead.

According to Eq. (2), we obtain estimates $\alpha_1, \alpha_2, \alpha_3$ of a_1, a_2, a_3 . The regression is estimated separately for each industry. TA_t is the total accruals of company i in year t , excluding below-the-line items, ΔREV_t is the difference between sales for company i in year t and year $t - 1$; PPE_t is the value of the plant, equipment and other fixed assets of company i at the end of year t ; and ε_t is the residual error representing the discretionary accruals. A_{t-1} is total assets in year $t - 1$.

The third step is to calculate nondiscretionary accruals NDA_t/A_{t-1}

$$NDA_t/A_{t-1} = \alpha_1(1/A_{t-1}) + \alpha_2[(\Delta REV_t - \Delta REC_t)/A_{t-1}] + \alpha_3(PPE_t/A_{t-1}). \quad (3)$$

Nondiscretionary accruals are calculated by putting the industry characteristic parameters $\alpha_1, \alpha_2, \alpha_3$ estimated in Eq. (2) into Eq. (3). NDA_t/A_{t-1} represents nondiscretionary accruals of company i in year t adjusted by total assets in year $t - 1$, ΔREC_t is the difference between accounts receivable of the company i for the year t and year $t - 1$, and the other variables are the same as in Eq. (2).

The fourth step is to calculate discretionary accruals $DAadj_t$

$$DAadj_t = TA_t/A_{t-1} - NDA_t/A_{t-1}. \quad (4)$$

Discretionary accruals equal the total accruals, which were calculated in Eq. (1), minus nondiscretionary accruals, which were estimated in Eq. (3).

Discretionary accruals 2 (*Daks*) are calculated using the modified/KS model (Kang and Sivaramakrishnan, 1995), and the regression is estimated for each industry as follows.

The first step is to calculate total accruals TA_t/A_{t-1}

$$TA_t/A_{t-1} = (OI_t - CFO_t)/A_{t-1}. \quad (5)$$

The second step estimates industry characteristic parameters $\alpha_1, \alpha_2, \alpha_3, \alpha_4$

$$TA_t/A_{t-1} = a_1(1/A_{t-1}) + a_2(REV_t/A_{t-1}) + a_3(COST_t/A_{t-1}) + a_4(PPE_t/A_{t-1}) + \varepsilon_t. \quad (6)$$

According to Eq. (6), we obtain estimates $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ of a_1, a_2, a_3, a_4 , respectively. The regression is estimated for each industry. REV_t is the sale of company i in year t , $COST_t$ represents the costs of company i in year t .

The third step is to calculate nondiscretionary accruals NDA_t/A_{t-1}

$$NDA_t/A_{t-1} = \alpha_1(1/A_{t-1}) + \alpha_2(REV_t/A_{t-1}) + \alpha_3(COST_t/A_{t-1}) + \alpha_4(PPE_t/A_{t-1}) \quad (7)$$

Nondiscretionary accruals are calculated by putting the industry characteristic parameters $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ estimated in Eq. (6) into Eq. (7).

The fourth step is to calculate the discretionary accruals $DAKs_t$

$$DAKs_t = TA_t/A_{t-1} - NDA_t/A_{t-1}. \quad (8)$$

Discretionary accruals are equal to total accruals, which were calculated in Eq. (5) minus nondiscretionary accruals, which were estimated in Eq. (7).

Generally, companies manage earnings through accruals. However, listed companies in China also manage earnings through below-the-line items such as related party transactions and asset disposals (Chen and Yuan, 2004). Therefore, in this paper we also use below-the-line items (*BL*) as a proxy for earnings management. Meanwhile, previous studies (Wei et al., 2007) show that extraordinary profit and loss⁹ are important for earnings management in China, so we also choose extraordinary profit and loss (*EI*) as another measurement.

3.2.2. Main explanatory variables: stock market situation

To diagnose the bull and bear market cycle, we use the approach of He and Zhou (2006) with appropriate adjustments.¹⁰ As the sample data in this study is from 1995 to 2008, we diagnose the market situation from January 1995 to December 2008, using the monthly stock market index P_t as follows:

First, find peaks and troughs according to Eqs. (9) and (10):

t is a peak time, if P_t is the maximum price within a 5-month window;

$$P_{t-5,\wedge}, P_{t-1} < P_t > P_{t+1,\wedge}, P_{t+5}; \quad (9)$$

t is a trough time, if P_t is the minimum price within a 5-month window;

$$P_{t-5,\wedge}, P_{t-1} > P_t < P_{t+1,\wedge}, P_{t+5}. \quad (10)$$

Further diagnostic requirements: (1) eliminate the lower of the continuous peaks and the higher of the continuous troughs to show alternating peaks and troughs; (2) if the duration of a bull market or a bear market lasts no more than 6 months, prices must rise or fall more than 20% when prices reverse; (3) remove peaks and troughs less than 6 months from the ends; (4) exclude peaks near the endpoints that are lower than the price at the endpoints, and exclude troughs near the endpoints that are higher than the price at the endpoints; (5) exclude bull and bear market cycles that last less than 10 months.

⁹ Extraordinary profit and loss are defined as gains/losses that are not related to companies' regular business or occasional one-time gains and losses, such as the impairment of assets caused by natural disasters, gains and losses of fixed asset disposal, gains and losses of debt restructuring, financial return, and subsidies income. It is a disclosure item for listed companies and will be reflected in items such as investment income, nonoperating income, nonoperating expenses, prior year income adjustment, management expenses, and financial expenses.

¹⁰ He and Zhou (2006) use a 3-month price window to diagnose market cycles to avoid missing short-term peaks and troughs. In our study, we needed to judge the market situation in a special year after the peaks and troughs diagnosis. So we use a 5-month price window applied to the business cycle diagnosis (Bry and Boschan, 1971). We also use a 3-month price window for the diagnosis; the basic cycles are the same, but it can more effectively diagnose short-term bull and bear markets.

Table 4

Market situation: Diagnosis of the bull and bear markets.

Shanghai composite index					Shenzhen component index				
Time	Price index	Status	Year	Market situation	Time	Price index	Status	Year	Market situation
199 509	741	Peak	1995	Bull				1995	Bear
199 602	530	Trough	1996	Bull	199 601	958	Trough	1996	Bull
			1997	Bull	199 705	5336	Peak	1997	Bear
199 806	1383	Peak	1998	Bear				1998	Bear
199 902	1101	Trough	1999	Bull	199 905	2800	Trough	1999	Bull
			2000	Bull	200 008	4962	Peak	2000	Bull
200 106	2214	Peak	2001	Bear				2001	Bear
			2002	Bear	200 212	2845	Trough	2002	Bear
200 311	1361	Trough	2003	Bear				2003	Bull
200 403	1708	Peak	2004	Bear	200 403	3985	Peak	2004	Bear
200 507	1042	Trough	2005	Bear	200 511	2683	Trough	2005	Bear
200 710	5824	Peak	2006	Bull	200 710	18,966	Peak	2006	Bull
			2007					2007	
200 811	1876	Trough	2008	Bear	200 811	6310	Trough	2008	Bear

This study selects companies listed on the A-share main board market on the Shanghai Stock Exchange and Shenzhen Stock Exchange. We use monthly prices of the Shanghai Composite Index and the Shenzhen Component Index to diagnose bull and bear markets. Table 4 shows the market situation of the Shanghai Composite Index and the Shenzhen Component Index. Diagnostic results show that from January 1995 to December 2008, the Shanghai Composite Index experienced five peaks and five troughs (five bull and bear market cycles), whereas the Shenzhen Component Index experienced four peaks and five troughs (four bull and bear market cycles). There is a synergistic effect between the two markets. On average, bull markets were longer in the Shanghai Composite Index, whereas bear markets were longer in the Shenzhen Component Index.

The Information Disclosure of Listed Companies stipulates that companies whose stocks or bonds are publicly traded are obliged to comply with continuous information disclosure. The main form of disclosure is periodic reports, including annual reports, semi-annual reports and quarterly reports. Annual reports should be disclosed within 4 months after the end of each fiscal year, semi-annual reports should be disclosed within 2 months after the end of the first half of each fiscal year and quarterly reports should be disclosed within a month after the end of the first 3 months and 9 months of each fiscal year. If the bull market (or bear market) ended in the first half of a year when most listed companies disclosed only first quarter reports, listed companies can manage earnings through semi-annual reports, third quarter reports and annual reports according to the market situation of the second half of the year. If the bull market (or bear market) ends in the second half of a year when most listed companies have already disclosed the first quarter reports, semi-annual reports or even third quarter reports, it is difficult to use last quarter reports only to reverse the direction of earnings management.

Therefore, we judge that if the bull market (or bear market) ended in the first half of the year, then the market situation is the trend in the second half of the year, namely a bear market (or bull market); if the bull market (or bear market) ended in the second half of the year, then the market situation is the trend in the first half of the year, namely a bull market (or bear market). According to the diagnosis results of Table 4, the variable *Market* is 1 if the sample observation is in a bull market, otherwise 0.

Table 5
Descriptive statistics.

Variables	N	Mean	Median	P25	P75	MIN	MAX	Standard
<i>DAadj</i>	8903	0.0017	−0.0024	−0.0444	0.0409	−0.2452	0.3210	0.0881
<i>DAks</i>	8903	−0.0035	−0.0065	−0.0492	0.0358	−0.2473	0.3026	0.0859
<i>BL</i>	8903	0.0051	0.0000	−0.0036	0.0090	−0.0417	0.0944	0.0181
<i>EI</i>	8903	0.0048	0.0000	−0.0026	0.0070	−0.0331	0.0844	0.0158
<i>Market</i>	8903	0.4081	0.0000	0.0000	1.0000	0.0000	1.0000	0.4915
<i>HPI</i>	8903	0.0017	0.0000	−0.0453	0.0500	−0.3975	0.3147	0.0942
<i>HPB</i>	8903	0.6686	0.0000	−0.9166	1.5248	−3.4743	10.7078	2.3012
<i>Change</i>	8903	0.3879	0.0000	0.0000	1.0000	0.0000	1.0000	0.4873
<i>CEO</i>	8903	0.3046	0.0000	0.0000	1.0000	0.0000	1.0000	0.4603
<i>Asset</i>	8903	9.2744	9.2206	8.9766	9.5255	8.4376	10.6117	0.4286
<i>Lev</i>	8903	0.4550	0.4629	0.3339	0.5839	0.0741	0.8066	0.1691
<i>State</i>	8903	0.2011	0.0000	0.0000	0.0000	0.0000	1.0000	0.4008
<i>PG</i>	8903	0.1018	0.0000	0.0000	0.0000	0.0000	1.0000	0.3024
<i>Region</i>	8903	0.4579	0.0000	0.0000	1.0000	0.0000	1.0000	0.4983
<i>ROA</i>	8903	0.0360	0.0287	0.0097	0.0563	−0.0896	0.1681	0.0401

3.3. Basic descriptive statistics

Table 5 lists descriptive statistics for the main variables. The average company's discretionary accruals *DAadj* and *Daks* are 0.17% and −0.35% of total assets, respectively, and the maximum discretionary accruals are 32.10% and 30.26% of total assets, respectively. The average industry-adjusted below-the-line item income is 0.51% of total assets, and the average of industry-adjusted extraordinary profit and loss is 0.48% of total assets. The proportion of listed companies that changed their CEOs or Chairman accounted for 38.79% of

Table 6
Earnings management in different market situations.

Variables	N	Mean	Median	P25	P75	MIN	MAX	Standard
<i>Panel A: Descriptive statistics</i>								
Earnings management in bull markets								
<i>DAadj</i>	3633	0.0070	0.0012	−0.0429	0.0478	−0.2452	0.3210	0.0927
<i>DAks</i>	3633	0.0020	−0.0024	−0.0470	0.0428	−0.2473	0.3026	0.0902
<i>BL</i>	3633	0.0072	0.0010	−0.0029	0.0118	−0.0417	0.0943	0.0193
<i>EI</i>	3633	0.0074	0.0015	−0.0020	0.0105	−0.0313	0.0844	0.0180
Earnings management in bear markets								
<i>DAadj</i>	5270	−0.0019	−0.0046	−0.0456	0.0363	−0.2452	0.3210	0.0845
<i>DAks</i>	5270	−0.0073	−0.0093	−0.0508	0.0314	−0.2473	0.3026	0.0826
<i>BL</i>	5270	0.0036	−0.0006	−0.0040	0.0075	−0.0417	0.0944	0.0170
<i>EI</i>	5270	0.0030	−0.0007	−0.0029	0.0048	−0.0331	0.0844	0.0138
<i>Panel B: Median and mean tests of earnings management in bull vs bear markets</i>								
	Mean test		Median test					
	<i>T</i>	$\Pr(T > t)$	<i>Z</i>	$\Pr > z $				
<i>DAadj</i>	−4.6970***	0.0000	−4.325***	0.0000				
<i>DAks</i>	−5.0019***	0.0000	−4.681***	0.0000				
<i>BL</i>	−9.2357***	0.0000	−9.657***	0.0000				
<i>EI</i>	−13.3035***	0.0000	−14.146***	0.0000				

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

the sample, and the proportion of listed companies that changed their CEOs accounted for 30.46% of the sample. State-owned companies accounted for almost 80% of the sample companies.

According to our predictions, listed companies choose to release more earnings in bull markets. Thus earnings management (*DAadj*, *DAks*, *BL* and *EI*) in bull markets should be higher than that of bear markets on average. Table 6 compares earnings management in different market situations. Panel A shows that mean discretionary accruals *DAadj* and *Daks* released are 0.007 and 0.002 during bull markets, and median discretionary accruals are 0.0012 and –0.0024. During bear markets, mean discretionary accruals *DAadj* and *Daks* are –0.0019 and –0.0073, and median discretionary accruals are –0.0046 and –0.0093. The mean (median) of below-the-line items (*BL*) is 0.0072 (0.0010) during bull markets and 0.0036 (–0.0006) during bear markets. The mean (median) of extraordinary profit and loss (*EI*) is 0.0074 (0.0015) during bull markets and 0.0030 (–0.0007) during bear markets. These results show that listed companies release more profits during bull markets. Panel B also shows that significantly more earnings were released during bull markets than bear markets ($p < 0.01$), providing further evidence that listed companies release earnings according to the market situation and release more earnings during bull market cycles.

4. Model and empirical results

4.1. Timing earnings tests

To analyze whether listed companies use the market timing approach to earnings management, we use the following regression model (1) clustered by industry:

$$EM = \beta_0 + \beta_1 Market + \beta_2 Asset + \beta_3 Lev + \beta_4 State + \beta_5 PG + \beta_6 Region + \beta_7 ROA + \varepsilon. \quad (\text{model1})$$

where *EM* is the level of earnings management involving four indicators *DAadj*, *Daks*, *BL* and *EI*. The main test variable *Market* is the market situation, a dummy variable that equals 1 during bull markets. According to our hypotheses, β_1 is expected to be positive. Referring to previous studies on earnings management (Bo and Wu, 2009; Chen et al., 2000; Lin and Wei, 2000; Lu, 1999; Wei et al., 2007), we also use *Size*, *LEV*, *State*, *PG*, *Region*, and *ROA* as control variables.

Table 7
Correlations.

	<i>DAadj</i>	<i>DAks</i>	<i>BL</i>	<i>EI</i>	<i>Market</i>
<i>DAadj</i>	1.0000				
<i>DAks</i>	0.9642 0.0000	1.0000			
<i>BL</i>	–0.0055 0.6070	0.0054 0.6084	1.0000		
<i>EI</i>	0.0752 0.0000	0.0850 0.0000	0.6665 0.0000	1.0000	
<i>Market</i>	0.0497 0.0000	0.0529 0.0000	0.0974 0.0000	0.1396 0.0000	1.0000

The upper values are correlation coefficients and the lowers are *P* values.

Table 8

Test results on timing earnings.

Variable	(1) <i>DAadj</i>	(2) <i>DAks</i>	(3) <i>BL</i>	(4) <i>EI</i>
<i>Market</i>	0.0069*** (3.534)	0.0078*** (3.899)	0.0028*** (8.403)	0.0039*** (8.276)
<i>Asset</i>	0.0181** (2.688)	0.0081 (1.523)	−0.0040*** (−3.430)	−0.0044*** (−6.220)
<i>Lev</i>	−0.0205 (−1.443)	−0.0239** (−2.578)	0.0058*** (3.081)	0.0040*** (2.963)
<i>State</i>	0.0071*** (3.109)	0.0040* (1.870)	−0.0024*** (−3.360)	−0.0009** (−2.742)
<i>PG</i>	0.0018 (0.521)	0.0003 (0.0779)	−0.0012** (−2.105)	0.0010 (1.620)
<i>Region</i>	−0.0007 (−0.214)	−0.0029 (−1.174)	0.0056*** (7.332)	0.0040*** (7.009)
<i>ROA</i>	0.4188*** (9.131)	0.3212*** (9.397)	0.1406*** (5.831)	0.0796*** (6.137)
<i>Constant</i>	−0.1762** (−2.644)	−0.0824 (−1.699)	0.0315** (2.854)	0.0378*** (5.990)
Observations	8903	8903	8903	8903
<i>R</i> ²	0.049	0.032	0.131	0.087
<i>F</i> test	39.62***	39.72***	29.78***	21.65***

Robust *t*-statistic in parentheses.* $p < 0.1$.** $p < 0.05$.*** $p < 0.01$.

Table 7 shows the results of the correlation analysis for the main variables. The variable *Market* (bull market) is positively related with earnings management measures (*DAadj*, *Daks*, *BL*, and *EI*).

Table 8 shows the regression results of the timing earnings test. We use discretionary accruals, *DAadj* and *DAks*, as dependent variables in Columns (1) and (2). After controlling for other related variables, the coefficient of *Market* (bull market) is positive ($p < 0.01$). These results indicate that listed companies release more earnings through accrual items during bull markets. The results of Columns (3) and (4), which use *BL* and *EI* as dependent variables, respectively, also show that below-the-line income (*BL*) and extraordinary profit and loss (*EI*) are significantly higher during bull markets than during bear markets. Listed companies release more earnings through below-the-line or extraordinary items during bull markets. Results of Columns (1)–(4) indicate that listed companies use a market timing approach to manage earnings and release more earnings during bull markets.

4.2. Additional tests: Company characteristics and timing earnings

Test 4.1 shows that listed companies time their earnings management in different market cycles. But, how do differences in company characteristics influence market timing behavior? In this section, we further analyze this question from two aspects: market valuation and profitability of listed companies.

We use *HPB* to indicate highly valued stocks, which is the price-to-book ratio (*PB*) adjusted by the industry median, and use core return on equity (operating income/equity) adjusted by industry median as proxy for firm profitability, with variable name *HPI*. Then we establish Model (2) on the basis of Model (1), and carry out regressions

Table 9

Market valuation effects on timing earnings.

Variable	(1) <i>DAadj</i>	(2) <i>DAks</i>	(3) <i>BL</i>	(4) <i>EI</i>
<i>Market</i>	0.0042** (2.440)	0.0057*** (3.160)	0.0025*** (6.338)	0.0034*** (6.795)
<i>Market * HPB</i>	0.0025* (1.895)	0.0024* (1.837)	0.0003** (2.281)	0.0005*** (3.067)
<i>HPB</i>	−0.0008 (−0.886)	−0.0011 (−1.434)	−0.0001 (−0.833)	−0.0003 (−1.714)
<i>Asset</i>	0.0181** (2.701)	0.0076 (1.403)	−0.0041*** (−3.632)	−0.0046*** (−6.808)
<i>Lev</i>	−0.0215 (−1.431)	−0.0239** (−2.429)	0.0058*** (3.122)	0.0040*** (3.440)
<i>State</i>	0.0069*** (2.993)	0.0038* (1.763)	−0.0024*** (−3.404)	−0.0010*** (−2.907)
<i>PG</i>	0.0016 (0.471)	0.0002 (0.0558)	−0.0012** (−2.148)	0.0009 (1.616)
<i>Region</i>	−0.0007 (−0.225)	−0.0029 (−1.104)	0.0056*** (7.190)	0.0040*** (6.890)
<i>ROA</i>	0.4162*** (8.725)	0.3232*** (9.244)	0.1406*** (5.740)	0.0801*** (5.927)
<i>Constant</i>	−0.1753** (−2.652)	−0.0775 (−1.577)	0.0319*** (3.014)	0.0390*** (6.515)
Observations	8903	8903	8903	8903
<i>R</i> ²	0.050	0.033	0.131	0.089
<i>F</i> test	37.12***	50.15***	26.50***	18.08***

Robust *t*-statistics in parentheses.* $p < 0.1$.** $p < 0.05$.*** $p < 0.01$.

clustered by industry. The coefficient β_2 is expected to be positive, which means that high-profit firms or firms with high valuations release more earnings during bull markets.

$$EM = \beta_0 + \beta_1 Market + \beta_2 Market * HPB(Market * HPI) + \beta_3 HPB(HPI) + \beta_4 Asset + \beta_5 Lev + \beta_6 State + \beta_7 PG + \beta_8 Region + \beta_9 ROA + \varepsilon. \quad (\text{model2})$$

Table 9 shows market valuation effects on the timing of earnings behavior. Columns (1)–(4) in Table 9 show that the coefficient of the market cycle variable *Market* (bull market) is positive, and the coefficient of *Market * HPB* is also positive. These results indicate that highly valued companies release more earnings in bull markets. However, the coefficient of market valuation (*HPB*) is not significant ($p > 0.01$), which suggests that during bear market cycles, even highly valued companies do not choose to release more earnings.

Table 10 shows the effects of company profitability on the timing of earnings behavior. In Columns (1) and (2) with discretionary accruals (*DAadj*, *DAks*) as the dependent variables, the coefficient of the market cycle variable *Market* (bull market) is significantly positive, and the coefficients on the interaction terms *Market * HPI* are 0.0656 ($p < 0.05$) and 0.0593 ($p < 0.10$), respectively. These results indicate that companies with higher profitability release more earnings during bull markets. Columns (3) and (4), using *BL* and *EI* as dependent variables, The results in Column (4) show that

Table 10

Company profitability effects on timing earnings.

Variable	(1) <i>DAadj</i>	(2) <i>DAks</i>	(3) <i>BL</i>	(4) <i>EI</i>
<i>Market</i>	0.0050** (2.822)	0.0062*** (3.542)	0.0037*** (10.70)	0.0042*** (9.229)
<i>Market*HPI</i>	0.0656** (2.112)	0.0593* (1.824)	−0.0058 (−0.935)	0.0051 (0.976)
<i>HPI</i>	0.2036*** (9.431)	0.1587*** (9.681)	−0.1141*** (−9.472)	−0.0504*** (−7.164)
<i>Asset</i>	0.0102 (1.551)	0.0019 (0.311)	−0.0001 (−0.106)	−0.0028*** (−3.918)
<i>Lev</i>	−0.0382*** (−3.000)	−0.0379*** (−4.169)	0.0149*** (6.152)	0.0078*** (5.394)
<i>State</i>	0.0021 (0.781)	0.0000 (0.0157)	0.0002 (0.267)	0.0001 (0.311)
<i>PG</i>	−0.0017 (−0.589)	−0.0026 (−0.777)	0.0002 (0.370)	0.0014** (2.292)
<i>Region</i>	0.0011 (0.332)	−0.0015 (−0.627)	0.0047*** (6.782)	0.0037*** (7.054)
<i>ROA</i>	0.0426 (0.923)	0.0233 (0.543)	0.3338*** (8.840)	0.1606*** (7.537)
<i>Constant</i>	−0.0808 (−1.248)	−0.0064 (−0.115)	−0.0160 (−1.324)	0.0184** (2.673)
Observations	8903	8903	8903	8903
<i>R</i> ²	0.081	0.053	0.320	0.130
<i>F</i> test	390.25***	127.66***	33.31***	23.25***

Robust *t*-statistics in parentheses.* $p < 0.1$.** $p < 0.05$.*** $p < 0.01$.

listed companies indeed use a market timing approach to manage earnings during bull markets. However, the coefficients on the interaction terms (*Market * HPI*), are not significant ($p > 0.10$).¹¹

4.3. Tests of the consequences of failure to time earnings

In bull markets, with low adverse selection costs, investors are generally willing to pay higher prices for stocks, and demand exceeds supply. Rational executives should choose to release more earnings in such a situation. Executives who fail to release earnings at these times may be punished or even dismissed by rational large shareholders. To test the consequences of the failure of managers to time earnings, we use the following logistic regression model (3) clustered by industry:

$$\begin{aligned} \text{Change}(\text{CEO}) = & \beta_0 + \beta_1 \text{Market} + \beta_2 \text{Market} * \text{EM} + \beta_3 \text{EM} + \beta_4 \text{Asset} + \beta_5 \text{Lev} \\ & + \beta_6 \text{State} + \beta_7 \text{Region} + \beta_8 \text{ROA} + \varepsilon \end{aligned} \quad (\text{model3})$$

¹¹ In further robustness tests, we divide the sample into high- and low-profit groups, using *BL* and *EI* as dependent variables. Comparison of the coefficients of *Market* (bull market) in the two groups show that high-profit groups release more earnings in bull markets than low-profit groups.

Table 11

Consequences of failure to time earnings.

Variables	(1) <i>Change</i>	(2) <i>Change</i>	(3) <i>CEO</i>	(4) <i>CEO</i>
<i>Market</i>	0.3100*** (4.495)	0.2835*** (3.831)	0.3116*** (4.371)	0.2877*** (3.727)
<i>Market * HDAadj</i>	−0.1104* (−1.661)		−0.1428* (−1.946)	
<i>HDAadj</i>	−0.0656 (−1.221)		−0.0487 (−0.819)	
<i>Market * HDAks</i>		−0.0559 (−0.679)		−0.0929 (−0.944)
<i>HDAks</i>		−0.1003* (−1.891)		−0.0758 (−1.229)
<i>Asset</i>	−0.1307 (−1.564)	−0.1347 (−1.626)	−0.1685 (−1.546)	−0.1727 (−1.609)
<i>Lev</i>	−0.1157 (−0.686)	−0.1165 (−0.686)	−0.1052 (−0.691)	−0.1051 (−0.696)
<i>State</i>	−0.1996*** (−3.391)	−0.2019*** (−3.399)	−0.0462 (−0.614)	−0.0484 (−0.641)
<i>Region</i>	−0.0670 (−0.965)	−0.0680 (−0.985)	−0.1049* (−1.648)	−0.1058* (−1.668)
<i>ROA</i>	−1.9459*** (−2.688)	−1.9814*** (−2.791)	−1.5525** (−2.011)	−1.5937** (−2.095)
<i>Constant</i>	0.8726 (1.157)	0.9293 (1.230)	0.8177 (0.814)	0.8721 (0.870)
Observations	7905	7905	7905	7905
Wald χ^2	96.86***	101.35***	47.99***	30.53***
Pseudo R^2	0.0063	0.0063	0.0055	0.0054

HDAadj equals 1 if discretionary accruals *DAadj* is higher than the industry median, otherwise 0. *HDAks* equals 1 if discretionary accruals *DAks* is higher than the industry median, otherwise 0. Robust z-statistics in parentheses.

* $p < 0.1$.

** $p < 0.05$.

*** $p < 0.01$.

The dependent variables are CEO or Chairman change (*Change*) and CEO change (*CEO*); *EM* stands for the level of earnings released, which is represented by *HDAadj*, *HDAks*.¹² If *DAadj* is higher than the industry median, then *HDAadj* equals 1, otherwise 0. If *DAks* exceeds industry median, then *HDAks* equals 1, otherwise 0. According to our predictions, β_2 , the coefficient of the interaction term (*Market * EM*) is expected to be negative. The more earn-

¹² We use discretionary accruals as dependent variables only to analyze the consequences of the failure of managers to time earnings for the following reasons. Due to information asymmetry and incompleteness of contracts, accounting standards allow executives to make professional judgments, such as decisions about future affairs, choices of accounting methods, and judgments on deferred revenues. Based on their understanding of economic transactions, executives can choose accounting methods, estimations, and report forms that fit the economic situation. The effects of these judgments are represented in accrual items. Compared with below-the-line items (*BL*) or extraordinary items (*EI*) within contracts, using professional judgments to manage earnings can be a more regular choice for executives. Specially, during bull markets, investors generally hold higher expectations, and chief shareholders may prefer executives to use professional judgment to manage earnings; executives who fail to do this might be punished. *BL* and *EI* are also important means of earnings management, but they are not regular choices and are sometimes restrained. For example, security regulation departments in China have issued regulations that make it necessary to account for the influences of extraordinary profit and loss in reporting profits and calculating financial ratios, such as *ROA*. Since 2001, CSRC has required companies applying for refinancing to have a weighted average *ROA* higher than 6% for the previous 3 years. The calculation of weighted average *ROA* uses the lower of income and income deducting extraordinary profit and loss. We also tried to use *BL* and *EI* as dependent variables to test the consequences of failure of market timing, and found that lower *BL* and *EI* in bull markets do not induce punishment such as dismissal.

ings released during bull markets, the less likely it is that the executive will be dismissed. This prediction indicates that executives who fail to release earnings during bull markets will be punished or even be dismissed by major shareholders.

Table 11 shows the consequences of failure of managers to time earnings. Using executives change (*Change*) as the dependent variable in Columns (1) and (2), the coefficients on *Market* are positive ($p < 0.01$). After adding the interaction terms, the results in Column (1) show that the coefficient of *Market * HDAadj* is -0.1104 ($p < 0.10$), indicating that executives are less likely to be dismissed if they release more earnings during bull markets. The results in Column (2) show that the coefficient on *Market * HDAks* is negative, but is not significant ($p > 0.10$). We use the change of CEOs (*CEO*) only as the dependent variable in Columns (3) and (4), and the results show that the coefficients on the interaction term *Market * HDAadj* are significantly negative ($p < 0.10$), indicating that a CEO will not be dismissed if he/she releases more earnings during bull markets. In other words, a CEO who fails to release earnings according to the market situation is more likely to be dismissed. The results in Column (4) show that the coefficient of *Market * HDAks* is not significant ($p > 0.10$).¹³

4.4. Robustness tests

We also performed the following robustness tests. First, we add the lagged total accruals (TA_{t-1}) as a control variable to the regression models with discretionary accruals (*DAadj*, *Daks*) as dependent variables. Because of the reversal feature, current accruals can be influenced by lagged accruals, and we add TA_{t-1} to regression models as a control variable. Second, to test the effects of market valuation on timing earnings behavior, we use the median industry price-to-earnings ratio (PE) at year t , adjusted by the industry median PE of all sample years, as the market valuation proxy. Third, to test the effects of company characteristics on the timing of earnings, we divide the total sample into groups of high- and low-profit companies and groups of high- and low-valuation stocks for further tests. We also divide the total sample into groups of bull markets and bear markets to test whether executives and CEOs are more likely to be dismissed if they do not release more earnings during bull markets. The results of all these robustness tests support the hypotheses.

5. Conclusion and limitations

Over time, stock markets exhibit periodic fluctuations, experiencing bull and bear markets. Adverse selection costs, supply and demand relationships and asymmetric market responses under different market situations influence the earnings management behavior of companies. This study uses 8903 observations from the A-share stock markets in China from 1995 to 2008 to analyze the market timing of earnings management. The results show that listed companies choose to release more earnings during bull markets, and this phenomenon is more evident in high-profit enterprises than in low-profit enterprises. From the microenterprise perspective, highly valued enterprises also release more earnings during bull markets. Finally, we find that executives who do not release more earnings during bull markets are more likely to be dismissed.

¹³ In further robust tests, we divided total samples into bull markets and bear markets groups, using *CEO* as dependent variables. The coefficients of *HDAks* in bull markets is significantly negative ($p < 0.05$), while the coefficients of *HDAks* in bear markets is negative, but is not significant ($p > 0.10$). Results show that a CEO who fails to release proper earnings in bull markets is more likely to be dismissed.

The limitations of this study are that earnings management is not limited to accruals and below-the-line items; firms can also manage earnings through real economic transactions (Dechow and Sloan, 1991; Roychowdhury, 2006), such as staff training, cuts in research and development and advertising, postponing new projects, cuts in soft expenses such as travel budgets, discounts to increase orders, and raising product prices during the first quarter of the year. Due to the proxy for earnings management used in this study, we are not able to completely describe the characteristics of real transaction-based earnings management under different stock market cycles.

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Auditor choice and accruals patterns of cross-listed firms

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ABSTRACT

We examine the association between auditor choice and the accruals patterns of Chinese listed firms that cross-list in Hong Kong. Our evidence suggests that the clients of Big 4 auditors report lower unsigned discretionary accruals relative to the clients of non-Big 4 auditors. Further, we find that cross-listed firms with non-Big 4 auditors are more likely to understate their earnings and experience larger reversals of accruals in the future than cross-listed firms with Big 4 auditors. These findings suggest that Big 4 auditors play a meaningful role in improving earnings quality for cross-listed firms, which helps to explain why cross-listed firms have higher earnings quality than their domestic counterparts, as documented in the previous literature. © 2011 China Journal of Accounting Research. Founded by Sun Yat-sen University and City University of Hong Kong. Production and hosting by Elsevier B.V. All rights reserved.

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1. Introduction

In this study, we investigate the accruals patterns of Chinese listed firms that cross-list on the Hong Kong Stock Exchange (HKEx) to shed light on the role of auditor choice in improving cross-listed firms' accounting quality. The extant literature shows that firms that cross-list on US exchanges have higher earnings quality. For instance, they have less aggressive earnings management, more conservative earnings, more timely loss recognition and a stronger association between accounting data and share prices, compared with non-cross-listed firms in their home markets (Lang et al., 2003; Huikgen and Lubberink, 2005). However, as Leuz (2006, p. 298) notes, "the mechanism by which cross listings improve corporate behavior is not well understood."

In this spirit, this study focuses on the effects of auditor choice on the characteristics of earnings for cross-listed firms in China. Previous research demonstrates the role of auditors in constraining firms' ability to manipulate earnings (e.g., Becker et al., 1998; Francis et al., 1999). Thus, the characteristics of reported accounting data should be jointly shaped by managers and auditors. By examining the effect of auditor choice, we can identify a specific channel that helps to explain why cross-listed firms have better accounting quality than non-cross-listed firms.

In particular, we are interested in investigating whether there are systematic differences in the accruals-based earnings of clients of Big 4 and non-Big 4 auditors.¹ Francis et al. (2009, p. 53) demonstrate that accruals can map onto earnings quality because accruals are the product of estimations and judgments by managers about future events and managers have discretion to distort accruals opportunistically to meet earnings targets. Furthermore, a number of studies have sought to link auditor size to accruals patterns and found that Big 4 clients have lower abnormal accruals than non-Big 4 clients, consistent with the theory that larger auditors are more effective at constraining opportunistic reporting by managers (DeAngelo, 1981; Dye, 1993).

Nevertheless, exactly what drives the difference in audit quality between big and small auditors remains debatable in the extant literature. One explanation is based on reputation. DeAngelo (1981) argues that a large auditor has a greater reputation to lose (greater aggregate reduction in quasi rent) if it provides low-quality audits. An alternative hypothesis is that wealthier auditors are more at risk from litigation and therefore have a greater incentive to issue accurate reports (Dye, 1993). Although several papers conclude that the insurance rationale for audit quality appears to dominate the reputation rationale (Lennox, 1999; Willenborg, 1999; Khurana and Raman, 2004), some studies also show that reputation does matter for audit quality (e.g., Weber et al., 2008).

China's A-share firms cross-listed on HKEx provide a clean setting for us to investigate the reputation rationale of Big 4 audits in an emerging market. The regulations require A-share firms cross-listed on HKEx (referred to as CL firms) to perform dual-audit and dual-reporting, based on Chinese GAAP and IFRS, respectively. Typically, a Hong Kong audit firm provides audit services for a CL firm based on IFRS. At the same time, another domestic audit firm provides audit services for the same firm based on Chinese GAAP. Generally, when a CL firm hires a mainland-based Big 4 firm for financial statement audits based

¹ The term "Big 4" is used because of the collapse of Arthur Andersen in 2002. However, Arthur Andersen was viewed as one of the "Big 5" during our sample period of 1998–2001. The "Big 5" auditors were Deloitte Touche, Ernst & Young, KPMG, PricewaterhouseCoopers and Arthur Andersen.

on Chinese GAAP (referred to as a domestic auditor), it is common practice for the firm to hire the same Big 4 firm in Hong Kong (e.g., KPMG Huazheng versus KPMG Hong Kong) for financial statement audits based on IFRS (referred to as an overseas auditor). Because domestic auditors who provide audit services for CL firms are not exposed to jurisdiction and liability under the stock regulations or laws of Hong Kong, there is no substantial change in their litigation risk. However, given that reputation plays an important role in the Hong Kong audit market, domestic Big 4 member firms may consider the reputation of their Hong Kong counterparts because they share the same international brand name, which in turn changes the incentives of domestic Big 4 member firms and results in lower levels of accruals.

Using a sample of cross-listed firms during the period 1998–2008, we find that firm size and leverage are the two main determinants of whether CL firms hire Big 4 firms to conduct their domestic audits. Moreover, we find that auditor choice affects the pattern of accruals in CL firms. CL firms with domestic Big 4 auditors have lower unsigned total accruals and unsigned abnormal working capital accruals, relative to CL firms audited by non-Big 4 auditors. This finding is robust to controlling for a number of variables, including firm size, leverage, performance, etc. In addition, to mitigate the self-selection problem in auditor choice, we compare the accruals patterns for Big 4 CL clients and non-Big 4 CL clients using a matched sample based on the propensity of CL firms to choose Big 4 auditors, and our conclusions are unchanged. Furthermore, by investigating the components of accruals, we find that the difference between the accruals of Big 4 and non-Big 4 clients can be attributed mainly to differences in the impairment of assets.

One alternative explanation for the above results is the joint (two) Big 4 pair, *per se*, which may supply higher audit quality than other auditor pairs. Francis et al. (2009) use France as their research setting, where two (joint) auditors are required by law, and find that firms that use two Big 4 auditors have smaller income-increasing abnormal accruals compared with other firms. To rule out this explanation, we examine the association between auditor choice and accruals using another sample consisting of listed firms that issue both A-shares to domestic investors and B-shares to overseas investors (referred to as AB firms). Before 2007, AB firms were also required to report their accounting data using Chinese GAAP and IFRS and hire domestic and overseas auditors to audit their financial statements. However, AB firms are now subject to regulation by the CSRC and their financial reporting environment is similar to that of other A-share firms. We find that AB firms with Big 4 auditors have higher unsigned total accruals and similar levels of abnormal working capital accruals than AB firms with non-Big 4 auditors. Therefore, two (joint) Big 4 audits does not necessarily enhance audit quality in China.

Our study extends the cross-listing literature by exploring the mechanism by which cross-listing has the potential to improve accounting quality. The paper also contributes to the quality-differential audit literature by providing evidence for how the auditing environment and reputation shape the behavior of Big 4 accounting firms.

The remainder of the paper proceeds as follows. In Section 2, we provide some institutional background on the audit markets in mainland China and Hong Kong and develop our hypotheses. Section 3 details our auditor choice and accruals measures and provides the main empirical results. Section 4 presents additional tests and Section 5 summarizes and concludes the study.

2. Institutional background and hypotheses development

The Tsingtao Brewery Company Limited (A-share code 600600) first issued H-shares (H-share code 00168) in 1993. By the end of 2008, a further 57 domestic firms had issued A-shares and H-shares. According to the HKEx listing rules, all listed firms' accountancy reports must be prepared by certified public accountants who are qualified under the Professional Accountants Ordinance, and such accounting firms must normally have an international name and reputation and be a member of a recognized body of accountants.² Therefore, a domestic firm cross-listing on HKEx must hire a qualified Hong Kong auditor to audit its financial statements based on IFRS. Meanwhile, according to CSRC regulations, A-shares firms must prepare their financial statements based on Chinese GAAP and they must be audited by a designated domestic auditor. Thus, a CL firm is mandated to provide two financial statements (dual-reporting), audited by a domestic auditor and a Hong Kong auditor, respectively. In addition, CL firms must reconcile items for bottom-line net income and shareholders' equity at a fairly summary level.

Hong Kong has consistently been viewed as one of the best financial markets in terms of investor protection. International Big 4 auditors have dominated the audit market in Hong Kong.³ Studies indicate that reputation is important for audit service pricing in Hong Kong. For example, DeFond et al. (2000a) examine the audit fees of Big 6 and non-Big 6 accounting firms using a sample of 348 publicly listed Hong Kong companies and find evidence of Big 6 premiums for both general brand name and for industry specialization. Firth and Lau (2004) analyze the 1997 merger between Kwan Wong Tan and Fong (KWTF) and Deloitte Touche and Tohmatsu (DTT) to become DTT, and the 1998 merger between Coopers and Lybrand (CL) and Price Waterhouse (PW) to form PricewaterhouseCoopers (PwC). Their evidence indicates that there are both across-firm and within-firm pre- and post-merger fee differences between Big 5 and non-Big 5 auditors in Hong Kong. In addition, some cross-country studies on accounting quality suggest that listed firms in Hong Kong have more conservative reported earnings and less earnings management than those in other emerging markets (e.g., Ball et al., 2003; Leuz et al., 2003; Bushman and Piotroski, 2006).

Relative to Hong Kong, China's emerging market is relatively immature and its weak investor protection has been criticized for extensive government intervention and significant expropriation of minority shareholders by majority shareholders and corporate managers (Jian and Wong, 2008; Jiang et al., 2010), which weaken the demand for high-quality accounting data and audit services. Research on accounting and auditing in China confirms this is the case. For example, DeFond et al. (2000b) find a decline in audit market share among large auditors following the release of new auditing standards in 1995. Chan et al. (2006) provide evidence that local auditors, who have greater economic dependence on local clients and are subject to more political influence from local governments, are inclined to report favorably on local government-owned companies to mitigate probable economic losses. Wang et al. (2008) document that Chinese state-owned enterprises are more likely to hire small auditors from the same region (low-quality auditors). They suggest that this pattern of auditor choice is likely to be explained by SOEs' lack of demand for high-quality audit services. Both the existing literature and anecdotal evidence imply that

² See "Rules Governing the Listing of Securities on the Stock Exchange of Hong Kong Limited (Chapter 4)."

³ DeFond et al. (2000a) reported that the Big 6 firms had approximately 80% market share as measured by the number of listed clientele.

reputation considerations are less likely to drive the behavior of auditors in China's audit market.

To date, numerous studies have examined the quality differentials between Big 4 auditors and non-Big 4 auditors. The evidence supports the notion that Big 4 accounting firms supply higher-quality audits (see the review by Francis (2004)). However, some studies also indicate that differences in the proxies for audit quality between Big 4 and non-Big 4 audit firms could be a reflection of their respective clients' characteristics (e.g., Lawrence et al., 2011), especially in non-US audit markets. Using a cross-country sample from 1994 to 2004, Francis and Wang (2008) find no difference in the earnings quality of Big 4 and non-Big 4 clients when investor protection is very weak. This suggests that in the absence of investor protection, Big 4 auditors simply do not have incentives to enforce high-quality earnings and risk dismissal by their clients. By investigating several audit proxies (e.g., propensity to issue modified audit opinions, discretionary accruals), Liu and Zhou (2007) find that audit quality differentials between Big 4 firms and non-Big 4 firms do not exist in China's A-share market. However, studies also provide evidence that Big 4 firms play a stronger governance role in emerging markets and charge higher audit fees (e.g., Fan and Wong, 2005; Choi and Wong, 2007; Choi et al., 2008). The mixed and inconclusive results on the quality differential between Big 4 firms and non-Big 4 firms in emerging markets motivate the present study.

If a CL firm's domestic and overseas auditors are member firms of the same international Big 4 accounting firm, then investors should expect the two auditors to have similar professional judgment for the transactions and events of the same firm. Given that overseas (Hong Kong) Big 4 auditors provide high-quality audits in the Hong Kong market, and due to the deterrent effect of sharing the same international brand name, the domestic Big 4 auditor is unlikely to allow managers to opportunistically report its domestic earnings because it needs to take the reputation of its Hong Kong counterpart into account. In contrast, if the Hong Kong auditor does not supply high-quality audits, and/or the domestic auditor does not have the same brand name as the overseas auditor, then the deterrent effect is weak and domestic auditors would not necessarily supply higher quality audits for CL firms. In our sample, if a CL firm's domestic auditor is a Big 4 firm, then the firms' overseas auditor is generally the same brand name Big 4 firm. Conversely, if the domestic auditor is a non-Big 4 firm, then the firms' overseas auditor generally does not share the same brand name. Therefore, we conjecture that domestic Big 4 auditors should be more effective at containing CL firms' aggressive or opportunistic reporting of domestic earnings than non-Big 4 domestic auditors.

3. The association between auditor choice and accruals

3.1. Data

We first obtain a list of A-share companies whose shares were cross-listed on HKEx (H-shares) at the end of 2008 from the CSMAR database. We then identify the listing date on the Chinese stock market (the Shanghai Stock Exchange and the Shenzhen Stock Exchange) and HKEx to determine the first cross-listing calendar-year for each CL firm. We discard firms in the finance industry because the characteristics of accruals for this industry differ from other industries. We thereby obtain 324 cross-listed firm-year observations for the period 1998–2008. Our sample period starts from 1998 because that is when

Table 1

Frequencies of cross-listed firms from 1998 to 2008.

				Observations		Frequency	
<i>Panel A: Auditor type analysis</i>							
Total				324		100.00	
<i>Domestic auditors</i>							
– Big 4				229		70.67	
– Non-Big 4				95		29.33	
<i>Overseas auditors</i>							
– Big 4				290		89.51	
– Non-Big 4				34		10.49	
Domestic and overseas auditors are the same				237		73.14	
– The same Big 4				225		69.44	
– The same Non-Big 4				12		3.70	
Year	Big 4 audits		Non-Big 4 audits		Total		
	Observations	Frequency	Observations	Frequency	Observations	Frequency	
<i>Panel B: Year analysis</i>							
1998	12	3.70	6	1.85	18	5.55	
1999	14	4.32	5	1.54	19	5.86	
2000	13	4.01	6	1.85	19	5.86	
2001	17	5.24	7	2.16	24	7.40	
2002	19	5.86	8	2.46	27	8.33	
2003	20	6.17	9	2.78	29	8.95	
2004	22	6.79	9	2.78	31	9.57	
2005	22	6.79	8	2.47	30	9.26	
2006	26	8.02	9	2.78	35	10.80	
2007	32	9.87	13	4.01	45	13.89	
2008	32	9.87	15	4.62	47	14.51	
Total	229	70.67	95	29.33	324	100.00	
<i>Panel C: Industry analysis</i>							
Mining	29	8.95	1	0.30	30	9.26	
Manufacturing	127	39.20	61	18.82	188	58.02	
Utilities	16	4.93	0	0.00	16	4.94	
Construction	4	1.23	0	0.00	4	1.23	
Transportation	35	10.80	21	6.48	56	17.28	
IT	4	1.23	12	3.70	16	4.94	
Real estate	3	0.93	0	0.00	3	0.93	
Social Services	11	3.40	0	0.00	11	3.39	
Total	229	70.67	95	29.33	324	100.00	

Notes: The sample is comprised of A-share listed companies with H-shares from 1998 to 2008 (excluding finance industry).

Chinese listed companies were first required to disclose their cash-flow statements, which are pivotal for calculating accruals and each component of accruals.

Table 1 provides a breakdown of our sample by auditor type, and by year and industry for Big 4 clients and non-Big 4 clients. As presented in panel A of Table 1, of the 324 cross-listed observations, 229 (70.67%) and 290 (89.51%) sample firms hire Big 4 auditors for domestic financial statements and overseas financial statements, respectively. Note that 225 cross-listed firms hire the same Big 4 firm for both domestic and overseas audits, whereas only 12 non-Big 4 audited cross-listed firms hire the same firm. Although the observations are spread among the industries, approximately 85% are in the manufacturing, transportation and mining industries.⁴

⁴ Our results do not change substantially if we use the firm sample for these three industries alone.

Table 2 presents descriptive statistics of firm characteristics for CL firms audited by domestic Big 4 versus non-Big 4 auditors and results of difference tests between the groups. To mitigate the effects of outliers, all continuous variables are winsorized at the first and 99th percentiles. CL firms with Big 4 auditors are, on average, larger than CL firms with non-Big 4 auditors in terms of total assets and sales. The differences in mean (median) total assets and sales are RMB 44.88 billion (11.30 billion) and RMB 44.76 billion (7.72 billion), respectively, and are statistically significant at the 1% level. The leverage for Big 4 audited CL firms is also significantly higher at the 1% level than that of non-Big 4 audited firms. In terms of accounting performance, CL firms with Big 4 auditors have better ROA and are less likely to make a loss than CL firms with non-Big 4 auditors. In addition, the median market-to-book ratio (MTB) for Big 4 clients is significantly smaller than that of non-Big 4 clients. In contrast, CL firms with Big 4 auditors have greater median sales growth. Therefore, it is unclear whether Big 4 audited firms have higher growth prospects given that both MTB and sales growth could be used as measures of growth opportunities. In general, the above evidence suggests that CL firms with Big 4 auditors are better quality

Table 2

Descriptive statistics of firm characteristics for Big 4 and Non-Big 4 samples.

Variables	Big 4 audits (N = 229) mean (median)	Non-Big 4 audits (N = 95) mean (median)	p-Value for tests of differences (two-tailed)
Total Assets (RMB billion)	56.88 (14.691)	12.001 (3.391)	<0.01 <0.01
Sales (RMB billion)	53.550 (9.790)	8.791 (2.076)	<0.01 <0.01
Size	23.390 23.410	22.31 21.94	<0.01 <0.01
Leverage	0.467 0.449	0.547 0.509	<0.01 <0.01
OCF	0.089 0.089	0.073 0.063	0.10 0.01
ROA	0.040 0.041	0.024 0.026	0.09 0.03
Loss	0.153 0.000	0.326 0.000	<0.01 –
MTB	3.187 2.371	3.660 2.843	0.19 0.04
Sales growth	0.233 0.184	0.176 0.132	0.24 0.02
State ownership	0.539 0.571	0.469 0.482	<0.01 <0.01
Foreign ownership	0.053 0.002	0.047 0.002	0.63 0.65
Protect dummy	0.689 1.000	0.274 0.000	<0.01 –

Notes: The sample is comprised of A-share listed companies with H-shares from 1998 to 2008 (excluding finance industry). Size is the natural logarithm of total assets at the end of year. Leverage is the ratio of total liabilities to total assets at the end of year. OCF is current operating cash flow divided by average total assets. ROA is return on assets, measured as net income divided by average total assets. Loss is a dummy variable that takes the value of 1 if the company has an operating loss in the current year. MTB is the market-to-book ratio at the end of year. Sales growth is the percentage change in sales over the previous year. State ownership is the percentage of shares owned by state shareholders. Foreign ownership is the percentage of foreign ownership among the 10 largest shareholders at the end of the reporting period. Protect dummy is an indicator of whether firms are from protected industries. Petrochemical, energy, raw materials and transportation are viewed as protected industries. T-tests and rank-sum tests are employed to test the differences in the means and medians of variables, respectively.

Table 3
Firm characteristics and auditor choice.

Variables	Predicted sign	
Size	+	1.021(3.88)***
Leverage	–	–3.988(–2.17)**
ROA	+	–10.468(–2.17)**
Loss	–	–1.209(–2.26)**
MTB	+	0.035(0.47)
Sales growth	+	0.276(0.67)
State ownership	+	–0.325(–0.14)
Foreign ownership	+	–0.791(–0.33)
Protect dummy	+	0.597(0.78)
Year fixed effect		Yes
N		324
Pseudo-R2		0.248

Notes: The sample is comprised of A-share listed companies with H-shares from 1998 to 2008 (excluding finance industry). The results are based on the probit model. The dependent variable is the auditor choice dummy variable that takes a value of 1 if clients hire a Big 4 auditor for domestic audits in that year and 0 otherwise. The Z-statistics in parentheses are based on robust standard errors clustered by firm. Other variables are defined in Table 2. The sample is winsorized at the top and bottom 1% of firm-year observations.

** Represent statistical significance at the 5% levels, respectively.

*** Represent statistical significance at the 1% levels, respectively.

than CL firms with non-Big 4 auditors in terms of firm size, leverage and performance. In addition, CL firms with Big 4 auditors have higher mean and median state ownership than CL firms with non-Big 4 auditors, and the differences are significant at the 1% level. However, the two groups have similar foreign ownership. Finally, we also check whether Big 4 clients are more likely to be from protected industries than non-Big 4 clients. Following Aharony et al. (2000), we view petrochemical, energy and raw materials as protected industries. We also view firms in the transportation industry as protected firms in terms of monopoly practices in China.⁵ In Table 2, 68.9% of the CL firm-years with Big 4 auditors are from protected industries, compared with 27.4% of the CL firm-years with non-Big 4 audited auditors, and the difference is statistically significant at the 1% level.

3.2. Firm characteristics and auditor choice

In addition to the descriptive evidence presented in Table 2, we also run a probit regression for the pooled sample of 324 firm-year observations to investigate how firm characteristics affect auditor choice for CL firms. The dependent variable is a dichotomous indicator for Big 4 versus non-Big 4 domestic auditors. The independent variables include firm size (natural log of total assets), leverage, ROA,⁶ loss, market-to-book (MTB), sales growth, state ownership, foreign ownership and a protected industry dummy. We also control for calendar-year fixed effects. The coefficients and the corresponding z-values based on robust standard errors corrected for heteroskedasticity are presented in Table 3. We find that only size, leverage, ROA and loss have statistically significant coefficients. Consistent with

⁵ The results presented in the following tables do not change if we view transportation as an unprotected industry.

⁶ If we use OCF to replace ROA as a measure of accounting performance in Table 3, then the coefficient for OCF is –4.504 and significant at the 5% level, similar to ROA.

the auditor choice literature (e.g., Francis et al., 1999), the results in Table 3 show that Big 4 auditors are more likely to be used by large and lower-leverage firms. In addition, loss firms are less likely to have Big 4 auditors. However, inconsistent with prior research and the descriptive evidence in Table 2, the coefficient of ROA is negative and statistically significant at the 5% level. This suggests that the ROA effect may be conditional on other explanatory variables.⁷ In conclusion, the main drivers for firms using Big 4 auditors are firm size and leverage.

3.3. Auditor choice and accruals

In an attempt to capture the effects of auditor choice on accruals patterns, we use two measures of accruals according to the previous literature. First, we examine the association between auditor choice and total accruals because the literature suggests that accruals models have limited predictive accuracy and power to detect earnings management (e.g., Dechow et al., 1995; Kang and Sivaramakrishnan, 1995), and this problem may be more serious in emerging markets such as China. Total accruals (TAC) is measured as the difference between net income (NI) and cash flows from operating activities (CFO) divided by average total assets.⁸ Second, in line with prior literature (e.g., DeFond and Park, 2001; Carey and Simnett, 2006; Francis et al., 2009), we use abnormal working capital accruals (AWCA) as a second accruals measure. DeFond and Park (2001) find AWCA to be a more powerful test in comparison to using total accruals. In addition, prior research also suggests that management has the greatest discretion over working capital accruals (Ashbaugh et al., 2003; Becker et al., 1998). Specifically, the measure is:

$$AWCA_t = WC_t - [(WC_{t-1}/S_{t-1}) * S_t], \quad (1)$$

where t is the year and $t - 1$ refers to the prior year; WC_t , the non-cash working capital in the current year computed as (current assets–cash and short-term investment)–(current liabilities–short-term debt); WC_{t-1} , the non-cash working capital in the previous year; S_t , the sales in the current year; and S_t is the sales in the previous year.

We scale all variables by average total assets according to Carey and Simnett (2006). In addition to investigating the absolute amount of accruals, we also distinguish between accruals according to their sign because the literature suggests that income-increasing accruals have different risks and implications from income-decreasing accruals (e.g., Kim et al., 2003).

Table 4 reports the univariate analysis for the accruals measures for Big 4 and non-Big 4 clients. We conduct parametric (t-tests) and nonparametric tests (rank-sum tests) to examine whether the differences in accruals measures for the two groups are statistically significant. The results presented in panel A indicate that CL firms audited by Big 4 auditors have lower absolute total accruals than CL firms with non-Big 4 auditors. The mean unsigned total accruals for non-Big 4 clients is 0.083, approximately 30% more than

⁷ We regress auditor choice on ROA by itself and find that the sign for ROA is positive but insignificant. We then add the other explanatory variables one-by-one and find that LOSS and SIZE cause the coefficient of ROA to be significantly negative. Indeed, the correlation coefficient is -0.66 between ROA and Loss and 0.23 between ROA and Size.

⁸ As a robustness check, we also use industry-year median adjusted TAC (IATAC) as an alternative measure of accruals to control for the common determinants of accruals among firms within the same industry and calendar effects. The results are qualitatively identical.

Table 4

Univariate analysis of accruals.

Accruals variables		Big 4 Audits		Non-Big 4 Audits		p-value for tests of differences (two-tailed)
		N	Value	N	Value	
Panel A: Total accruals analysis						
TAC	Mean	229	0.063	95	0.083	0.01
	Median	229	0.052	95	0.063	0.12
	Std.	229	0.053	95	0.080	
TAC (TAC≥0)	Mean	42	0.041	29	0.052	0.34
	Median	42	0.023	29	0.040	0.12
	Std.	42	0.049	29	0.043	
TAC (TA<0)	Mean	187	0.068	66	0.096	<0.01
	Median	187	0.057	66	0.077	0.06
	Std.	187	0.053	66	0.089	
Panel B: Abnormal working capital current accruals analysis						
AWCA	Mean	229	0.072	95	0.123	<0.01
	Median	229	0.046	95	0.062	0.09
	Std.	229	0.078	95	0.223	
AWCA (AWCA≥0)	Mean	120	0.076	46	0.094	0.25
	Median	120	0.053	46	0.050	0.45
	Std.	120	0.084	46	0.095	
AWCA (AWCA<0)	Mean	109	0.068	49	0.151	<0.01
	Median	109	0.045	49	0.066	0.11
	Std.	109	0.071	49	0.295	

Notes: The sample is comprised of A-share listed companies with H-shares from 1998 to 2008 (excluding finance industry). TAC is measured as the difference between net income and cash flows from operating activities divided by average total assets. |TAC| is the absolute value of TAC. IATAC is the industry-year median adjusted TAC. AWCA is abnormal working capital accruals. *t*-Tests and rank-sum tests are employed to test the differences in the means and medians of variables, respectively.

Big 4 clients. From the sign of accruals, we find that Big4 clients have lower but statistically insignificant income-increasing accruals than non-Big 4 clients. In terms of income-decreasing accruals, non-Big 4 clients have more negative total accruals than Big 4 clients and the difference is statistically significant. These findings are somewhat inconsistent with the literature. For example, Francis et al. (1999) find firms with higher absolute total accruals more likely to hire Big 4 auditors, even though they have lower discretionary accruals relative to non-Big 4 clients. However, the univariate evidence presented by Becker et al. (1998) suggests this is not the case. In addition, Francis and Krishnan (1999) document that income-increasing accruals are more likely to result in conservative reporting than incoming-decreasing accruals.

In panel B of Table 4, we examine the differences in abnormal working capital accruals between the two types of sample firms. The results based on AWCA are similar to those based on total accruals. Big 4 clients have less absolute abnormal working capital accruals than non-Big 4 clients. Further tests suggest the difference is only statistically significant for income-decreasing accruals.

The purpose of our study is to compare accruals patterns across our Big 4 and non-Big 4 samples. Although we conduct univariate tests, we also use a multivariate test to control for the potential factors that simultaneously affect a firm's choice of auditor and its accruals properties. In our multivariate analysis, the accruals measures are regressed on a dummy variable indicating auditor type and several control variables.

Table 5
Regression analysis of accruals.

	[TAC] (1)	[TAC] (TAC \geq 0) (2)	[TAC] (TAC<0) (3)	[AWCA] (4)	[AWCA] (AWCA \geq 0) (5)	[AWCA] (AWCA<0) (6)
Big 4	–0.002 (–0.29)	–0.009 (–0.97)	0.007 (0.89)	–0.043 (–2.20)**	–0.007 (–0.32)	–0.079 (–1.87)*
Size	–0.006 (–1.69)*	0.014 (2.92)***	–0.011 (–3.10)***	–0.006 (–1.01)	–0.018 (–2.24)**	–0.002 (–0.17)
Leverage	0.097 (2.81)***	–0.026 (–1.02)	0.118 (4.77)***	–0.019 (–0.36)	–0.004 (–0.08)	–0.027 (–0.35)
OCF	0.331 (2.82)***	–0.604 (–5.32)***	0.562 (5.87)***	–0.403 (–2.38)**	–0.107 (–1.20)	–0.734 (–1.99)**
Loss	0.044 (3.26)***	–0.022 (–1.33)	0.065 (5.60)***	–0.025 (–1.58)	–0.048 (–3.06)***	–0.044 (–0.96)
Firm/year cluster	Yes	Yes	Yes	Yes	Yes	Yes
N	324	71	253	324	166	158
R ²	0.281	0.467	0.447	0.094	0.078	0.153

Notes: The sample is comprised of A-share listed companies with H-shares from 1998 to 2008 (excluding finance industry). This table reports estimates from pooled time-series cross-sectional OLS regressions. The dependent variables are accruals proxies. The dependent and independent variables are defined in Table 2 and Table 4. *t*-Statistics are presented in parentheses below the coefficients and are corrected for heteroskedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year level. The sample is winsorized at the top and bottom 1% of firm-year observations.

* Represent statistical significance at the 10% levels, respectively.

** Represent statistical significance at the 5% levels, respectively.

*** Represent statistical significance at the 1% levels, respectively.

The evidence presented in Table 3 indicates that firm size, leverage and firm performance significantly affect auditor choice. Therefore, we include size, leverage, loss and OCF in the regressions.⁹ We do not include ROA, because accruals are a component of earnings. We also include year dummies. Because we use unbalanced panel data, there could be both time-series and cross-sectional interdependence in the error terms of the OLS regression. There could also be heteroskedasticity. Consequently, the OLS standard errors may be biased and either overestimate or underestimate the true variability of the coefficient estimates (Petersen, 2009). Therefore, in calculating the standard errors we adjust for clusters at both the firm and year level, as recommended by Petersen (2009).¹⁰ (http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se_programming.htm). Table 5 presents the results of the multivariate regressions.

In column (1), the coefficient of Big 4 is –0.002 but insignificant, which is inconsistent with the results from the univariate tests presented in Table 4, indicating that the difference in total accruals across the two groups may be induced by other firm characteristics. In columns (2) and (3), we examine the association between auditor choice and income-increasing accruals and income-decreasing accruals after controlling for other factors. Again, the coefficients for Big 4 are not statistically significant.

⁹ We do not include sales growth, MTB, state ownership, foreign ownership or the protected industry dummy in the regression because these variables are not correlated with the choice of auditor (see Table 3). In the matched propensity analysis, these variables are controlled for in the sense that they are included in the auditor choice selection model. Finally, as a robustness check, we include these variables in the regression and our conclusions remain robust after controlling for these effects.

¹⁰ Petersen (2009) documents that standard errors clustered on multiple dimensions are unbiased and produce correctly sized confidence intervals for panel data in corporate finance applications. We use the Stata command *cluster2*, downloaded from Mitchell Petersen's website: (http://www.kellogg.northwestern.edu/faculty/petersen/htm/papers/se/se_programming.htm).

In columns (4)–(6), we examine the relationship between auditor choice and abnormal working capital accruals. The coefficient for Big 4 is -0.043 and significant at the 5% level (the t -statistic is -2.20) in column (4), suggesting that Big 4 clients have lower unsigned discretionary accruals than non-Big 4 clients. In columns (5) and (6), we examine the effect of auditor choice on income-increasing and income-decreasing discretionary accruals. Both Big 4 coefficients are negative but only statistically significant for income-decreasing accruals, consistent with the results from the univariate tests in Table 4. Taken together, the evidence from the multivariate regressions suggests that CL firms with Big 4 auditors have lower unsigned discretionary accruals than total accruals compared with CL firms with non-Big 4 auditors. Meanwhile, the differences in income-decreasing discretionary accruals across the two groups of sample firms are larger than income-increasing accruals.

The significant difference between income-decreasing accruals and income-increasing accruals is somewhat inconsistent with the US literature. The results could be induced by managers' strong incentives to "take a big bath" in the Chinese stock market (Li and Li, 2005). Because earnings quality is impaired if earnings are either overstated or understated, our evidence suggests that CL firms with Big 4 auditors are likely to have higher earnings quality than CL firms with non-Big 4 auditors.

Nevertheless, we aim to understand why CL firms audited by non-Big 4 auditors have more negative abnormal accruals than CL firms audited by Big 4 auditors. First, we assume that auditors only have incentives to contain their clients' accruals choice when their earnings management exceeds a certain threshold. Further, we predict that the audit quality differential between Big 4 and non-Big 4 should be more significant for extremely large abnormal accruals. To test this prediction, in Fig. 1 we plot the frequency distribution based on deciles of signed abnormal working capital accruals (AWCA) for Big 4 and non-Big 4 clients, respectively.

In Fig. 1, for the lowest interval (Interval 1, the lowest 10%) of AWCA, the frequency is 16% for non-Big 4 clients and 8% for Big 4 clients. For the highest interval (Interval 10, the highest 10%) of AWCA, the frequency is 14% for non-Big 4 and 8% for Big 4. That is, 30% of non-Big 4 clients have either the lowest negative AWCA or the highest positive AWCA, whereas this amount is only 16% for Big 4 clients. This preliminary evidence suggests that Big 4 auditors are more effective in deterring clients from extreme income-increasing or income-decreasing earnings management than Non-Big 4 auditors.

According to our previous findings, there is an insignificant difference in income-increasing AWCA between Big 4 and Non-Big 4 clients. One reason for this finding may be the small sample size, which reduces the power of the tests. After all, according to

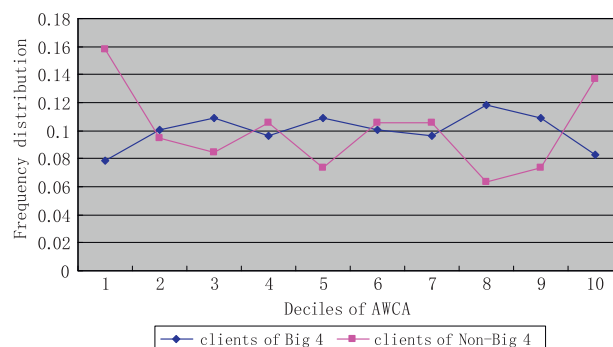


Fig. 1. CL Clients' frequency distribution based on deciles of abnormal working capital accruals (AWCA).

Table 6

Analysis of “big bath” and the reversal of abnormal working capital accruals: CL clients of Big 4 versus CL clients of non-Big 4.

	The lowest 10% of AWCA in year t (Decile 1)		
	Big 4 mean (median) [N]	Non Big 4 mean (median) [N]	Difference tests (p -value, one-tailed)
$\Delta AWCA_{t+1}$	0.228 (0.220) [17]	0.382 (0.334) [12]	0.10 0.09
$\Delta AWCA_{t+2}$	0.265 (0.230) [14]	0.404 (0.343) [10]	0.07 0.06

Notes: The sample is comprised of A-share listed companies with H-shares from 1998 to 2008 with extremely negative (the lowest 10%) AWCA. $\Delta AWCA_{t+1}$ is calculated as the difference between $AWCA_{t+1}$ and $AWCA_t$. $\Delta AWCA_{t+2}$ is calculated as the difference between $AWCA_{t+2}$ and $AWCA_t$. t -Tests and rank-sum tests are employed to test the differences in the means and medians of variables (one-tailed), respectively.

Fig. 1 and anecdotal evidence, the audit-quality differential between high-quality auditors and low-quality auditors is only apparent when clients have extreme opportunistic earnings management.

For negative (income-decreasing) AWCA, we conjecture that clients have “big bath” incentives, and Big 4 auditors are more effective than non-Big 4 auditors in constraining the “big bath” behavior of clients. However, other factors (e.g., losses) could induce non-Big 4 clients to have more negative abnormal accruals than Big 4 clients.

The purpose of “taking a big bath” is to reverse accruals in the future. Accordingly, we predict that future reversals in abnormal accruals should be high for “big bath” clients. To examine this argument, we calculate the change in AWCA from year t to year $t + 1$ (and year $t + 2$) for extremely negative AWCA groups and compare the difference in $\Delta AWCA$ between Big 4 and non-Big 4 clients. Table 6 presents the results.

Clients with large negative abnormal working capital accruals in year t have larger reversals in year $t + 1$ and year $t + 2$. Table 6 shows that the mean (median) change in AWCA in year $t + 1$ ($\Delta AWCA_{t+1}$) is 0.228 (0.220) and 0.382 (0.334) for Big 4 and non-Big 4 clients, respectively. A one-tailed t -test (rank sum test) shows the difference is significant at the 10% level. The analysis of $\Delta AWCA_{t+2}$ shows similar results. The evidence presented in Fig. 1 and Table 6 suggests that non-Big 4 clients are more likely to “take a big bath” than Big 4 clients. Although we cannot completely rule out alternative explanations, our evidence implies that Big 4 auditors provide higher-quality audits for CL firms than non-Big 4 auditors.

4. Additional tests

4.1. Auditor choice and accruals patterns for AB firms

So far, we find that CL firms that appoint Big 4 firms for domestic audits have lower absolute abnormal working capital accruals than other CL firms. Our explanation is that domestic member firms of the international Big 4 need to take the reputation of their Hong Kong counterparts into account because they share the same international brand name and therefore have an incentive to constrain their clients’ aggressive reporting behavior. One might conjecture that the differences in the two groups’ accruals patterns could be

Table 7

Regression analysis of accruals using the “A+B share” sample.

Dependent variables	TAC (1)	TAC (TAC ≥0) (2)	TAC (TAC<0) (3)	AWCA (4)	AWCA (AWCA≥0) (5)	AWCA (AWCA<0) (6)
Big 4	0.021 (2.94)***	0.015 (2.45)**	0.012 (1.55)	−0.010 (−0.64)	−0.009 (−0.70)	−0.021 (−0.70)
Size	−0.005 (−1.49)	0.001 (0.31)	−0.011 (−3.69)***	−0.016 (−2.02)**	−0.005 (−0.74)	−0.017 (−1.17)
Leverage	0.091 (3.74)***	0.014 (0.78)	0.113 (4.40)***	0.160 (2.95)***	0.066 (2.80)***	0.180 (2.70)***
OCF	0.218 (3.19)***	−0.619 (−9.22)***	0.599 (12.39)***	−0.243 (−1.81)*	−0.286 (−2.69)***	−0.254 (−1.15)
Loss	0.053 (9.13)***	−0.041 (−5.02)***	0.085 (11.60)***	0.039 (1.29)	−0.021 (−2.23)**	0.038 (0.67)
Firm/Year cluster	Yes	Yes	Yes	Yes	Yes	Yes
N	755	229	526	755	387	368
R ²	0.316	0.543	0.523	0.138	0.095	0.139

Notes: The sample is comprised of A-share listed companies with B-shares from 1998 to 2006 (excluding finance industry). This table reports estimates from pooled time-series cross-sectional OLS regressions. The dependent variables are accruals proxies. The dependent and independent variables are defined in Table 2 and Table 4. *t*-statistics are presented in parentheses below the coefficients and are corrected for heteroskedasticity and cross-sectional and time-series correlation using a two-way cluster at the firm and year level. The sample is winsorized at the top and bottom 1% of firm-year observations.

* Represent statistical significance at the 10% levels, respectively.

** Represent statistical significance at the 5% levels, respectively.

*** Represent statistical significance at the 1% levels, respectively.

created by dual-audits per se. That is, two Big 4 auditors may have higher audit quality than other auditor pairs (Francis et al., 2009). Fortunately, the Chinese setting allows us to rule out this alternative explanation, because Chinese-listed companies with B-shares were also required to conduct a dual-audit before 2007.¹¹ Unlike the Hong Kong audit market, the B-share audit market is greatly affected by Chinese institutional forces. For example, it has the same monitors (the two stock exchanges and the CSRC) and similar investors to the A-share audit market.¹² Therefore, if auditors have a similar incentive to conduct audits in both the B-share and the A-share markets, and if Big 4 firms do not supply higher audit quality in the A-share market, as documented in the literature (Liu and Zhou, 2007), then we would not expect accruals patterns to be strongly associated with auditor choice for B-share firms. In examining the propensity to issue modified audit opinions, Li and Wu (2003) find no evidence that supplementary auditing in the B-share market improves audit quality.

To analyze this issue, we examine the association between auditor choice and accruals patterns using a sample of B-share listed firms for the period 1998–2006. We identify 89 AB firms with 755 firm-year observations. Twenty-four and a half percent (185 of 755) of the AB firm-years hired Big 4 auditors for domestic audits. The estimated results are presented in Table 7. The models, variable definitions and estimation methods in Table 7 are consistent with those in Table 5. The results in column (1) show that the coefficient for Big 4 is positive and highly significant at the 1% level, indicating that the B-share clients of Big 4 auditors have higher accruals than the B-share clients of non-Big 4 auditors. Further tests

¹¹ On September 12, 2007, the CSRC released a notice that cancelled the requirement for dual audits in the B-share market.

¹² Before 2001, Chinese listed companies issued B-shares (denominated in foreign currencies) to foreign investors. Since February 19, 2001, domestic investors have been allowed to use their legitimate holdings of foreign currency to trade B-shares according to the announcement issued by the CSRC.

reported in columns (2) and (3) suggest that AB firms audited by Big 4 firms have significantly higher income-increasing total accruals than AB firms audited by non-Big 4 firms. Considering the results using abnormal working capital accruals in columns (4)–(6), three of the coefficients for Big 4 are negative but insignificant, suggesting that there is no systematic association between auditor choice and discretionary accruals. Overall, the evidence reported in Table 7 suggests that Big 4 auditors are not more effective at constraining clients' aggressive earnings reporting than non-Big 4 auditors in the B-share market, consistent with our prediction and with prior studies in China. The evidence also indicates that dual-audits per se do not improve clients' quality of earnings, contrary to the findings reported by Francis et al. (2009).

4.2. Analysis of industry-adjusted accruals components

In Tables 4 and 5, we find some evidence that CL firms with non-Big 4 auditors are more likely to understate their earnings than CL firms with Big 4 auditors. A natural question is how CL firms manage their earnings. We aim to answer this by examining the differences in the accruals components between clients of Big 4 auditors and clients of non-Big 4 auditors. Specifically, we compute four accruals components: depreciation and amortization (DEPAMO), provision for asset impairment (PAIM), annual change in inventory (ΔINV) and annual change in accounts receivable (ΔAR). To remove size and industry effects, the four accruals components are scaled by average total assets and adjusted by industry-year median values. In Table 8, we present the four accruals components separately for Big 4 and non-Big 4 subsamples and conduct difference tests. The results show that the mean and median DEPAMO and ΔAR are similar for the two groups. However, the mean (median) PAIM is 0.005 (–0.000) for Big 4 clients, which is lower than for non-Big 4 clients. The differences are statistically significant, indicating that clients of non-Big 4 auditors write down more asset impairment losses. The finding that Big 4 audit clients have a lower provision for impairment losses may explain why CL firms with Big 4 auditors have lower income-decreasing accruals than CL firms with non-Big 4 auditors. In terms of the change in inventory, although the t-test suggests that Big 4 audit clients have a greater positive increase in inventory than non-Big 4 clients (the *p*-value is 0.04), the rank-sum test indicates that the difference in ΔINV is insignificant (the *p*-value is only 0.36). In summary, the evidence presented in Table 8 shows that asset impairment is an

Table 8
Analysis of industry-adjusted accruals components.

Accruals components	Big 4 Audits (N=229)		Non-Big 4 Audits (N=95)		p-Value for tests of differences (two-tailed)	
	Mean	Median	Mean	Median	t-test	Rank-sum test
DEPAMO	0.011	0.009	0.010	0.006	0.37	0.28
PAIM	0.005	–0.000	0.009	0.002	0.07	0.04
ΔINV	0.010	0.000	–.001	0.001	0.04	0.36
ΔAR	0.016	0.008	0.019	0.015	0.57	0.63

Notes: The sample is comprised of A-share listed companies with H-shares from 1998 to 2008 (excluding finance industry). DEPAMO is the industry-year adjusted depreciation and amortization scaled by average total assets in the year. PAIM is the industry-year adjusted provision for asset impairment scaled by average total assets in the year. ΔINV is the industry-year adjusted annual change in inventory scaled by average total assets. ΔAR is the industry-year adjusted annual change in accounts receivable scaled by average total assets in the year. T-tests and rank-sum tests are employed to test the differences in the means and medians of variables, respectively.

important factor in explaining the accruals pattern differential between clients of Big 4 and non-Big 4 auditing firms.

4.3. Using a matched sample

There is an endogeneity concern for the above findings because auditor choice is not random. Big 4 firms are more likely to choose clients with high earnings quality to mitigate reputation and/or litigation losses. Clients with lower earnings quality may also prefer to select non-Big 4 auditors to reduce costs (Johnson and Lys, 1990). To an extent, this self-selection bias could be an alternative explanation for the difference in the accruals patterns of Big 4 and non-Big 4 clients. Many previous studies apply the Heckman two-stage model to correct for this selectivity problem. However, Francis and Lennox (2008) point out that many accounting researchers have been misusing the Heckman model. As an alternative and preferable technique, Francis and Lennox (2008) suggest using “matched propensity scores,” thus avoiding the need to impose any exclusion restrictions as in the Heckman model. Several recent auditing studies have applied the matched propensity approach (e.g., Chan and Wu, 2011; Lawrence et al., 2011).

Following Francis and Lennox (2008), we implement the matching technique by first estimating a probit model to predict the propensity for CL firms to choose Big 4 auditors, using the pooled 324 CL firm-year observations. The explanatory variables are the same as those in Table 3. We then sort the sample by the predicted probabilities. For each Big 4 client-year observation, we identify the two observations that have the closest predicted probabilities and adopt the following matching rule: (a) if only one of the two potential matches is a non-Big 4 client, then we choose that one as the match; (b) if both potential

Table 9

Univariate analysis of accruals using a propensity-score matched sample.

Accruals variables		Big 4 Audits	Non-Big 4 Audits	p-value for tests of differences (two-tailed)
<i>Panel A: Total accruals analysis</i>				
TAC	Mean	0.063	0.083	0.12
	Median	0.049	0.057	0.26
	N	73	73	
TAC (TAC ≥ 0)	Mean	0.047	0.040	0.63
	Median	0.032	0.033	0.81
	N	20	20	
TAC (TA < 0)	Mean	0.069	0.097	0.06
	Median	0.061	0.077	0.13
	N	53	53	
<i>Panel B: Abnormal working capital current accruals analysis</i>				
AWCA	Mean	0.082	0.137	0.07
	Median	0.059	0.092	0.08
	N	73	73	
AWCA (AWCA ≥ 0)	Mean	0.097	0.098	0.98
	Median	0.068	0.078	0.35
	N	36	34	
AWCA (AWCA < 0)	Mean	0.067	0.171	0.06
	Median	0.042	0.111	0.07
	N	37	39	

Notes: The sample includes 73 Big 4 client-year observations and 73 matched observations of non-Big 4 client-years using the propensity score matching approach. T-tests and rank-sum tests are employed to test the differences in the means and medians of variables (two-tailed), respectively.

Table 10

Regression analysis of accruals using a propensity-score matched sample.

	TAC (1)	TAC (TAC \geq 0) (2)	TAC (TAC<0) (3)	AWCA (4)	AWCA (AWCA \geq 0) (5)	AWCA (AWCA<0) (6)
Big 4	−0.013 (−1.87)*	0.003 (0.23)	−0.013 (−1.44)	−0.068 (−2.91)***	−0.002 (−0.05)	−0.114 (−1.94)*
Size	−0.012 (−1.48)	0.021 (2.32)**	−0.199 (−1.71)*	0.001 (0.04)	−0.011 (−0.85)	0.005 (0.34)
Leverage	0.137 (2.56)**	−0.097 (−1.58)	0.169 (2.87)***	−0.014 (−0.17)	0.044 (0.38)	−0.053 (−0.51)
OCF	0.372 (2.43)**	−0.678 (−4.15)***	0.627 (2.81)***	−0.658 (−2.45)**	−0.033 (−0.14)	−1.204 (−2.32)**
Loss	0.053 (2.78)***	−0.032 (−2.96)***	0.077 (4.54)***	−0.019 (−0.81)	−0.022 (−0.76)	−0.051 (−0.87)
Firm/Year cluster	Yes	Yes	Yes	Yes	Yes	Yes
N	146	40	106	146	70	76
R ²	0.338	0.552	0.469	0.110	0.024	0.209

Notes: The sample includes 73 Big 4 client-year observations and 73 matched non-Big 4 client-year observations using the propensity score matching approach. This table reports estimates from pooled time-series cross-sectional OLS regressions. The dependent variables are accruals proxies. The dependent and independent variables are defined in Table 2 and Table 4. *t*-statistics are presented in parentheses below the coefficients and are corrected for heteroskedasticity and cross-sectional and time-series correlations, using a two-way cluster at the firm and year level. The sample is winsorized at the top and bottom 1% of firm-year observations.

* Represent statistical significance at the 10% levels, respectively.

** Represent statistical significance at the 5% levels, respectively.

*** Represent statistical significance at the 1% levels, respectively.

matches are non-Big 4 clients, then we choose the one with the closest predicted probability; and (c) if both potential matches are Big 4 clients, then we determine that there is no suitable match. This rule ensures that we obtain extremely close matches, implying that the scored distributions are virtually identical for Big 4 and non-Big 4 clients. We are able to identify 73 pairs of firm-year observations. We then use these 146 observations to compare the accruals patterns for Big 4 CL and non-Big 4 CL clients.

Tables 9 and 10 present the results for the univariate analysis and multivariate analysis, respectively. The results in Table 9 show that Big 4 clients have a smaller absolute amount of accruals, especially for abnormal working capital accruals. In Table 10, the coefficients for Big 4 are negative and statistically significant in column (1) and column (4), reinforcing the conclusion from the univariate analysis. From the signed accruals tests, we also find that non-Big 4 clients have more negative abnormal working capital accruals than Big 4 clients, similar to the findings in Table 5. Therefore, the evidence from the matched-pairs technique supports our conclusion that Big 4 audits are associated with firms' accruals patterns.

5. Conclusion

This study examines the association between auditor choice and accruals properties using a sample of Chinese firms that cross-list their shares on HKEx over the period 1998–2008. We find that the clients of Big 4 auditors have lower unsigned accruals, especially discretionary accruals, relative to the clients of non-Big 4 auditors. In addition, we find that non-Big 4 clients are more likely to understate their earnings than Big 4 clients. The results are robust to controlling for firm characteristics and using a matched sample. Moreover, using a sample of listed firms with B-shares, we find that the results cannot be

explained by dual-audits per se. Taken together, our evidence suggests that Big 4 firms play a meaningful role in enhancing the earnings quality of cross-listed firms, which helps to explain why cross-listed firms have higher earnings quality than their domestic counterparts, as documented in the extant literature. The findings also suggest that reputation shaped by the institutional environment can change Big 4 incentives in an emerging market.

The study is subject to numerous caveats. The most significant limitation is the small sample size, and the results should therefore be interpreted with caution. In addition, we assume that the observed difference in the accruals patterns of Big 4 audit clients and non-Big 4 audit clients is driven by the auditing quality differential between Big 4 and non-Big 4 firms. It may be that we do not adequately control for other unobserved differences between the two groups and that these may be driving the observed differences in accruals patterns.

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Is investment–cashflow sensitivity a good measure of financial constraints?

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ABSTRACT

Since Fazzari et al. (1988), investment–cashflow sensitivity has been one of the most important indicators for testing and measuring the external financial constraints of corporations. This study analyzes the effect of changes in the relative cost of internal and external financing on investment decisions in response to tax changes. China's 2004 VAT reform decreased companies' effective tax rates, leading to an increase in operating cashflow. This, in turn, reduced the internal cost of financing and the value of the tax shield and increased the cost of debt financing. This study shows that in the case of the VAT reform, investment–cashflow sensitivity increased significantly, whereas cash holdings–cashflow sensitivity and borrowing-slack sensitivity did not significantly change. We conclude that investment–cashflow sensitivity is not an effective measure of financial constraints under information asymmetry, but

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cash–cashflow sensitivity and borrowing-slack sensitivity may be useful alternatives.

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1. Introduction

This paper investigates the internal validity of investment–cashflow sensitivity to measure financial constraints under information asymmetry, using the opportunity provided by the Value Added Tax (VAT) reform in China. Since Fazzari et al. (1988), investment–cashflow sensitivity has been one of the most important indicators used to measure financial constraints and one of the basic models used to test Myers and Majluf's (1984) pecking order hypothesis. Fazzari et al. (1988) state that if there is no difference between the cost of internal and external financing, investment and financing is irrelevant. However, the presence of information asymmetry increases the relative cost of external financing. The higher the degree of information asymmetry, the greater the external financial constraints and investment will rely more on internal financing, i.e., operating cashflow. Therefore, investment–cashflow sensitivity can be used to measure financial constraints under information asymmetry.

However, Poterba (1988), Cleary (1999), Erickson and Whited (2000), Kaplan and Zingales (1997, 2000), Almeida et al. (2004), Alti (2003) and Bushman et al. (2008) have questioned the validity of this indicator from different perspectives. Based on an analytical model, Kaplan and Zingales (1997, 2000) show that investment–cashflow sensitivity cannot effectively measure the cost of external financial constraints. Bushman et al. (2008) argue that the existing investment–cashflow sensitivity model actually reflects the correlation between investment in fixed assets and working capital. As a result, these authors have proposed competing indicators.

This study uses an exogenous event, VAT reform, to investigate the internal validity of investment–cashflow sensitivity as a measure of financial constraints. Internal validity is the ability of a research design to rule out other theories. The stronger the exclusiveness of the research design, the higher the internal validity. Although previous studies assume that a company's operating cashflow is given, operating cashflow is affected by both the profitability of a company and the level of corporate taxes. Under tax reform, companies receive tax subsidies and their operating cashflow increases. If firms invest more and there is an increasing relationship between investment and operating cashflow, this obviously cannot be explained by changes in the company's financial constraints under information asymmetry. Exogenous tax reform seldom changes the inherent information asymmetry between companies and capital markets, including financial constraints. It does, however, change the extent to which investment decisions depend on operating cashflows. If so, investment–cashflow sensitivity may not always reflect the status of information asymmetry-based external financial constraints, i.e. it is a measure with less internal validity.

The remainder of the paper is organized as follows. Section 2 reviews the existing literature. Section 3 presents our hypothesis development. Section 4 provides the sample selection and description of variables. Section 5 presents the empirical test results and analysis, and Section 6 concludes.

2. Literature review

In frictionless capital markets, there is no difference between internal and external financing costs, which implies that there is no relationship between investment and financing. It is also a basic assumption of Modigliani and Miller's (1958) capital structure irrelevance theory. However, under asymmetric information (Akerlof, 1970), external financing will cause adverse selection and reduce firm value. Therefore, companies have to give priority to internal financing, then to debt financing and finally to equity financing, which is called pecking order theory (Myers and Majluf, 1984).

Pecking order theory and trade-off theory are two competing views on capital structure and many studies have focused on which theory has more explanatory power (Fama and French, 2002; Shyam-Sunder and Myers, 1999; Frank and Goyal, 2000, 2008). Other studies have tested the extended pecking order hypothesis, for example, the market reaction to SEOs (Smith, 1986; Eckbo et al., 2006) and the financial constraints hypothesis (Smith, 1986; Eckbo et al., 2006).

In their seminal paper, Fazzari et al. (1988) argue that pecking order theory can explain companies' investment behavior when facing external financial constraints. Information asymmetry and agency costs increase the cost of external financing. To minimize the cost of capital, companies will prefer internal financing from their operating cashflow. When a company's operating cashflow cannot meet its investment needs, the company will turn to external financing. Therefore, the higher the investment–cashflow sensitivity, the higher the implicit costs of external financing and the higher the financial constraints. Investment–cashflow sensitivity has been used as an important measure of financial constraints in finance and accounting research (Biddle and Hilar, 2006; Beatty et al., 2007; Cleary et al., 2007; Lyandres, 2007; Polk and Sapienza, 2008; Pulvino and Tarhan, 2006; McNichols and Stubben, 2008).

Although the theory of financial constraints is widely accepted by scholars, there is considerable controversy about the validity of using investment–cashflow sensitivity as a proxy. Kaplan and Zingales (1997, 2000) show that after controlling for growth opportunities, the relationship between investment and operating cashflow is uncertain. Bushman et al. (2008) argue that changes in operating cashflow and increased investment in fixed assets must be accompanied by an increase in working capital. Therefore, the investment–cashflow sensitivity may reflect, to a certain extent, the relationship between investment in fixed assets and working capital. This is a natural phenomenon arising from the expansion of a company's investment and it cannot be used to explain the company's cost of external financing.

Chinese scholars have conducted several studies to examine whether investment–cashflow sensitivity can be used to measure the financial constraints of listed companies in China, with inconsistent conclusions. Feng (1999) divide their sample into two groups according to the existence and non-existence of financial constraints, using the standard of whether the company is one of the 300 pivotal enterprises appointed by the State Economic and Trade Commission, one of the 212 companies organized under the main bank system's support, or one of the 120 state pivotal enterprise groups. They investigate the effect of cashflow on investment levels in these samples and find that government-sponsored enterprises are almost free from internal cashflow. Wei and Liu (2004) show that financial constraints and investment–cashflow sensitivity have a significant positive relationship. Guo and Ma (2009) find that compared with state-owned listed companies,

private companies' investments have higher cashflow sensitivity and investment–cashflow sensitivity is greater during periods of low bank lending rates than during periods of high bank lending rates. On the contrary, Guo and He (2008) find that investment–cashflow sensitivity has a non-binding relationship with financial constraints, in a sample divided according to the level of state ownership, return on net assets and enterprise size.

Academics have also studied the factors affecting financial constraints. For example, Lian and Cheng (2007) find that companies with fewer financial constraints show a stronger investment–cashflow sensitivity and tend to over-invest. Whereas companies facing more serious financial constraints suffer from under-investment, with information asymmetry as the main cause of cashflow sensitivity. Wang et al. (2008) confirm that higher corporate financial constraints are linked to higher investment–cashflow sensitivity, but they find that asymmetric information theory cannot fully explain the relationship between financial constraints and investment–cashflow sensitivity.

These mixed findings are likely due to endogeneity problems and fail to take into account China's tax system and its reforms, which could lead to measurement bias when using investment–cashflow sensitivity to measure financial constraints. Based on the results of our analytical model, we find that investment–cashflow sensitivity increases during the tax reform, which is indicative of increased financial constraints. We also compare this result to some other measurements of financial constraints to identify more robust measures.

3. Hypothesis development

3.1. Institutional background of VAT reform

To minimize endogeneity problems, we use China's VAT reform pilot in 2004 and analyze its effect on investment–cashflow sensitivity. VAT has been the most important source of revenue, accounting for more than 35% of state tax revenues since 1994. From 1994 to 2008, production-based VAT, calculated as sales revenue minus the purchasing cost of raw materials was implemented in China.

In 2004, the Ministry of Finance and State Administration of Taxation issued "Several Issues on Value-Added Tax Provisions in Northeast China" (Tax [2004] No. 156), allowing general taxpayers in six industries in Northeast China (including Heilongjiang, Jilin, and Liaoning Province) to recover input VAT on purchases of fixed assets. This was a pilot for changing from production-based VAT to consumption-based VAT (hereinafter abbreviated as the VAT pilot) beginning in July 2004. In 2005, the input tax deduction from fixed assets changed from an incremental deduction to a full deduction. In 2006, the pilot was expanded to Central and Western China. In January 2009, the VAT reform was implemented nationwide.

There are several advantages in studying the VAT pilot in China: (1) As a national policy, VAT is completely exogenous to corporate decision-making which avoids endogeneity issues. At the same time, it is unlikely to affect the information asymmetry between capital markets and companies, or at least will not lead to an increase in information asymmetry. (2) The pilot was implemented only in Northeast China, leaving companies in other regions still facing production-based VAT, providing a natural control sample. (3) Value-Added Tax should change neither the company's investment spending nor its income

tax rate,¹ therefore the VAT reform should primarily affect operating cashflows in the current period, namely internal financing costs, without affecting external financing costs.² Based on the above features, if there is a significant change in investment–cashflow under the VAT reform, it will challenge the internal validity of investment–cashflow sensitivity as proxy for financial constraints.³

3.2. VAT and investment–cashflow sensitivity

As mentioned earlier, China implemented production-based VAT before the Value-Added Tax reform, and does not allow companies to recover input tax on the purchase of fixed assets from the output tax on products and services in the same period. Because China's VAT is based on prices excluding tax, VAT is not part of current costs and is not reflected in the income statement, thus it will not affect income tax payable in the current period. Although firms are not allowed to recover the VAT on fixed assets, it can be included in the initial value of fixed assets. Thus, VAT will reduce income tax liability in the future period through depreciation, thereby reducing corporate income tax costs. Thus, under production-based VAT, product sales and VAT on raw materials will not affect the company's operating profit and operating cashflow. Input VAT on the purchase of fixed assets does not affect the company's procurement operating cashflow, but can increase future operating cashflow by increasing depreciation.

Under production-based VAT, the company's operating cashflow after tax and the VAT due after making an investment can be expressed as follows:

$$OCF_1 = NI_1 + FC_1 = \left[(S - VC) - \frac{I(1 + \tau_v)}{N} \right] (1 + \tau_c) + \frac{I(1 + \tau_v)}{N}, \quad (1)$$

where NI_1 represents net profit after tax; FC_1 represents the amount of depreciation of investments for each year of operation under production-based VAT; S is sales revenue; VC is raw material costs; and I is the amount of investment in fixed assets. The corporate income tax rate and VAT tax rate are expressed as τ_c , τ_v , respectively, assuming fixed asset

¹ Since the income tax reform in 2008, the change in the tax rate affects the company's future profitability and external financing tax shield while changing the company's cost of external financing. As this situation does not provide a clean experimental environment, we did not use the comprehensive VAT reform in 2009 as the research event in this study. The value-added tax reform in 2004 can better explore the relationships between the pilot sample companies and investment financing when the income tax remains unchanged.

² The VAT reform reduces future operating cashflows. Investors will decrease the expected future earnings of current investment, which leads to higher financing costs, but will also expect the return on investment of projects to change due to lower investment costs and higher revenue under the VAT reform. Therefore, these factors do not directly result in future expectation declines and higher external finance costs. In addition, the reduction in internal financing does not mean that financial constraints increase, particularly as the result of an increase in information asymmetry. As emphasized in the classical theory of financial constraints, it is information asymmetry that results in the cost difference between internal and external financing. Under the VAT reform, there is no reason to believe that an increase in investment–cashflow sensitivity is due to asymmetric information.

³ Tax subsidies may lead to increased profitability, and thus banks should be more willing to provide loans to businesses. Revitalization of the Northeast should then lead to companies having easier access to bank loans. These effects will result in a reduction in corporate financial constraints, but will not result in an increase in financial constraints based on the investment–cashflow model. Therefore, the effect of these factors is a “bias against”, and will not affect the conclusions of this study. The study is also based on previous research on the measurement of financial constraints. We examine the time-series variation of the dividend policy, asset-liability ratio and the average cash holdings in the pilot areas and non-pilot areas, and we do not find any systematic differences around the existence of the pilot in different regions. The descriptive evidence suggests that events that are exogenous to the VAT reform do not lead to an increase in financial constraints.

investment is entirely from internal financing. Using straight-line depreciation, the depreciation period is N . Because sales (purchases) receive (pay) an equivalent output tax (input tax), VAT does not affect the company's current operating cashflow.

Under the consumption-based VAT system, VAT input tax (hereinafter abbreviated as input tax) on the purchase of fixed assets can be recovered in the current period, which directly reduces the company's current Value-Added Tax expenditure and increases the company's current operating cashflow. At the same time, because VAT is not included in the initial value of fixed assets, this leads to a reduction in depreciation, directly increasing the company's profitability and income tax expense during the period and reducing future operating cashflow.

Under consumption-based VAT, the company's operating cashflow after tax and VAT on investment management can be expressed as

$$OCF_2 = NI_2 + FC_2 = \left[(S - VC) - \frac{I}{N} \right] (1 - \tau_c) + \frac{I}{N}, \quad (2)$$

where NI_2 refers to net profit after tax, and FC_2 represents the amount of depreciation during each operating year after an investment is made under consumption-based VAT.

Clearly, compared with Eq. (1), VAT is not included in the depreciation of fixed assets, therefore the operating cashflow declines during the period under consumption-based VAT. The marginal decline is

$$\Delta OCF = -\frac{I\tau_v\tau_c}{N}. \quad (3)$$

However, under the consumption-based VAT system, VAT on fixed assets is deductible in the current period, which directly increases the operating cashflow of the current period:

$$\Delta OCF_{INV} = I\tau_v. \quad (4)$$

The effect of the VAT reform on net operating cashflow is then

$$I\tau_v - \sum_{t=1}^N \frac{I\tau_v\tau_c/N}{(1+R)^t}, \quad (5)$$

where R is the discount rate. The remaining variables are defined earlier.

Eq. (5) has two important implications: First, the VAT reform, in essence, reduces the cost of investment by way of tax subsidies, which has a positive effect. Second, the depreciation of fixed assets decreases after the VAT reform, thereby reducing future operating cashflows, which has a negative effect. As the income tax rate is always less than 1, the VAT reform can directly increase the companies' operating cashflows. This means that the VAT reform can directly increase companies' current operating cashflow.

3.3. Analysis of the effect of VAT transform on investment–cashflow sensitivity

To determine whether the VAT reform affects companies' investment–cashflow sensitivity, based on Kaplan and Zingales (1997), we set the investment objective function as

$$\max[F(I) - C(E, K) - I], \quad (6)$$

C refers to financial constraints, a convex function of investment, which means the first derivative is greater than 0 and the second derivative is greater than 0. F is the return

function of the investment, which is concave, thus the first derivative is greater than 0 and the second derivative is less than 0. E represents the amount of external financing, that is, $I = E + W$, where W is internal operating cashflow. K is the difference between the cost of external financing and internal financing. To maximize investment gains, $F(I)$, the scale of investment I should be:

$$F_1(I) = 1 + C_1(I - W, k), \quad (7)$$

where the first and the second subscript refer to the first derivative and second derivative of I (and hereinafter).

The scale of the effect of internal financing capacity on investment can be obtained by the implicit functional derivative of Eq. (7):

$$\frac{dI}{dW} = \frac{C_{11}}{C_{11} - F_{11}} > 0. \quad (8)$$

Because C is a convex function and F is a concave function, investment and operating cashflow have a positive relationship in an incomplete market.

Operating cashflow increases under the VAT reform, that is, $E = I - (w + It)$,⁴ where, supposing t_v is the VAT rate, the drawback tax rate can be defined as $t = \frac{t_v}{1+t_v}$. Using the implicit functional derivation method, we obtain

$$\frac{dI}{dW} = \frac{C_{11}}{(1-t)C_{11} - F_{11}} > 0. \quad (9)$$

Clearly, if (9) > (8), the VAT reform will increase the company's investment–cashflow sensitivity. Thus, this paper proposes the following research hypothesis:

Hypothesis. The VAT reform significantly increases companies' investment–cashflow sensitivity.

4. Sample selection and variable definitions

4.1. Sample and control sample selection

The sample is selected from A-share companies listed on China's stock exchanges and data is extracted from the CCER database. To isolate the influence of the VAT reform, we refer to the methodology used by Aharony et al. (2000). The sample period is from 2001 to 2006. Enterprises in the three Northeastern provinces (Jilin, Liaoning, Heilongjiang) that meet the conditions are selected as the research sample, and enterprises that meet the conditions and are from other areas are selected as the control sample. We investigate whether investment–cashflow sensitivities increased significantly in listed companies from the three Northeast provinces following the VAT reform.

To ensure the validity of our conclusions, we exclude the following firm-year data:

⁴ To simplify the discussion, we assume that fixed assets are purchased at the end of the year, thus we do not need to consider the influence of depreciation on operating cashflow during the period in which the asset was purchased. On the one hand, depreciation occurs mainly in future operating periods. On the other hand, a long-term service life limits the possible effect of the tax shield on operating cashflow, even if there is depreciation in the current period. Including the investment period depreciation factors alters the formulas slightly but does not affect the conclusions.

Table 1

Sample distribution by industry.^a

	Equipment manufacturing industry	Petroleum, chemical industry	Metallurgy industry	Transportation and equipment manufacturing	Agricultural product processing industry	Total
Northeast	30	84	30	36	48	228
Others	498	714	216	156	540	2124
Total	528	798	246	192	588	2352

^a Because the industry code in the CCER database is only to level 3, firms in the ship manufacturing and automobile manufacturing industries all belong to “C75 transportation equipment manufacturing industry”. As we cannot subdivide these two industries, they are merged into the “transportation and equipment manufacturing” industry. This simplification does not affect the results.

- (1) All companies in industries that were unaffected by the VAT reform. Because only certain industries enjoyed the benefits of the input-VAT deduction, non-related industries are not in our research scope and are thus eliminated. We refer to *The Listed Company Industry Guidelines* released in April 2001 by the China Securities Regulatory Commission for the VAT reform-related or non-related industry base. The VAT reform-related industries are divided according to the *State Administration of Taxation* [2004] 156 date file, including equipment manufacturing, petrochemical, metallurgy, shipping manufacturing, ship and floating device manufacturing, automobile manufacturing, and agricultural product processing. Because the industry codes for some listed companies in the existing database are unclear, which may influence the accuracy of the conclusions, we also remove this data.⁵
- (2) Companies with missing firm-year data between 2001 and 2006. Excluding these companies ensures that all sample firms have observations before and after the VAT reform, and also balances the panel data to ensure the samples are fully comparable. We therefore rule out the possibility that the research conclusions result from differences in the samples before and after the VAT reforms.

Following the above selection process, our sample includes 2352 firm-year observations from 392 companies. A total of 228 firm-year observations from 38 companies are from the three Northeastern provinces and 2124 firm-year observations from 354 companies are from other locations. Table 1 shows the industry distribution of the samples. The equipment manufacturing industry is the largest sector, with 528 observations, and transportation and equipment manufacturing is the smallest, with 192 observations. Thus, the sample selected in our research is representative.

4.2. Variable definitions

4.2.1. Dependent variable

In the paper, we use “cash payout in the acquisition and construction of fixed assets, intangible assets and other long-term assets” divided by total assets at the beginning of each year as a measure of fixed asset investment,⁶ presented as *Inv*. After the VAT re-

⁵ These industries are “communication equipment, computer and other electronic equipment manufacturing”, which does not affect the conclusions of this paper. Only the significance of the full sample regression is affected, whereas the divided sample regression results remain unchanged.

⁶ In this paper, we also test a different method for measuring the scale of fixed asset investment. The conclusions do not change significantly.

form, the investment variables do not include VAT in the Northeast area investment but VAT is included in the other areas. In the descriptive statistics, we also examine the investment in the Northeast multiplied by 1.17 to eliminate the effect of the inconsistency between the variables. We also use the above adjusted data in the regressions.

4.2.2. Main explanatory variables

We define enterprise operating cashflow as “net operating cashflow + tax fee paid + tax returned from the government” divided by total assets at the beginning of each year,⁷ presented as *Opcash*.

According to the theoretical analysis in this paper, the VAT reform should increase the operating cashflow in that period, and will also increase the investment and cashflow sensitivities. Thus, we expect the VAT reform to significantly increase the investment–cashflow sensitivities in Northeast listed companies after 2004. In this paper we focus on whether investment–cashflow sensitivity is significantly greater than 0 in the Northeast listed companies after 2004. We define “*After*” as a dummy variable that equals 1 for the years after 2004, and 0 otherwise. “*Db*” is a dummy variable that equals 1 if a firm is located in the Northeast, and 0 otherwise. We investigate whether the coefficient of $Db * After * Opcash$ is significantly greater than 0.

To ensure the completeness of the model, we also interact each pair of *Opcash*, *Db* and *After*. However, these interactions are not the focus of this study and we do not forecast the directions of these interactions.

4.2.3. Control variables

Based on previous studies, we include the following control variables: (1) *Tobinq* is used as the proxy for growth. The higher the growth, the greater the opportunities for investment and the more likely that firms are to invest in fixed assets. We expect *Tobinq* and investment to be positively related. (2) *Size* is measured as the logarithm of total assets at the beginning of the year, which is used to control for scale. (3) *Loan* equals companies’ long-term liabilities (long-term loans plus bonds payable) divided by total assets at the beginning of each year. Myers (1977) insists that the stronger the debt constraint, the weaker the will to invest. According to the debt bonding theory, this variable should be negatively related to investment. However, because of the widespread soft budget constraints in China’s state-owned enterprises, it may be negatively correlated with investment. (4) New loans (*Loanchg*) are measured as the change in loans divided by total assets at the beginning of each year (loans = short-term borrowing + short-term bonds + - long-term debt due within 1 year + long-term loans + bonds payable).⁸ When a company’s investment increases, it usually increases loan financing at the same time, so we expect this variable and investment to be positively related.

4.2.4. Other variables

To further test related theories, we also use the following variables. (1) Cash holding (*Cashchg*): measured as the change in cash and cash equivalents divided by total assets

⁷ Tax payments and returns are not included in operating cashflow, because tax may be affected by the different tax rates and tax policies in different regions and also because tax is not controllable for the enterprise. The cashflow computed in this way is more comparable. In a robustness check, we also use the operating cashflow without adjusting tax as the independent variable, and the conclusions are unchanged.

⁸ When we compute company loans using only bank loans (long term loans + short term loans) and use it to calculate debt constraints (loan) and increased loans (*Loanchg*), the conclusions are unchanged.

at the beginning of each year. (2) Financial slack (*Deficit*): Shyam-Sunder and Myers (1999) measure financial slack as “dividend payment + capital expenditure + change in operating funds + long term loans due within 1 year – operating cashflow.” However, they were interested in the influence of financial demands on long-term debt, whereas in this paper we are interested in the effect of internal financial demands on enterprise credit capacity. To better meet the requirements for testing financial constraint theory, we measure it as “(dividend payment + capital expenditure + change in operating funds + long-term loans due within 1 year – operating cashflow)/total assets at the beginning of each year.” Dividend payment is derived from “cash dividends, distributed profits and interest payments” in the cash-flow statement, capital expenditure is derived from “cash payouts for the acquisition and construction of fixed assets, intangible assets and other long-term assets”, change in operating funds is derived from “decrease in inventory + decrease in operating receivables + increase in operating payables” in the cash-flow statement, and operating cashflow is derived from “net cashflow from operating activities” in the cash-flow statement.

The main regression model is as follows:

$$Inv_{i,t} = Opcash_{i,t} + Db_i + After_{i,t} + Db_i * After_{i,t} + Db_i * Opcash_{i,t} + After_{i,t} * Opcash_{i,t} + Db_i * After_{i,t} * Opcash_{i,t} + Tobinq_{i,t} + Loan_{i,t} + Size_{i,t}, \quad (10)$$

where subscript *i* represents companies and subscript *t* represents years.

4.3. Descriptive statistics and correlation analysis

Table 2 presents the descriptive statistics. To avoid the possibility that extreme values may affect the conclusions, the continuous variables are winsorized at the 1% level. The investment ratio (*Inv*, investment divided by total assets at the beginning of each year, hereafter abbreviated as the proportion of investment) has a mean of 0.063, a median of 0.042 and a standard deviation of 0.066. The operating cashflow percentage (*Opcash*), the main explanatory variable, has an average of 0.062, a median of 0.057 and a standard deviation of 0.079. This highlights the considerable difference in investment and operating cashflow among the sample companies.

The average proportion of debt in relation to total assets (*Loan*) is 0.053, whereas the average change in debt (*Loanchg*) is 0.034, which indicates an increasing trend for company debt. The average of *Deficit* is 0.045, which demonstrates that most companies cannot satisfy their investment requirements from their own funds, thus they need to resort to outside funding. The average of *Tobinq* is 2.218 and the average of *size* is 9.209, from which it can be inferred that the average asset size is 1 billion yuan.

Table 2
Descriptive statistics (based on 2352 observations).

Variables	<i>Inv</i>	<i>Opcash</i>	<i>Cashchg</i>	<i>Loan</i>	<i>Loanchg</i>	<i>Deficit</i>	<i>Tobinq</i>	<i>Size</i>
Mean	0.063	0.062	0.01	0.053	0.034	0.045	2.218	9.209
p50	0.042	0.057	0.002	0.024	0.013	0.039	1.756	9.188
sd	0.066	0.079	0.084	0.072	0.114	0.144	1.336	0.376
99% percentile	0.34	0.315	0.357	0.382	0.544	0.632	7.834	10.259
1% percentile	0	−0.224	−0.243	0	−0.275	−0.416	0.691	8.333

Notes: *Size* = *Ln* (total assets at the beginning of the year); the 1% percentile of *Inv* equals 0 because investment is a small part of total assets and is rounded off to 0.

Table 3
Pearson correlation matrix.

	<i>Inv</i>	<i>Opcash</i>	<i>Cashchg</i>	<i>Loan</i>	<i>Loanchg</i>	<i>Deficit</i>	<i>Tobinq</i>
<i>Opcash</i>	0.29*** (0.00)						
<i>Cashchg</i>	0.02 (0.25)	0.39*** (0.00)					
<i>Loan</i>	0.18*** (0.00)	0.09*** (0.00)	−0.02 (0.26)				
<i>Loanchg</i>	0.46*** (0.00)	−0.11*** (0.00)	0.24*** (0.00)	0.03 (0.21)			
<i>Deficit</i>	0.36*** (0.00)	−0.70*** (0.00)	−0.30*** (0.00)	0.06*** (0.00)	0.45*** (0.00)		
<i>Tobinq</i>	0.04*** (0.06)	−0.06*** (0.00)	0.06*** (0.01)	−0.16*** (0.00)	0.07*** (0.00)	0.10*** (0.00)	
<i>Size</i>	0.11*** (0.00)	0.18*** (0.00)	0.01 (0.80)	0.21*** (0.00)	0.02 (0.41)	−0.03 (0.13)	−0.55*** (0.00)

Notes: Parameters in brackets under correlations are *P* values.

* Significance at the 10% level (two-tailed test).

** Significance at the 5% level (two-tailed test).

*** Significance at the 1% level (two-tailed test).

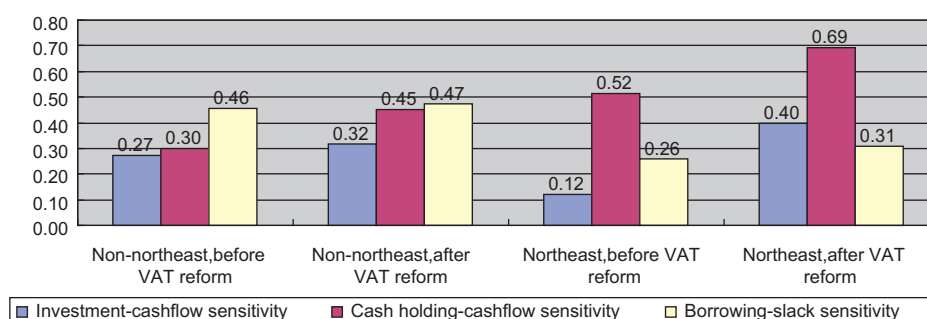


Fig. 1. Comparison of Pearson correlations using different measures.

Table 3 presents the Pearson correlation coefficient matrix, in which there is a significant positive relationship between operating cashflow (*Opcash*) and investment (*Inv*), and also between *loan* and operating cashflow (*Opcash*). This finding is consistent with the previous literature. The correlation between *loan* and investment proportion (*Inv*) is 0.18, and the correlation between company scale (*Size*) and investment proportion (*Inv*) is 0.11. The correlations are significant at the 1% level (two-tailed test).

If our hypothesis is correct, the improvement in financing ability due to the VAT reform will increase firm investment. But, the relationship between investment and operating cashflow in different areas will be significantly different. We therefore examine the investment and operating cashflow relationship in different areas before and after the VAT reform (Fig. 1). The figure shows that the correlation between investment and operating cashflow increases from 12% to 40% for firms in the Northeast, a 28% increase, whereas it changes from 27% to 32% in the other areas, an increase of only 5%.⁹ This shows that

⁹ Spearman correlation coefficients also produce similar results.

the correlation between investment and operating cashflow increased more significantly in firms located in the Northeast than in firms in other areas. This is consistent with our hypothesis. However, the other two measures, cash holding–cashflow sensitivity and borrowing-slack sensitivity, show no significant difference between firms in the Northeast and other areas before and after the VAT reforms.

5. Empirical results and analysis

5.1. Regression analysis

Regression analysis of investment–cashflow sensitivity is shown in Table 4. According to our hypothesis, investment–cashflow sensitivity should significantly increase following the VAT reform in the Northeast, which means the regression coefficient on $Db * After * Opcash$ should be significantly positive.

In Table 4, regardless of whether *loan* is included or not, the coefficient on $Db * After * Opcash$ is 0.162 and significant at the 10% level (two-tailed). This means that as operating cashflow increased by 1%, firm investment increased by 0.162% in Northeast listed firms

Table 4
Fixed effects regression of investment–cashflow sensitivity.

Dependent variable: <i>Inv</i>		
<i>After</i>	−0.002 (−0.65)	−0.002 (−0.61)
<i>Db * After</i>	0.000 (0.04)	0.001 (0.14)
<i>Opcash</i>	0.079*** (3.27)	0.078*** (3.24)
<i>Db * Opcash</i>	−0.141* (−1.87)	−0.140* (−1.86)
<i>After * Opcash</i>	0.060** (1.96)	0.060* (1.94)
<i>Db * After * Opcash</i>	0.162* (1.73)	0.162* (1.73)
<i>Tobinq</i>	0.004*** (3.08)	0.004*** (3.06)
<i>Size</i>	−0.071*** (−6.32)	−0.074*** (−6.48)
<i>Loan</i>		0.034 (1.43)
<i>Constant</i>	0.702*** (6.70)	0.732*** (6.85)
<i>R-squared</i>	0.08	0.08
<i>Observations</i>	2352	2352
<i>Number of firms</i>	392	392

Notes: *t* Values are presented in brackets under the coefficients.

Autocorrelation and heterogeneity are controlled for.

* Significance at the 10% level respectively (two-tailed test).

** Significance at the 5% level respectively (two-tailed test).

*** Significance at the 1% level respectively (two-tailed test).

after the VAT reform. This is equivalent to 326,000 yuan (the average investment is 2.01 million yuan), which we consider to be economically significant. Thus, it can be inferred that the VAT reform had a significant influence on investment–cashflow sensitivity in the Northeast, and overall the sensitivity increased following the VAT reform. This result is consistent with our hypothesis, which stated that the VAT reform would significantly increase the sensitivity of investment and operating cashflow.

The coefficients on the control variables in Table 4 are also consistent with previous findings. The coefficient on *Tobinq* is significantly positive, which means that the higher the growth potential, the more opportunities that are available for investment and the bigger the scale of the investment. The coefficient on *Size* is significantly negative, which means the bigger the company, the smaller the relative investment scale. The coefficient on *Loan* is positive but not significant, which is not consistent with the loan constraints theory, but provides support for the soft budget constraints theory. Since most of the listed companies are government owned, this non-significant result is not unexpected.

Under existing theory, cash holding–cashflow sensitivity is also used to measure financial constraints, as cash holding is considered a negative investment. The result of the VAT reform is to decrease firms' cash holdings. The model to test cash holding–cashflow sensitivity is as follows:

$$\begin{aligned} \text{Cashchg}_{i,t} = & \text{Opcash}_{i,t} + \text{Db}_i + \text{After}_{i,t} + \text{Db}_i * \text{After}_{i,t} + \text{Db}_i * \text{Opcash}_{i,t} + \text{After}_{i,t} \\ & * \text{Opcash}_{i,t} + \text{Db}_i * \text{After}_{i,t} * \text{Opcash}_{i,t} + \text{Tobinq}_{i,t} + \text{Size}_{i,t}. \end{aligned} \quad (11)$$

Table 5 shows the regression results of the cash holding–cashflow model. The coefficient on $\text{Db} * \text{After} * \text{Opcash}$ is negative but not significant, which means that cash holdings in companies in the Northeast decreased following the VAT reform. This is consistent with a decrease in financial constraints, although the result is not significant. However, we note that this result is not consistent with the result presented in Table 4. We think cash holding is affected by many other factors besides investment, such as dividend distributions, loan repayments and so forth. The correlation between cash holding and cashflow is smaller than that between investment and operating cashflow. These results suggest that the cash-holding model is better than the investment–cashflow model for measuring financial constraints.

Based on the model used by Shyam-Sunder and Myers (1999), we also use borrowing-slack sensitivity to measure financial constraints. When companies are facing financial slack, they may turn either to their own funds or to external financing. External financing is influenced more by information asymmetry and changes in external financing ability can better reflect the change in financial constraints. If changes in investment–cashflow sensitivity reflect changes in financial constraints, an increase in sensitivity in the Northeast after the VAT reform should be interpreted as an increase in financial constraints. In this way, the borrowing-slack model is consistent with theory, thus external funding should decrease because it is harder to obtain external finance. The model is as follows:

$$\begin{aligned} \text{Loanhchg}_{i,t} = & \text{Deficit}_{i,t} + \text{Db}_i + \text{After}_{i,t} + \text{Db}_i * \text{After}_{i,t} + \text{Db}_i * \text{Deficit}_{i,t} + \text{After}_{i,t} \\ & * \text{Deficit}_{i,t} + \text{Db}_i * \text{After}_{i,t} * \text{Deficit}_{i,t}. \end{aligned} \quad (12)$$

The regression in column 1 of Table 6 shows that financial constraints did not increase. The coefficient on $\text{Reform} * \text{After} * \text{Deficit}$ is positive but not significant. The coefficient is 0.085 and the *T* value is 0.80, which is contrary to an increase in financial constraints

Table 5
Fixed effects regression of cash–cashflow sensitivity.

Dependent variable: <i>Cashchg</i>		
<i>After</i>	0.002 (0.35)	0.002 (0.28)
<i>Db * After</i>	−0.008 (−0.61)	−0.008 (−0.61)
<i>Opcash</i>	0.389*** (10.38)	0.403*** (10.82)
<i>Db * Opcash</i>	0.394*** (3.38)	0.368*** (3.18)
<i>After * Opcash</i>	0.097** (2.04)	0.108** (2.28)
<i>Db * After * Opcash</i>	−0.106 (−0.74)	−0.076 (−0.53)
<i>Tobinq</i>	−0.000 (−0.14)	0.001 (0.23)
<i>Size</i>	−0.136*** (−7.78)	−0.149*** (−8.51)
<i>Inv</i>		−0.185*** (−5.30)
<i>Constant</i>	1.230*** (7.57)	1.360*** (8.33)
<i>R-squared</i>	0.19	0.20
<i>Observations</i>	2352	2352
<i>Number of firms</i>	392	392

Notes: *t* Values are presented in brackets under the coefficients.

Autocorrelation and heterogeneity are controlled for.

* Significance at the 10% level respectively (two-tailed test).

** Significance at the 5% level respectively (two-tailed test).

*** Significance at the 1% level respectively (two-tailed test).

and is consistent with a decrease in financial constraints after the VAT reform. Theoretically, when internal operating cashflow increases it can be used to guarantee increases in loans. To further test whether the model above is consistent with the expectations of financial constraints theory, we partition the sample by financial slack (columns 2–3 in Table 6). Theoretically, if the VAT reform alters financial constraints, then the change in constraints should be stronger in companies with more financial slack. Therefore, we would expect the sub-sample with slack above 0 to show a significant result, whereas the group with slack below 0 should not. However, from the results in columns 2 and 3, we find that financial constraints are not significantly affected by the VAT reform, which is contrary to the result from the investment–cashflow model.

The above tests show that when the tax rate changes, investment–cashflow sensitivity may not be an effective way to measure financial constraints. On the one hand, tax reform does not increase external financial constraints, or at least does not make financial constraints stronger. However, the significant increase in investment–cashflow sensitivity reported in the regression result is not consistent with the classic theory. On the other hand, under the same tax reform, the relationship between cash holding–cashflow and

Table 6
Fixed effects regression of borrowing-slack sensitivity.

Dependent variable: <i>Loanchg</i>			
	Full sample	Slack < 0	Slack > 0
<i>After</i>	−0.016*** (−3.49)	−0.019*** (−3.37)	0.002 (0.15)
<i>Reform * After</i>	0.002 (0.11)	0.015 (0.86)	0.010 (0.28)
<i>Deficit</i>	0.337*** (13.74)	0.352*** (12.17)	0.216*** (3.48)
<i>Reform * Deficit</i>	−0.206*** (−2.60)	−0.062 (−0.63)	−0.412** (−2.54)
<i>After * Deficit</i>	0.017 (0.51)	0.038 (0.94)	0.064 (0.84)
<i>Reform * After * Deficit</i>	0.085 (0.80)	−0.036 (−0.28)	0.245 (1.17)
<i>Constant</i>	0.027*** (8.37)	0.027*** (6.48)	0.010 (1.40)
<i>R-squared</i>	0.18	0.22	0.10
<i>Observations</i>	2352	1794	558
<i>Number of firms</i>	392	299	93

Notes: *t* Values are presented in brackets under the coefficients.

Autocorrelation and heterogeneity are controlled for.

* Significance at the 10% level respectively (two-tailed test).

** Significance at the 5% level respectively (two-tailed test).

*** Significance at the 1% level respectively (two-tailed test).

borrowing-slack does not significantly change. These findings suggest that in China's institutional setting, the latter two models may be better measures of financial constraints. Of course, the above results are not sufficient to provide full support for this conclusion, and we believe it is an open question for future research.

5.2. Further discussion and robustness checks

Information asymmetry, agency costs and capital market efficiency are the three major pillars of financial theory. Fazzari et al. (1988) point out that the investment-financial constraints model is a development of the information asymmetry model in Myers and Majluf (1984). Kaplan and Zingales (1997) criticize the effectiveness of the investment-cashflow model to reflect financial constraints under information asymmetry, although there is no indication of the actual factors and the direction of the effect.

This paper provides support for the view of Kaplan and Zingales (1997). We also argue that enterprise tax subsidies do not increase the degree of information asymmetry between enterprises and banks, nor do they result in an increase in agency costs. Although tax subsidies boost corporate cashflow through increased investment, enterprise free cashflow does not increase and therefore does not lead to an increase in agency costs. At the same time, tax subsidies do not change the governance structure of the company and related agency costs. Therefore, the results cannot be attributed to either a change in agency costs or to information asymmetry, and therefore extend and strengthen the findings of Kaplan and Zingales (1997).

Is there a potential “survivorship bias” problem from using the balanced panel data analysis in our research? Because delisting of China-listed companies is rare, the difference in the sample of balanced and non-balanced data is mainly caused by the listing time and missing data, rather than “survivorship bias”.

We also use different variable definitions. For instance, we use “cash payout for acquisition and construction of fixed assets, intangible assets and other long-term assets” minus “cash received from disposal of fixed assets, intangible assets and other long-term assets” to proxy for investment. We use the sales growth rate to replace *Tobin's* *Q* as a proxy for growth opportunities, and use investment data without the tax adjustment to re-analyze the data. In all cases, the above conclusions still hold.

6. Conclusions

In this paper, we explore the internal validity of investment–cashflow sensitivity as a proxy for financial constraints from both a theoretical and an empirical perspective. Since Fazzari et al. (1988), investment–cashflow sensitivity has become an important measure of financial constraints and one of the basic models used to test Myers' and Majluf (1984) pecking order theory. However, the validity of this measure has been frequently questioned (Poterba, 1988; Cleary, 1999; Erickson and Whited, 2000; Kaplan and Zingales, 1997, 2000; Almeida et al., 2004; Alt, 2003; Bushman et al., 2008). These scholars have also proposed alternative measures of financial constraints from different perspectives.

This paper discusses the validity of investment–cashflow sensitivity as a measure of financial constraints under an exogenous tax reform. Our findings suggest that the VAT reform resulted in corporate investment being more dependent on operating cashflow. In other words, although the investment–cashflow sensitivity increased significantly, it is not explained by companies' financial constraints, especially those arising from increased information asymmetry. For the company and the capital market, the tax rate change caused by the VAT reform was a relatively exogenous event and should neither increase the inherent information asymmetry between the company and capital markets, nor lead to financial constraints caused by information asymmetry. However, tax rate changes affect the degree to which investment depends on operating cashflows. Therefore, the investment–cashflow relationship may not always reflect firms' external financial constraints and it may not be an effective measure of financial constraints caused by information asymmetry.

In this paper, we compare the investment–cashflow sensitivity between listed firms in the Northeast and other areas following the VAT reform in Northeast China in 2004. Our results show that following the VAT reform, investment–cashflow sensitivity increased significantly in listed companies in the Northeast. However, the regressions of cash holding–cashflow and borrowing–slack sensitivities show that financial constraints in listed companies in the Northeast did not change significantly, and this is consistent with the theory that financial constraints did not increase.

This paper has important theoretical implications. Whether investment–cashflow sensitivity is an adequate measure of financial constraints is theoretically controversial, and its effectiveness in China needs further theoretical study and empirical testing. In this paper, we explore the issue from a tax perspective and the results show that investment–cashflow sensitivity is an inadequate measure, whereas the cash–cashflow model and borrowing–slack model are relatively more effective. The implications of this paper for Chinese

researchers is that in China's newly emerging market, investment–cashflow sensitivity is unsuitable as a measure of financial constraints. China has experienced many tax reforms since the 1980s, which will affect investment–cashflow sensitivity without changing financial constraints. This study indicates that the cash holding–cashflow and borrowing-slack sensitivity models are relatively free from tax reform influence and thus are better measures than investment–cashflow sensitivity.

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