Effects of Audit Quality on Earnings Management and Cost of Equity Capital: Evidence from China*

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1. Introduction

The considerable economic restructuring and reform undergone by the Chinese economy over the last 30 years have led to a marked increase in the number of shareholding companies and a revival of its auditing profession. At issue is whether, and to what extent, audit quality plays a role in firm valuation and constraining earnings management in the world's largest transitional economy and emerging market. In this paper, we examine the effects of audit quality on earnings management and cost of equity capital for two groups of Chinese firms, state-owned enterprises (SOEs) and non–state-owned enterprises (NSOEs). SOEs and NSOEs differ in the nature of their ownership, agency relations, and bankruptcy risks, which lead to differences in the effectiveness of auditing in reducing financial reporting noise and investors' pricing of information risk. We hypothesize and provide evidence that the effects of audit quality on earnings management and cost of equity capital are more pronounced for NSOEs than for SOEs.

The value of audit quality to financial statement users is of considerable interest to practitioners, regulators, and academics. Studies of the U.S. audit market commonly assume that the effects of audit quality on financial reporting credibility are uniform across firms (e.g., Teoh and Wong 1993; Khurana and Raman 2004; Becker, DeFond, Jiambalvo, and Subramanyam 1998). Our study adds to that body of research by investigating the effects of audit quality on earnings management and cost of equity capital in China, an environment where these effects are likely to vary substantially between SOEs and NSOEs. The uniqueness of the Chinese setting allows us to compare the effects of audit quality across two groups of firms that have different ownership structures and agency problems and whose managers face different incentives and constraints to intervene in the financial reporting process.

The value of auditing arises, in part, because auditing is a form of monitoring that constrains managerial reporting discretion and therefore reduces information risk. We measure managerial reporting discretion and information risk by the magnitude of discretionary accruals and use it to assess the effect of audit quality (Becker et al. 1998). We

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also utilize the ex ante cost of equity capital as a yardstick to assess the valuation implications of audit quality, as do Khurana and Raman 2004. If high audit quality reduces information risk, which is nondiversifiable, it should translate to a tangible benefit in the form of lower cost of equity capital.

Our analyses are based on a sample of 3,310 firm-year observations with sufficient data on the China Securities Markets and Accounting Research Database from 2001 to 2004. Consistent with prior research, we use audit firm size as a proxy for audit quality. We classify the eight largest audit firms (Top 8), which include the international Big 4 and the four largest Chinese firms, as high audit quality providers and all other audit firms (non–Top 8) as low audit quality providers. We use absolute and signed performance-matched modified Jones model discretionary accruals to measure earnings management. We measure ex ante cost of equity capital using the industry method introduced by Gebhardt, Lee, and Swaminathan 2001 and the PEG ratio method proposed by Easton 2004.

We find a significantly lower level of earnings management for NSOEs audited by Top 8 auditors than for NSOEs audited by non–Top 8 auditors. By contrast, we do not observe a significant corresponding difference in the level of earnings management for SOEs. Additionally, we find a significantly greater reduction in earnings management from hiring Top 8 versus non–Top 8 auditors for NSOEs than for SOEs. We obtain consistent results when we use absolute discretionary accruals and income-increasing discretionary accruals to measure earnings management.

Our analysis indicates that the effect of audit quality on cost of equity capital is not uniform across SOEs and NSOEs. Cost of equity capital is significantly lower for NSOEs audited by Top 8 auditors than for NSOEs audited by non–Top 8 auditors, but not for SOEs audited by Top 8 and non–Top 8 auditors. We also find that, for NSOEs, the reduction in cost of equity capital from hiring Top 8 versus non–Top 8 auditors is significantly greater than the corresponding reduction for SOEs. We obtain consistent results for both cost of equity capital measures and also when we control for endogenous auditor choice.

We add to the body of research on audit quality in several important ways. First, Fan and Wong (2005) find that, in the emerging market of East Asia, high-quality auditors play a corporate governance role in that firms with high agency conflicts are more likely to hire high-quality auditors. This is consistent with auditors playing an important role in these less-litigious environments, which are characterized by lack of traditional governance mechanisms. Our results show that, while high-quality auditors play a governance role in a less litigious environment such as China, that role is limited to a subset of firms. We also extend Fan and Wong's 2005 study by providing evidence on whether hiring high-quality auditors translates into a tangible benefit in the form of lower cost of equity capital in China.

Second, Khurana and Raman (2004) document that high-quality auditors are associated with lower cost of equity capital only in the United States but not in other Anglo-American countries such as Canada, the United Kingdom, and Australia. They posit that it is not the auditor's brand name reputation but the litigation exposure that drives perceived audit quality. Our results indicate that, even under the same legal jurisdiction, the effects of audit quality (in the form of lower earnings management and cost of equity capital) vary cross-sectionally among firms with different ownership structures. By focusing on the Chinese capital market, where the effects of audit quality substantially differ across two major types of firms (SOEs and NSOEs), we are able to control for cross-country differences that may confound the effects of audit quality on earnings management and cost of equity capital. Additionally, by comparing differences in earnings management and cost of equity capital between NSOEs and SOEs audited by Top 8 and non–Top 8 auditors, we are able to control for period-specific phenomena such as economic conditions that may differentially affect firms audited by auditors with different quality.

Third, a recent study by Wang, Wong, and Xia 2008 finds that, compared to NSOEs, SOEs controlled by local governments are more likely to hire small local auditors. They argue that such a choice pattern likely results from local SOEs' lack of demand for large or nonlocal auditors. Our study extends their research by focusing on the economic consequences of SOEs' and NSOEs' auditor choices in China.

Fourth, our study has research design implications for audit research in China. Our results indicate that, if researchers treat all Chinese firms alike, they may erroneously conclude that audit quality has no impact on earnings management or cost of equity capital. Our findings underscore the importance of partitioning the sample based on ownership type so that the power will likely increase in subsample analyses.

The rest of this paper is organized as follows. We describe the institutional environment in section 2, where we emphasize the salient features of the Chinese capital and audit markets. We develop the hypotheses in section 3, describe our sample and data in section 4, and present the research design in section 5. We discuss the results of the main and additional tests in sections 6 and 7 and present our conclusions in section 8.

2. Institutional background

Development of the stock market in China

The stock market in China has become an increasingly important part of China's economy since the partial privatization of SOEs and the establishment of the Shanghai and Shenzhen Stock Exchanges in the early 1990s. The number of listed firms increased from 50 in 1992 to 1,378 in 2004, with the total market value of publicly traded shares exceeding RMB (i.e., *Renminbi*, the Chinese currency) 3,960 billion by the end of 2004. There were 353 NSOEs listed on the exchanges at the end of 2004, approximately 25 percent of the total number of listed firms. Although considerably smaller than SOEs, NSOEs had a total market value of RMB 479 billion by the end of 2004, or 12.1 percent of the total stock market value.

Since 1979, China has launched a series of economic reforms to reorient its economy toward a market-based one. The most recent of these reforms is corporatization of previously owned SOEs. Corporatization involves initial public offering of a minority portion of state shares to individual investors who can trade their shares freely on the Shanghai and Shenzhen Stock Exchanges, while the majority ownership of these newly listed companies is still controlled by parent state enterprises. The government still remains the majority shareholder and retains two key control rights: the ultimate decision right concerning disposal of assets and mergers and acquisitions, and the appointment of chief executive officers (CEOs) (Qian 1995).

Lack of rights to dispose of state assets and engage in mergers and acquisitions to a large extent ensures that SOEs have low bankruptcy risk, because they can be subsidized by the government when they face financial distress (Faccio 2006). As the largest shareholder of these partially privatized SOEs, the Chinese government put forth a series of policies to help those SOEs in trouble, including reducing the tax burden, injecting capital to repay part of the debt, allowing debt-for-equity swaps, and establishing state-owned asset management companies to relieve SOEs' debt burdens. The government, in effect, serves as an insurance provider for SOEs.

An important consequence of the state government's right to appoint CEOs of SOEs is that CEOs face multiple (and often divergent) goals. Because the CEOs of most SOEs are current or former government bureaucrats, their promotion and compensation are measured by various political and social objectives, such as improving the employment rate and the fiscal condition of the region under their jurisdiction, and building relationships with colleagues and superiors by trading favors, in addition to their operating and

financial performance (Fan, Wong, and Zhang 2007). In contrast to SOEs, operating and financial performance are frequently the principal criteria on which CEOs of NSOEs are evaluated.

Access to bank capital is another reason for differential reliance on financial information across SOEs and NSOEs. SOEs typically have better access to low-cost capital from state-owned banks (the predominant source of capital in China) than NSOEs because state-owned banks often lend to SOEs for (political, employment, and tax) reasons other than profitability (Brandt and Li 2003). In contrast, banks' loan granting decisions to NSOEs are based largely on financial rather than on political considerations. Consequently, their loan granting decisions rely more on the content and credibility of the information in NSOEs' financial statements.

Characteristics of the Chinese audit market

China reestablished its auditing profession in 1980 after a suspension of more than 30 years. Many local audit firms were established during the 1980s. The opening of the Shanghai and Shenzhen Stock Exchanges in the early 1990s accelerated the development of the auditing profession, with a select group of audit firms being granted permission by the government to audit public companies. In addition, joint ventures with the Big 4 were approved to practice in China in 1992. By the end of 2005, there were 5,639 audit firms and 69,848 practicing certified public accountants (CPAs), of which 70 audit firms (including the Big 4 joint ventures) and 9,633 CPAs were qualified to audit public companies.

Market concentration is much lower in China compared to the oligopolistic audit market structure in the United States. Currently, both local firms and the Big 4 joint ventures constitute the major providers of audit services in China. At the end of 2004, the Big 4's market share in China by number of clients and by revenue was 10 percent and 35 percent, respectively. By comparison, the market share of the four largest national audit firms (national top 4) both by number of clients and by revenues was approximately 10 percent, indicating that the supply of audit services in China is more competitive than in the United States.

In the early 1980s, when most of the local audit firms were established, they were sponsored by and connected to local government agencies or universities. The affiliation of audit firms with local governments resulted in a lack of independence and regional protectionism and played a key role in impeding the supply of high-quality audit service. In order to improve audit quality, the Ministry of Finance and the China Securities Regulatory Commission issued regulations to force these local-government-affiliated auditors to separate both financially and operationally from the government in 1998. Since completion of the reform in early 2000, Chinese audit firms are independent of local governments and operate under competitive market forces.

Although the legal environment in China is far from mature, CPAs and audit firms are subject to legal liabilities in case of audit failure. These liabilities include administrative penalties, civil penalties, and criminal charges, which are defined in the Certified Public Accountants Law, Company Law, Act of Security, Criminal Law, and other legal documents. The Ministry of Finance first established legal penalties for violating auditing standards in 1992 and released the Interim Regulations against Securities Frauds and the Company Law in 1993. In 1995, China adopted a new set of auditing standards that closely follow the International Standards on Auditing. The new standards provide auditors with detailed rules for independent behavior and a credible threat of penalties for noncompliance. The Act about the Acceptance of Tort Cases Caused by Fraudulent Financial Reporting in Security Market, enacted by the Chinese Supreme Court in 2002 further defined an individual auditor's liability for damages to investors for undetected material misstatements; negligent auditors have joint and

several liability. The new Act of Security, passed in 2005, also mandates that auditors be held liable for damages to investors.

3. Hypotheses development

China provides a setting in which several key factors that determine the effects of audit quality on earnings management and cost of equity capital vary systematically between SOEs and NSOEs. We develop hypotheses that capitalize on this systematic cross-sectional variation.

Effect of audit quality on earnings management

Given that firms have sufficient incentives and opportunities to manage earnings, the value of auditing arises in part because it reduces managerial opportunistic discretion in financial statements. The effect of audit quality on earnings management, however, varies with a firm's incentives to manage accounting performance. The stronger those incentives, the greater the value of auditing as a monitoring device in the corporate governance mechanism. We argue that, on average, SOEs have weaker incentives to manage accounting performance than NSOEs because of their different ownership structures and agency relations. As noted earlier, since corporatization in the 1990s, the government has retained control over decisions regarding the appointment of CEOs. Fan et al. (2007) find that almost 28 percent of listed SOE CEOs during the 1993–2000 period are politically connected; they are either current or ex-government bureaucrats. The appointment of politically connected CEOs of listed SOEs is typically linked to the government's objectives of diverting corporate resources for social or political goals, even though those objectives are not always consistent with firm value maximization. The trade-off between economic and political objectives is reflected in SOE CEOs' compensation contracts, which typically place relatively less weight on accounting performance than the compensation contracts of CEOs of profit-maximizing NSOEs. Therefore, compared to their non–state-owned counterparts, managers of SOEs have relatively weaker incentives to manage accounting performance. As a result, the value of auditing as a monitoring device in the corporate governance mechanism is likely to be less pronounced for SOEs than for NSOEs. Accordingly, we expect a weaker effect of audit quality on earnings management for SOEs than for NSOEs.

We note that, although SOEs may not have the same strong incentives to manage earnings as their non–state-owned counterparts, SOE managers nevertheless still have incentives to manage earnings in an effort to increase accounting-performance-based compensation, obtain a higher initial public offering (IPO) price, attract foreign investment, and apply for permission to issue additional shares in the equity market. For example, Aharony, Lee, and Wong (2000) examine the role of earnings management in the IPO process of Chinese SOEs. They argue that, to the extent SOE managers value a firm's listed status for nonpecuniary benefits, and regulatory agencies use accounting-based rules to choose IPO candidates, SOE managers may attempt to manage earnings to boost the firm's chance of going public. Their finding that median return on assets (ROA) peaks in the IPO year and declines in the three years following the IPO is consistent with SOE managers manipulating earnings around the time of an IPO. Additional earnings-based regulations in China require that shares be suspended from trading or delisted if firms report losses for three consecutive years and that listed firms achieve a minimum return on equity (ROE) of 10 percent in each of the previous three years to qualify for applying for additional issuance of shares. Jian and Wong (2010) argue that even SOE managers have strong incentives to help listed firms maintain their listing status and qualify for raising more funds, because such firms are better able to help improve employment levels and enhance infrastructure development of the regions in which they operate.

Although not all listed firms actually seek to raise additional capital through rights offerings and only a small number have ever been suspended from trading, these accounting-based regulations become general profitability targets for listed firms (Chen, Chen, and Su 2001a). Many studies document evidence consistent with opportunistic earnings management behavior in response to the 10 percent rule in China (e.g., Jiang and Wei 1998; Chen, Xiao, and Guo 2000; Chen et al. 2001a; Haw, Qi, Wu, and Wu 2003; Chen and Yuan 2004). In sum, although SOEs have different ownership structures, agency relations and objective functions relative to NSOEs, they nevertheless are subject to the same accounting-based regulations, which create sufficient incentives to manipulate accounting performance.

Based on the preceding discussion, we posit the following:

HYPOTHESIS 1. *The effect of audit quality on earnings management is weaker for SOEs than for NSOEs.*

Effect of audit quality on cost of equity capital

Auditing serves as a monitoring device designed to improve information about the firm's performance. This, in turn, reduces information asymmetry between the firm and its investors. In general, the greater the information risk faced by investors, the greater the value of audit quality.[1]

Auditing reduces information risk faced by (uninformed) investors because it allows them to verify the validity of financial statements. If information risk is priced by investors, it is reasonable to argue that how investors perceive or price the information risk will vary with the effectiveness of auditing in reducing earnings management. The stronger the effect of audit quality on constraining earnings management, the stronger the effect of audit quality on reducing information risk faced by investors. In return, investors will lower their required rate of return on investment. Given that the effect of audit quality on earnings management is less pronounced for SOEs than for NSOEs, we expect the effect of audit quality on cost of equity capital is also less pronounced for SOEs than for NSOEs.

The effect of audit quality on cost of equity capital also varies with the insurance role played by audit firms in the capital markets (Wallace 1987). Menon and Williams (1994) argue that the right to recover potential losses from the audit firm is priced by the stock market. They show that this pricing effect varies with the likelihood that the right will be exercised. Auditors likely play different insurance roles for SOEs and NSOEs in China. As discussed in section 2, SOEs have low bankruptcy risk because they are politically favored and supported by the government. Even if they run into financial trouble, investors' immediate reaction is to look to the largest shareholder (i.e., the government) as the ultimate resort for compensation for their investment losses. The government, not the auditor, performs the traditional role of "deep pocket" for SOEs. However, NSOEs rely more on auditors for such insurance (Wang et al. 2008). In other words, the insurance protection provided by high-quality auditors is likely to be less pronounced for SOEs than for NSOEs. Therefore, investors are more likely to discount the value of the insurance role of SOEs' auditors in their capital allocation decisions.

Based on the above discussion, we hypothesize that:

1. Easley and O'Hara (2004) and Lambert, Leuz, and Verrecchia (2007) are two recent theoretical studies that investigate how the supply of information affects the cost of equity capital. Francis, LaFond, Olsson, and Schipper (2004, 2005) provide empirical evidence consistent with information risk, in the form of accounting information quality, being priced by investors.

HYPOTHESIS 2. *The effect of audit quality on cost of equity capital is weaker for SOEs than for NSOEs.*

4. Sample selection and data

We begin with all firms listed on the Shanghai and Shenzhen Stock Exchanges for the years 2001 to 2006 that are included in the China Securities Markets and Accounting Research Database (CSMAR). Because our ex ante cost of equity capital measure (discussed in the next section) requires at least two years of future realized ROE or earnings per share data, the actual years examined are 2001 to 2004. The sample begins in 2001, when all audit firms became financially separated from the local government agencies. We eliminate 1,193 (2,581) firm-years with insufficient data to calculate cost of equity capital under the industry (PEG ratio) approach and 244 firms controlled by foreign investors, local township and village governments, or whose ultimate shareholders cannot be identified. Of the remaining 3,380 observations, we delete four firms in the financial industry. Upon examining the data for outliers, we find some extreme values for cost of equity capital. Accordingly, we eliminate 66 observations with cost of equity capital in the extreme 1 percent tails of the distribution, leaving us with a final sample of 3,310 firm-year observations (722 in 2001, 841 in 2002, 849 in 2003, and 898 in 2004).[2] Panel A of Table 1 summarizes our sample selection procedure.

Our analyses call for separating SOEs and NSOEs. The classification of the firm's ownership type is based on the owner who has the largest ownership control in the firm. We obtain ownership information from CSMAR, which has collected ownership data from firms' annual reports since 2001, when disclosure of the identity of the ultimate owner became mandatory. We identify SOEs as those firms owned by state asset management bureaus or other SOEs controlled by the government. In section 7, we further decompose SOEs into central and local SOEs based on the level of government ownership. Local SOEs are owned by local governments such as provincial state asset management bureaus or finance bureaus. Central SOEs are owned by agencies of the central government such as the Ministry of Finance. We identify NSOEs as firms owned by individual entrepreneurs or private investors.[3]

Panel B of Table 1 details the distribution of firm-years across industries. Overall, the industry composition of firm-years is similar to that of the CSMAR population with manufacturing the most heavily represented industry (57.04 percent of sample observations). When we divide SOEs and NSOEs into subsamples by audit quality, we find a significant difference in the industry distributions of SOEs ($\chi^2 = 70.78$, $p < 0.01$), but not in the industry distributions of NSOEs ($\chi^2 = 16.39$, $p = 0.12$). Accordingly, we control for differences in industry composition in our tests.

Panel C of Table 1 reports market shares, as measured by audit fee and number of client firms, of the Big 4, the national top 4, and small local audit firms.[4] During our sample period (except 2001), the market share, as measured by audit fee, of the Big 4 is similar to that of the national top 4; specifically, 10.96 percent (9.04 percent) in 2002,

2. The results are not sensitive to winsorizing cost of equity capital at the extreme 1 percent, 2 percent, and 3 percent levels.
3. We exclude township-village enterprises from our analyses. A township-village enterprise refers to a business unit that belongs to all residents of a rural community where it is also usually located. According to Che and Qian 1998, it is neither an SOE nor an NSOE. They argue that it is best characterized as a community enterprise with a governance structure in which the community government has control.
4. The Big 4 include Arthur Andersen (dissolved in 2002), KPMG, PwC, E&Y, and Deloitte. The national top 4 are Shanghai Lixin, Xinyong Zhonghe, Yuehua, and Zhongshen. There are 62 small local audit firms in our 2001 sample, 64 in 2002, 64 in 2003, and 63 in 2004.

TABLE 1
Descriptive information on sample selection, industry distribution, and audit market share

Panel A: Sample selection

Total firm-year observations available on CSMAR from 2001–2004	4,817
Less:	
Observations with insufficient data to calculate cost of equity capital	(1,193)
Observations of firms controlled by local township and village governments, foreign investors, or whose ultimate controlling shareholder cannot be identified	(244)
Observations of firms in the financial industry	(4)
Observations with cost of equity capital below the 1st percentile or above the 99th percentile	(66)
Final sample	3,310

Panel B: Sample composition by industry

Industry group	# of firm-years on CSMAR	# of firm-years in sample	% of firm-years in sample
Agriculture, forestry & fishing	122	88	2.66
Mining	73	35	1.06
Manufacturing	2,831	1,888	57.04
Utilities	188	160	4.83
Construction	84	59	1.78
Transportation	203	117	3.53
Information & Technology	251	171	5.17
Wholesale trade	396	289	8.73
Real estate	136	88	2.66
Services	159	143	4.32
Entertainment	45	27	0.82
Conglomerates	325	245	7.40
Total	4,813	3,310	100.00

Panel C: Market share as measured by audit fee and by number of client firms of the Big 4, national top 4 and small local auditors

	Market share as measured by audit fee (%)			Market share as measured by number of client firms (%)		
	Big 4	*National Top 4*	*Small*	*Big 4*	*National Top 4*	*Small*
2001	5.65	14.88	79.47	4.30	12.56	83.14
2002	10.96	9.04	80.00	6.68	8.36	84.96
2003	9.76	9.52	80.72	5.96	9.20	84.84
2004	13.20	12.28	74.52	5.52	10.48	84.00

Notes:

Panel A explains the sample selection process. Panel B reports the industry distribution of the sample. Industry groups are based on the China Securities Regulatory Commission's classification. Panel C reports the market share as measured by audit fee and by number of client firms for the Big 4, National Top 4 and small auditors. The Big 4 include Arthur Andersen (dissolved in 2002), KPMG, PwC, E&Y, and Deloitte. The national top 4 are Shanghai Lixin, Xinyong Zhonghe, Yuehua, and Zhongshen. There are 62 small local audit firms in our 2001 sample, 64 in 2002, 64 in 2003, and 63 in 2004.

9.76 percent (9.52 percent) in 2003, and 13.20 percent (12.28 percent) in 2004 for the Big 4 (national top 4). However, the national top 4 have a larger market share as measured by number of clients (12.56 percent in 2001, 8.36 percent in 2002, 9.20 percent in 2003, and 10.48 percent in 2004) than the Big 4 (4.3 percent in 2001, 6.68 percent in 2002, 5.96 percent in 2003, and 5.52 percent in 2004). Because our definition of audit quality is based on audit firm Chinese revenues over the sample period, we combine the Big 4 and the national top 4. We refer to these firms as Top 8 audit firms and classify them as high-quality auditors.[5]

5. Variable measurement and research design

Measuring earnings management

Following Becker et al. 1998 and Reynolds and Francis 2000, we assume that the magnitude of discretionary accruals, $|DACC|$, reflects the consequences of earnings management. We measure $DACC$ as the residual from the modified Jones model, adjusted by a performance matched firm (Dechow, Sloan, and Sweeney 1995; Kothari, Leone, and Wasley 2005):

$$TACC_{it}/TA_{it-1} = \alpha_1(1/TA_{it-1}) + \alpha_2 \Delta REV_{it}/TA_{it-1} + \alpha_3 PPE_{it}/TA_{it-1} + \varepsilon_{it} \quad (1),$$

where $TACC$ is total accruals, calculated as net income before extraordinary items less cash flow from operations, TA is total assets, ΔREV is change in revenue, and PPE is gross property, plant, and equipment.

We estimate (1) for each industry and year.[6] We then use the estimates of α_1, α_2, and α_3 obtained from (1) to estimate $DACC$ as follows:

$$DACC_{it} = TACC_{it}/TA_{it-1} - [\hat{\alpha}_1(1/TA_{it-1}) + \hat{\alpha}_2(\Delta REV_{it} - \Delta REC_{it})/TA_{it-1} + \hat{\alpha}_3 PPE_{it}/TA_{it-1}] \quad (2),$$

where ΔREC is change in receivables. We match each firm-year observation with another from the same industry and year on ROA (net income divided by beginning-of-year total assets). We measure performance-adjusted $DACC$ for firm i in year t as the modified Jones model discretionary accruals in year t minus the matched firm's modified Jones model discretionary accruals in year t.[7]

To provide further evidence on whether there is any differential relation between audit quality and our measure of discretionary accruals conditional on whether they are income increasing or income decreasing, we also conduct the analyses after partitioning the sample into two groups based on the sign of discretionary accruals.

Measuring cost of equity capital

We utilize the industry method introduced by Gebhardt et al. 2001 and the PEG ratio method proposed by Easton 2004 to estimate firm-specific ex ante cost of equity capital. The industry method imposes the assumption that a firm's ROE reverts to the industry level ROE beyond the forecast horizon. The PEG ratio method imposes the assumption of

5. As a sensitivity test, we also define audit quality based on the size of the audit firm in terms of audited assets in China (DeFond, Wong, and Li 2000). Our results are robust to the use of this measure.
6. We estimate $DACC$ based on 4,581 firm-year observations with sufficient data to calculate the variables of the modified Jones model and ROA. Consistent with prior research, we require each industry to have at least 10 observations in any given year (Kothari et al. 2005).
7. To assess the effectiveness of the performance matching, we calculate the mean difference in ROA of all matched pairs in each industry-year. We find no significant difference in any industry-year. As an alternative approach to control for performance in estimating $DACC$, we augment (1) to include ROA as a control variable. The main results are qualitatively the same.

zero growth in abnormal earnings beyond the forecast horizon.[8] Lu and Ye (2004) show that the industry approach is most appropriate in the Chinese capital market setting. However, Botosan and Plumlee (2005) conclude that the PEG ratio approach is a preferable measure of cost of equity capital in the U.S. capital market setting because it dominates the other alternatives in the sense that it is consistently and predictably related to various risk measures. Based upon this evidence, and to assess the robustness of our results, we use both these cost of equity capital measures in our analysis.

Following Gebhardt et al. 2001, we derive the implied cost of equity capital, r_{GLS}, from the following equation:

$$P_t = B_t + \sum_{i=1}^{\infty} \frac{E_t(ROE_{t+i} - r_{GLS})B_{t+i-1}}{(1 + r_{GLS})^i} \quad (3),$$

where P_t is stock price per share at time t, B_t is book value of equity per share at time t, r_{GLS} is estimated ex ante (implied) cost of equity capital, and ROE_{t+i} is return on book equity for period $t+i$. Although (3) requires an infinite series of earnings forecasts, it can be operationalized by conversion into the following finite-horizon form with a ''terminal value'':

$$P_t = B_t + \sum_{i=1}^{11} \frac{FROE_{t+i} - r_{GLS}}{(1 + r_{GLS})^i} B_{t+i-1} + \frac{FROE_{t+12} - r_{GLS}}{r_{GLS}(1 + r_{GLS})^{11}} B_{t+11} \quad (4),$$

where *FROE* is forecasted *ROE*. According to Gebhardt et al. 2001, we need *FROE* for 12 future years in (4). Because earnings forecast data are not publicly available in China, we use reported *ROE* if it is available.[9] We then forecast *FROE* for the remaining years using a linear interpolation to the industry median *ROE* of the past three years.[10]

We assume that book value of equity, earnings and dividends satisfy the ''clean surplus relation'', that is, $B_{t+i} = B_{t+i-1} + FROE_{t+i} \times B_{t+i-1} \times (1 - pout_{it})$, where $pout_{it}$ is the expected dividend payout ratio, measured as the median payout ratio over the past three years.

Under the PEG ratio approach, the implied cost of equity capital, r_{PEG}, is estimated as the square root of the inverse of the price-earnings-growth ratio:

8. A critical assumption underlying both approaches is that earnings are value relevant in China, because both approaches use earnings as inputs in the valuation model. Chen, Chen, and Su's 2001b empirical evidence supports this assumption.

9. Gebhardt et al. (2001) estimate r using analysts' earnings forecasts for the first three years, and then forecast *FROE* beyond the third year using a linear interpolation approach. We note that using reported *ROE* to estimate r_{GLS} is a limitation of our study in that it may introduce error in measuring r_{GLS}. Specifically, if reported *ROE* is greater (less) than expected *ROE*, then r_{GLS} will be biased upward (downward). To the extent that the error is not correlated with *SOE* and/or *AUD*, the coefficients on *SOE* and/or *AUD* in (8) will not be biased. We also note that prior studies find clients of high-quality auditors are less likely to report losses (see, e.g., Chaney, Jeter, and Shivakumar 2004; Francis, Maydew, and Sparks 1999; De Franco, Gavious, Richardson, and Jin 2011; Lawrence, Minutti-Meza, and Zhang 2011). Therefore, it is not unreasonable to argue that firms audited by Top 8 auditors are more likely to report favorable earnings news (i.e., reported *ROE* is greater than expected *ROE*) than firms audited by non–Top 8 auditors, which implies that the potential bias introduced by our substitution of reported *ROE* for expected *ROE*, if any, should result in an upward bias of r_{GLS} for the firms audited by Top 8 auditors. The upward bias in r_{GLS} reduces the probability of rejection of our hypothesis because we show that NSOEs audited by Top 8 auditors have lower r_{GLS}. We thank Gordon Richardson for providing this explanation.

10. For example, to estimate r_{GLS} for 2001, we use reported *ROE* from 2002 to 2006 and then forecast *FROE* from 2007 to 2013. Our estimation procedure is consistent with Zeng and Lu 2006.

$$r_{PEG} = \sqrt{\frac{eps_{t+2} - eps_{t+1}}{P_t}} \quad (5),$$

where r_{PEG} is the estimated ex ante (implied) cost of equity capital under the PEG ratio approach, eps_{t+1} is the one-year-ahead realized EPS, eps_{t+2} is the two-year-ahead realized EPS, and P_t is the fiscal year-end price per share.

We use realized eps_{t+1} and eps_{t+2} in (5) instead of the theoretically correct expected eps_{t+1} and eps_{t+2} because, as noted earlier, analysts' earnings forecast data are not available in China. We note that use of the PEG ratio approach warrants some caution. First, it is not yet established that the PEG ratio approach yields the most robust measure of cost of equity capital in the Chinese capital market setting, although Botosan and Plumlee (2005) conclude it does so in the U.S. setting. Second and more importantly, the PEG ratio approach requires that $eps_{t+2} > eps_{t+1} > 0$. We lose 1,388 observations because they violate this assumption. The data screening for the PEG ratio approach likely results in retaining only firms for which earnings are consistently growing; thus it sacrifices some power of the tests and may result in an unrepresentative sample.

We assess the validity of the r_{GLS} and r_{PEG} estimates by regressing them on three risk proxies: beta, size and book-to-market ratio. We expect r_{GLS} and r_{PEG} to be positively related to beta and book-to-market ratio, and negatively related to size (Fama and French 1993; Francis et al. 2004). The (untabulated) results are consistent with these predictions and support the reliability of our cost of equity capital estimates.

Proxy for audit quality

DeAngelo (1981) shows analytically that larger audit firms have greater incentives to provide higher-quality audit service. However, whether DeAngelo's argument is applicable in the Chinese setting critically hinges on whether the legal environment in China is strong enough to incentivize auditors to avoid violating auditing regulations. Although the legal environment in China is not as sophisticated as that in the United States, the increased concern with litigation risk and loss of reputation from violating auditing regulations following the series of reforms initiated in the late 1990s motivates larger Chinese auditors to differentiate themselves from smaller auditors.

DeFond et al. (2000) find strong evidence that larger Chinese auditors tend to issue modified audit reports more frequently than smaller auditors, consistent with the prediction that larger Chinese auditors are more independent. Following DeFond et al. 2000, we define audit quality, AUD, based on an audit firm's Chinese revenues over the sample period. We classify Top 8 firms as relatively high-quality auditors and all others as relatively low-quality auditors.

To assess the construct validity of our proxy for audit quality, we follow DeFond et al. 2000 and use the frequency with which auditors issue modified audit reports as a yardstick to assess audit quality (or auditor independence) in China. We estimate the following logistic regression:

$$\begin{aligned} MAO_{it} = {} & \varphi_0 + \varphi_1 AUD_{it} + \varphi_2 SIZE_{it} + \varphi_3 LEV_{it} + \varphi_4 INV_{it} + \varphi_5 REC_{it} + \varphi_6 BM_{it} \\ & + \varphi_7 ST/PT_{it} + \varphi_8 ROA_{it} + \varphi_9 SOE_{it} + \varphi_{10} OWNER_{it} + \varphi_{11} INDIR_{it} \\ & + \varphi_t \sum\nolimits_t YEAR_t + \varphi_j \sum\nolimits_j IND_j + \varepsilon_{it} \end{aligned} \quad (6)$$

where MAO is 1 if the client firm receives a modified opinion and 0 otherwise, AUD is 1 for Top 8 client firms and 0 for non–Top 8 client firms. A positive coefficient on AUD is consistent with the expectation that larger Chinese auditors are on average more independent. We control for several firm characteristics including firm size

(*SIZE*), leverage (*LEV*), inventory-to-total assets ratio (*INV*), accounts receivable-to-total assets ratio (*REC*), book-to-market ratio (*BM*), whether the firm has losses for two consecutive years (*ST/PT*), *ROA*, whether the firm is state-owned (*SOE*), percentage of ownership held by the ultimate shareholder (*OWNER*), and percentage of independent directors (*INDIR*). We include year and industry dummies to control for year and industry effects.

We estimate (6) using 4,387 firm-year observations with audit opinion information and sufficient data available to calculate all the variables in the model. We find that 10.4 percent of the sample received a modified audit opinion. Table 2 reports the results of the logistic regression. The coefficient on *AUD* is significantly positive at the 1 percent level, indicating that there are significantly more modified audit opinions issued by larger auditors in China.[11] To the extent that higher-quality auditors are less likely to succumb to management pressure to issue clean opinions when modified opinions are appropriate, our results, which are consistent with DeFond et al.'s 2000 findings, support the view that larger auditors in China have stronger incentives to protect their reputation and provide higher-quality audits.

Model specification

Exogenous auditor choice

Our study hypothesizes that the effects of audit quality on earnings management and cost of equity capital differ across SOEs and NSOEs. Prior studies regress discretionary accruals on an indicator variable for audit quality (e.g., Big 6 vs. non–Big 6 audit firms) in addition to other control variables (e.g., Becker et al. 1998). The coefficient on audit quality is the incremental effect on the level of earnings management from choosing a higher-quality auditor. Our study extends prior research by allowing the effects of audit quality to differ across SOEs and NSOEs. Accordingly, we interact our measure of audit quality with an indicator variable specifying the nature of firm ownership and use the following models to test our hypotheses:

$$\begin{aligned}|DACC_{it}| = {} & \gamma_0 + \gamma_1 AUD_{it} + \gamma_2 SOE_{it} + \gamma_3 AUD_{it} * SOE_{it} + \gamma_4 BETA_{it} + \gamma_5 BM_{it} + \gamma_6 LEV_{it} \\ & + \gamma_7 SIZE_{it} + \gamma_8 CFO_{it} + \gamma_9 ST/PT_{it} + \gamma_{10} CROSSLIST_{it} + \gamma_{11} OWNER_{it} \\ & + \gamma_{12} GEO_{it} + \gamma_{13} INDIR_{it} + \gamma_t \sum\nolimits_t YEAR_t + \gamma_j \sum\nolimits_j IND_j + \varepsilon_{it} \end{aligned} \tag{7}$$

$$\begin{aligned} r_{it} = {} & \alpha_0 + \alpha_1 AUD_{it} + \alpha_2 SOE_{it} + \alpha_3 AUD_{it} * SOE_{it} + \alpha_4 BETA_{it} + \alpha_5 BM_{it} \\ & + \alpha_6 LEV_{it} + \alpha_7 SIZE_{it} + \alpha_8 GROWTH_{it} + \alpha_9 VOLUME_{it} + \alpha_{10} CROSSLIST_{it} \\ & + \alpha_{11} OWNER_{it} + \alpha_{12} GEO_{it} + \alpha_{13} INDIR_{it} + \alpha_t \sum\nolimits_t YEAR_t \\ & + \alpha_j \sum\nolimits_j IND_j + \varepsilon_{it} \end{aligned} \tag{8}$$

where $|DACC|$ is the absolute value of performance-adjusted discretionary accruals, r is the cost of equity capital under the industry approach (r_{GLS}) or the cost of equity capital under the PEG ratio approach (r_{PEG}), *AUD* equals 1 for Top 8 client firms and 0 for non–Top 8 client firms, *SOE* equals 1 if the firm is an SOE and 0 if the firm is an NSOE, *BETA* is systematic risk reported in CSMAR, *BM* is book value of equity divided by market value of equity, *LEV* is total liabilities divided by total assets, *SIZE* is log of market value of equity, *GROWTH* is average growth in revenue over the last three years, *VOLUME* is trading volume divided by total shares outstanding, *CFO* is cash flow from

11. We compute t statistics based on two-way, cluster-robust standard errors in all our regressions. Gow, Ormazabal, and Taylor (2010 show that two-way, cluster-robust standard errors are well-specified in the presence of cross-sectional and/or time-series dependence.

TABLE 2
Logistic regression of audit opinions on audit quality and firm characteristics

Variable	Pred. sign	Coeff. est.	*t*-value
Intercept	?	−3.550	−2.09**
AUD	+	0.363	2.32***
SIZE	−	0.074	1.13
LEV	+	1.804	3.20***
INV	+	−2.322	−7.91***
REC	+	1.406	1.78**
BM	+	−0.299	−0.95
ST/PT	+	0.840	6.94***
ROA	−	−12.212	−12.62***
SOE	−	−0.363	−2.52***
OWNER	?	−1.133	−3.10***
INDIR	−	−1.169	−2.11**
YEAR		YES	
IND		YES	
Wald chi square		270.90	
Pseudo R^2		28.36%	
Log likelihood		−1,037.75	
Observations		4,387	

Notes:

This table examines the relation between the likelihood of receiving a modified audit opinion and audit quality, after controlling for firm characteristics. We estimate the following logistic model:

$$MAO_{it} = \varphi_0 + \varphi_1 AUD_{it} + \varphi_2 SIZE_{it} + \varphi_3 LEV_{it} + \varphi_4 INV_{it} + \varphi_5 REC_{it} + \varphi_6 BM_{it} + \varphi_7 ST/PT_{it} + \varphi_8 ROA_{it} + \varphi_9 SOE_{it} + \varphi_{10} OWNER_{it} + \varphi_{11} INDIR_{it} + \varphi_t \sum_t YEAR_t + \varphi_j \sum_j IND_j + \varepsilon_{it}$$

The analysis is based on 4,387 firm-year observations with audit opinions and data available to calculate the regression variables. Of the 4,387 firm-year observations, 10.4 percent received modified audit opinions.

MAO equals 1 if the firm receives a modified audit opinion, 0 otherwise. *AUD* is 1 for Top 8 client firms, 0 for non–Top 8 client firms. *SIZE* is the natural logarithm of market value of equity measured at the beginning of the year. *LEV* is leverage ratio, defined as total liabilities divided by total assets. *INV* is total inventory divided by total assets. *REC* is total receivables divided by total assets. *BM* is book-to-market ratio measured at the beginning of the year. *ST/PT* is 1 if the firm reported losses for two consecutive years, 0 otherwise. *ROA* is return on assets. *SOE* is 1 if the firm is an SOE, 0 if it is an NSOE. *OWNER* is the percentage of ownership held by the ultimate shareholder. *INDIR* is the percentage of independent directors on the board. *YEAR* and *IND* are year and industry dummies, respectively.

t-values are calculated based on two-way, cluster-robust standard errors. *** and ** indicate significance at the 1 percent and 5 percent levels, respectively (one-tailed test where directional predictions are made, two-tailed test otherwise).

operations divided by beginning total assets, *ST/PT* equals 1 if a firm has losses for two consecutive years and 0 otherwise, *CROSSLIST* equals 1 if a firm issues shares to foreign investors and 0 otherwise, *OWNER* is percentage of ownership held by the ultimate

shareholder, *GEO* is log of market index for each province or provincial level region, and *INDIR* is percentage of independent directors on the board.

We include commonly used control variables in (7) and (8) to capture the effects of other factors that impact earnings management and cost of equity capital (McNichols 2000; DeFond and Jiambalvo 1993; Becker et al. 1998; Frankel, Johnson, and Nelson 2002; Lang, Raedy, and Yetman 2003; Klein 2002; Amihud and Mendelson 1986; Fama and French 1992, 1993; Ye and Lu 2006; Hail and Leuz 2009).

We note that Hail and Leuz (2009) find strong evidence that firms with cross-listings on U.S. exchanges in general experience a significant decrease in their cost of capital. However, such a relation may not hold (or may even have the opposite sign) in the Chinese setting. Guo and Tang (2006) examine the cost of capital for Chinese firms that issue both domestic shares and shares on the Hong Kong Stock Exchange between 1993 and 2003 and conclude that Chinese firms cannot obtain lower cost of capital by listing overseas. Hung, Wong, and Zhang (2008) find that cross-listing of Chinese SOEs is primarily driven by political needs, not by firms' desire to fund growth and expand foreign sales. They also show that strong political connections significantly weaken the cross-listing effect on investment efficiency and post-listing performance. If domestic investors expect future cash flow volatility to increase as a result of the non–economic-based, cross-listing decision, they are likely to increase the required rate of return. Given the uniqueness of the Chinese setting, we do not make a directional prediction on the relation between cost of equity capital and *CROSSLIST*; instead, we leave it as an empirical question.

In (7), γ_0 indicates the level of earnings management for NSOEs with low audit quality, and γ_1 reflects the difference in the level of earnings management between NSOEs with high and low audit quality. We expect γ_1 to be negative because high-quality auditors will constrain earnings management more than will low-quality auditors. γ_2 is the difference in the level of earnings management between SOEs with low audit quality and NSOEs with low audit quality. We expect SOEs on average to have relatively weaker incentives to manage accounting performance because of their different ownership structures and agency relations. Therefore, we predict γ_2 to be negative. γ_3 is the coefficient of primary interest. It reflects the difference in the effect of audit quality in constraining earnings management between SOEs and NSOEs. Hypothesis 1 predicts that this effect is less pronounced for SOEs than for NSOEs; we therefore expect γ_3 to be positive.

In (8), α_0 measures the cost of equity capital for NSOEs with low audit quality; the corresponding measure for NSOEs with high audit quality is $(\alpha_0 + \alpha_1)$. We expect α_1 to be negative. The estimates of cost of equity capital for SOEs with low and high audit quality are $(\alpha_0 + \alpha_2)$ and $(\alpha_0 + \alpha_1 + \alpha_2 + \alpha_3)$, respectively. This implies that the difference in cost of equity capital between SOEs with low and high audit quality is $(\alpha_1 + \alpha_3)$. If the difference in cost of equity capital between firms with low and high audit quality is attributable to their ownership type, then, according to Hypothesis 2, α_3 should be greater than zero.

Endogenous auditor choice

(7) and (8) do not take into account that auditor choice may be endogenous. Following Chaney et al. 2004, we adopt a two-stage procedure to correct for endogeneity of auditor choice. In the first stage, we obtain consistent estimates from a logistic regression of the binary variable *AUD* on variables that affect auditor choice, and use these estimates to calculate the inverse Mills ratio (*IMR*). Then, in the second stage, we estimate (7) and (8) with *IMR* included as an additional explanatory variable. Besides econometric implications, the results of the logistic model can shed light on an important and relevant question for our study, that is, whether SOEs are more or less likely to use high-quality auditors.

Our first-stage self-selection model is specified as:

$$AUD_{it} = \beta_0 + \beta_1 SOE_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 ISSUE_{it} + \beta_6 LLOSS_{it} + \beta_7 GEO_{it} + \beta_8 OWNER_{it} + \beta_9 SQUOWN_{it} + \beta_{10} CROSSLIST_{it} + \beta_t \sum_t YEAR_t + \beta_j \sum_j IND_j + \varepsilon_{it} \quad (9)$$

where *ISSUE* equals 1 if the firm issues equity in the current year and 0 otherwise, *LLOSS* equals 1 if the firm reported a loss in the previous year and 0 otherwise, *SQUOWN* is the square of *OWNER*.

Our earlier discussion indicates that audit quality plays a less pronounced role in constraining earnings management and in firm valuation for SOEs than for NSOEs; therefore, we conjecture that SOEs are less likely to choose high-quality auditors than NSOEs. We follow the prior literature to identify common factors that are likely to affect the choice of auditor (Simunic and Stein 1987; Johnson and Lys 1990; DeFond 1992; Copely and Gaver 1995; Beatty 1989). We also include variables reflecting the unique features of the Chinese setting that impact auditor choice. For example, the institutional heterogeneity across regions in China influences auditor choice (Wang, Chen, and Yu 2006; Wang et al. 2008). We use the Index of Marketization for China's Provinces calculated by Fan and Wang 2003 to capture regional disparity. The larger the index, the more advanced the region's market-oriented institutional transformation and economic development.[12] We expect a positive relation between *GEO* and *AUD*. We include *OWNER* to capture the choice of audit quality arising from agency conflicts. Because there is an inverse U-shaped relation between block share ownership and auditor choice in China (Zeng and Ye 2005), we also include *SQUOWN* and expect its coefficient to be negative. Cross-listed firms or firms that issue shares to foreign investors face stronger demand for high-quality audits (Sun and Cao 2004). We expect the coefficient on *CROSSLIST* to be positive.

6. Results

Descriptive statistics

We provide detailed descriptive statistics because of the paucity of information about firms listed in China and differences between SOEs and NSOEs. We report descriptive statistics on firm characteristics for the full sample in Panel A of Table 3. The mean (median) cost of equity capital under the industry method is 0.066 (0.034) and the mean (median) cost of equity capital under the PEG ratio method is 0.082 (0.065).[13] These estimates are consistent with prior studies on Chinese capital markets (Zeng and Lu 2006).[14] The mean (median) value of $|DACC|$, which reflects the level of earnings management, is 0.094

12. The index captures the degree of government intervention, legal environment development, and credit market development. A higher value indicates less government intervention, better legal environment, and better credit market development.

13. The mean (median) estimates from the industry and PEG ratio methods of estimating cost of equity capital differ for at least two reasons. First, the samples differ because of differences in data availability. Second, the models make different assumptions about future earnings and earnings growth. For brevity, we only tabulate and discuss the univariate results for the r_{GLS} sample.

14. Compared with most mature capital markets, the cost of equity capital is much smaller in China. Fernald and Rogers (2002) find that, for Chinese cross-listed firms, domestic investors pay about four times more than foreign investors for essentially identical assets. They attribute this pricing difference to the lack of investment alternatives in China. The main alternative to stocks in China is bank deposits, which tend to pay interest rates below world levels. Fernald and Rogers further argue that Chinese investors may have a low equity premium because stocks offer one of the few opportunities available to diversify their investments.

TABLE 3
Sample descriptive statistics

Panel A: Descriptive statistics of the full sample

Variable	Mean	Median	Std. Dev.	Q1	Q3
r_{GLS}	0.066	0.034	0.15	0.016	0.061
$\|DACC\|$	0.094	0.066	0.10	0.031	0.124
AUD	0.184	0	0.39	0	0
SOE	0.82	1	0.38	1	1
BETA	1.02	1.05	0.25	0.89	1.18
BM	0.31	0.28	0.16	0.19	0.41
SIZE	14.81	14.74	0.71	14.32	15.21
LEV	0.45	0.46	0.17	0.33	0.58
GROWTH	0.82	0.50	1.27	0.16	1.08
VOLUME	2.26	1.92	1.32	1.35	2.78
LLOSS	0.11	0	0	0	0
ROA	0.02	0.03	0.05	0.01	0.05
ISSUE	0.23	0	0	0	0
GEO	2.92	2.99	0.20	2.78	3.07
OWNER	0.43	0.42	0.17	0.29	0.57
CFO	0.05	0.05	0.08	0.01	0.09
ST/PT	0.03	0	0.16	0	0
CROSSLIST	0.09	0	0.29	0	0
INDIR	0.25	0.30	0.14	0.18	0.33

Panel B: Descriptive statistics by ownership type: state-owned enterprises (SOEs) versus non–state-owned enterprises (NSOEs)

	SOEs			NSOEs			Difference	
Variable	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median
r_{GLS}	0.059	0.033	0.13	0.097	0.037	0.22	−3.89	−2.64
$\|DACC\|$	0.091	0.063	0.10	0.111	0.080	0.11	−3.89	−4.57
AUD	0.20	0	0.40	0.12	0	0.33	5.04	4.49
BETA	1.02	1.04	0.24	1.03	1.07	0.30	−0.67	−2.29
BM	0.32	0.29	0.16	0.29	0.25	0.17	3.45	4.32
SIZE	14.88	14.80	0.71	14.48	14.42	0.65	13.22	12.42
LEV	0.44	0.45	0.17	0.51	0.52	0.18	−8.09	−8.23
GROWTH	0.76	0.48	1.27	1.06	0.65	1.25	−5.33	−5.58
VOLUME	2.22	1.89	1.29	2.41	2.04	1.47	−2.78	−2.79
LLOSS	0.10	0	0.29	0.14	0	0.35	−3.72	−4.15
ROA	0.02	0.03	0.05	0.01	0.02	0.06	5.09	7.80
ISSUE	0.21	0	0.41	0.21	0	0.41	0.31	0.32
GEO	2.92	2.99	0.2	2.91	2.93	0.22	1.57	0.26
OWNER	0.46	0.46	0.17	0.32	0.29	0.13	25.81	21.50
CFO	0.05	0.05	0.079	0.03	0.03	0.09	5.47	5.65
ST/PT	0.02	0	0.15	0.05	0	0.21	−2.63	−3.26

(The table is continued on the next page.)

TABLE 3 (Continued)

	SOEs			NSOEs			Difference	
Variable	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.	Mean	Median
CROSSLIST	0.10	0	0.30	0.05	0	0.22	−5.55	−4.57
INDIR	0.24	0.29	0.14	0.29	0.33	0.12	−8.47	−8.43
Observations		2,722			588			

Panel C: Descriptive statistics of state-owned enterprises (SOEs) by audit quality: Top 8 versus non–Top 8 client firms

	Top 8 client firms			non–Top 8 client firms		
Variable	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
r_{GLS}	0.051	0.032	0.11	0.061	0.034	0.14
$\|DACC\|$	0.088	0.060	0.10	0.092	0.064	0.10
BETA	1.03	1.05	0.22	1.02	1.04	0.24
BM	0.30	0.28	0.15	0.32	0.29	0.16
SIZE	15.26	15.17	0.84	14.79	14.73	0.64
LEV	0.44	0.44	0.17	0.44	0.45	0.17
GROWTH	0.61	0.40	0.77	0.80	0.50	1.36
VOLUME	2.35	1.98	1.33	2.19	1.87	1.27
LLOSS	0.05	0	0.22	0.11	0	0.31
ROA	0.03	0.03	0.04	0.02	0.03	0.05
ISSUE	0.24	0	0.43	0.20	0	0.40
GEO	2.98	3.07	0.17	2.91	2.93	0.20
OWNER	0.47	0.48	0.16	0.45	0.45	0.17
CFO	0.06	0.06	0.08	0.05	0.05	0.08
ST/PT	0.02	0	0.15	0.02	0	0.15
CROSSLIST	0.31	0	0.46	0.05	0	0.22
INDIR	0.25	0.28	0.12	0.24	0.29	0.14
Observations		541			2,181	

Panel D: Descriptive statistics of non–state-owned enterprises (NSOEs) by audit quality: Top 8 versus non–Top 8 client firms

	Top 8 client firms			non–Top 8 client firms		
Variable	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
r_{GLS}	0.049	0.029	0.096	0.103	0.039	0.24
$\|DACC\|$	0.091	0.082	0.079	0.113	0.079	0.118
BETA	0.96	1.01	0.32	1.04	1.08	0.29
BM	0.24	0.20	0.13	0.30	0.26	0.18
SIZE	14.87	14.84	0.64	14.43	14.37	0.63
LEV	0.53	0.53	0.16	0.51	0.52	0.18
GROWTH	0.96	0.66	0.88	1.08	0.65	1.30
VOLUME	2.42	2.32	1.20	2.41	2.03	1.51

(The table is continued on the next page.)

TABLE 3 (Continued)

	Top 8 client firms			non–Top 8 client firms		
Variable	Mean	Median	Std. Dev.	Mean	Median	Std. Dev.
LLOSS	0.05	0	0.22	0.16	0	0.36
ROA	0.02	0.03	0.06	0.01	0.02	0.06
ISSUE	0.28	0	0.45	0.20	0	0.40
GEO	2.95	3.07	0.24	2.91	2.93	0.23
OWNER	0.36	0.30	0.13	0.31	0.29	0.13
CFO	0.04	0.04	0.07	0.03	0.03	0.09
ST/PT	0.04	0	0.20	0.05	0	0.21
CROSSLIST	0.16	0	0.37	0.04	0	0.19
INDIR	0.27	0.33	0.11	0.29	0.33	0.12
Observations		71			517	

Notes:

Panel A presents descriptive statistics of firm characteristics for the full sample. Panel B presents descriptive statistics for the SOE and the NSOE subsamples. Panel C and Panel D report descriptive statistics for the SOE and the NSOE subsamples, respectively, with further partitioning based on audit quality.

r_{GLS} is cost of equity capital estimated using the industry approach introduced by Gebhardt et al. 2001. $|DACC|$ is absolute value of performance-adjusted discretionary accruals. *AUD* is 1 for Top 8 client firms, 0 for non–Top 8 client firms. *SOE* is 1 if the firm is an SOE, 0 if it is an NSOE. *BETA* is systematic risk reported on CSMAR. *BM* is book-to-market ratio measured at the beginning of the year. *SIZE* is the natural logarithm of market value of equity measured at the beginning of the year. *LEV* is leverage ratio, defined as total liabilities divided by total assets. *GROWTH* is average growth in revenues over the last three years. *VOLUME* is trading volume divided by total shares outstanding. *LLOSS* is 1 if the firm reported a loss in the previous year, 0 otherwise. *ROA* is return on assets. *ISSUE* is 1 if the firm issues equity in current year, 0 otherwise. *GEO* is the natural logarithm of the marketization index for each province or provincial level region. *OWNER* is the percentage of ownership held by the ultimate shareholder. *CFO* is cash flows from operations divided by beginning total assets. *ST/PT* is 1 if the firm reported losses for two consecutive years, 0 otherwise. *CROSSLIST* is 1 if the firm issues shares to foreign investors (e.g., B shares or H shares), 0 otherwise. *INDIR* is the percentage of independent directors on the board.

t-tests are used to test differences between the SOE and NSOE means. Wilcoxon two-sample tests are used to test differences between the SOE and NSOE medians.

(0.066). The Top 8 auditors in China audit 18.4 percent of our sample firms. Not surprisingly, SOEs constitute the majority of sample firms (82 percent). The ultimate shareholder controls an average of 43 percent of sample firms, reflecting the highly concentrated ownership structure in Chinese firms. Nine percent of sample firms issue shares to foreign investors and 25 percent of board members are independent. Various performance and risk measures (e.g., *ROA, LLOSS, CFO, LEV, BM* and *BETA*) indicate that our sample firms are financially healthy.

Panel B of Table 3 reports descriptive statistics for SOEs and NSOEs. Overall, investors demand a higher cost of equity capital for NSOEs (0.097) than for SOEs (0.059), indicating that NSOEs are, on average, riskier than SOEs. Consistent with their higher riskiness, NSOEs have larger *BETA*, smaller *SIZE*, and higher *LEV*. In terms of operating

performance, although NSOEs have higher *GROWTH*, they suffer more *LLOSS*, have lower *ROA* and *CFO*. Top 8 auditors audit only 12 percent of NSOEs compared with 20 percent of SOEs. Further analysis reveals that this difference is primarily driven by the cross-listed firms in our sample. We find that 10 percent of SOEs are cross-listed and 60 percent of those cross-listed SOEs choose Top 8 auditors to audit their domestic financial reports, whereas only 5 percent of NSOEs are cross-listed and 34 percent of them choose Top 8 auditors to audit their domestic financial reports.[15] Cross-listed firms have different financial characteristics and regulatory environments from firms that only issue domestic shares. Although interesting in its own right, how cross-listed firms make auditor choices is beyond the scope of this study. When we exclude cross-listed firms from the sample, Top 8 auditors audit 15 percent and 11 percent of SOEs and NSOEs, respectively. The difference is not statistically significant.[16] Turning to earnings management, the mean $|DACC|$ for NSOEs is 0.111, significantly higher than that for SOEs (0.091). A higher percentage of NSOEs suffer losses in two consecutive years (*ST/PT*), which may explain why NSOEs engage in more earnings management.

Panels C and D of Table 3 further partition the SOE and NSOE subsamples on the basis of audit quality. SOEs audited by Top 8 auditors enjoy a 1 percent average reduction in cost of equity capital and exhibit slightly lower earnings management than SOEs audited by non–Top 8 auditors. Such differences are much more pronounced for NSOEs. The difference in the level of earnings management and in the cost of equity capital between NSOEs with Top 8 and non–Top 8 auditors are 2.2 percent and 5.4 percent, respectively. However, caution should be exercised in interpreting the implications of these univariate analyses. It is likely that auditors self-select into different groups; consequently, the observed differences in cost of equity capital and level of earnings management may merely reflect differences in firms' underlying characteristics rather than the effects of differences in audit quality.

Univariate correlations

We report Pearson (below the diagonal) and Spearman (above the diagonal) pairwise correlations among the variables of interest for the full sample in Table 4. As expected, cost of equity capital (r_{GLS}) and audit quality (AUD) are strongly negatively correlated.[17] SOEs, on average, enjoy lower cost of equity capital than NSOEs. Consistent with prior theoretical and empirical studies, cost of equity capital is positively correlated with *BETA, BM* and *LEV* and negatively correlated with *SIZE*. We find a significantly positive Pearson correlation between cost of equity capital and $|DACC|$; however, the Spearman correlation is not reliably different from zero. In addition, we do not observe a significant correlation between audit quality and the level of earnings management. This is probably because a large percentage of our sample comprises SOEs and the effect of audit quality on earnings management is weaker for SOEs. We find a negative correlation between $|DACC|$ and *SOE*, consistent with SOEs, on average, having weaker incentives to manage earnings than NSOEs.

Ordinary least squares (OLS) results

Panel A of Table 5 summarizes the OLS estimates of the effect of audit quality on the level of earnings management. In the first two columns, we start with a base model version

15. China requires all cross-listed firms to appoint a domestic audit firm to audit financial statements under Chinese generally accepted accounting principles (GAAP) and a separate audit firm to audit financial statements under foreign accounting standards (such as HK GAAP or International Financial Reporting Standards).
16. The results of our primary hypotheses tests are unchanged when we exclude cross-listed firms.
17. The correlation between r_{PEG} and AUD is −0.15 ($p < 0.01$).

TABLE 4
Correlation matrix

Variable		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
r_{GLS}	(1)		*−0.04*	**−0.05**	0.01	**0.20**	**0.18**	**−0.36**	**0.18**	**−0.33**	**0.10**	**−0.16**	**0.08**	0.01	**−0.06**	−0.03	**0.36**
AUD	(2)	**−0.05**		**0.08**	−0.01	−0.01	−0.03	**0.25**	−0.01	**−0.06**	*0.04*	**0.12**	0.00	**0.32**	**0.04**	**0.08**	−0.01
SOE	(3)	**−0.10**	**0.08**		**−0.07**	**−0.06**	**0.08**	**0.22**	**−0.14**	**−0.10**	**−0.05**	**0.13**	**−0.05**	**0.08**	**0.30**	**−0.03**	**−0.15**
|DACC|	(4)	**0.04**	−0.03	**−0.08**		−0.02	**−0.07**	**−0.04**	**0.07**	**0.11**	0.02	**−0.03**	−0.01	**−0.05**	**−0.03**	−0.01	−0.01
BETA	(5)	**0.03**	−0.00	***−0.04***	−0.02		**−0.05**	**−0.24**	**0.07**	**−0.14**	**0.29**	**−0.22**	−0.02	**−0.04**	**−0.05**	**−0.03**	0.02
BM	(6)	**0.05**	*−0.05*	**0.06**	**−0.09**	−0.01		**−0.15**	**−0.07**	**−0.03**	**−0.05**	**0.22**	**−0.10**	**−0.07**	**0.07**	−0.03	**0.35**
SIZE	(7)	**−0.17**	**0.27**	**0.21**	**−0.09**	**−0.24**	**−0.12**		**−0.19**	**0.11**	**−0.14**	**0.41**	**−0.10**	**0.30**	**0.20**	**0.12**	**−0.32**
LEV	(8)	**0.18**	−0.02	**−0.14**	**0.17**	**0.05**	**−0.08**	**−0.19**		**0.10**	**0.11**	**−0.07**	**0.08**	**0.03**	**−0.14**	0.01	**0.15**
GROWTH	(9)	**−0.07**	**−0.06**	**−0.09**	**0.12**	**−0.09**	**−0.07**	**0.06**	**0.06**		0.01	0.04	**−0.17**	**−0.14**	0.01	**−0.06**	**−0.04**
VOLUME	(10)	**0.10**	*0.03*	**−0.06**	0.02	**0.30**	*−0.04*	**−0.08**	**0.10**	0.02		**−0.09**	**0.06**	**0.10**	0.02	0.01	**0.15**
CFO	(11)	−0.02	**0.11**	**0.04**	**−0.05**	**−0.09**	**0.09**	**0.30**	−0.00	−0.01	*0.03*		−0.06	**0.06**	**0.10**	**0.06**	−0.03
ST/PT	(12)	0.02	0.00	**−0.05**	0.03	−0.01	**−0.09**	**−0.10**	**0.11**	**−0.10**	**0.06**	−0.01		**0.03**	**−0.07**	0.01	0.04
CROSSLIST	(13)	**−0.02**	**0.32**	**0.08**	**−0.05**	**−0.03**	**−0.07**	**0.35**	**0.03**	**−0.10**	**0.09**	**0.06**	**0.03**		−0.04	**0.18**	0.02
OWNER	(14)	−0.02	**0.04**	**0.29**	**−0.05**	**−0.04**	**0.06**	**0.22**	**−0.14**	−0.02	−0.00	**0.10**	**−0.07**	**−0.05**		**−0.10**	**−0.05**
GEO	(15)	−0.02	**0.07**	**−0.03**	−0.02	−0.02	−0.02	**0.11**	**−0.01**	**−0.04**	0.00	**0.04**	0.01	**0.16**	**−0.09**		**0.05**
INDIR	(16)	0.02	0.00	**−0.13**	−0.01	0.02	**0.32**	**−0.27**	**0.13**	**−0.05**	**0.14**	−0.02	**0.04**	**0.02**	−0.06	**0.05**	

Notes:

The table reports the correlation matrix for the full sample (3,310 firm-year observations). Pearson (Spearman) correlations are presented below (above) the diagonal.

r_{GLS} is cost of equity capital estimated using the industry approach introduced by Gebhardt et al. 2001. *|DACC|* is absolute value of performance-adjusted discretionary accruals. *AUD* is 1 for Top 8 client firms, 0 for non–Top 8 client firms. *SOE* is 1 if the firm is an SOE, 0 if it is an NSOE. *BETA* is systematic risk reported on CSMAR. *BM* is book-to-market ratio measured at the beginning of the year. *SIZE* is the natural logarithm of market value of equity measured at the beginning of the year. *LEV* is leverage ratio, defined as total liabilities divided by total assets. *GROWTH* is average growth in revenues over the last three years. *VOLUME* is trading volume divided by total shares outstanding. *CFO* is cash flows from operations divided by beginning total assets. *ST/PT* is 1 if the firm reported losses for two consecutive years, 0 otherwise. *CROSSLIST* is 1 if the firm issues shares to foreign investors (e.g., B shares or H shares), 0 otherwise. *OWNER* is the percentage of ownership held by the ultimate shareholder. *GEO* is the natural logarithm of the marketization index for each province or provincial level region. *INDIR* is the percentage of independent directors on the board.

Bold and *Italics* indicate significance at the 1 percent and 5 percent levels, respectively (two-tailed test).

TABLE 5
Relation between audit quality and earnings management for state-owned enterprises (SOEs) and non–state-owned enterprises (NSOEs)

Panel A: Earnings management measured by absolute value of performance-adjusted discretionary accruals ($|DACC|$)

Variable	Pred. sign	Coeff. est.	*t*-value	Coeff. est.	*t*-value
Intercept	?	0.223	8.60***	0.224	7.16***
AUD	−	−0.002	−0.31	−0.019	−1.71**
SOE	−			−0.017	−2.35***
*AUD * SOE*	+			0.020	1.89**
BETA	?	−0.017	−4.22***	−0.017	−3.93***
BM	?	−0.049	−2.04**	−0.045	−2.07**
LEV	+	0.038	4.35***	0.036	3.94***
SIZE	−	−0.006	−4.54***	−0.005	−3.78***
CFO	?	−0.058	−1.04	−0.057	−1.01
ST/PT	+	0.003	0.29	0.003	0.28
CROSSLIST	−	−0.012	−2.60***	−0.012	−2.41***
OWNER	?	−0.011	−3.10***	−0.002	−0.37
GEO	?	−0.002	−1.59	−0.002	−0.66
INDIR	−	0.012	1.32	0.007	0.80
YEAR		YES		YES	
IND		YES		YES	
Adj. R^2		3.66%		3.99%	

Panel B: Earnings management measured by income-increasing ($DACC+$) or income-decreasing performance-adjusted discretionary accruals ($DACC-$)

	$DACC+$ subsample			$DACC-$ subsample		
Variable	Pred. sign	Coeff. est.	*t*-value	Pred. sign	Coeff. est.	*t*-value
Intercept	?	0.148	4.37***	?	−0.278	−7.37***
AUD	−	−0.042	−3.84***	+	−0.004	−0.26
SOE	−	−0.290	−5.26***	+	0.005	0.41
*AUD * SOE*	+	0.034	5.81***	−	−0.005	−0.42
BETA	?	−0.021	−3.73***	?	0.010	6.09***
BM	?	−0.036	−2.27**	?	0.059	1.59
LEV	+	−0.008	−1.02	+	−0.080	−4.04***
SIZE	−	0.002	0.65	+	0.011	6.09***
CFO	?	−0.262	−3.40***	?	−0.154	−2.09**
ST/PT	+	0.017	0.70	+	0.006	0.59
CROSSLIST	−	−0.002	−0.51	+	0.019	1.76**
OWNER	?	0.007	0.70	?	0.013	0.52
GEO	?	−0.001	−0.30	?	0.003	2.47**
INDIR	−	−0.003	−0.09	+	−0.012	−0.74
YEAR		YES			YES	
IND		YES			YES	
Adj. R^2		9.66%			5.58%	

(The table is continued on the next page.)

TABLE 5 (Continued)

Notes:

This table examines the relation between audit quality and earnings management for SOEs and NSOEs using the following regression model:

$$|DACC_{it}| = \gamma_0 + \gamma_1 AUD_{it} + \gamma_2 SOE_{it} + \gamma_3 AUD_{it} * SOE_{it} + \gamma_4 BETA_{it} + \gamma_5 BM_{it} + \gamma_6 LEV_{it} + \gamma_7 SIZE_{it} + \gamma_8 CFO_{it} + \gamma_9 ST/PT_{it} + \gamma_{10} CROSSLIST_{it} + \gamma_{11} OWNER_{it} + \gamma_{12} GEO_{it} + \gamma_{13} INDIR_{it} + \gamma_t \sum_t YEAR_t + \gamma_j \sum_j IND_j + \varepsilon_{it}$$

Panel A reports the regression results using $|DACC|$ as the dependent variable. Panel B reports the results of regressions using $DACC+$ and $DACC-$ as the dependent variables. The sample in Panel A consists of 3,310 firm-year observations from 2001 to 2004. The samples in Panel B consist of 1,702 firm-year observations with positive $DACC$ and 1,608 firm-years with negative $DACC$ from 2001 to 2004, respectively.

$|DACC|$ is the absolute value of performance-adjusted discretionary accruals. $DACC+$ and $DACC-$ are positive and negative performance-adjusted discretionary accruals, respectively. AUD is 1 for Top 8 client firms, 0 for non–Top 8 client firms. SOE is 1 if the firm is an SOE, 0 if it is an NSOE. $BETA$ is systematic risk reported on CSMAR. BM is book-to-market ratio measured at the beginning of the year. $SIZE$ is the natural logarithm of market value of equity measured at the beginning of the year. LEV is leverage ratio, defined as total liabilities divided by total assets. CFO is cash flows from operations divided by beginning total assets. ST/PT is 1 if the firm reported losses for two consecutive years, 0 otherwise. $CROSSLIST$ is 1 if the firm issues shares to foreign investors (e.g., B shares or H shares), 0 otherwise. $OWNER$ is the percentage of ownership held by the ultimate shareholder. GEO is the natural logarithm of the marketization index for each province or provincial level region. $INDIR$ is the percentage of independent directors on the board. $YEAR$ and IND are year and industry dummies, respectively.

t-values are calculated based on two-way, cluster-robust standard errors. *** and ** indicate significance at the 1 percent and 5 percent levels, respectively (one-tailed test where directional predictions are made, two-tailed test otherwise).

of (7), which constrains the coefficient on AUD to be the same for SOEs and NSOEs. We do not find a statistically significant relation between audit quality and the level of earnings management ($\gamma_1 = -0.002$, $t = -0.31$). As discussed earlier, this is probably because our sample comprises a large percentage of SOEs and, by constraining γ_1 to be the same across SOEs and NSOEs we only capture an average effect of audit quality on earnings management with SOEs considerably more heavily weighted.

The results for the full model are shown in the last two columns. ($\gamma_0 + \gamma_1$), which indicates the level of earnings management for NSOEs with high audit quality, is 0.205 ($t = 3.11$), and γ_0, which indicates the level of earnings management for our benchmark group, NSOEs with low audit quality, is 0.224 ($t = 7.16$). The difference, γ_1, is significantly less than zero ($t = -1.71$), indicating that high-quality auditors constrain earnings management in NSOEs. The coefficients ($\gamma_0 + \gamma_1 + \gamma_2 + \gamma_3$) and ($\gamma_0 + \gamma_2$), which represent the level of earnings management of SOEs with high and low audit quality, are 0.208 ($t = 3.03$) and 0.207 ($t = 2.90$), respectively. The difference, ($\gamma_1 + \gamma_3$), is 0.001 ($t = 0.37$), indicating that audit quality has little effect on earnings management for SOEs. Hypothesis 1 predicts a greater reduction in earnings management from high-quality auditors for NSOEs than for SOEs. Our results support this hypothesis. γ_3, which measures the difference in reduction in earnings management from high-quality auditors across NSOEs and

SOEs is significantly positive (γ_3 = 0.020, t = 1.89). Our results also show that γ_2 is significantly less than zero (γ_2 = −0.017, t = −2.35), indicating that, when both SOEs and NSOEs are audited by non–Top 8 auditors, SOEs on average engage in lower levels of earnings management. This is consistent with SOEs in general having weaker incentives to manage financial performance than NSOEs. Finally, we find that the level of earnings management increases with *LEV* and decreases with *BETA, BM, SIZE*, and *CROSSLIST*.

To examine whether any differential relation between audit quality and our measure of earnings management exists conditional on whether firms engage in income-increasing or income-decreasing earnings management behavior, we partition the sample into two groups based on the sign of *DACC*. Panel B of Table 5 reports regression results estimated separately for the income-increasing and income-deceasing *DACC* subsamples. We find that the effect of audit quality on constraining income-increasing earnings management is more pronounced for NSOEs than for SOEs (γ_3 = 0.034, t = 5.81). Not surprisingly, we find no significant difference in the effect of audit quality on constraining income-decreasing earnings management between SOEs and NSOEs (γ_3 = −0.005, t = −0.42).

We present OLS estimates of (8) using r_{GLS} as the dependent variable in Panel A of Table 6. The first two columns report the results of estimating a base model version of (8) that constrains the effect of audit quality on cost of equity capital to be homogenous across SOEs and NSOEs. Although negative as predicted, the relation between r_{GLS} and *AUD* after controlling for various risk factors is insignificant (α_1 = −0.013, t = −1.28). This is probably because a major portion of our sample firms are SOEs and, by constraining the relation between cost of equity capital and audit quality to be the same across SOEs and NSOEs, we only capture an average effect of audit quality on cost of equity capital with SOEs considerably more heavily weighted.

To examine differences in the effect of audit quality on cost of equity capital across SOEs and NSOEs, we allow the coefficient on *AUD* to differ between these two groups of firms. The results are presented in the last two columns of Panel A. (α_0 + α_1) and α_0, which measure the cost of equity capital for NSOEs with high and low audit quality, are 0.120 (t = 1.92) and 0.169 (t = 3.07), respectively. α_1, therefore, represents the difference in cost of equity capital for NSOEs with high and low audit quality. Our results show that NSOEs that hire Top 8 auditors average a 4.9 percent lower cost of equity capital (α_1 = −0.049, t = −3.40) than similar firms that do not hire Top 8 auditors. (α_0 + α_1 + α_2 + α_3) and (α_0 + α_2), which measure the cost of equity capital for SOEs with high and low audit quality, are 0.140 (t = 2.23) and 0.147 (t = 2.48), respectively. The difference, (α_1 + α_3), is −0.007 (t = −0.77), indicating that there is no significant effect of audit quality on cost of equity capital for SOEs.

We find that the decrease in cost of equity capital from high audit quality is significantly lower for SOEs than for NSOEs (α_3 = 0.042, t = 2.91). This result provides strong support for Hypothesis 2. We also find that α_2 is significantly negative (α_2 = −0.022, t = −3.05), indicating that, despite low audit quality, SOEs on average incur lower cost of equity capital than NSOEs. This result suggests that investors perceive SOEs have lower business risk, perhaps due to government support. Finally, most of the control variables have the predicted signs and are significantly related to the cost of equity capital, except *BM*, *OWNER, GEO*, and *INDIR*. The coefficient on *CROSSLIST* is positive. However, it is significant in the r_{GLS} model but not in the r_{PEG} model. Therefore, we are unable to draw any definitive conclusion on the relation between the cost of capital and Chinese firms' cross-listing status. We leave this interesting question to future research.

Panel B of Table 6 reports the results of estimating (8) using r_{PEG} as the dependent variable. The results are consistent with the results reported in Panel A.

TABLE 6
Relation between audit quality and cost of equity capital for state-owned enterprises (SOEs) and non–state-owned enterprises (NSOEs)

Panel A: Cost of equity capital measured by r_{GLS}

Variable	Pred. sign	Coeff. est.	*t*-value	Coeff. est.	*t*-value
Intercept	?	0.167	2.94***	0.169	3.07***
AUD	−	−0.013	−1.28	−0.049	−3.40***
SOE	−			−0.022	−3.05***
*AUD * SOE*	+			0.042	2.91***
BETA	+	0.041	2.86***	0.040	2.91***
BM	+	−0.008	−0.96	−0.005	−0.61
LEV	+	0.122	2.61***	0.121	2.64***
SIZE	−	−0.015	−5.28***	−0.014	−5.08***
GROWTH	−	−0.007	−1.68**	−0.008	−1.73**
VOLUME	+	0.003	1.69**	0.003	1.67**
CROSSLIST	?	0.008	1.87*	0.007	2.00**
OWNER	?	−0.032	−1.78*	−0.021	−1.21
GEO	?	0.001	0.35	0.001	0.30
INDIR	?	−0.005	−0.45	−0.012	−1.02
YEAR		YES		YES	
IND		YES		YES	
Adj. R^2		8.14%		9.59%	

Panel B: Cost of equity capital measured by r_{PEG}

Variable	Pred. sign	Coeff. est.	*t*-value	Coeff. est.	*t*-value
Intercept	?	0.070	1.38	0.066	1.24
AUD	−	−0.008	−1.49*	−0.042	−2.77***
SOE	−			−0.017	−3.71***
*AUD * SOE*	+			0.039	3.30***
BETA	+	0.034	2.09**	0.034	2.05**
BM	+	0.134	6.81***	0.136	7.26***
LEV	+	0.137	19.72***	0.137	20.22***
SIZE	−	−0.007	−2.14**	−0.007	−2.33***
GROWTH	−	−0.004	−1.93**	−0.004	−1.91**
VOLUME	+	0.003	1.09	0.004	1.12
CROSSLIST	?	0.005	0.78	0.005	0.74
OWNER	?	−0.003	−0.10	0.006	0.23
GEO	?	−0.005	−6.03***	−0.005	−6.64***
INDIR	?	0.004	0.23	0.001	0.07
YEAR		YES		YES	
IND		YES		YES	
Adj. R^2		14.78%		15.08%	

(The table is continued on the next page.)

TABLE 6 (Continued)

Notes:

This table examines the relation between audit quality and cost of equity capital for SOEs and NSOEs using the following regression model:

$$r_{it} = \alpha_0 + \alpha_1 AUD_{it} + \alpha_2 SOE_{it} + \alpha_3 AUD_{it} * SOE_{it} + \alpha_4 BETA_{it} + \alpha_5 BM_{it} + \alpha_6 LEV_{it} + \alpha_7 SIZE_{it} + \alpha_8 GROWTH_{it} + \alpha_9 VOLUME_{it} + \alpha_{10} CROSSLIST_{it} + \alpha_{11} OWNER_{it} + \alpha_{12} GEO_{it} + \alpha_{13} INDIR_{it} + \alpha_t \sum_t YEAR_t + \alpha_j \sum_j IND_j + \varepsilon_{it}$$

Panel A and Panel B report the results of the regression using r_{GLS} and r_{PEG} as the dependent variables, respectively. The sample in panel A consists of 3,310 firm-year observations from 2001 to 2004. The sample in panel B consists of 1,922 firm-year observations from 2001 to 2004.

r_{GLS} is cost of equity capital estimated using the industry approach introduced by Gebhardt et al. 2001. r_{PEG} is cost of equity capital estimated using the PEG ratio approach proposed by Easton 2004. *AUD* is 1 for Top 8 client firms, 0 for non–Top 8 client firms. *SOE* is 1 if the firm is an SOE, 0 if it is an NSOE. *BETA* is systematic risk reported on CSMAR. *BM* is book-to-market ratio measured at the beginning of the year. *SIZE* is the natural logarithm of market value of equity measured at the beginning of the year. *LEV* is leverage ratio, defined as total liabilities divided by total assets. *GROWTH* is average growth in revenues over the last three years. *VOLUME* is trading volume divided by total shares outstanding. *CROSSLIST* is 1 if the firm issues shares to foreign investors (e.g., B shares or H shares), 0 otherwise. *OWNER* is the percentage of ownership held by the ultimate shareholder. *GEO* is the natural logarithm of the marketization index for each province or provincial level region. *INDIR* is the percentage of independent directors on the board. *YEAR* and *IND* are year and industry dummies, respectively.

t-values are calculated based on two-way, cluster-robust standard errors. ***, ** and * indicate significance at the 1 percent, 5 percent and 10 percent levels, respectively (one-tailed test where directional predictions are made, two-tailed test otherwise).

Two-stage least squares (2SLS) results

Table 7 presents the results of the auditor choice model (9). We do not observe a significant relation between SOEs and the choice of Top 8 auditors. There are at least two alternative explanations for this result. First, the effect of state ownership on auditor choice is likely to be subsumed or dominated by the effects of other firm characteristics (such as risk, performance, and cross-listing status) on auditor choice. Second, despite having weaker economic incentives for high audit quality, some SOEs may be motivated to hire a Top 8 auditor (and presumably pay higher audit fees) for political reasons. For example, the choice of a Top 8 auditor may be used as a (costly) signal to the market by the government that it is committed to improving SOEs' corporate governance and the investment environment in the Chinese capital market. An insignificant coefficient on *SOE* in (9) indicates that on average political concerns do not appear to outweigh economic incentives in SOEs' auditor choices.

Consistent with prior studies (Wang et al. 2006; Wang et al. 2008), we find that firms that are larger in size (*SIZE*), have better operating performance (*ROA*), and are located in more market-oriented regions (*GEO*) are more likely to hire Top 8 auditors. Firms that have higher financial leverage (*LEV*) and suffer operating losses (*LLOSS*) exhibit a higher level of risk and are less likely to hire Top 8 auditors. We also find that firms with more

TABLE 7
Logistic regression of auditor choice on firm characteristics

Variable	Pred. sign	Coeff. est.	*t*-value
Intercept	?	−16.906	−11.78***
SOE	?	0.132	0.99
SIZE	+	0.526	9.85***
LEV	?	−2.138	−3.68***
ROA	+	2.505	2.32***
ISSUE	+	0.058	0.55
LLOSS	?	−0.058	−3.07***
GEO	+	0.946	3.59***
OWNER	+	5.890	3.71***
SQUOWN	−	−5.790	−3.36***
CROSSLIST	+	1.751	14.10***
YEAR		YES	
IND		YES	
Wald chi square		454.05	
Pseudo R^2		14.06%	
Log likelihood		−1,797.90	
Observations		3,310	

Notes:

This table examines the relation between the likelihood of hiring a Top 8 auditor and firm characteristics using the following logistic regression:

$$AUD_{it} = \beta_0 + \beta_1 SOE_{it} + \beta_2 SIZE_{it} + \beta_3 LEV_{it} + \beta_4 ROA_{it} + \beta_5 ISSUE_{it} + \beta_6 LLOSS_{it} + \beta_7 GEO_{it} + \beta_8 OWNER_{it} + \beta_9 SQUOWN_{it} + \beta_{10} CROSSLIST_{it} + \beta_t \sum_t YEAR_t + \beta_j \sum_j IND_j + \varepsilon_{it}$$

AUD is 1 for Top 8 client firms, 0 for non–Top 8 client firms. *SOE* is 1 if the firm is an SOE, 0 if it is an NSOE. *SIZE* is the natural logarithm of market value of equity measured at the beginning of the year. *LEV* is leverage ratio, defined as total liabilities divided by total assets. *ROA* is return on assets. *ISSUE* is 1 if the firm issues equity in current year, 0 otherwise. *LLOSS* is 1 if the firm reported a loss in the previous year, 0 otherwise. *GEO* is the natural logarithm of the marketization index for each province or provincial level region. *OWNER* is the percentage of ownership held by the ultimate shareholder. *SQUOWN* is the square of *OWNER*. *CROSSLIST* is 1 if the firm issues shares to foreign investors (e.g., B shares or H shares), 0 otherwise. *YEAR* and *IND* are year and industry dummies, respectively.

t-values are calculated based on two-way, cluster-robust standard errors. *** indicates significance at the 1 percent level (one-tailed test where directional predictions are made, two-tailed test otherwise).

ownership controlled by their ultimate shareholders (*OWNER*) are more likely to have higher audit quality, and that the relation is nonlinear, consistent with Zeng and Ye 2005. Cross-listed firms are more likely to choose Top 8 auditors.

Our second-stage regression results (untabulated) generally confirm the OLS results of our primary hypotheses tests. The inverse Mills ratios (*IMR*) are not significant in any of the earnings management models, but they are significant in both cost of equity capital regressions. Nevertheless, correction for self-selection does not alter the results of our analysis.

7. Additional analyses

Alternative measure of audit quality

We investigate whether our results are sensitive to the measure of audit quality used. Prior studies find that industry specialist auditors provide higher audit quality than nonspecialist auditors (Balsam, Krishnan, and Yang 2003; Beasley and Petroni 2001; Owhoso, Messier, and Lynch 2002; O'Keefe, Simunic, and Stein 1994). We measure industry specialization as the ratio of the sum of the square root of the total assets of clients that an auditor has in a particular industry to the sum of the square root of the total assets of all clients of the auditor (Choi and Doogar 2005). If an auditor has at least 10 clients in an industry and its industry specialization measure is greater than 10 percent, we view it as an industry specialist (Craswell, Francis, and Taylor 1995). Our results (untabulated) are qualitatively unchanged when we repeat the analyses using this alternative measure of audit quality.

Excluding firms with auditor changes

Lennox and Francis (2008) find that the Heckman procedure is sensitive to minor changes in model specification and sample selection criteria. To address the concern with possible misspecification of the first-stage model, we follow Lennox and Francis 2008 to evaluate whether our main results are sensitive to dropping 315 firms with auditor changes. We find results (untabulated) consistent with those reported for the main tests.

Finer decomposition of SOEs

Wang et al. (2008) argue that SOEs controlled by local governments are more likely to hire small local auditors than NSOEs. In addition, they show that small local auditors provide lower-quality services and are less independent on average. To assess the impact of different government ownership on our results, we partition our sample into three groups: central SOEs (the ultimate shareholder is the central government), local SOEs (the ultimate shareholder is a local government), and NSOEs. We modify (9) by replacing the *SOE* dummy with two binary variables: *LOCAL_SOE* and *CENTRAL_SOE*. We find (untabulated) that the coefficient on *CENTRAL_SOE* is significantly positive, indicating that central SOEs are more likely to hire Top 8 auditors than NSOEs, whereas the coefficient on *LOCAL_SOE* is negative but insignificant. Although the results do not fully support Wang et al.'s finding, they suggest that local SOEs are more likely to avoid hiring high-quality auditors than central SOEs.

We rerun our main tests after replacing *SOE* with *CENTRAL_SOE* and *LOCAL_SOE* to assess whether our results are sensitive to different levels of government ownership. Panel A of Table 8 summarizes the results of the modified (7). Consistent with our main results, NSOEs that hire Top 8 auditors exhibit a significantly lower level of earnings management than NSOEs that hire non–Top 8 auditors, as evidenced by the coefficient on *AUD*. The sum of the coefficients on *AUD* and *AUD * CENTRAL_SOE* indicates that central SOEs with high-quality auditors have significantly lower earnings management than central SOEs with low-quality auditors ($t = 1.70$). However, there is little effect of audit quality on earnings management for local SOEs. Interestingly, the coefficient on *AUD * CENTRAL_SOE* is positive and only weakly significant, suggesting that the effect of audit quality on earnings management is marginally significantly different between central SOEs and NSOEs. However, we do observe a significantly less pronounced effect of audit quality on earnings management for local SOEs than for NSOEs ($t = 1.99$). The coefficient on *AUD * LOCAL_SOE* is significantly larger than that of *AUD * CENTRAL_SOE* ($t = 2.00$), indicating that the effect of audit quality on earnings management is significantly greater for central SOEs than for local SOEs. Overall, these results indicate

TABLE 8
Relations between audit quality and earnings management and cost of equity capital for central and local state-owned enterprises (SOEs) and non–state-owned enterprises (NSOEs)

Panel A: Earnings management measured by absolute value of performance-adjusted discretional accruals ($|DACC|$)

Variable	Pred. sign	Coeff. est.	*t*-value
Intercept	?	0.223	6.91***
AUD	−	−0.020	−1.72**
CENTRAL_SOE	−	−0.010	−1.95**
*AUD * CENTRAL_SOE*	+	0.007	1.51*
LOCAL_SOE	−	−0.019	−2.24**
*AUD * LOCAL_SOE*	+	0.023	1.99**
BETA	?	−0.017	−3.51***
BM	?	−0.043	−2.04**
LEV	+	0.036	4.06***
SIZE	−	−0.005	−3.59***
CFO	?	−0.056	−1.01
ST/PT	+	0.004	0.31
CROSSLIST	−	−0.012	−2.33***
OWNER	?	−0.002	−0.40
GEO	?	−0.002	−1.73*
INDIR	−	0.007	0.71
YEAR		YES	
IND		YES	
Adj. R^2		4.08%	

Panel B: Cost of equity capital (r_{GLS} and r_{PEG})

		r_{GLS}		r_{PEG}	
Variable	Pred. sign	Coeff. est.	*t*-value	Coeff. est.	*t*-value
Intercept	?	0.170	3.09***	−0.065	−1.30
AUD	−	−0.049	−3.39***	−0.042	−2.71***
CENTRAL_SOE	−	−0.017	−2.17**	−0.016	−1.32
*AUD * CENTRAL_SOE*	+	0.042	2.34***	0.037	2.19***
LOCAL_SOE	−	−0.022	−3.13***	−0.017	−5.54***
*AUD * LOCAL_SOE*	+	0.042	4.60***	0.040	3.49***
BETA	+	0.040	2.98***	0.034	2.06**
BM	+	−0.004	−0.45	0.136	7.12***
LEV	+	0.122	2.65***	0.137	20.15***
SIZE	−	−0.014	−5.08***	0.007	2.49***
GROWTH	−	−0.008	−1.72**	−0.004	−1.93**
VOLUME	+	0.003	1.59*	0.004	1.08
CROSSLIST	?	0.008	2.16**	0.005	0.76
OWNER	?	−0.022	−1.23	0.006	0.23
GEO	?	0.001	0.31	−0.005	−6.62***

(The table is continued on the next page.)

TABLE 8 (Continued)

		r_{GLS}		r_{PEG}	
Variable	Pred. sign	Coeff. est.	*t*-value	Coeff. est.	*t*-value
INDIR	?	−0.012	−0.95	0.001	0.07
YEAR		YES		YES	
IND		YES		YES	
Adj. R^2		8.41%		15.08%	

Notes:

Panel A examines the relation between audit quality and earnings management for central SOEs, local SOEs, and NSOEs using the following regression:

$$|DACC_{it}| = \gamma_0 + \gamma_1 AUD_{it} + \gamma_2 CENTRAL\_SOE_{it} + \gamma_3 AUD_{it} * CENTRAL\_SOE_{it} + \gamma_4 LOCAL\_SOE_{it} + \gamma_5 AUD_{it} * LOCAL\_SOE_{it} + \gamma_6 BETA_{it} + \gamma_7 BM_{it} + \gamma_8 LEV_{it} + \gamma_9 SIZE_{it} + \gamma_{10} CFO_{it} + \gamma_{11} ST/PT_{it} + \gamma_{12} CROSSLIST_{it} + \gamma_{13} OWNER_{it} + \gamma_{14} GEO_{it} + \gamma_{15} INDIR_{it} + \gamma_t \sum_t YEAR_t + \gamma_j \sum_j IND_j + \varepsilon_{it}$$

Panel B examines the relation between audit quality and cost of equity capital for central SOEs, local SOEs, and NSOEs using the following regression:

$$r_{it} = \alpha_0 + \alpha_1 AUD_{it} + \alpha_2 CENTRAL\_SOE_{it} + \alpha_3 AUD_{it} * CENTRAL\_SOE_{it} + \alpha_4 LOCAL\_SOE_{it} + \alpha_5 AUD_{it} * LOCAL\_SOE_{it} + \alpha_6 BETA_{it} + \alpha_7 BM_{it} + \alpha_8 LEV_{it} + \alpha_9 SIZE_{it} + \alpha_{10} GROWTH_{it} + \alpha_{11} VOLUME_{it} + \alpha_{12} CROSSLIST_{it} + \alpha_{13} OWNER_{it} + \alpha_{14} GEO_{it} + \alpha_{15} INDIR_{it} + \alpha_t \sum_t YEAR_t + \alpha_j \sum_j IND_j + \varepsilon_{it}$$

$|DACC|$ is the absolute value of performance-adjusted discretionary accruals. *AUD* is 1 for Top 8 client firms, 0 for non–Top 8 client firms. *CENTRAL_SOE* is 1 if the firm is an SOE controlled by the central government, 0 otherwise. *LOCAL_SOE* is 1 if the firm is an SOE controlled by the local governments, 0 otherwise. *BETA* is systematic risk reported on CSMAR. *BM* is book-to-market ratio measured at the beginning of the year. *SIZE* is the natural logarithm of market value of equity measured at the beginning of the year. *LEV* is leverage ratio, defined as total liabilities divided by total assets. *CFO* is cash flows from operations divided by beginning total assets. *ST/PT* is 1 if the firm reported losses for two consecutive years, 0 otherwise. *CROSSLIST* is 1 if the firm issues shares to foreign investors (e.g., B shares or H shares), 0 otherwise. *OWNER* is the percentage of ownership held by the ultimate shareholder. *GEO* is the natural logarithm of the marketization index for each province or provincial level region. *INDIR* is the percentage of independent directors on the board. *YEAR* and *IND* are year and industry dummies, respectively. r_{GLS} is cost of equity capital estimated using the industry approach introduced by Gebhardt et al. 2001. r_{PEG} is cost of equity capital estimated using the PEG ratio approach proposed by Easton 2004. *GROWTH* is average growth in revenues over the last three years. *VOLUME* is trading volume divided by total shares outstanding.

t-values are calculated based on two-way, cluster-robust standard errors. ***, ** and * indicate significance at the 1 percent, 5 percent, and 10 percent levels, respectively (one-tailed test where directional predictions are made, two-tailed test otherwise).

that the effect of audit quality on earnings management is most pronounced for NSOEs and least pronounced for local SOEs.

We present the results of the modified (8) in panel B of Table 8. The first two columns report results when r_{GLS} is the dependent variable. We find that NSOEs exhibit a 4.9 percent reduction ($t = -3.39$) in cost of equity capital if they are audited by Top 8 auditors. The coefficients on $AUD * CENTRAL\_SOE$ and $AUD * LOCAL\_SOE$ are 0.042 ($t = 2.34$) and 0.042 ($t = 4.60$), respectively, suggesting a significantly weaker effect of audit quality on cost of equity capital for central and local SOEs than for NSOEs. More importantly, there is no statistical difference in the coefficients on $AUD * CENTRAL\_SOE$ and $AUD * LOCAL\_SOE$ ($t = 0.00$), which suggests that our test of Hypothesis 2 is robust to different government ownership. The results when r_{PEG} is the dependent variable, reported in the last two columns, are consistent with the r_{GLS} results. The 2SLS results (untabulated) generally confirm the OLS results.

Separate analyses for SOEs and NSOEs

In our main tests, we use a single regression with dummy variables that permit the coefficient estimates to vary across SOEs and NSOEs. An alternative approach is to estimate separate regressions for each group. By doing so, we relax the assumption of homogeneity in the residual variances of the two groups that underlies the single regression approach. We first estimate auditor choice models and calculate *IMR* separately for SOEs and NSOEs. We then test the effects of audit quality on earnings management and cost of equity capital for each group. The results (untabulated) are generally consistent with the single regression results.

Impact of growth on cost of equity capital measures

Because the measure of cost of equity capital under the industry approach (r_{GLS}) assumes that all firms' earnings grow at the industry median beyond the forecast horizon, it is likely that r_{GLS} is systematically understated for high-growth firms. Our descriptive analyses show significant differences in growth among different groups of firms. To address this potential confounding effect on the cost of equity capital, we augment (8) by including the terms $SOE * GROWTH$, $AUD * GROWTH$, and $SOE * AUD * GROWTH$ to control for the differential effect of growth on cost of equity capital across different groups of firms. We find that our main results (untabulated) are robust to this specification.

8. Conclusions

This study examines how differences in audit quality affect earnings management and cost of equity capital for two classes of firms in China: SOEs and NSOEs. The different characteristics of SOEs and NSOEs lead to differences in the effects of audit quality on earnings management and cost of equity capital. We hypothesize that higher audit quality will lead to greater reduction in earnings management and cost of equity capital for NSOEs than for SOEs.

We test our hypotheses using 3,310 firm-year observations over the years 2001 to 2004. Our results are consistent with the hypotheses. We find that NSOEs exhibit greater reduction in earnings management relative to SOEs when they both employ high-quality auditors. We also find that NSOEs that employ high-quality auditors exhibit significantly greater reduction in the cost of equity capital than their state-owned counterparts that employ high-quality auditors.

The results of the study should be considered in light of the following limitations. First, a high-quality audit is only one of many potential monitoring and corporate governance mechanisms that firms may choose to constrain earnings management and reduce the cost of equity capital. Thus, we cannot rule out that our results may be driven by

other aspects of corporate governance. Second, our findings should not be interpreted to mean that SOEs do not benefit from hiring a high-quality auditor. Constraining earnings management and reducing the cost of equity capital are only two of many benefits that firms with high audit quality may obtain.

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