China Journal of Accounting Research

Volume 12, 3 (2019)

Website:
http://www.cnjar.com
http://www.cb.cityu.edu.hk/research/cjar

12 | 3

China Journal of Accounting Research Vol. 12/3 (2019) 231–336

ELSEVIER

Volume 12 • Issue 3 • September 2019

China Journal *of* Accounting Research

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Available online at www.sciencedirect.com
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ISSN 1755-3091

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Production and hosting by Elsevier

Radarweg 29, 1043 NX Amsterdam, The Netherlands

ISSN 1755-3091

Founded by Sun Yat-sen University and City University of Hong Kong

Sponsored by: CPA Hong Kong Institute of Certified Public Accountants 香港會計師公會

Published quarterly in March, June, September, and December

China Journal of Accounting Research has been indexed by Emerging Sources Citation Index (ESCI), Cabell's Directory, Scopus, CNKI, Australian Business Deans Council (ABDC) Journal Quality List and Excellence in Research for Australia (ERA) Journal List.

http://www.elsevier.com/journals/china-journal-of-accounting-research/1755-3091/guide-for-authors

CHINA JOURNAL OF ACCOUNTING RESEARCH

Volume 12/3 (2019)

China Journal of Accounting Research 12 (2019) 231–250

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Contents lists available at ScienceDirect

China Journal of Accounting Research

journal homepage: www.elsevier.com/locate/cjar

The impact of accounting standards convergence on Chinese firms' overseas mergers and acquisitions

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ARTICLE INFO

Article history:
Received 15 November 2017
Accepted 17 May 2019
Available online 4 June 2019

Keywords:
Accounting standards convergence
Overseas mergers and acquisitions
Comparability of accounting information

ABSTRACT

This paper investigates how accounting standards (AS) convergence influences Chinese firms' overseas mergers and acquisitions (M&As) and shows that this convergence significantly promotes Chinese firms' overseas M&As. Specifically, we find that both the probability of success and the value of transactions increases significantly in countries that implemented International Financial Reporting Standards (IFRS) prior to 2007. These results suggest that accounting standards (AS) convergence can improve the comparability of accounting information between China and other countries that have adopted IFRS. Moreover, we find that the impact of accounting standards (AS) convergence on state-owned enterprise (SOE) acquirers is weak. These findings demonstrate that accounting standards (AS) convergence can facilitate Chinese firms' overseas M&As by improving the comparability of accounting information between China and target countries.

1. Introduction

The number of overseas mergers and acquisitions (M&As) made by Chinese enterprises has grown rapidly. M&A has become one of the main avenues of foreign direct investment (FDI) in the country, and it has received considerable attention from the government. The *2011 Review and Prospects on Mergers and Acquisitions by Chinese Enterprises* released by PricewaterhouseCoopers shows that Chinese enterprises' overseas M&As have maintained strong momentum, with the number of transactions reaching a record-setting 207,

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https://doi.org/10.1016/j.cjar.2019.05.001
1755-3091/

a year-over-year growth of 10%, and the total value of transactions reaching USD42.9 billion, a year-over-year growth of 12%. The *Yellow Book of World Economy* released by the Chinese Academy of Social Sciences in 2011 also shows that Chinese enterprises, as the acquiring parties, rank second globally in terms of the number of transactions in M&As, gradually shifting from the role of the acquired parties in the past to acquiring parties. To alleviate the pressure of renminbi appreciation, secure energy supplies, and upgrade industries, the Chinese government encourages eligible enterprises to develop overseas investments. The report of the 17th National Congress of the Communist Party of China clearly proposes a "go global" strategy, which has become an important part of the national strategy and national policy for long-term development.

Owing to the continuous growth in overseas M&As, the literature investigates numerous factors that affect the success of overseas M&As and the performance of companies post-M&A, such as institutional and socio-cultural factors, industrial and company factors, and transaction details and management style. Today, over a hundred countries and regions have converged their standards with International Financial Reporting Standards (IFRS). However, the literature on the effects of accounting standards (AS) convergence on corporate overseas M&As is limited.

Overseas M&As are different from domestic M&As in that in overseas M&As, cultural differences can lead to different business models and management styles. Moreover, differences in financial "languages" can hinder transactions between both parties, leading to an increase in transaction costs. Accounting, which is often known as the language of business, is the main source of financial information in M&A transactions. Accounting information that is prepared and disclosed in line with different accounting standards isolates both parties in an M&A, which makes it increasingly difficult for the acquiring party to assess the target party in the M&A transaction. Accounting standards (AS) convergence has undoubtedly unified the financial "language" between both parties in an M&A, thereby enhancing the usefulness of financial information, reducing information asymmetry, and ensuring that the investor is able to identify the differences between the two economies. In this paper, we study the effect of accounting standards on Chinese enterprises' overseas M&A by investigating the influence of accounting standards (AS) convergence on their success rates and transaction volumes. China's accounting standards are continuously converging with international financial reporting standards, which has increased the consistency between corporate reports from China and those from IFRS-compliant countries. Accounting standards (AS) convergence facilitates Chinese enterprises' overseas M&As and is consistent with the national "go global" strategy. The study's empirical results show that accounting standards (AS) convergence has increased the comparability of accounting information between Chinese enterprises and overseas enterprises, reduced the information asymmetry for Chinese enterprises in overseas M&As, and increased the probability of success and the scale of transactions of Chinese enterprises' overseas M&As. Further result has found this to be more significant in private enterprises that are sensitive to transaction costs.

This study makes three contributions. First, it expands the literature on the network externalities of international financial reporting standards. Studies mainly find that the network externalities of international financial reporting standards have a positive effect on investments in the securities market (Defond et al., 2011; Yu, 2010; Florou and Pope, 2012) and that the empirical evidence mainly focuses on changes in the accounting standards of European countries in 2005. Studies on accounting standards (AS) convergence in China, however, focus on the new accounting standards in terms of companies' decisions, compensation contracts at the management level, analysts' earnings forecasts, and other factors (Wang et al., 2009; Hou and Jin, 2010) without considering the economic consequences of accounting standards (AS) convergence in the M&A market. The objective of this paper is to examine the accounting standards (AS) convergence effect via Chinese enterprises' overseas M&As. Accounting standards (AS) convergence can significantly increase the success rates and transaction volumes of Chinese enterprises' overseas M&As by supplementing the network externalities theory on international financial reporting standards with empirical evidence from the overseas M&A market.

Second, this study expands the literature on the factors influencing overseas M&As. According to the literature, the factors affecting overseas M&As are mainly (1) macrolevel factors such as geographic location, cultural gap, property rights protection systems, the exchange rates and tax rates of the two countries, and trade relations between the two countries; and (2) microlevel factors such as M&A experience, extent of industry matching, and the hiring of professional consultants (Rossi and Volpin, 2004; Erel et al., 2012; Zhang et al., 2010). From the perspective of the language of business (accounting standards), this paper explores

the effect of the comparability of accounting information on Chinese enterprises' overseas M&As and expands the literature on the factors that influence overseas M&As.

Finally, this paper's conclusions can serve as a reference for the creators of accounting standards and corporate investment decision-makers. M&As are important corporate investment decisions. Overseas M&As can provide Chinese enterprises with foreign natural resources, advanced management experience, and research and development technology. This paper determines the influence of information costs on the success or failure and efficiency of overseas M&As. With regard to selecting the objectives of M&As and executing these M&A, international financial reporting standards can serve as a decision variable that can reduce information asymmetry for Chinese enterprises in overseas M&As. In future, such empirical evidence will provide a decision-making reference for the creators of accounting standards, which can be significant in the formulation of future Chinese accounting standards.

The remainder of this paper is structured as follows: Section II presents the literature review and research hypotheses, Section III presents the data and modeling, Section IV presents the empirical tests and results analysis, Section V presents further tests and sensitivity analysis, and Section VI presents the conclusions and findings.

2. Literature review and research hypotheses

2.1. Influencing factors of overseas M&As

Rossi and Volpin (2004) studied the determinants of overseas M&As relatively early and believed that acquiring parties often hail from countries with stronger investor protection institutions and have higher financial reporting quality. Based on prior research, Erel et al. (2012) mainly focused on the effect of value factors on M&As and noted that while acquiring parties usually hail from countries that experience stock market appreciation, national currency appreciation, and relatively high price-to-book ratios, acquired parties hail from countries that experience comparatively poor value factor performance.

Hu and Yu (2003) studied the entry modes of Chinese enterprises' in foreign markets and pointed out that when the strategic value of domestic assets is sufficiently high, there is a greater chance of overseas M&As taking place. Deng (2009) explained the strategic assets of Chinese enterprises' overseas M&As from an institutional perspective. Rui and Yip (2008) also explored the motives of Chinese enterprises in overseas M&As and pointed out that Chinese enterprises carry out overseas M&As to mainly acquire strategic assets that can enhance their competitive advantage or to offset shortcomings in their ownership structure to ensure that local operations are subjected to less policy intervention.

In their empirical study, Zhang et al. (2010) examined the factors that affect the success rates of overseas M&As, from a macro and micro perspective, using 1324 overseas M&A transactions by Chinese enterprises. The trade intensity between countries and the interference of political forces in the M&As of sensitive industries could affect the success rates of overseas M&As. The ownership structures of both parties, the acquiring party's overseas M&A experience, and M&A intermediaries could all affect the success rates of overseas M&As. In addition, Zhang and Zhou (2012) found that the state ownership structure of the acquiring party has a significantly negative effect on the success rate of M&As from an institutional perspective, and this effect is exacerbated if the acquired party's country has a high degree of marketization and a democratically elected government.

2.2. International financial reporting standards and the comparability of accounting information

The comparability of accounting information is one of the features of accounting information quality. Europe was the first to adopt international financial reporting standards in 2005, and the rest of the world gradually followed suit. Proponents of the mandatory implementation of International Financial Reporting Standards (IFRS) believed that following unified accounting standards in European countries improved the comparability of financial reports (Bielstein et al., 2007). The International Accounting Standards Board (IASB) promoted international financial reporting standards to mainly enhance the comparability of accounting information across countries, thereby improving the overall quality of financial reports. Unified

accounting standards can lower information barriers between countries, thereby promoting international capital flow. All subsequent studies directly or indirectly confirmed that the implemention of international financial reporting standards can enhance the comparability of accounting information.

Armstrong et al. (2010) found that the stock markets in European Union (EU) countries reacted positively to the announcement of the mandatory implementation of international financial reporting standards in 2005, but the study did not specify whether they did so because they expected enhanced comparability or an improvement in information quality. Daske et al. (2008) studied the economic consequences of the capital markets of 26 countries that were proponents of the mandatory implementation of international financial reporting standards and found that these capital markets experienced significantly enhanced liquidities and corporate values, which were partially caused by the increased comparability of accounting standards. Li (2010) studied the reduction in capital costs for companies in the EU after their mandatory implementation of international financial reporting standards and attributed the results to an increased comparability of accounting standards. Horton et al. (2013) also found that, following the mandatory implementation of IFRS, the accuracy of analysts' forecasts increased significantly, which was due to enhanced accounting comparability.

The above literature indirectly corroborates that implementing international financial reporting standards leads to increased comparability. De Franco et al. (2011) provided direct evidence of the comparability of accounting information and its benefits to information users. Comparability of accounting information increases the total volume and quality of corporate information and reduces analysts' information acquisition costs. In this study, comparability correlated positively with the number of analysts and the accuracy of analysts' forecasts and negatively with the degree of dispersion in analysts' earnings forecasts. Closely following this study, Yip and Young (2012) used the model of De Franco et al. (2011) to investigate the economic consequences of implementing international financial reporting standards in 17 European countries; according to their study, accounting standards (AS) convergence and improved accounting information quality can increase the comparability of information, which is affected by the institutional environment of the country wherein the enterprise is located.

However, some scholars believed that implementing international financial reporting standards may not necessarily lead to the increased comparability of accounting information. The principle behind IFRS is providing guidance in the implementation of accounting standards, which could still lead to false reporting (Ahmed et al., 2013; Capkun et al., 2012). The mandatory implementation of IFRS brings about increased comparability and improved quality of information disclosure. However, these benefits could be offset by a lower IFRS implementation quality. (Ball et al., 2003; Holthausen and Watts, 2000).

Recently, scholars in China have paid close attention to the effects of the new standards on accounting information features and their economic consequences. Xue et al. (2008) studied the value relevance of accounting information using the new and old accounting standards and found that information on accounting earnings and net assets is more value-relevant under the new accounting standards. Mao and Dai (2009) studied changes in the robustness of earnings of listed companies caused by their implementation of the new accounting standards and found that the new accounting standards weakened the principle of robustness and expanded the use of fair value, which increased the level of corporate earnings management. According to Jin (2010), the new accounting standards increased the understandability of the accounting information, thereby decreasing the effect of private information on stock price synchronicity. Studies on the economic consequences of the new accounting standards were carried out in terms of the companies' decisions, compensation contracts at the management level, and analysts' earnings forecasts. Hou and Jin (2010) studied the effect of the new accounting standards on the compensation of senior executives and found that implementing these standards made senior executives sensitive to corporate accounting performance and especially to normal accruals. However, there are very few studies in China on the effect of the new accounting standards on Chinese companies' overseas M&A performance.

2.3. Accounting standards and overseas M&As

The literature on the effect of accounting standards on overseas M&As is very relevant to this paper. Studies show that the quality of accounting information disclosure and the comparability of accounting information can promote the flow of capital in different markets and reduce the degree of information asymmetry

(Young and Guenther, 2003; Bradshaw et al., 2004). Ball (2006) and Choi and Meek (2005) found that the implementation of IFRS can increase the comparability of accounting information across countries, increase the transparency of financial reports, reduce information costs, and decrease information asymmetry, thereby enhancing market liquidity, competitiveness, and efficiency. Ahearne et al. (2004) stated that home bias is an important consequence of information asymmetry, as U.S. fund investors prefer to hold stocks of U.S.-listed overseas companies. Leuz et al. (2009) believed that foreign investors prefer investing in countries that provide high-quality information disclosure because the local investors in these countries are less informed about insider information. Using data from the U.S. markets, Covrig et al. (2007) found that shareholders' funds of companies that voluntarily implemented international financial reporting standards were high. Khurana and Michas (2011) corroborated this viewpoint and found that the higher the execution quality of international financial reporting standards, the lower the home bias is.

The effect of IFRS implementation on overseas investment decisions has two aspects. First, the IFRS requirement of greater information disclosure makes the information environment of international investment markets more transparent (Barth et al., 2008). Second, the comparability of accounting information across countries is greater because of their adoption of international financial reporting standards, even in the absence of greater information disclosure (Bradshaw et al., 2004; DeFond et al., 2011). Scholars have studied the investments of institutional investors in IFRS-compliant countries. For example, Yu (2010) studied 39 countries (before and after their implementation of international financial reporting standards) and found that their implementation of IFRS led to an increase in the proportion of mutual fund holdings, and the greater the differences between the original standards and the new accounting standards, the higher the returns were. Defond et al. (2011) studied 14 European countries and concluded that their mandatory implementation of international financial reporting standards led to a substantial increase in the comparability of accounting information, thereby leading to increased overseas investments in the mutual funds of these countries during the implementation period.

Compared to professional investors, who are mainly institutional investors and fund managers, FDI is more sensitive to information than foreign portfolio investment (FPI) (Goldstein and Razin, 2006). The investment period of FPI is short, the transaction volume is small, and divestment can be done at any time; the investment period of FDI is long and divestment is not easy, which is similar to operational investment; therefore, FDI is more easily affected by political risks. The literature on M&As mostly focused on the effect of the information environment on transnational M&As. For example, Francis et al. (2016) used the transnational M&As data from 1998 to 2004 to examine the effect of the similarity in the accounting standards of different countries on the number of M&As and the volume of M&A transactions prior to implementing IFRS. The higher the similarity between the standards of two countries, the greater the frequency of M&A transactions and transaction volumes was. The implementation of international financial reporting standards has increased the number of overseas M&As between EU countries and the transaction premiums; this enhancement is more obvious in countries in which the new standards are considerably different from the old ones.

Apart from using accounting information, some studies investigated this issue using enterprise ownership forms and national image. For example, Li et al. (2017) studied U.S. companies and found that if the acquiring party is a foreign state-owned enterprise, the probability of M&A success may not be reduced significantly, but the duration for completing the deal is much longer. He and Zhang (2018) found that emerging economies are affected by national image during overseas M&As, and a negative national image could reduce the probability of overseas M&A success.

2.4. Research hypotheses

Ramanna and Sletten (2014) found that the network effect is an important determinant in a country's choice to implement international financial reporting standards. They pointed out that as more countries with economic ties to a given country adopt international financial reporting standards, the network benefits of the accounting standards could reduce the information costs of that country with other countries. The network externalities of accounting standards (AS) convergence refer to a set of unified accounting standards that can enhance the degree of comparability of accounting information across all member nations, thereby

reducing the perceived trade costs of member nations. The financial and accounting comparability brought about by accounting standards (AS) convergence has also been confirmed by numerous scholars. For example, De Franco et al. (2011) confirmed that the comparability of financial reports can reduce investors' information acquisition costs and increase the volume and quality of information obtained by them. Yip and Young (2012) found that the mandatory implementation of international financial reporting standards in EU countries increases the comparability of accounting information and that such comparability is affected by the international institutional environment.

Overseas M&As lead to a redistribution of the corporate right of control. Factors such as information asymmetry could hinder the effective transfer of the right of control, thereby affecting the success or failure of M&As. Relative to the acquired party, the foreign investor has an information disadvantage. Accounting information is an important component of a country's capital market information environment. Differences in the accounting standards of different countries require the foreign investor to process the accounting information before interpreting it, thereby increasing the cost of information processing.

Chinese enterprises have been implementing new accounting standards since 2007, with the aim of converging Chinese accounting standards with international financial reporting standards. China's implementation of international financial reporting standards has increased the comparability between its accounting information and that of other IFRS-compliant countries. Greater comparability makes it easier for Chinese investors to analyze and evaluate the accounting information of companies from IFRS-compliant countries in overseas M&As. Information transmission costs and processing costs are important components of transaction costs; therefore, the network externalities of accounting standards (AS) convergence have reduced the transaction costs between China and IFRS-compliant countries. The comparability and understandability of the accounting information of the acquired party play a crucial role in the acquiring party's evaluation of the acquired party's assets and in the valuation of the M&A, which affects the success or failure of the M&A.

The success or failure of an M&A depends on whether both parties in the transaction have a consistent understanding of the quality and risks of the assets being merged, which is specifically manifested in the ability of both parties to reach a consensus in terms of valuable consideration and payment guarantee. As mentioned above, the network externalities of accounting standards (AS) convergence refer to a set of unified accounting standards that can enhance the degree of comparability of the accounting information of all member nations, thereby reducing their perceived trade costs. Cascino and Gassen (2015) found that after the implementation of international financial reporting standards, in addition to achieving an increase in the comparability of goodwill, the differences in balance sheet items also decreased. As China had not adopted international financial reporting standards prior to 2007, Chinese enterprises participating in overseas M&As were forced to pay financial report conversion costs, which increased the expected payment of both parties.

In 2007, new corporate accounting standards were first implemented in China's listed companies and large state-owned enterprises, and other enterprises followed suit. Since then, China's accounting standards have gradually converged with international financial reporting standards. Louis and Urcan (2014) found that overseas M&A activities are more prevalent in IFRS-compliant countries on a mandatory basis, rather than on a voluntary basis. Upon investigating the effect of accounting standard differences on overseas M&As, Francis et al. (2016) found that the transnational M&A transaction volumes are greater among enterprises with similar accounting standards and that their M&A premiums are also relatively high. Adopting the same set of accounting standards as those of the acquired enterprise can lower the costs of information collection and information processing for Chinese companies in overseas M&As, promote the recognition of corporate quality by both parties in the transaction, facilitate easy consensus on valuable consideration, and increase the competition of the acquiring party. This prompts the likelihood of deal completion in overseas M&As and increase their transaction volumes. Hypothesis 1 is thus proposed:

Hypothesis 1. Accounting standards (AS) convergence can increase Chinese enterprises' success rates and transaction volumes in the M&As of enterprises in IFRS-compliant countries.

Rui and Yip (2008) divided Chinese enterprises' overseas M&As into four categories. The first category includes extra-large, state-owned, energy-type enterprises such as Sinopec and PetroChina. They mainly carry out M&As to obtain foreign national resources, irrespective of the costs incurred. The second category includes state-owned enterprises such as Nanjing Telecom that respond to the government's "go global"

strategy. These enterprises also use M&A opportunities to carry out strategic transformation. The third category includes large or small-to-medium listed companies that carry out overseas M&As for strategic purposes and for maximizing shareholder value. The fourth category includes large, medium, and small private enterprises that carry out overseas M&A to enhance their competitiveness and to achieve their strategic objectives.

From the above classifications, the motives of state-owned enterprises and private enterprises in carrying out overseas M&As are completely different. State-owned enterprises are resource-driven. Especially in China, some state-owned enterprises' objectives are often similar to the strategic policy objectives of the central or local governments, such as acquiring natural resources overseas. Although it is relatively easy for state-owned enterprises to raise funds for their M&As via the capital market, they continue to receive financial support from the government. Therefore, the overseas M&As of state-owned enterprises are relatively less sensitive to cost. Private enterprises carry out overseas M&As for corporate business development. These enterprises comprehensively evaluate the acquired company to fully consider the ensuing economic consequences and to avoid any losses that may incur. As the investment opportunities of financially constrained private enterprises are limited, they are more careful about overseas M&As. Accounting standards (AS) convergence reduces the information asymmetry between the Chinese and foreign enterprises and enables them to make more efficient M&A decisions, which is more obvious in private enterprises. Therefore, Hypothesis 2 is proposed:

Hypothesis 2. Accounting standards (AS) convergence has a more significant promoting effect on the overseas M&As of private enterprises.

3. Research design

3.1. Sample selection and data sources

In this paper, the overseas M&A events of Chinese enterprises from January 2002 to December 2016 are used as the initial sample. These samples are taken from the Thomson Reuters global M&A database (a securities data company) and are supplemented with overseas investment data from the China Research Data Services Platform. For our sample, we select the overseas M&A transactions wherein the acquiring enterprises are from mainland China and the target companies are from other countries or regions,. As the effect of the increase in comparability post accounting standards (AS) convergence on the success or failure and efficiency of overseas M&As is being studied, this paper focuses only on the significant changes in M&A activities by Chinese enterprises before and after 2007 in countries that have already implemented IFRS. We exclude Chinese enterprises' M&A activities in target countries that implemented IFRS after 2007. The data on implementing international financial reporting standards in various countries have been obtained manually. The data were taken from the briefing on implementing international financial reporting standards (International Accounting Standards Plus, IAS Plus) released by Deloitte & Touche and the International Accounting Standards Committee's annual summary on implementing accounting standards across countries. The information about the nature of acquiring enterprises is collected via multiple channels such as the company websites, annual reports, and the exchanges. To control for the effect of potential extreme values, this study winsorizes all continuous control variables at the 1% and 99% levels.

Panel A of Table 1 reports the distribution of the target countries and regions in Chinese companies' overseas M&As and the number of M&A transactions actually completed. In terms of regional distribution, the top three regions/countries that Chinese enterprises have overseas M&A intentions with are Hong Kong (24.37%), the United States (15.21%), and Australia (11.01%); the sum of the M&As in these three regions/countries exceeds 50% of the total number of M&As. Panel B of Table 1 reports the distribution of Chinese enterprises' overseas M&As in line with the nature of property rights of the acquiring party. The number of overseas M&As by private enterprises from 2002 to 2016 (1743 cases) exceeds the number of overseas M&As by state-owned enterprises (900 cases), thereby becoming a predominant driver in the overseas M&A activities of Chinese enterprises. The success rate of private companies' overseas M&As (65%) is higher than that of state-owned enterprises' overseas M&As (58.33%). In terms of the value factors of M&As, while the average value of state-owned enterprises' overseas M&As is USD320 million, the average value of private enterprises'

Table 1
Distribution of Chinese enterprises' overseas M&As from 2002 to 2016.

Country/Region	M&A intention		Number of M&A transactions actually completed		Success rate (%)	Number of transactions (millions of USD)	Average value of transactions (millions of USD)
	Number of cases	Proportion of all transactions (%)	Number of cases	Proportion of successful transactions (%)			
Panel A: M&A statistics by region							
Hong Kong	644	24.37%	376	22.68%	58.39%	34,776.19	92.49
The United States	402	15.21%	269	16.22%	66.92%	75,078.10	279.10
Australia	291	11.01%	178	10.74%	61.17%	26,999.30	151.68
Singapore	115	4.35%	67	3.98%	58.26%	4546.53	67.86
Canada	109	4.12%	70	4.22%	64.22%	18,441.40	263.43
Japan	86	3.25%	65	3.92%	75.58%	4548.90	69.98
Germany	98	3.71%	66	3.98%	67.35%	5346.35	81.01
The United Kingdom	89	3.37%	59	3.56%	66.29%	17,548.89	297.44
The British Virgin Islands	50	1.89%	42	2.53%	84.00%	1234.61	29.40
France	51	1.93%	36	2.17%	70.59%	7605.87	211.27
Indonesia	31	1.17%	21	1.27%	67.74%	2663.95	126.85
Thailand	24	0.91%	10	0.60%	41.67%	569.73	56.97
The Netherlands	40	1.51%	26	1.57%	65.00%	5984.95	230.19
Taiwan	33	1.25%	22	1.33%	66.67%	163.90	7.45
Italy	57	2.16%	38	2.29%	66.67%	13,760.28	362.11
South Korea	38	1.44%	25	1.51%	65.79%	2562.49	102.50
Mongolia	23	0.87%	12	0.72%	52.17%	175.30	14.61
Malaysia	25	0.95%	16	0.97%	64.00%	2486.99	155.44
Kazakhstan	22	0.83%	10	0.60%	45.45%	4869.64	486.96
Vietnam	18	0.68%	10	0.60%	55.56%	27.70	2.77
South Africa	25	0.95%	12	0.72%	48.00%	9248.79	770.73
Russia	12	0.45%	4	0.24%	33.33%	3901.00	975.25
Others	360	13.62%	224	13.51%	62.22%	57,909.99	258.53
Total	2643	100.00%	1658	100.00%	62.73%	300,450.50	181.21

	M&A intention	Number of completed transactions	Success rate (%)	Number of transactions (millions of USD)	Average value of transactions (millions of USD)
Panel B: Classification of the nature of the property rights of the acquiring party					
State-owned enterprises	900	525	58.33%	166,713.25	317.55
Private enterprises	1743	1133	65.00%	133,737.26	118.04
Total	2643	1658	62.73%	300,450.50	181.21

overseas M&As is only USD120 million; compared with private enterprises, the number of M&A cases of state-owned enterprises is often higher, which has a bearing on the type of industry and funds allotted by state-owned and private enterprises in M&A transactions. The overseas M&As of state-owned enterprises often focus on securing large energy supplies and resources, and the scale of these M&As is far larger than that of private enterprises.

3.2. Research model and variable definitions

The model of Francis et al. (2016) is used to examine the effect of accounting standards (AS) convergence on Chinese enterprises' M&As, and the following regression model is established:

$$Ma = \alpha_0 + \beta_1 IFRS + \beta_2 IFRSAdopter + \beta_3 IFRS * IFRSAdopter + \beta_4 SOE + \beta_5 Adv + \beta_6 AcqExp + \beta_7 HightecInd + \beta_8 Regulated + \beta_9 Match + \lambda Industry + \varepsilon \quad (1)$$

$$Ln\_ValueofTran = \alpha_0 + \beta_1 IFRS + \beta_2 IFRSAdopter + \beta_3 IFRS * IFRSAdopter + \beta_4 SOE + \beta_5 Adv + \beta_6 AcqExp + \beta_7 HightecInd + \beta_8 Regulated + \beta_9 Match + \lambda Industry + \varepsilon \quad (2)$$

wherein Model (1) is a Logit model and Model (2) is a Tobit model.

The definitions of the various variables in this paper are as follows:

a. Dependent variables

Ma is a dummy variable denoting the success or failure of Chinese enterprises' overseas M&As. If the overseas M&A by a Chinese enterprise is successful, it takes the value of 1, and otherwise 0. We consider the Securities Data Company (SDC) database samples wherein M&As are completed as successful M&A samples and those wherein M&As are withdrawn as failed M&A samples. The samples wherein M&As are intended are denoted by W, and those wherein the M&A status is unknown are excluded. We also exclude samples with "pending" status, as we cannot determine whether an M&A is successful within one year of the initiation of the M&A. We consider samples that are still "pending" one year after the initiation of the M&A as failed M&A samples.

ValueofTran denotes the number of M&A transactions, which is expressed in millions of USD. In successful M&A cases, *ValueofTran* is the actual number of M&A transactions, and in failed M&A cases, *ValueofTran* is 0. *ValueofTran* is a continuous variable limited at one end. In our model, we take the logarithmic value of *ValueofTran* to increase the smoothness of the data, which is denoted by *Ln_ValueofTran*.

b. Explanatory variables

In this paper, *IFRS* serves as accounting standards (AS) convergence measurement index. China has been converging its accounting standards with international financial reporting standards since 2007; therefore, if an M&A transaction occurred after 2007, *IFRS* is 1, and 0 otherwise.

IFRSAdopter is a dummy variable that represents a target country's adoption of international financial reporting standards (*IFRS*) before China. If the target country had already adopted *IFRS* prior to 2007, *IFRSAdopter* is 1, and 0 otherwise. To make the samples cleaner, we exclude the countries that have implemented *IFRS* after 2007. Therefore, $IFRSAdopter = 0$ represents the countries that did not implement international financial reporting standards during our sample period.

The financial reports of unlisted companies are not publicly disclosed. Therefore, we can neither accurately judge whether the sampled Chinese companies adopted the new accounting standards in 2007, nor can we accurately establish the time of adoption of the international financial reporting standards by each overseas enterprise. The current research design is only accurate at the national level and not at the corporate level, which is a limitation of this paper.

c. Control variables

SOE is a dummy variable denoting the nature of an enterprise's property rights. If the acquiring party is a state-owned enterprise, then *SOE* is 1, and 0 otherwise. Owing to the special nature of their property rights, state-owned enterprises are more prone to administrative intervention from the acquired party's national government, particularly in countries with strong property rights protection systems (Zhang et al., 2010).

Adv denotes the hiring of a professional intermediary organization in an M&A transaction. If either party in the M&A hires an intermediary organization, then *Adv* is 1, and 0 otherwise. Particularly in overseas M&A transactions, wherein both parties in the M&A face a high degree of information asymmetry and the intermediary organization is more familiar with the laws and financial accounting systems of the acquired party's country, the degree of information asymmetry undoubtedly reduces, thereby promoting overseas M&As and their success.

AcqExp denotes the success of a Chinese enterprise's overseas M&As. If the enterprise experienced prior success in its overseas M&As, then *AcqExp* is 1, and 0 otherwise. The enterprise experiencing prior success in its overseas M&As can use this experience in subsequent M&A activities. Vermeulen and Barkema (2011) found that if an enterprise is experienced in negotiating with the overseas M&A target and the government of its host country, it can better screen the valuable M&A targets, become familiar with international rules, and better integrate overseas enterprises.

HightecInd is a dummy variable denoting whether the target firm belongs to a high-tech industry. According to Louis and Urcan (2014), the industries of the target companies of M&As are classified. In this paper, companies that belong to industries with Standard Industrial Classification (SIC) codes in medicinal chemicals and botanical products (2833–2836); computers and office equipment (3570–3577); electronic and other electrical equipment (3600–3647); measurement, analysis, and control equipment (3812–3845); computer programming and data processing (7371–7379); and research and development testing services (8731–8734) are classified as high-tech companies. If the merged party belongs to the aforementioned industries, *HightecInd* is 1, and 0 otherwise. Deng (2009) believed that Chinese enterprises that carry out overseas M&As are strongly motivated to acquire advanced technology. However, differences in technical expertise between both parties in an M&A may hinder its smooth progress. At the same time, high-tech industries may have group interests or national security issues and are therefore affected by noneconomic factors.

Regulated is a dummy variable denoting whether the target firm belongs to a regulated industry. According to Louis and Urcan (2014), if the acquired party's SIC is in public utilities (4000–4999) or in finance (6000–6999), *Regulated* is 1, and 0 otherwise. The M&A of regulated industries may face stricter review by the acquired party's host country, thereby affecting the smooth progress of the M&A.

Match denotes whether the M&A takes place within the same industry. If the first four digits of the SIC for both parties in the M&A are the same, both parties belong to the same industry; then, *Match* is 1, and 0 otherwise. If both the acquiring party and the acquired party belong to different industries, the announcement of an M&A could cause negative market reactions (Flanagan, 1996), which could hinder the completion of the M&A.

Industry is a dummy variable that denotes the industry the acquiring party belongs to. The success rates and scale of overseas M&As in different industries are different. To control for the effect of this factor on the conclusion, we manually classify the acquiring party to an industry on the basis of the 22 industries provided by the China Securities Regulatory Commission.

4. Empirical test and analysis

4.1. Descriptive statistics

Table 2 presents the descriptive statistics of the main variables. Of the 2643 M&A transactions, 1657 are successful, a success rate of 62.7%. The mean value of the M&A transactions is USD169 million, and the value of the largest M&A transaction is as high as USD3.024 billion. The transactions after 2007 account for 84% of the total samples. The proportion of countries that implemented IFRS is 63.4%. Of the 2643 M&A cases, 34% were state-owned enterprises, 18.5% hired professional intermediary organizations as advisors, 33.4% had

Table 2
Descriptive statistics of the main variables.

	Observed value	Mean	Minimum	Median	Maximum	Standard deviation
Ma	2643	0.627	0	1	1	0.484
ValueofTran	2229	169.087	0	8.230	3024.266	489.688
IFRS	2643	0.837	0	1	1	0.370
IFRSadopter	2643	0.634	0	1	1	0.482
SOE	2643	0.341	0	0	1	0.474
Adv	2643	0.185	0	0	1	0.388
AcqExp	2643	0.334	0	0	1	0.472
HightecInd	2643	0.106	0	0	1	0.308
Regulated	2643	0.192	0	0	1	0.394
Match	2643	0.219	0	0	1	0.414

M&A experience, 10.6% belonged to high-tech industries, 19.2% belonged to regulated industries, and 21.9% belonged to the same industry.

4.2. Univariate analysis of accounting standards (AS) convergence using the success rates and the number of transactions of overseas M&As

After grouping the samples on the basis of the time of occurrence of the M&A and the target's host country, the results are reported in Table 3. The overall success rate of Chinese enterprises' overseas M&As was 65.3% prior to 2007, decreasing to 62.2% after 2007; however, this change is not significant.

M&A success rates in countries that had implemented international financial reporting standards did not decrease after 2007, but increased from 60.6% to 62.7%. M&A success rates in countries that had not implement international financial reporting standards decreased significantly, from 74% prior to 2007 to 61.4% after 2007. According to the descriptive statistics, although the overall success rates of M&A are decreasing, those IFRS-compliant countries are increasing, suggesting that the implementation of new accounting standards increases the comparability of accounting information, thereby reducing transaction costs and promoting the completion of M&A transactions.

The fair value of successful M&A transactions by Chinese enterprises increased after 2007 compared with those before 2007, and the natural logarithm of the fair value increased by 0.672. This increase is more apparent in IFRS-compliant countries. Prior to 2007, the natural logarithm of the M&A value was 1.123, and post 2007, 1.981. The natural logarithm of the M&A value for countries that had not implemented international financial reporting standards also increased by 0.239 after 2007. Statistically speaking, the value of M&A transactions significantly increases in a target country that has implemented international financial reporting standards, suggesting that the new accounting standards increase the comparability of accounting information, which in turn, increases the volume of transactions.

4.3. Analysis of the transaction volumes and success rates of Chinese enterprises' overseas M&As

Table 4 presents the main regression results of this study, wherein the test results based on Hypothesis 1 are listed in Columns (1) and (2), and the explained variable is the dummy variable *Ma* that determines whether

Table 3
M&A success rates and mean M&A transaction values.

		Post-IFRS adoption	Pre-IFRS adoption	Diff (T-value)
MA	All (N = 2643)	0.622 (N = 2211)	0.653 (N = 432)	−0.030 (−1.20)
	IFRS adopter (N = 1675)	0.627 (N = 1393)	0.606 (N = 282)	0.021 (0.66)
	Other countries (N = 968)	0.614 (N = 818)	0.740 (N = 150)	-0.126^{***} (−2.96)
Ln_ValueofTran	All (N = 2229)	2.016 (N = 1926)	1.344 (N = 303)	0.672^{***} (4.78)
	IFRS adopter (N = 1414)	1.981 (N = 1205)	1.123 (N = 209)	0.858^{***} (5.20)
	Other countries (N = 815)	2.075 (N = 721)	1.836 (N = 94)	0.239 (0.91)

Table 4
Regression results of the effect of accounting standards (AS) convergence on the overseas M&A transaction volumes and success rates of Chinese enterprises.

	(1) *Ma*	(2) *Ma*	(3) *Ln_ValueofTran*	(4) *Ln_ValueofTran*
*IFRS*IFRSAdopter*	0.672**	0.728**	1.175**	1.109***
	(2.45)	(2.57)	(2.29)	(2.80)
IFRS	−0.583**	−0.589**	0.205	0.189
	(−2.37)	(−2.22)	(0.42)	(0.52)
IFRSAdopter	−0.614*	−0.635**	−1.260***	−1.147***
	(−1.93)	(−1.99)	(−2.67)	(−3.42)
SOE		−0.458***		−0.331*
		(−5.02)		(−1.910)
Adv		0.638***		2.401***
		(4.87)		(11.832)
AcqExp		0.157*		0.166
		(1.96)		(0.76)
HightecInd		0.411***		−0.289
		(2.66)		(−1.36)
Regulated		−0.152		−0.602***
		(−1.57)		(−3.178)
Match		0.167		0.147
		(0.98)		(0.37)
Constant	1.046***	0.221	0.737*	−0.170
	(3.76)	(0.51)	(1.65)	(−0.16)
Industry	Control	Control	Control	Control
Pseudo R-squared	0.0028	0.0302	0.0028	0.0208
Observations	2643	2643	2229	2229

Note: Robust *z*-statistics are reported in parentheses in Columns (1) and (2), robust t-statistics are reported in parentheses in Columns (3) and (4), and cluster analysis is carried out on the target countries. ***, **, and * denote that the test is significant at the 1%, 5%, and 10% levels, respectively.

the overseas M&As by Chinese enterprises are successful. In Column (1), the coefficient of the interaction term *IFRS*IFRSAdopter* is positive and significant at the 5% level. The control variables are added in Column (2), and the coefficient of *IFRS*IFRSAdopter* is 0.728 and significant at the 5% level. The coefficient of *IFRS* is −0.589 and significant at the 5% level. The sum of the coefficients of *IFRS* and the coefficient of *IFRS*IFRSAdopter* is positive (−0.589 + 0.728), suggesting that post implementation of IFRS, M&A success rates of Chinese enterprises increase significantly in the target IFRS-compliant countries. The coefficient of *SOE* (the state ownership of the acquiring party) is significantly negative, illustrating that the success rate of state-owned enterprises in overseas M&As is significantly lower than that of private enterprises, which is consistent with Zhang et al. (2010).

The test results based on Hypothesis 1 are listed in Columns (3) and (4), and the explained variable denotes the volume of transactions in overseas M&As. The results indicate that post implementation of the new accounting standards in China, the volume of transactions by Chinese enterprises in target countries that have implemented IFRS (*IFRSAdopter*) increases significantly. The coefficients of the interaction term *IFRS*IFRSAdopter* in Columns (3) and (4) are 1.175 and 1.109, respectively, and are significant at the 5% and 1% levels; the sum of the coefficients of *IFRS* and *IFRS*IFRSAdopter* is positive, which verifies Hypothesis 1. In Column (4), the coefficient of *Adv* (intermediary organization during M&A) is also significantly positive, illustrating that the volume of transactions is higher when intermediary organizations are involved in M&As.

4.4. Analysis of the transaction volumes and success rates of overseas M&As by state-owned and private enterprises

Table 5 presents the regression results based on Hypothesis 2. To verify Hypothesis 2, group testing is carried out on the samples in line the nature of the corporate property rights of the acquiring party. From the

Table 5
Regression results of overseas M&A success rates after the grouping based on the nature of the enterprises.

	Ma		*Ma*	
	State-owned enterprises (1)	Private enterprises (2)	State-owned enterprises (3)	Private enterprises (4)
*IFRS*IFRSAdopter*	0.725*	0.869***	0.703	0.865**
	(1.85)	(2.60)	(1.60)	(2.41)
IFRS	−0.438	−0.945***	−0.379	−0.858***
	(−1.24)	(−3.28)	(−0.95)	(−2.68)
IFRSAdopter	−0.659*	−0.794**	−0.654*	−0.752*
	(−1.83)	(−1.98)	(−1.69)	(−1.83)
Adv			0.718***	0.580***
			(5.01)	(2.64)
AcqExp			0.051	0.200**
			(0.48)	(2.18)
HightecInd			−0.267	0.575***
			(−1.16)	(3.24)
Regulated			−0.169	−0.155
			(−0.80)	(−1.53)
Match			0.108	0.247
			(0.72)	(0.93)
Constant	0.731**	1.478***	−0.031	0.130
	(2.27)	(4.65)	(−0.06)	(0.23)
Industry	Control	Control	Control	Control
Pseudo R-squared	0.0041	0.0046	0.0335	0.0331
Observations	900	1743	900	1743

Note: Z-statistics are reported in parentheses, and cluster analysis is carried out on the target countries. ***, **, and * denote that the test is significant at the 1%, 5%, and 10% levels, respectively.

regression results (Columns (3) and (4) of Table 5), when the acquiring party is a state-owned enterprise, the coefficient of the interaction term *IFRS*IFRSAdopter* is positive but not statistically significant, and when the acquiring party is a private enterprise, the coefficient of the interaction term *IFRS*IFRSAdopter* is 0.865 and significant at a 1% level. Moreover, the sum of the coefficients of *IFRS* and *IFRS*IFRSAdopter* is positive, which verifies Hypothesis 2.

According to the regression results (Table 6), when the acquiring party is a state-owned enterprise, the coefficient of the interaction term *IFRS*IFRSAdopter* is positive but not statistically significant, and when the acquiring party is a private enterprise, the coefficients of the interaction term *IFRS*IFRSAdopter* are 0.692 and 0.817, which are significant at a 10% level. In addition, the sum of the coefficients of *IFRS* and *IFRS*IFRSAdopter* is positive. The aforementioned results show that the promoting effect of implementing new accounting standards on the volume of transactions in overseas M&As by Chinese enterprises is affected by the nature of the property rights of the acquiring party. That is, when acquiring parties are state-owned enterprises, their implementation of new accounting standards may not affect the volume of transactions in their overseas M&As, and when acquiring parties are private enterprises, their implementing new accounting standards could significantly increase the volume of transactions in their overseas M&As.

The aforementioned results show that the promoting effect of implementing new accounting standards on the success rate of Chinese enterprises' overseas M&As is affected by the nature of the property rights of the acquiring party. In other words, if the acquiring parties are state-owned enterprises, their implementation of new accounting standards may not affect the success rate of their overseas M&As, and if the acquiring parties are private enterprises, their implementation of new accounting standards could significantly increase the success rate of their overseas M&As. Consistent with the hypotheses, implementing new accounting standards can enhance the comparability of financial information across countries, thereby effectively reducing the cost of information acquisition in M&As. As China's state-owned enterprises' M&A objectives are more in tune with the state's national policy objectives, and they are supported by the state in terms of funds and resources.

Table 6
Regression results of overseas M&A transaction volumes after the grouping based on the nature of enterprises.

	Ln_ValueofTran		*Ln_ValueofTran*	
	State-owned enterprises (1)	Private enterprises (2)	State-owned enterprises (3)	Private enterprises (4)
*IFRS*IFRSAdopter*	0.535	0.692*	0.670	0.817*
	(0.52)	(1.67)	(0.70)	(1.86)
IFRS	2.012**	0.114	1.634*	−0.098
	(2.14)	(0.31)	(1.86)	(−0.27)
IFRSAdopter	−0.813	−0.723*	−1.044	−0.723*
	(−0.83)	(−1.68)	(−1.23)	(−1.80)
Adv			3.398***	1.531***
			(9.17)	(6.19)
AcqExp			−0.308	0.273
			(−0.83)	(1.20)
HightecInd			−1.307**	−0.072
			(−2.52)	(−0.35)
Regulated			−0.742	−0.562***
			(−1.45)	(−3.43)
Match			0.136	0.177
			(0.29)	(0.41)
Constant	−1.064	0.848**	−1.418	−0.264
	(−1.16)	(2.34)	(−0.97)	(−0.19)
Industry	Control	Control	Control	Control
Pseudo R-squared	0.0043	0.0019	0.0440	0.0142
Observations	749	1,473	749	1,473

Note: Huber–White Sandwich robust t-statistics are reported in parentheses, and cluster analysis is carried out on the target countries. ***, **, and * denote that the test is significant at the 1%, 5%, and 10% levels, respectively.

Therefore, overseas M&As by state-owned enterprises are not as sensitive as those of private enterprises to reduced information costs that arise from the implementation of new accounting standards.

5. Further testing

5.1. Reverification of hypotheses using national-level data

Referring to Francis et al. (2016), national annual-level data is also used to verify this study's hypotheses. The national annual-level data from countries with three or fewer M&A transactions are excluded because when the frequency of M&A transactions, which serves as the dependent variable in the model, is comparatively low, success rates tend to be extremely low or high. A total of 167 samples were obtained from 2002 to 2016 via sample screening.

Unlike corporate-level data, the success rate data of different countries in different years are a continuous variable rather than a dummy variable. Therefore, this study uses a multiple linear regression equation to carry out regression on annual national-level data and heteroscedasticity and autoregression processing. In the model, the effects of the capital market development, economic development, transaction costs, and geographic distance between China and the target country on M&A success rates are controlled for. In more developed capital markets, both information seeking and financing are more convenient and faster, which promotes the capital market development of both parties in the M&A and facilitates M&A transactions. In this paper, the *FDI* and the scale of the capital market (*MKT_Cap*) of the target country are used as surrogate variables to measure the development status of the local capital market. The economic development of both parties in the M&A could also affect the success rates of the M&A. Erel et al. (2012) found that the exchange and interest rates of the two countries could affect the transaction volumes of M&As. In this paper, gross domestic product per capita (*GDPPC*), GDPPC growth rate (*GDPPC_G*), and the inflation rate (*Inflation*)

are used as surrogate variables and are controlled for. Transaction costs of M&A could also affect M&A transactions. The turnover rate of the stock market (*STK_TO*) in the host countries of both parties in the M&A serves as the control variable for the transaction costs of M&A activities. Finally, according to Rossi and Volpin (2004), the geographic locations (*Distance*) of both parties in the M&A could affect their M&A transactions. Greater distances between the countries can often lead to the failure of M&As; therefore, both parties' geographic locations are controlled for. The regression model is as follows:

$$Ma\_Rate = \alpha_0 + \beta_1 IFRS + \beta_2 IFRSAdopter + \beta_3 IFRS * IFRSAdopter + \beta_4 FDI + \beta_5 MKT\_Cap + \beta_6 GDPPC + \beta_7 GDPPC\_G + \beta_8 Inflation + \beta_9 STK\_TO + \beta_{10} Distance + \varepsilon \quad (3)$$

From the regression results in Column (2) of Table 7, the coefficient of *IFRS* is negative, but not significant. The coefficient of the interaction term *IFRS*IFRSAdopter* is positive and significant at the 1% level. Moreover, the sum of the coefficients of the *IFRS* and the *IFRS*IFRSAdopter* ($-0.113 + 0.230 = 0.117$) is positive, suggesting that in cases wherein the target country does not adopt international financial reporting standards, China's implementation of the new accounting standards has no significant effect on the M&A's success rate (the coefficient of the *IFRS* is not significant); in cases wherein the target country does adopt international financial reporting standards, China's implementation of the new accounting standards significantly increases the success rate of its enterprises' overseas M&As. This is consistent with the conclusion obtained from the corporate-level data.

Table 7
Regression results of the success rates of overseas M&As at the national level.

	Ma_Rate (Freq > 3) (1)	*Ma_Rate (Freq > 3)* (2)
*IFRS*IFRSAdopter*	0.303***	0.230***
	(3.34)	(3.51)
IFRS	−0.274***	−0.113
	(−7.19)	(−1.29)
IFRSAdopter	−0.261**	−0.220***
	(−2.74)	(−2.97)
FDI		−0.024*
		(−1.85)
MKT_Cap		0.001
		(0.06)
GDPPC		0.016**
		(2.14)
GDPPC_G		−0.006
		(−0.05)
Inflation		0.001
		(1.28)
STK_TO		−0.003
		(−0.09)
Distance		−0.110
		(−1.56)
Constant	0.807***	0.619***
	(13.70)	(3.14)
R-squared	0.078	0.247
Observations	167	167

Note: Huber–White sandwich robust t-statistics are reported in parentheses. ***, **, and * denote that the test is significant at the 1%, 5%, and 10% levels, respectively.

5.2. Placebo test

One challenge that we face is that overseas countries/regions adopting or not adopting IFRS is not the result of random selection. After 2007, in the wake of the international financial crisis, Chinese enterprises pursued more acquisitions in developed countries that were more likely to adopt IFRS. Therefore, the results observed in the paper are affected by factors other than the adoption of IFRS by Chinese enterprises after 2007. To eliminate the effect of random events after 2007 on the conclusions of this paper, the placebo test method is adopted. Specifically, the *Event2008* variable is constructed, which is defined as follows: if the M&A transaction occurred after 2008, *Event2008* is 1, and 0 otherwise. This variable has been used because we assume that the increase in the number of overseas M&A is not due to the adoption of international financial reporting standards in 2007 but rather to the events that occurred following the 2008 financial crisis. The following regression model is used for testing:

$$\begin{aligned} Ma = {} & \alpha_0 + \beta_1 IFRS + \beta_2 Event2008 + \beta_3 IFRSAdopter + \beta_4 IFRS * IFRSAdopter + \beta_5 Event2008 \\ & * IFRSAdopter + \beta_6 SOE + \beta_7 Adv + \beta_8 AcqExp + \beta_9 HightecInd + \beta_{10} Regulated + \beta_{11} Match \\ & + lIndustry + \varepsilon \end{aligned} \tag{4}$$

Table 8
Regression results of the placebo test.

	(1) *Ma*	(2) *Ln_ValueofTran*
IFRS	−0.454	−0.001
	(−1.15)	(−0.00)
Event2008	−0.270	0.109
	(−1.32)	(0.34)
IFRSAdopter	−0.701**	−1.275***
	(−2.11)	(−3.88)
*IFRS*IFRSAdopter*	0.681*	1.023**
	(1.68)	(2.49)
*Event2008*IFRSAdopter*	0.142	0.256
	(0.61)	(0.66)
SOE	−0.470***	−0.340**
	(−5.05)	(−1.96)
Adv	0.671***	2.436***
	(5.02)	(11.74)
AcqExp	0.139*	0.161
	(1.77)	(0.76)
HightecInd	0.424***	−0.202
	(2.63)	(−0.96)
Regulated	−0.176*	−0.562***
	(−1.80)	(−2.98)
Match	0.156	0.169
	(0.90)	(0.42)
Constant	0.359	−0.128
	(0.82)	(−0.12)
Industry	Control	Control
Pseudo R-squared	0.0325	0.0213
Observations	2643	2229

Note: Robust z-statistics are reported in parentheses in Columns (1) and (2), robust t-statistics are reported in parentheses in Columns (3) and (4), and cluster analysis is carried out on the target countries. ***, **, and * denote that the test is significant at the 1%, 5%, and 10% levels, respectively.

$$Ln\_ValueofTran = \alpha_0 + \beta_1 IFRS + \beta_2 Event2008 + \beta_3 IFRSAdopter + \beta_4 IFRS * IFRSAdopter + \beta_5 Event2008 * IFRSAdopter + \beta_6 SOE + \beta_7 Adv + \beta_8 AcqExp + \beta_9 HightecInd + \beta_{10} Regulated + \beta_{11} Match + lIndustry + \varepsilon \quad (5)$$

If the coefficient of *Event2008*IFRSAdopter* is still significant but the value of the coefficient is smaller than the value of the coefficient of *IFRS*IFRSAdopter*, or if the coefficient of *Event2008*IFRSAdopter* is not significant, then only the coefficient of *IFRS*IFRSAdopter* is significant. In this case, the conclusions of this paper are due to the adoption of new accounting standards; otherwise, they are due to the events following the 2008 financial crisis.

The results in Table 8 show that although the coefficient of *Event2008*IFRSAdopter* is also positive, it is not significant, which supports the conclusions of this paper to a certain extent.

5.3. Retaining the M&A samples of target countries that implemented IFRS after 2007

To verify whether there were significant changes in M&A activities by Chinese enterprises before and after 2007 in the countries that had already implemented international financial reporting standards and to acquire cleaner research samples, the M&A samples of Chinese enterprises in target countries that have implemented IFRS after 2007 are excluded. To a certain extent, defining *IFRSAdopter* according to the specific year of implementation in target countries can also verify the research hypotheses of this paper. For example, if a certain country implemented the accounting standards in 2009, then *IFRSAdopter* is 0 before 2009 and 1 after. In other words, it is a variable that changes over time. Table 9 presents the regression results after *IFRSAdopter* is redefined.

Table 9
Regression results of the effect of accounting standards (AS) convergence on the transaction volume and success rates of Chinese enterprises' overseas M&As.

	(1)	(2)	(3)	(4)
	Ma	*Ma*	*Ln_ValueofTran*	*Ln_ValueofTran*
*IFRS*IFRSAdopter*	0.529***	0.510**	1.279***	1.215***
	(2.61)	(2.50)	(2.74)	(2.77)
IFRS	−0.609***	−0.594***	−1.103**	−1.100**
	(−3.23)	(−3.03)	(−2.17)	(−2.21)
IFRSAdopter	−0.194	−0.183	−0.397	−0.380
	(−1.15)	(−1.02)	(−1.28)	(−1.24)
SOE		−0.108		0.352*
		(−1.40)		(1.85)
Adv		0.145		0.819***
		(1.36)		(2.77)
AcqExp		0.028		0.648**
		(0.23)		(2.17)
HightecInd		−0.147		−0.409
		(−0.85)		(−1.00)
Regulated		−0.016		0.049
		(−0.13)		(0.18)
Match		0.184***		0.367**
		(2.61)		(2.24)
Constant	0.045	−0.037	0.156	−0.126
	(0.13)	(−0.11)	(0.21)	(−0.18)
Industry	Control	Control	Control	Control
Pseudo R-squared	0.0234	0.0253	0.0103	0.0133
Observations	2972	2972	2972	2972

Note: Robust z-statistics are reported in parentheses in Columns (1) and (2), robust t-statistics are reported in parentheses in Columns (3) and (4), and cluster analysis is carried out on the target countries. ***, **, and * denote that the test is significant at the 1%, 5%, and 10% levels, respectively.

Table 10
Regression results of the success rates of overseas M&As after the grouping based on the nature of enterprises.

	Ma		*Ln_ValueofTran*	
	State-owned enterprise (1)	Private enterprises (1)	State-owned enterprises (3)	Private enterprises (4)
*IFRS*IFRSAdopter*	0.223	0.679***	0.462	0.620**
	(0.72)	(2.94)	(1.22)	(2.19)
IFRS	−0.482**	−0.675***	−0.594*	−0.332
	(−2.25)	(−2.74)	(−1.68)	(−1.57)
IFRSAdopter	0.027	−0.319*	−0.054	−0.228
	(0.10)	(−1.68)	(−0.19)	(−1.00)
Adv	0.159	0.158	0.635*	0.578***
	(0.80)	(1.22)	(1.89)	(3.43)
AcqExp	0.096	0.016	0.580***	0.366
	(0.87)	(0.09)	(3.36)	(1.58)
HightecInd	−0.838***	0.069	−0.475	−0.124
	(−3.30)	(0.37)	(−1.60)	(−0.77)
Regulated	−0.069	−0.008	0.120	−0.047
	(−0.35)	(−0.05)	(0.48)	(−0.32)
Match	0.197	0.223**	0.221	0.107*
	(1.16)	(2.57)	(0.96)	(1.72)
Constant	−11.553***	0.109	0.594*	1.662***
	(−12.72)	(0.23)	(1.68)	(3.24)
Industry	control	control	control	control
Pseudo R-squared	0.0367	0.0261	0.0636	0.0523
Observations	961	2011	961	2011

Note: Z-statistics are reported in parentheses, and cluster analysis is carried out on the target countries. ***, **, and * denote that the test is significant at the 1%, 5%, and 10% levels, respectively.

The regression results in Table 9 show that regardless of whether the control variables are controlled, the coefficient of the interaction term *IFRS*IFRSAdopter* is positive and significant at least at a 5% level, suggesting that after implementing the new accounting standards, the M&A success rates and transaction volumes of Chinese enterprises in target countries that implemented international financial reporting standards (*IFRSAdopter*) increased significantly, which also supports Hypothesis 1.

The regression results based on Hypothesis 2 are reported in Table 10. The coefficient of the interaction term *IFRS*IFRSAdopter* is significantly positive only in the sample group of private enterprises, which supports Hypothesis 2; that is, the promoting effect of accounting standards (AS) convergence is more significant for private enterprises' overseas M&As.

6. Conclusions

This study uses China's implementation of the new accounting standards in 2007 to investigate the effect of accounting standards (AS) convergence on the success rates and transaction volumes of Chinese enterprises' overseas M&As. Based on prior research, the effect of international financial reporting standards in reducing the transaction costs of Chinese enterprises in overseas M&As is tested in this paper. The sample is classified according to the nature of property rights of the enterprises. Based on prior analysis, this study hypothesizes that private enterprises are more sensitive to reductions in information costs due to changes in accounting standards. Further analysis is carried out on the samples using national-level data, and the findings confirm the main hypotheses of this paper. The main conclusions of this paper are as follows:

First, accounting standards (AS) convergence increases the comparability of the accounting information of Chinese enterprises with that of IFRS-compliant countries, thus reducing the costs of information processing during Chinese enterprises' overseas M&As, which significantly increases their success rates. Second, implementing new accounting standards leads to an increase in accounting comparability, which can significantly increase the transaction volumes of Chinese enterprises' overseas M&As. Third, unlike private enterprises,

state-owned enterprises are not sensitive to reductions in information costs in M&A transactions because of the increase in comparability. Therefore, despite state-owned enterprises' implementation of the new accounting standards, there were no significant changes in their success rates and transaction volumes in their overseas M&A; however, those of private enterprises increased significantly.

Accounting information plays an important role in overseas M&As. These conclusions serve as a reference for the formulation of Chinese accounting standards and the overseas M&As of Chinese enterprises. Adopting the same accounting standards can reduce the information asymmetry in the transactions of both parties in the M&A. While selecting overseas M&A targets, enterprises can consider evaluating the degree of consistency in accounting standards.

Acknowledgements

We are grateful for the anonymous reviewers' helpful comments. Shuwei Sun acknowledges financial support from the National Natural Science Foundation of China (No. 71602112) and the Shanghai Educational Development Foundation Morning Project (15CG57). Xianjie He acknowledges financial support from the National Natural Science Foundation of China (Nos. 91746117 and 71572101) and the Ministry of Education (MOE) Key Research Institute of Humanities and Social Sciences at Universities (No. 16JJD790037).

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China Journal of Accounting Research 12 (2019) 251–269

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China Journal of Accounting Research

journal homepage: www.elsevier.com/locate/cjar

Reliability of R&D capitalization: Evidence from ex post impairment in China

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ARTICLE INFO

Article history:
Received 13 December 2018
Accepted 2 August 2019
Available online 21 August 2019

Keywords:
R&D capitalization
Reliability
Impairment
Accounting choice

ABSTRACT

Unlike prior studies that investigate research and development (R&D) accounting as a dichotomous choice between capitalizing vs. expensing, this study identifies low-reliability R&D capitalization by the occurrence of ex post impairment of capitalized R&D costs. I find that low-reliability capitalization is associated with higher discretionary accruals but fails to signal future innovation, whereas normal capitalization without subsequent impairment lacks earnings aggressiveness and predicts future innovation positively, compared to expensing firms. Next, this study shows that Big 4 and industry specialist auditors improve reliability by notably decreasing the likelihood of low-reliability R&D capitalization. The results remain robust after controlling for R&D investment intensity and potential endogeneity in the capitalization decision. Additional tests show that managers strategically time the recognition of impairment for big-bath and earnings-smoothing purposes, and that analyst coverage does not help differentiate between low-reliability and normal R&D capitalization. Collectively, this paper increases our understanding of R&D accounting and auditing and contributes to the debate on the reliability of R&D capitalization.

1. Introduction

Accounting for corporate research and development (R&D) costs is a controversial issue worldwide. While the International Financial Reporting Standards allow the capitalization of R&D costs when they meet certain criteria, claiming that it conveys relevant information about a firm's R&D activities, the U.S. Generally Accepted Accounting Principles mandate the full expensing of all R&D costs for public firms (Lev and

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https://doi.org/10.1016/j.cjar.2019.08.001
1755-3091/

Sougiannis, 1996), because R&D capitalization, as Healy et al. (2002) emphasize, creates an opportunity for corporate managers to not only discretionarily capitalize the costs of projects that have a low probability of success but also delay the write-down of impaired R&D assets. The lack of real data on R&D capitalization in the U.S. compels researchers to rely on simulation models (e.g. Lev and Sougiannis, 1996; Kothari et al., 2002). As a result, in the debate on relevance vs. reliability in R&D reporting, the reliability side of the trade-off has received far less investigation than relevance.

Recently, however, some empirical evidence on the reliability of R&D capitalization has been provided in a few jurisdictions adopting the International Financial Reporting Standards (IFRS). For example, Prencipe et al. (2008) and Markarian et al. (2008) document that companies in Italy tend to use capitalization for earnings-smoothing purposes; Cazavan-Jeny et al. (2011) find that French firms capitalize R&D outlays when they need to meet or beat earnings thresholds; and Xie et al. (2017) find that firms in China are more likely to capitalize R&D costs when the controlling shareholders' shares are pledged. Overall, these studies suggest that R&D capitalization is driven by management earnings-related incentives and that its reliability is questionable.

However, prior studies on the reliability of R&D capitalization are subject to several limitations. First, the typical key variable, the capitalizing vs. expensing indicator, is somewhat crude. Given that a single accounting choice can be jointly motivated by multiple goals (Fields et al., 2001), the capitalization decision does not necessarily indicate low reliability; rather, it may show faithful information signaling by management. Furthermore, accounting conservatism does not necessarily mean higher reliability or faithful representation (Watts, 2003; Bandyopadhyay et al., 2010); therefore, full expensing is not always more desirable and indicative of better reliability than capitalizing treatment. In this sense, treating all R&D capitalization as homogeneous and lacking reliability could be problematic. Second, prior studies focus mainly on the period of capitalization, but limited attention is paid to the conditions of the R&D assets in subsequent periods after the capitalization decision. Moreover, despite the questionable reliability of R&D capitalization, there has been little exploration of whether external monitoring mechanisms, such as independent auditing, could effectively improve its reliability.

In this paper, I provide a new measure of (low) reliability R&D capitalization, based on the ex post impairment of capitalized R&D costs as the direct economic consequence of poor capitalization decisions. Specifically, I define a capitalization decision as of low reliability if the development project(s) is subsequently impaired, and normal if it is not, and find the following. First, unlike normal capitalization, low-reliability capitalization is positively associated with both concurrent overall earnings aggressiveness and earnings management in other items proxied by abnormal accruals. Second, while normal capitalization positively predicts future innovation, low-reliability capitalization shows merely a marginal or insignificant relation to future innovation, suggesting that ex post impairment is a satisfactory measure of low-reliability R&D capitalization. Next, I investigate the monitoring role of independent auditors and find that firms audited by Big 4 and industry specialists are notably less prone to low-reliability R&D capitalization, whereas the relation is insignificant for normal capitalization. The results hold after several robustness checks. In further analysis, I document some evidence of earnings-smoothing and big-bath behavior in the timing of R&D capital impairment recording after R&D capitalization. Finally, I show that analyst coverage fails to help differentiate between normal and low-reliability R&D capitalization.

This study contributes to the extant literature in the following ways. First, it offers a new way of measuring the reliability of R&D capitalization. The ex post impairment of capitalized R&D is a preferable measure because it unambiguously captures the negative consequence of imprudent capitalization decisions. Once a previously capitalized R&D project has been written down, there is less need to identify low-quality capitalization via indirect references. It thus lowers the Type I error rate caused by mixing faithful vs. opportunistic capitalization. In this way, making a distinction between low-reliability and normal capitalization based on ex post impairment offers a more detailed research perspective.

The findings are also relevant to the auditing literature. First, they add new evidence to the continuing debate on auditor differentiation in an area of high risk of misstatement, and in an emerging market that is quite different from Western markets. More importantly, the evidence indicates that greater size and industry expertise are still useful strategies for auditing firms facing the challenge of R&D audits, and answers the call

for more archival evidence on the auditing of complex accounting estimates (Bratten et al., 2013, Defond and Zhang, 2014). In sum, this paper extends the R&D-related accounting and auditing literature and has implications for both regulators and the setters of accounting standards.[1]

The remainder of the paper proceeds as follows. Section 2 describes the accounting of R&D in China. Section 3 reviews the literature and develops the hypotheses. Section 4 describes the research design, while Sections 5 and 6 report the empirical results and additional tests. Section 7 presents the conclusion and discussion.

2. R&D accounting in China

In China, accounting for intangibles, including R&D costs, is regulated by the *Accounting Standard for Business Enterprises No. 6* (*Qiyekuaijizhunze*, ASBE 6). Similar to the IFRS, China's ASBE 6 requires research expenditure to be expensed as incurred, whereas expenditure in the development phase can be capitalized, provided a battery of conditions are met.[2] For multi-period R&D projects that have already entered the development stage but are not yet ready for successful recognition as intangible assets, the costs are booked temporarily as *Development costs*. *Development costs* is an asset account and its year-end balance equals the sum of capitalized in-process development costs. Once a project becomes successful, the balance of *Development costs* is shifted to intangible assets; however, if the project finally fails, all of the previously capitalized amounts must be expensed and impaired.

The increases and decreases in the *Development costs* account for each project are disclosed separately in the accompanying notes of the annual reports, depicting annually when each individual R&D project is started, completed successfully or impaired. Appendix A illustrates a typical example of Development costs disclosure by a Chinses listed firm.

The Chinese regulatory authorities assess substantial risk associated with R&D capitalization. For example, in one of its bulletins, the China Securities Regulatory Commission issued warnings about the premature capitalization of R&D costs.[3] The Shanghai and Shenzhen Securities Exchanges have sent several inquiry letters to listed firms in recent years related to R&D capitalization.[4] In 2016, the Chinese Institute of Certified Public Accountants scheduled an interview with a few accounting firms to warn of the risk associated with R&D capitalization, stating that "audit firms should pay attention to the reliability of *Development costs* and assess the reasonability of the distinction between research phase and development phase made by the clients."[5]

Although the criteria for the capitalization of R&D costs are quite clearly regulated, considerable flexibility is left to the managers. For example, the probability of technical feasibility and future profitability depends on estimation, which is subject to judgmental errors and managerial incentives. In particular, the transitory nature of in-process R&D assets (*Development costs*) makes it potentially an attractive channel to pre-capitalize R&D expenses that should otherwise be expensed, because it avoids a reduction in profit. Besides, even if a write-off of the *Development costs* is needed, it is booked as administration expenses, rather than the more noticeable impairment of long-lived intangible assets. Therefore, managers may have incentives to prematurely capitalize R&D expenditure as *Development costs*. Indeed, some high-profile scandals have caused intense dispute over the issue of capitalizing R&D costs among Chinese stock investors and news media.[6]

[1] See more discussion in Section 7.

[2] The conditions include (1) the technical feasibility of completing the development; (2) the intention to complete the development; (3) the pattern of future economic benefits or the usefulness for internal use; (4) the availability of adequate technical and financial resources to complete the development; and (5) the capability to measure development expenditure separately and reliably.

[3] For example, see http://www.csrc.gov.cn/pub/beijing/xxfw/bjfxjs/201401/t20140112_242418.htm.

[4] For example, see http://www.sse.com.cn/disclosure/credibility/supervision/inquiries/maarao/c/4119227.pdf.

[5] See http://www.cicpa.org.cn/news/201604/t20160419_48542.html.

[6] For example, LeTV, a technology company and one of the largest online video companies in China, is reported to have unduly capitalized large amounts of R&D costs that could have caused losses if expensed in recent years. See http://tech.sina.com.cn/i/2016–06-07/doc-ifxsvenx3606939.shtml.

3. Literature review and hypothesis development

3.1. Reliability of capitalized R&D costs

As stipulated in ASBE 6, the criteria for capitalizing R&D costs depend heavily on management judgment. It is difficult to verify the reasonableness of capitalization decisions and capitalized R&D amounts, because unlike other tangible capital investments that share common characteristics across firms within an industry, R&D costs can be unique and even confidential to the developing firm. As a result, R&D capitalization is risky with a high potential for misreporting (Aboody and Lev, 2000; Healy et al., 2002).

In contrast with the large body of studies on the relevance of R&D capitalization, based on both simulated (e.g. Lev and Sougiannis, 1996; Boone and Raman, 2001) and real data (e.g. Ahmed and Falk, 2006; Oswald and Zarowin, 2007), investigation into the reliability of R&D capitalization can only be conducted in a few IFRS countries. For example, Markarian et al. (2008) find that R&D capitalization is associated with earnings smoothing in Italy, and Cazavan-Jeny et al. (2011) find that managers use R&D capitalization to meet or beat earnings thresholds in France, indicating that the reliability of R&D capitalization may be distorted by the reporting incentives of managers.

However, previous studies cannot unambiguously clarify whether managements manipulate earnings through R&D capitalization. First, a research design that uses a dichotomous variable coded 1 for capitalizers crudely mixes all capitalization decisions motivated by all sorts of incentives. As a tendency to capitalize R&D does not necessarily suggest lower reliability, the conclusions could be confounded by noise in the measure of reliability, which needs to be captured more precisely. Second, the literature focuses mainly on the decision itself; little is known about the conditions and quality of R&D costs after they are capitalized. In addition, although the internal determinants of the R&D capitalization decision, such as management traits, have been examined, evidence of the role of external monitors in shaping reliability is very limited (e.g. Tutticci et al., 2007).

3.2. Hypothesis development

Based on the discussion above, I measure low-reliability R&D capitalization using the ex post impairment/-failure of in-process R&D projects that have entered the development phase and been capitalized. This is a desirable measure of lower reliability because ex post impairment directly reflects the wealth-destroying consequence of a poor R&D capitalization decision, with a lower Type I error rate in the identification of misstatements in R&D capitalization. Specifically, I define capitalization that is later impaired as low reliability, and that without subsequent impairment as normal.

First, I hypothesize on the low-reliability phenomenon and whether ex post impairment fairly represents low-reliability R&D capitalization. As the premature recognition of R&D assets delays the reduction of current earnings, managers are likely to take advantage of their discretion in R&D capitalization to boost earnings. Moreover, in most situations, multiple accounting choices are chosen jointly to achieve earnings goals (Fields et al., 2001) and premature capitalization of R&D expenditure can be one of many channels for income-increasing earnings management. Therefore, low-reliability R&D capitalization is predicted to be concurrent with a firm's earnings aggressiveness. In contrast, for normal capitalization, such a positive association is not expected, because it is presumably less likely to be driven by earnings manipulation incentives.

H1a. Low-reliability R&D capitalization, captured by ex post impairment, is positively associated with (aggressive) earnings management.

H1b. Normal R&D capitalization without ex post impairment is NOT positively associated with (aggressive) earnings management.

Tension remains in the hypotheses, especially in H1a, because the impairment may not be caused by prematurely capitalized costs in previous periods. For example, the occurrence of ex post impairment of capitalized R&D costs could be due to unintentional estimation errors rather than managerial manipulation. Even when the capitalization decision is free from managerial manipulation and estimation errors, ex post

impairment can be caused by unexpected changes in the technical environment after the capitalization decision is made. In such cases, one should expect to observe low reliability only for specific R&D projects but not for concurrent general earnings, and should not predict a positive relation between a firm's overall earnings management and ex post failed R&D capitalization. Moreover, supposing a firm controls its overall earnings management, for example, if it chooses to capitalize R&D costs but to report more conservatively on other items to maintain a reasonable level of discretionary accruals, it is possible to observe an insignificant or even negative relation between its R&D capitalization and overall earnings management.

In addition to the earnings effects, another question of interest is whether varied levels of reliability in capitalization reflect the real economics of the firm's R&D activities. According to the proponents of R&D capitalization, capitalization of R&D costs is positive information signaled by the management. The underlying argument is that R&D capitalization is a leading indicator of future innovation outcomes. In this case, one should expect the more faithful normal capitalization to be positively related to future innovation. In contrast, if the capitalization is premature and its reliability is questionable, the positive relation should be tempered. Therefore, I hypothesize as follows:

H2a. Normal capitalization of R&D costs is positively associated with future innovation outcomes.

H2b. Low-reliability R&D capitalization, captured by ex post impairment, is less positively associated with future innovation outcome than normal capitalization.

Next, I ask the question whether independent auditing, an important external monitoring mechanism, improves the reliability of R&D capitalization. As financial reporting is the joint result of management and auditors, whose primary role is to verify the accounting numbers (Antle, 1982), auditors of higher quality, such as the Big 4 and industry specialists, are expected to enhance the reliability of R&D capitalization, because they are usually larger and more economically independent and more competent, and bear greater litigation and reputation risks (e.g. DeAngelo, 1981; Solomon et al., 1999). As discussed, regulatory authorities in China also motivate auditors to pursue a higher level of assurance when auditing R&D capitalization. In this context, the question becomes whether higher-quality auditors can decrease the probability of poor R&D capitalization decisions that are followed by subsequent impairment. In contrast, for normal capitalization, a neutral prediction is made, because although auditors are naturally in favor of accounting conservatism and income-decreasing accounting treatment, it is also reasonable for auditors to act strictly only with riskier low-reliability capitalization, but not with normal capitalization that may even signal lower business risk (Krishnan and Changjiang, 2014).

H3. Auditors of higher quality decrease the probability of low-reliability capitalization of R&D costs.

Nevertheless, there are reasons why these hypotheses regarding the role of auditors may not be supported. To provide reasonable assurance of the reliability of a client's R&D capitalization, which involves complex accounting estimates, auditors are required to obtain not only an assessment of the client's financial and operational conditions, but also an understanding of the related technological advances and future productivity, which is often beyond the expertise of traditional auditors (Griffith et al., 2015). Moreover, they can learn little by observing the R&D performance of industry peers if the knowledge is unique and nontransferable. As a result, when the task difficulty increases dramatically, it is not clear whether the expertise of the Big 4 and industry specialists in verifying historical information is applicable to the auditing of R&D-related estimates.

4. Research design

4.1. Identification of ex post R&D impairment

In this paper, I measure low-reliability R&D capitalization using the ex post impairment of in-process R&D projects that have entered the development phase and been capitalized. The project-specific disclosure of *Development costs* by Chinese firms enables me to identify the cases of full impairment of capitalized costs for each in-process R&D project and to ascertain the exact capitalization decision-making period. Specifically, I define an R&D project as impaired when it meets all of the following criteria: (1) the opening balance of

Development costs for the project is non-zero; (2) the ending balance for the project is zero; and (3) the full reduction in *Development costs* for the project is due to the permanent expensing of previously capitalized R&D costs rather than the successful transfer to intangible assets or a change in the membership of consolidated subsidiaries. Appendix B provides an example of full R&D impairment and the corresponding low-reliability capitalization of the specific R&D project.

4.2. Model specification

First, I test whether the lower reliability of R&D capitalization captured by the occurrence of ex post impairment of capitalized R&D costs is related to firm earnings management. If low-reliability capitalization reflects opportunistic incentives, it is probably accompanied by several other channels to manage earnings upwards. However, if the impairment merely reflects unintentional estimation errors or unexpected changes, and if the firm maintains a controlled level of earnings management, it is less likely to show a positive association between the R&D capitalization decision and earnings aggressiveness.

To begin with, I follow prior studies that use a capitalizing vs. expensing indicator, as shown in Eq. (1a), where *CAPITAL* equals 1 if a firm capitalizes some portion of its R&D expenditure in the current period, and 0 if it records all of the expenditure as period expenses.[7]The dependent variable *DA* is the signed discretionary accruals calculated following Kothari et al. (2005). I also calculate the adjusted discretionary accruals *DA_OTHER* by subtracting the R&D capitalization component from total accruals to measure the earnings management achieved from items other than R&D capitalization.[8]

$$DA = \alpha_0 + \alpha_1 CAPITAL + Controls + \mu \tag{1a}$$

Next, I take away from prior studies by replacing *CAPITAL* in Eq. (1a) with *CAPITAL_NM* and *CAPITAL_LR*. *CAPITAL_NM* indicates normal capitalization, coded 1 for capitalizers and if none of the R&D projects capitalized in a firm-year suffers impairment in the subsequent three years and 0 otherwise; *CAPITAL_LR* indicates low-reliability capitalization, which equals 1 if at least one R&D project capitalized in a firm-year suffers impairment in the subsequent three years, and 0 otherwise.

$$DA = \alpha_0 + \alpha_1 CAPITAL\_NM + \alpha_2 CAPITAL\_LR + Controls + \mu \tag{1b}$$

Meanwhile, a set of firm characteristic variables are controlled in Eqs. (1a) and (1b), including the natural log of year-end total assets (*LNTA*), total liability to total assets ratio (*LEV*), profitability (*ROA*), number of listing years (*AGE*), state ownership (*SOE*), receivables to total assets ratio (*REC_P*), and inventory to total assets ratio (*INV_P*).[9] As prior studies find that firm managers engage in income-increasing management to meet or beat earnings thresholds, I control for zero earnings threshold beating using *SMALL_PROFIT,* which equals 1 if the final *ROA* falls in the range of [0%, 1%] and 0 otherwise, and *SMALL_GROWTH*, which is coded 1 if current earnings beat last-year earnings by [0%, 1%] and 0 otherwise. I estimate Eqs. (1a) and (1b) using OLS regression, taking expensing firms as the benchmark group and predicting α_2 to be positive.

To examine whether current R&D capitalization signals any difference in future innovation outcome, I use the number of patents approved by authorities as the proxy for innovation. I regress the number of patents approved by authorities in periods *t + 1*, *t + 2*, and *t + 3* following the capitalization decision year on the three types of R&D capitalization, i.e. normal capitalization, low-reliability capitalization, and expensing groups, as shown in Eqs. (2a) and (2b).

$$PATENT_{t+x(1,2,3)} = \beta_0 + \beta_1 CAPITAL + Controls + \mu \tag{2a}$$

$$PATENT_{t+x(1,2,3)} = \beta_0 + \beta_1 CAPITAL\_NM + \beta_2 CAPITAL\_LR + Controls + \mu \tag{2b}$$

[7] In this paper, I treat a firm as an R&D capitalizer if the firm meets one of the criteria in a given year: (1) the firm discloses that it capitalizes a certain amount of R&D expenditure; (2) it reports an increase in *Development cost (assets)* and this increase has no other causes such as the acquisition of other entities.

[8] I also use Jones's (1991) model to calculate discretionary accruals and find similar results.

[9] To avoid mechanical associations, I adjust all control variables that are based on net profit and total assets (*LNTA*, *LEV*, *ROA, REC_P, INV_P*) for the effect of R&D capitalization by subtracting the amount of R&D capitalized for the period, treating this amount as if it were expensed.

The experimental and control variables remain the same as in Eqs. (1a) and (1b), except that I do not control for *REC_P, INV_P, SMALL_PROFIT* and *SMALL_GROWTH*, which are not closely related to future patents. As the number of patents granted is a non-negative integral number, I estimate Eqs. (2a) and (2b) using a Poisson regression, with expensing firms as the benchmark group.

Finally, I use the following equations to test whether higher-quality auditors affect the quality of R&D capitalization decisions and increase the reliability of R&D capitalization.

$$CAPITAL = \gamma_0 + \gamma_1 AUD + Controls + \mu \tag{3a}$$

$$CAPITAL\_T = \gamma_0 + \gamma_1 AUD + Controls + \mu \tag{3b}$$

In Eq. (3a), the dependent variable *CAPITAL* equals 1 if a firm capitalizes some portion of its R&D expenditure in the current period, and 0 if the firm fully expenses all R&D costs. In contrast, in Eq. (3b), *CAPITAL_T* is a categorical variable with three outcomes that have no natural ordering. *CAPITAL_T* equals 0 if a firm fully expenses all of its R&D expenditure; it equals 1 for normal capitalization, i.e. when $CAPITAL\_NM = 1$; and it equals 2 if a firm capitalizes at least one R&D project that is fully impaired in the subsequent three periods, i.e. when $CAPITAL\_LR = 1$. I estimate Eq. (3a) using logit regression and Eq. (3b) using multinomial (polytomous) logistic regression.

The key test variable *AUD* in Eqs. (3a) and (3b) denotes higher audit quality. It is proxied by auditor size (*BIG4*) and auditor industry specialization (*SPECIALIST*). *BIG4* is an indicator variable taking the value of 1 if a firm hires a Big 4 auditor,[10] and 0 otherwise. *SPECIALIST* equals 1 if a firm hires an auditor that ranks as a top 2 auditor in an industry in terms of national market share based on audit fees, and 0 otherwise.

4.3. Sample construction

Panel A, Table 1 displays the sample construction procedures. It begins with Chinese listed firms that make R&D investments from 2007 to 2015. Next, I categorize the full sample into three subgroups, i.e. the low-reliability capitalization group ($CAPITAL\_LR = 1$), normal capitalization group ($CAPITAL\_NM = 1$), and benchmark group (expensing firms). After dropping firm-years from the financial sector and those with missing values for variables in the equations, I obtain final regression samples of 626, 2140, and 6171 firm-years for the three subgroups, respectively. Panel B displays the yearly distribution of the final sample, showing that the accounting treatment of R&D capitalization becomes increasingly common among Chinese listed firms throughout the sample period.

In this study, all of the financial and R&D-related data are drawn from the CSMAR and WIND databases.

5. Empirical results

5.1. Descriptive statistics and univariate tests

Table 2 reports the descriptive statistics. The mean of *CAPITAL* is approximately 0.3095, indicating that on average 30.95% of the sample firm-years show capitalization of a portion of the R&D expenditure. While 23.95% of the firm-years capitalize some R&D costs with no impairment of the capitalized R&D projects in the subsequent three years, approximately 7% of the firm-years book R&D assets for R&D projects and subsequently have at least one capitalized project fully impaired, 11.32% demonstrate zero-profit earnings threshold beating, and 3.86% demonstrate last-year earnings threshold beating. Big 4 auditors are used in 5.06% of the sample, while 25.15% are audited by industry specialists. The other control variables are reasonably distributed, consistent with prior studies.

Panel A, Table 3 reports the univariate differences in firm earnings management and innovation across the subgroups. It shows that abnormal accruals (*DA*) is highest at 0.008 for the low-reliability capitalizing group ($CAPITAL\_LR = 1$), followed by −0.0002 for the expensing group ($CAPITAL = 0$) and −0.001 for the normal capitalizing group ($CAPITAL\_NM = 1$). The t-tests show that low-reliability firms differ significantly

[10] i.e. the branches of Ernst & Young (EY), Deloitte, KPMG, and Pricewaterhouse Coopers (PwC) in China.

Table 1
Sample construction.

Panel A: Sample selection

Sample selection procedure	# Of firm-year observations
Low-reliability capitalization group (CAPITAL_LR = 1)	
Firm-years that capitalize at least one R&D project which is fully impaired within the subsequent 3 years	657
Less: observations from financial industries	(3)
Less: firm years with missing variable values	(28)
Subtotal	626
Normal capitalization group (CAPITAL_NM = 1)	
Firm-years that capitalize at least one R&D project without subsequent impairment	2307
Less: observations from financial industries	(22)
Less: firm-years with missing variable values	(145)
Subtotal	2140
Control group (CAPITAL = 0, i.e. *expensing firms)*	
Firm-years that expense all R&D costs	7119
Less: observations from financial industries	(49)
Less: firm-years with missing variable values in Eqs. (1)-(2)	(899)
Subtotal	6171
Total	8937

Panel B: Distribution of sample by year

Year	$CAPITAL\_LR = 1$	$CAPITAL\_NM = 1$	$CAPITAL = 0$	Total
2007	17	45	78	140
2008	27	70	166	263
2009	38	121	194	353
2010	49	130	281	460
2011	83	192	476	751
2012	101	307	1160	1568
2013	102	427	1183	1712
2014	106	378	1298	1782
2015	103	470	1335	1908
Total	626	2140	6171	8937

from expensing firms (t-stat. = 3.25, $p < 0.01$) and from normal capitalizing firms (t-stat. = −3.39, $p < 0.01$). However, the level of accrual management does not differ between normal capitalizing and expensing firms (t-stat. = −0.29, $p > 0.1$). Ranksum tests for the median values report similar results. However, the mean value of *DA_OTHER* is −0.005 for normal capitalizers but 0.005 for low-reliability capitalizers. Taken together, normal capitalizing firms, despite capitalizing R&D, report other items more conservatively and their overall earnings effect is not aggressive. In contrast, low-reliability firms tend to be aggressive in all reporting items.

In period *t + 1*, while normal capitalizing firms obtain significantly more patents than expensing firms (11.639 vs. 7.195; t = 6.38, $p < 0.01$), the difference is not significant between low-reliability capitalizing firms and the expensing group (8.172 vs. 7.195; t = 0.94, $p > 0.10$), indicating that although the firms in the low-reliability group capitalize R&D in their accounting treatment, the decision does not signal any differential information on future innovation outcomes. The univariate results are similar for periods *t + 2* and *t + 3*, and for the ranksum tests of median values.

Panel B of Table 3 reports the likelihood of R&D capital impairment by auditor type. It reveals that clients of Big 4 audit firms are more likely to apply normal R&D capitalization, i.e. when $CAPITAL\_NM = 1$ (0.389 vs. 0.231; t-stat. = 7.69, $p < 0.01$). However, when $CAPITAL\_LR = 1$, Big 4 firms are less likely to capitalize R&D projects that subsequently turn out be impaired (0.044 vs. 0.071; t-stat. = −2.20, $p < 0.05$). The results of the ranksum tests of the medians are similar. When it comes to auditor industry expertise, the table reports that although industry specialists are more conservative with normal capitalization when *CAPITAL_NM = 1,* the difference is not significant (0.229 vs. 0.242, t = −1.33, $p > 0.1$). The difference is stronger for R&D cap-

Table 2
Descriptive statistics (N = 8937).

Variables	Mean	S.D.	Min	Median	Max
CAPITAL	0.3095	0.4623	0	0	1
CAPITAL_NM	0.2395	0.4268	0	0	1
CAPITAL_LR	0.0700	0.2552	0	0	1
DA	0.0003	0.0628	−0.2372	−0.0007	0.2526
DA_OTHER	−0.0003	0.0631	−0.2374	−0.0011	0.2526
$PATENT_t$*	8.3276	27.6867	0	0	190
LNTA	21.8530	1.2360	18.8370	21.6583	26.2297
LEV	0.4116	0.2134	0.0505	0.4000	1.3797
ROA	0.0372	0.0581	−0.3148	0.0352	0.2017
AGE	8.3870	6.1687	0.6082	5.9726	25.0493
SOE	0.3642	0.4812	0	0	1
REC_P	0.1295	0.0994	0.0000	0.1110	0.5100
INV_P	0	0.1063	0	0.1244	0.7270
SMALL_PROFIT	0.1132	0.3169	0	0	1
SMALL_GROWTH	0.0386	0.1926	0	0	1
BIG4	0.0506	0.2191	0	0	1
SPECIALIST	0.2515	0.4339	0	0	1

(1) Continuous variables are winsorized at 1% and 99%.
(2) See Section 4.2 for variable definitions.
(3) I only report *PATENT* in period t, to maintain identical sample scope of other variables.

Table 3
Univariate Tests.

Panel A: Earnings management and innovation by capitalization type

Groups	(1) *CAPITAL_NM* = 1 Mean (Median)	(2) *CAPITAL_LR* = 1 Mean (Median)	(3) *CAPITAL* = 0 Mean (Median)	(1) vs. (3) t-stat. (z-stat.)	(2) vs. (3) t-stat. (z-stat.)	(1) vs. (2) t-stat. (z-stat.)
DA	−0.001	0.008	−0.0002	−0.29	3.25***	−3.39***
	(0.0001)	(0.007)	(−0.001)	(−0.36)	(3.06***)	(−2.75***)
DA_OTHER	−0.005	0.005	−0.0002	−3.49***	1.70*	−3.69***
	(−0.004)	(0.005)	(−0.001)	(−3.08***)	(−1.48)	(−3.11***)
$PATENT_{t+1}$	11.639	8.172	7.195	6.38***	0.94	2.28**
	(0.000)	(0.000)	(0.000)	(2.23**)	(0.68)	(0.63)
$PATENT_{t+2}$	13.223	8.413	8.167	6.44***	0.21	2.85***
	(0.000)	(0.000)	(0.000)	(2.84***)	(0.13)	(1.68*)
$PATENT_{t+3}$	14.175	9.639	8.556	5.95***	0.78	2.26**
	(0.000)	(0.000)	(0.000)	(2.82***)	(0.33)	(1.29)

Panel B: Likelihood of R&D capitalization by auditor type

	BIG4 = 1		*BIG4* = 0		*BIG4 = 1* vs. *BIG4 = 0*	
	Mean	Median	Mean	Median	t-stat.	z-stat.
CAPITAL_NM	0.389	0.000	0.231	0.000	7.69***	7.66***
CAPITAL_LR	0.044	0.000	0.071	0.000	−2.20**	2.21**
	SPECIALIST = 1		*SPECIALIST* = 0		*SPECIALIST* = 1 vs. *SPECIALIST* = 0	
	Mean	Median	Mean	Median	t-stat.	z-stat.
CAPITAL_NM	0.229	0.000	0.242	0.000	−1.33	−1.33
CAPITAL_LR	0.053	0.000	0.075	0.000	−3.58***	−3.57***

(1) *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.
(2) t-stats are the results of t-tests of mean values; z-stats are the results of the ranksum test of median values.
(3) See Section 4.2 for variable definitions.

italization that is subsequently impaired, where *CAPITAL_LR = 1* (0.053 vs. 0.075; t = −3.58, p < 0.01). The results of the ranksum tests of the medians are similar.

To sum up, the univariate tests suggest significantly more income-increasing earnings management and reduced innovation outcomes in the low-reliability capitalization group, while the Big 4 auditors and industry specialists suppress low-reliability R&D capitalization. The results are consistent with the hypotheses, and the significant differences highlight the necessity of discriminating between low-reliability and normal R&D capitalization, adding confidence to the validity of my measure of low-reliability R&D capitalization using the occurrence of ex post impairment.

5.2. Regression analysis

Table 4 reports the regression results for Eqs. (1a) and (1b). In column I, Table 4, the coefficient for *CAPITAL* is 0.003, which is not significantly different from zero (t-stat. = 1.61, p > 0.1), suggesting that in China

Table 4
R&D Capitalization and Earnings Management.

Dependent variables	*DA*		*DA_OTHER*	
	I	II	III	IV
	Coef.	Coef.	Coef.	Coef.
Independent variables	(t-stat.)	(t-stat.)	(t-stat.)	(t-stat.)
CAPITAL	0.003		−0.002	
	(1.61)		(−1.04)	
CAPITAL_NM		0.001		−0.004
		(0.33)		(−2.75)***
CAPITAL_LR		0.010		0.006
		(3.31)***		(2.17)**
LNTA	0.001	0.001	0.001	0.001
	(1.42)	(1.51)	(1.28)	(1.79)*
LEV	−0.016	−0.017	−0.015	−0.016
	(−2.84)***	(−2.91)***	(−2.58)***	(−3.23)***
ROA	0.018	0.017	0.027	0.023
	(0.91)	(0.86)	(1.39)	(1.43)
AGE	−0.001	−0.001	−0.001	−0.001
	(−2.88)***	(−2.93)***	(−2.73)***	(−3.68)***
SOE	0.005	0.005	0.005	0.005
	(2.21)**	(2.27)**	(2.21)**	(2.87)***
REC_P	0.079	0.079	0.080	0.084
	(8.26)***	(8.28)***	(8.29)***	(10.41)***
INV_P	0.101	0.102	0.102	0.105
	(11.29)***	(11.33)***	(11.25)***	(13.30)***
SMALL_PROFIT	0.009	0.009	0.010	0.009
	(4.13)***	(4.12)***	(4.40)***	(4.54)***
SMALL_GROWTH	0.000	0.000	0.000	−0.000
	(0.15)	(0.08)	(0.03)	(−0.02)
Constant	−0.059	−0.060	−0.056	−0.061
	(−2.67)***	(−2.76)***	(−2.60)***	(−3.54)***
Industry & year fixed effects	Yes	Yes	Yes	Yes
Observations	8937	8937	8937	8937
R-squared	0.053	0.052	0.054	0.055
Comparison of coefficients within groups (H_o: *CAPITAL_NM = CAPITAL_LR*)				
Chi^2		8.11***		9.04***

(1) *DA* stands for overall signed discretionary accruals calculated following Kothari et al. (2005); *DA _OTHER* is discretionary accrual adjusted for R&D capitalization.
(2) *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.
(3) See Section 4.2 for variable definitions.

there is no obvious association between the crude R&D capitalize-or-not indicator and firm accrual earnings management. However, looking more closely at column II, Table 4, while the coefficient for *CAPITAL_NM* is not significantly different from zero (t-stat. = 0.33, $p > 0.1$), the coefficient for *CAPITAL_LR* is positive and significant (t-stat. = 3.31, $p < 0.01$), and the difference between the two coefficients is highly significant ($chi^2 = 8.11$, $p < 0.01$). The results mean that overall earnings management does not differ between normal capitalizers and expensers, but is more aggressive among low-reliability capitalizing firms.

Columns III and IV in Table 4 report the results when the dependent variable is *DA_OTHER*, the measure of discretionary accruals caused by items other than R&D capitalization. The coefficient of *CAPITAL_NM* is significantly negative ($t = -2.75$, $p < 0.01$). In combination with the finding that overall earnings management for normal capitalizing firms is no higher than that of expensing firms (column II, Table 4), the inverse relation suggests that normal capitalizing firms seemingly have a controlled budget for overall earnings management, and R&D capitalization and other items are substitutes. In contrast, the coefficient on *CAPITAL_LR* is significantly positive ($t = 2.17$, $p < 0.05$), indicating that low-reliability capitalizing firms engage in income-increasing earnings management not only in R&D accounting, but also in other reporting items, consistent with the notion that multiple accounting choices are chosen jointly for earnings purposes. The evidence in Table 4 suggests that low-reliability R&D capitalization serves as a channel to manage earnings upward.

The control variables show higher levels of accrual earnings management for firms with a larger size, lower leverage ratio, higher *ROA*, higher receivables, higher inventory intensity, and small reported profits, in line with prior studies.

Table 5 reports the regression results for Eqs. (2a) and (2b). It shows that for period *t + 1*, the coefficient for *CAPITAL* is 0.11 (z-stat. = 0.75, $p > 0.1$). The coefficient is positive for *CAPITAL_NM* but negative for *CAPITAL_LR*, although neither differ significantly from zero. For period *t + 2,* the coefficient for *CAPITAL* is 0.21 (z-stat. = 2.29, $p < 0.05$), indicating that R&D capitalization generally predicts a higher level of innovation in the following two years. However, the positive leading predictive power is limited to normal capitalization (*CAPITAL_NM*), with a positive and significant coefficient 0.25 (z-stat. = 2.54, $p < 0.05$), whereas the coefficient on *CAPITAL_LR* is not significant (z-stat. = 0.18, $p > 0.1$), indicating no difference in innovation outcome between low-reliability capitalizing and expensing firms. The results remain similar for period *t + 3*. Table 5 suggests that low-reliability capitalization proxied by ex post impairment also underperforms compared to normal capitalization in terms of future innovation.

Table 5
R&D Capitalization and Innovation Outcome.

Dependent variables	$PATENT_{t+1}$				$PATENT_{t+2}$				$PATENT_{t+3}$			
Independent variables	Coef.	z-stat.	Coef.	z-stat.	Coef.	z-stat.	Coef.	z-stat.	Coef.	z-stat.	Coef.	z-stat.
$CAPITAL_t$	0.11	0.75			0.21	2.29**			0.24	2.53**		
$CAPITAL\_NM_t$			0.14	0.93			0.25	2.54**			0.28	2.79***
$CAPITAL\_LR_t$			−0.11	−0.49			0.03	0.18			0.06	0.34
$LNTA_t$	0.75	12.57***	0.75	12.53***	0.34	8.26***	0.34	8.14***	0.33	7.45***	0.32	7.34***
LEV_t	−0.51	−1.26	−0.50	−1.23	0.02	0.07	0.03	0.10	0.07	0.20	0.07	0.23
ROA_t	1.75	1.06	1.72	1.04	2.71	3.00***	2.72	3.01***	2.84	2.91***	2.85	2.92***
AGE_t	−0.04	−3.18***	−0.04	−3.17***	−0.02	−2.34**	−0.02	−2.31**	−0.02	−2.02**	−0.02	−2.00**
SOE_t	0.38	2.36**	0.38	2.37**	0.35	2.96***	0.35	2.97***	0.30	2.43**	0.30	2.45**
Constant	−15.19	−10.77***	−15.15	−10.73***	−7.32	−7.54***	−7.27	−7.45***	−7.18	−6.47***	−7.14	−6.39***
Industry &year fixed effects	Yes		Yes		Yes		Yes		Yes		Yes	
Observations	8937		8937		8923		8923		7006		7006	
Comparison of coefficients within groups (H_o: *CAPITAL_NM* = *CAPITAL_LR*)												
Chi^2			1.27				3.75*				3.45*	

(1) *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.
(2) See Section 4.2 for variable definitions.

Meanwhile the control variables show that larger, more profitable, and younger firms and state-owned enterprises produce more firm innovation.

Table 6 presents the regression results for Eqs. (3a) and (3b). In panel A of Table 6, I first replicate the prior literature by regressing the dichotomous variable *CAPITAL* using a logit model. It shows that the coefficient for *BIG4* is 0.07, not significantly different from zero (z-stat = 0.58, p > 0.10), indicating there is no difference in the R&D capitalization tendency of firms audited by Big 4 and non-Big 4 firms, which is consistent with Xie et al. (2017). The coefficient on *SPECIALIST* is −0.12 (z-stat = −2.03, p < 0.05), indicating that firms audited by industry specialists are less likely to capitalize R&D costs.

Table 6
Auditor Quality and R&D Capitalization Reliability.

Panel A Full sample

Dependent Var.	*CAPITAL*		*CAPITAL_T*				*Diff.* in Coef.s
			=1		=2		
Independent Var.	Coef.	z-stat.	Coef.	z-stat.	Coef.	z-stat.	
BIG4	0.07	0.58	0.18	1.46	−0.78	−3.14***	14.14***
SPECIALIST	−0.12	−2.03**	−0.04	−0.68	−0.34	−3.10***	6.60***
LNTA	0.28	9.87***	0.33	10.43***	0.30	6.25***	0.50
LEV	−0.84	−5.23***	−0.76	−4.29***	−0.16	−0.58	4.36**
ROA	−4.05	−8.34***	−4.98	−9.48***	−4.41	−5.36***	0.47
AGE	0.03	5.59***	0.01	2.15**	0.02	2.66***	1.47
SOE	0.19	3.08***	0.29	4.20***	0.09	0.77	2.87*
SMALL_PROFIT	0.03	0.35	0.08	0.98	0.12	0.89	0.08
SMALL_GROWTH	0.11	0.90	0.01	0.08	0.43	2.15**	3.85**
Constant	−7.03	−11.26***	−8.18	−11.77***	−9.55	−8.76***	
Industry & year fixed effects	Yes		Yes				
Observations	8937		8937				
Pseudo R^2	0.07		0.06				

Panel B PSM sample based on *BIG4*

Dependent Var.	*CAPITAL_T*				*Diff.* in Coef.s
	=1		=2		
Key Var.	Coef.	z-stat.	Coef.	z-stat.	Chi2
BIG4	0.30	1.88*	−0.84	−2.97***	15.34***
SPECIALIST	−0.20	−0.98	−1.35	−3.00***	6.14**
Controls		Yes			
Observations		878			
Pseudo R^2		0.13			

Panel C PSM sample based on *SPECIALIST*

Dependent Var.	*CAPITAL_T*				*Diff.* in Coef.s
	=1		=2		
Key Var.	Coef.	z-stat.	Coef.	z-stat.	Chi2
BIG4	0.26	1.49	−0.75	−1.88*	6.16**
SPECIALIST	0.01	0.13	−0.47	−3.64***	11.97**
Controls		Yes			
Observations		4490			
Pseudo R^2		0.07			

(1) *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.
(2) Panels B and C report the results of multinomial regressions based on matched samples using propensity score matching (PSM) on *BIG4* and *SPECIALIST*, respectively.
(3) In panela B and C, control variables are not tabulated for brevity.
(4) See Section 4.2 for variable definitions.

The results of Eq. (3b) show that when *CAPITAL_T* equals 1, that is, normal capitalization without subsequent impairment, the coefficient on *BIG4* is 0.18, positive but not significant at the 10% level (z-stat. = 1.46). By contrast, when *CAPITAL_T* equals 2, that is, low-reliability capitalization followed by subsequent impairment, the coefficient for *BIG4* is −0.78 and significant at the 1% level (z-stat. = −3.14), showing a strong negative relation between low-reliability R&D capitalization and *BIG4*. The difference between the two coefficients for *BIG4* when *CAPITAL_T* equals 1 vs. 2 is highly significant ($chi^2 = 14.14$, $p < 0.01$). However, although the coefficients for *SPECIALIST* show a negative relation between industry specialty auditors and general R&D capitalization, the relation is mostly driven by low-reliability capitalization firms. For firms that capitalize R&D costs normally (*CAPITAL_T = 1*), the coefficient on *SPECIALIST* is −0.04 (z-stat. = −0.68, $p > 0.10$), while for firms that potentially capitalize R&D projects prematurely (*CAPITAL_T = 2*), the coefficient on *SPECIALIST* is −0.34 (*z-stat.* = −3.10, $p < 0.01$). The comparison test also shows a significant difference in the coefficients ($chi^2 = 6.60$, $p < 0.01$).

The control variables show that less leveraged firms and SOEs are more likely to apply normal capitalization, while firms reporting a small increase from the previous year are more likely to apply low-reliability capitalization.

According to Defond and Zhang (2014), a major challenge to the literature on auditor differentiation is self-selection, which means that the superior audit quality of larger audit firms and industry specialists may be attributable to client characteristics (Lawrence et al., 2011; Minutti-Meza, 2013) rather than the effect of the auditors. In other words, the differential probability of normal vs. low-reliability R&D capitalization could be determined by client characteristics potentially omitted from the extant regression models. In an attempt to control for the potential effect of endogeneity in auditor choice, I use propensity-score matching (PSM) models following Lawrence et al. (2011). First, I use a logistic model to estimate the probability of hiring a Big 4 auditor and predict the propensity scores. In the second stage, I match a non-Big 4 auditor client with a Big 4 auditor client having the closest predicted propensity score with a maximum distance of 3% without replacement. To control for potential endogeneity in the choice of an industry specialist auditor, I follow a similar procedure. Using the propensity-score matching method, I match 439 non-Big4 clients one-to-one to Big 4 clients; and 2245 non-industry specialist auditor clients to industry specialist clients,[11] and re-estimate Eqs. (3a) and (3b). The results of the regressions for the matched samples based on *BIG4* and *SPECIALIST* are reported in panels B and C of Table 6, respectively. The results remain robust after using propensity score matching.

Collectively, Table 6 suggests that capitalized R&D costs audited by Big 4 auditors and industry specialists are significantly less likely to be impaired in future periods, reflecting higher reliability, thus supporting my hypothesis that independent auditors serve as external monitors and increase the reliability of R&D capitalization of their clients.

6. Robustness and additional tests

6.1. Controlling for R&D investment

For robustness checks, I incorporate in Eq. (3b) the industry-adjusted level of R&D investment *INTENSITY*, which equals total R&D expenditure divided by total assets minus the industry median for R&D intensity.[12] Alternatively, I include an indicator variable *HIGH_INTENISTY* which equals 1 if a firm's R&D investment is above the industry median, and 0 otherwise. The sample size decreases to 8410 after the inclusion, and Table 7 reports the results.

Table 7 shows that the inclusion of R&D intensity does not change the results. In addition, the coefficient for *INTENSITY* is 17.55 (z-stat. = 10.41, $p < 0.01$) when *CAPITAL_T* equals 1, and 8.46 (z-stat. = 2.82, $p < 0.01$) when *CAPITAL_T* equals 2. The difference between the coefficients is statistically significant

[11] The first-stage models are specified as follows: $BIG4/SPECIALIST = \delta_0 + \delta_1 LNTA + \delta_2 LEV + \delta_3 ROA + \delta_4 SOE + \mu$ In the untabulated results of the first-stage regressions and the t-tests for the explanatory variables, none of the explanatory variables above differs systematically between the treatment and matched samples, indicating that the matched firm-years are satisfactory control samples.

[12] The results (untabulated) of Eqs. (1a)–(1b) and (2a)–(2b) remain robust after controlling for R&D investment.

Table 7
Eq. (3b) Controlling for R&D Intensity.

Dependent Var.	*CAPITAL_T*					
Key Var.	=1 Coef. (z-stat.)	=2 Coef. (z-stat.)	*Diff.* in Coef.s Chi2	=1 Coef. (z-stat.)	=2 Coef. (z-stat.)	*Diff.* in Coef.s Chi2
BIG4	0.07	−0.76	8.36***	0.11	−0.74	8.76***
	(0.51)	(−2.74)***		(0.79)	(−2.69)***	
SPECIALIST	−0.05	−0.30	3.79*	−0.06	−0.30	3.59*
	(−0.84)	(−2.53)**		(−0.94)	(−2.53)**	
INTENSITY	17.55	8.46	8.63***			
	(10.41)***	(2.82)***				
HIGH_INTENSITY				0.41	0.16	5.55**
				(7.02)***	(1.56)	
Controls		Yes			Yes	
Observations		8410			8410	
Pseudo R^2		0.09			0.09	

(1) *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.
(2) See Section 4.2 and Section 6.1 for variable definitions.

($chi^2 = 8.63$, $p < 0.01$). The difference is more apparent in the coefficients for *HIGH_INTENSITY*, indicating that a high level of R&D investment is a positive predictor of normal capitalization, but the explanatory power decreases dramatically for low-reliability capitalization. Possible explanations are that high R&D investment represents a stronger commitment to and better capacity for R&D activities, and also that higher R&D investment is likely to be negatively related to managerial opportunism through R&D capitalization, because managers could cut the investment instead of turning to aggressive R&D reporting if they need to manipulate earnings upward.

6.2. Controlling for capitalizing vs. expensing accounting choice

The accounting treatment of capitalizing vs. expensing R&D expenditure is potentially endogenous, in that the evidence may be confounded by existing systematic differences in firm characteristics and managerial incentives between capitalizing vs. expensing firms (Markarian et al., 2008; Cazavan-Jeny et al., 2011). To control for this, I exclude expensing firms from the regressions and focus on capitalizing firms only. For Eqs. (1b) and (2b), the dependent variables remain the same and the key experimental variable is *CAPITAL_LR,* with normal capitalizing firms as the control group. For Eq. (3b), the key experimental variables *BIG4* and *SPECIALIST* remain the same, while the dependent variable is *CAPITAL_LR*, equaling 1 for low-reliability capitalization and 0 for normal capitalization. The results are reported in Table 8.

Table 8 shows that compared to normal capitalizing firms, low-reliability firms report higher discretionary accruals and are associated with fewer patents in the following three years. Also, the capitalized R&D costs audited by Big 4 and industry specialists are notably less likely to be impaired in subsequent periods, all consistent with the main tests. The results remain robust when I replace the *CAPITAL_LR* dummy with a continuous variable equaling the amount of impairment scaled by R&D costs.

6.3. Timing of impairment recording

So far, I have examined the reliability issue during the period of the capitalization decision, i.e. premature capitalization of R&D projects with a low probability of success. Another argument against R&D capitalization is that managers may delay the write-down of impaired R&D assets for earnings purposes (Healy et al., 2002). As estimation involved in R&D capitalization is highly contingent on the manager's judgement and incentives, information uncertainty also applies to the timing of the recording of R&D assets impairment. Corporate managers can strategically select the period when the prematurely capitalized costs are written down. The literature shows that managers are likely to take "big baths" when earnings are surprisingly

Table 8
Regression Results Within Capitalizing Firms.

	I	II	III	IV	V
Dependent Var.	*DA*	$PATENT_{t+1}$	$PATENT_{t+2}$	$PATENT_{t+3}$	*CAPITAL_LR*
	Coef.	Coef.	Coef.	Coef.	Coef.
Key Var.	(z-stat.)	(z-stat.)	(z-stat.)	(z-stat.)	(z-stat.)
CAPITAL_LR	0.01	−0.38	−0.47	−0.55	
	(2.72)***	(−1.95)*	(−2.38)**	(−2.58)**	
BIG4					−0.93
					(−3.58)***
SPECIALIST					−0.34
					(−2.82)***
Controls	Yes	Yes	Yes	Yes	Yes
Observations	2766	2766	2760	2183	2733
Adj./Pseudo R^2	0.13	–	–	–	0.05

(1) *, ** and *** denote significance at the 10%, 5%, and 1% levels, respectively.
(2) In column I, the control variables are the same as in Eqs. (1a) and (1b); in columns II–IV, the control variables are the same as in Eqs. (2a) and (2b); in column V, the control variables are the same as in Eqs. (3a) and (3b). The control variables are not tabulated for brevity.
(3) The results in columns I to IV remain robust when low-reliability firms are matched one-to-one to normal capitalizing firms that have the closest predicted propensity score for low-reliability capitalization.
(4) See Section 4.2 for variable definitions.

bad, and smooth earnings downwards when they are surprisingly good (Zucca and Campbell, 1992). Accordingly, I examine whether the recording of R&D capital impairment also demonstrates earnings management. I limit the research sample to low-reliability firms and to the periods after the capitalization decision is made. The equation is as follows:

$$WRITEOFF = \theta_0 + \theta_1 SMOOTH + \theta_2 BATH + Controls + \mu \quad (4)$$

The dependent variable *WRITEOFF* in Eq. (4) is an indicator that equals 1 if it is in the year when the prematurely capitalized R&D assets are eventually impaired, and 0 otherwise. Following Francis et al. (1996) and Riedl (2004), the proxy for downward earnings-smoothing reporting (*SMOOTH*) is equal to the change in firm earnings from period $t-1$ to t, divided by total assets at the end of $t-1$, when the change is above the median of positive values for this variable, and 0 otherwise. The proxy for "big bath" reporting (*BATH*) equals the absolute value of the change in firm earnings from $t-1$ to t, divided by total assets at the end of $t-1$, when the change is below the median of negative values of this variable, and 0 otherwise.

I incorporate the following control variables in Eq. (4): the natural log of total assets (*LNTA*) and leverage ratio (*LEV*), annual stock returns (*ANNUALRET*), and auditor characteristics *BIG4* and *SPECIALIST*. Meanwhile, I control for the potential effects of a change of auditor (*SWITCH*) and change of CEO and board chairman (*TURNOVER*) on the write-down decision. Eq. (4) is estimated while controlling for firm fixed effects, and the results are reported in Table 9.

Table 9 shows that the coefficient on *SMOOTH* is 12.03 (t-stat. = 2.45, $p < 0.05$), which means that managers tend to book the impairment of R&D costs in periods when earnings are surprisingly good, supporting the "earnings smoothing" hypothesis. Meanwhile, the coefficient for *BATH* is 9.06 ($t = 1.81$, $p < 0.1$), providing some marginal evidence for a "big bath" approach associated with R&D capital write-offs. The evidence suggests that earnings management exists not only in the period of the capitalization decision, but also in the timing of recording the impairment of the capitalized R&D costs.

6.4. Analyst coverage and R&D capitalization

Financial analysts serve as information intermediaries, although they do not affect the financial reporting process directly, as auditors do. Their monitoring role is supported by some evidence that firms followed by more analysts manage their earnings less (Yu, 2008). For further analysis, I test the association between analyst coverage and R&D capitalization using Eq. (5):

Table 9
Timing of R&D capital impairment recording.

Dependent Var.	*WRITEOFF*	
Independent Var.	Coef.	z-stat.
SMOOTHING	12.03	2.45**
BATH	9.06	1.81*
LNTA	0.99	0.98
LEV	2.58	0.83
ANRETURN	−0.20	−0.59
BIG4	1.48	0.00
SPECIALIST	1.04	2.02**
SWITCH	−0.17	−0.33
TURNOVER	−0.06	−0.16
Observations	744	

(1) * and ** denote significance at the 10% and 5% levels, respectively.
(2) See Section 6.3 for variable definitions.

$$CAPITAL\_T = \delta_0 + \delta_1 Coverage + Controls + \mu \quad (5)$$

The model specification in Eq. (5) remains the same as for Eq. (3b), except that auditor quality indicators are replaced with analyst coverage. I use the number of following analysts (*ANALYST*) and number of research reports on the followed firm (*REPORT*) to measure the intensity of analyst coverage. Untabulated results show that (*ANALYST*) is positively related to both normal (coef. = 0.01, z-stat. = 3.19, $p < 0.01$) and low-reliability capitalization (coef. = 0.02, z-stat. = 2.99, $p < 0.01$), but the difference is not significantly different from zero ($chi^2 = 0.80$, $p > 0.1$). The results for *REPORT* are similar, suggesting that although analyst coverage is positively related to general capitalization, it fails to discriminate between normal and low-reliability R&D capitalization and provides no differential information on the ex post impairment of current R&D capitalization.

7. Conclusion and discussion

In the debate around the accounting for R&D costs, the central underlying issue is reliability. Opponents of R&D capitalization argue that although the information may be relevant to shareholders, managers can take advantage of the flexibility to manipulate earnings. In addition to the fact that R&D capitalization is forbidden in some countries, such as the U.S., another challenge to progress in R&D accounting research is the difficulty of measuring the reliability of capitalization. Theoretically, capitalizing R&D costs does not necessarily indicate lower reliability, because this decision is driven by various motivations. Similarly, full expensing does not necessarily indicate better reliability, because accounting conservatism does not automatically mean faithful representation. In this sense, the dichotomous classification of capitalizing vs. expensing is somewhat crude and suffers from loss of information.

In this study, I use the occurrence of ex post impairment of capitalized R&D costs to signal lower reliability. Based on such occurrences, capitalizing firms are categorized into low-reliability vs. normal capitalizing firms. The empirical tests support the validity and desirability of this measure. First, a low-reliability R&D capitalization decision is associated with higher concurrent levels of signed discretionary accruals, while normal capitalization is not accompanied by higher earnings aggressiveness. Second, in contrast to normal capitalization that signals better innovation performance, proxied by patents approved in periods *t + 2* and *t + 3* after the capitalization period, future innovation in low-reliability capitalizing firms is not significantly different from that of expensing firms. For the monitoring role of external auditing, I find that Big4 and industry specialist auditors noticeably restrain low-reliability capitalization but not normal capitalization. Meanwhile, further analysis finds evidence of earnings management after the capitalization decision, with managers selectively delaying the recording of R&D impairment to certain periods for earnings-smoothing and big-bath

purposes. In addition, it reveals that analyst coverage does not significantly differentiate the reliability of R&D capitalization.

This study extends the prior R&D literature by presenting a new way of measuring the reliability of R&D capitalization, which is congruous with the hypotheses on both earnings management properties and the real economy of firm innovation. In this way, distinguishing between low-reliability and normal capitalization offers a more detailed perspective for assessing firm capitalization decisions.

This study also contributes to the auditing literature. First, it adds evidence to the continuing debate on auditor differentiation by showing that Big4 and industry specialists maintain higher standards in the auditing of R&D capitalization. More importantly, it suggests that higher quality auditors, defined by traditional dimensions such as size and industry expertise, are still sufficiently prepared for the challenges of auditing R&D capitalization, which features complex accounting estimates.

The findings are also relevant to accounting standard setters internationally. Consistent with prior studies based on IFRS-adopting countries such as France and Italy, I show that in China, low reliability does exist in the capitalization decision. I also document earnings management behavior in the timing of recording the impairment after capitalization. Nonetheless, unlike prior researchers such as Cazavan-Jeny et al. (2011) who conclude that their findings "contrast with the supportive evidence for capitalization" (p. 162), I provide positive evidence that auditors of higher quality notably decrease the likelihood of poor capitalization decisions. This evidence that the monitoring role of auditors can alleviate concerns that R&D capitalization is totally subject to managerial discretion could help to restore confidence in the reliability of R&D capitalization.

One limitation of this study is that the measure used for R&D capitalization reliability, namely ex post R&D impairment, cannot be known to information users such as investors beforehand when faced with corporate R&D capitalization and high information asymmetry. However, as R&D cost impairment offers a preferable measure of R&D capitalization reliability, future studies could investigate the potential determinants of low-quality capitalization and current predictors of future impairment of R&D costs. In addition, I caution that the evidence and conclusions of this study pertain only to R&D accounting and auditing in China. Similar research can be done to study the determinants and consequences of R&D capitalization in other jurisdictions, such as the UK, where the data on the impairment of in-process development is available.

Acknowledgement

I am grateful to an anonymous reviewer and participants of workshops at Central University of Finance and Economics (CUFE) and Xiangtan University for their constructive comments. I acknowledge the financial support from the National Natural Science Foundation of China (approval number: NSFC-71902137).

Appendix A. Typical disclosure of *development costs* (assets) in the accompanying notes of the financial statements.

Project	Opening Balance	Increase		Decrease			Ending Balance
		Development Expenditure	Other	Successful Shift to Intangibles	Expensed	Other	
A							
B							
Total							

Note:
Increase—Development expenditure: increase through internal development.
Increase—Other: increase due to other reasons, such as acquisition of other entities.
Decrease—Recognized as intangible assets: decrease via successful transfer to intangible assets.
Decrease—Expensed: decrease due to impairment (expensing) of failed projects.
Decrease—Other: decrease due to other reasons, such as losing control of other entities.

Appendix B. Example case of R&D cost impairment

"The patent application for the Fabric Project got denied. Therefore, we expense the R&D asset that was previously capitalized." (Extracted and translated from a real annual report of a Chinese listed firm in Year 2014.)

Project	Opening Balance	Increase		Decrease			Ending Balance
		Development Expenditure	Other	Successful Shift to Intangibles	Expensed	Other	
Fabric Project	1,225,990.47	0.00	0.00	0.00	1,225,990.47	0.00	0.00

Disclosure in Year 2013 after prior capitalization of the Fabric Project.

Project	Opening Balance	Increase		Decrease			Ending Balance
		Development Expenditure	Other	Successful Shift to Intangibles	Expensed	Other	
Fabric Project	0.00	2,673,612.75	0.00		1,447,622.28	0.00	1,225,990.47

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China Journal of Accounting Research 12 (2019) 271–291

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China Journal of Accounting Research

journal homepage: www.elsevier.com/locate/cjar

Pledgee competition, strategic disclosure, and future crash risk

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ARTICLE INFO

Article history:
Received 17 May 2019
Accepted 22 May 2019
Available online 27 June 2019

Keywords:
Share pledge
Pledgee competition
Tone management

ABSTRACT

We investigate whether pledgee competition affects the disclosure choice of firms whose controlling shareholders pledge their shares. We find that pledgee competition is positively related to pledge firms' annual report tone management. This positive relationship is stronger for pledge firms with lower credit quality and non-state-owned enterprise pledge firms. Further corroborating our results, higher pledgee competition increases the future crash risk of pledge firms. Collectively, our results suggest that competition pressure induces pledgees to lower their monitoring incentives to remain competitive in the marketplace, thus leading to pledge firms' bad news hoarding behavior.

1. Introduction

In recent years, approximately 40% of Chinese listed firms' controlling shareholders have pledged their shares as collateral to raise funds. Share pledging enables them to easily obtain low-cost loans without losing control of their firms. In the process, the pledgees (i.e., financial institutions, such as banks and securities firms) retain legal ownership of the shares and become responsible for monitoring the controlling shareholders (Tan and Wu, 2013; Asija et al., 2016). The Guidelines on Share Pledge Repo Transactions, Registration and Settlement (Guidelines, hereafter), which came into effect in May 2013, allows securities companies to engage in share pledging. This has resulted in the deregulation of the pledgee market and increasingly competitive

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https://doi.org/10.1016/j.cjar.2019.05.002
1755-3091/

environments. We investigate whether competition affects pledgees' monitoring practices by examining the disclosure choices of pledge firms.

Studies consider the monitoring effect of pledgees on accounting conservatism (Tan and Wu, 2013) and on the earnings management of pledge firms (Asija et al., 2016). However, less is known about how the effect varies with pledgee competition. Studies show that bank competition diminishes banks' incentives for both ex-ante screening (Marquez, 2002; Dell'Ariccia and Marquez, 2006) and ex-post monitoring (Bushman et al., 2016). Given that pledgees are responsible for monitoring controlling shareholders (i.e., borrowers) in the pledge loan contract, similar to banks in loan contracts, whether pledgee competition affects the efficacy of pledgee monitoring is of particular concern. Meanwhile, the literature only focuses on the quantitative information of pledge firms and provides an incomplete picture of their disclosure choices. As readable and clear narrative information is an important input into lenders' lending and monitoring practices (Ertugrul et al., 2017), pledgees may request narrative information to learn more about pledge firms.

Using annual report tone management to gauge narrative disclosure choice, we find robust evidence that greater competition increases pledge firms' incentive to engage in tone management. By allowing securities companies to undertake share pledging, deregulation increases the competition among pledgees, diminishes their ability to earn profit, and thus pressures them to lower their monitoring incentives. As a result, higher competition is negatively related to ex-post monitoring. This increases the incentive of pledge firms to use tone management to maintain the share price, which is the primary determinant of loan terms in a pledge loan contract.

We next examine the cross-sectional variation in the impact of competition on pledgees' monitoring incentives. First, we find the positive relationship between competition and pledge firms' tone management to be stronger for firms with lower credit quality. Pledgees may lower ex-post monitoring to a larger extent for firms with lower credit quality, which are subject to higher default risk. To avoid share price reduction and market capitalization erosion, such firms engage in tone management more. Second, we find the negative effect of competition to be present primarily among non-state-owned enterprises (non-SOEs). In the case of default, pledgees may liquidate pledged shares to recover dues. However, there exist legal restrictions to selling the shares of state-owned enterprises (SOEs; Xie et al., 2016). Thus, the controlling shareholders of non-SOEs are more vulnerable to losing control rights in the event of default and have higher incentives to use tone management to increase stock price and avoid default.

To further investigate the negative impact of competition, we examine the relationship between pledgee competition and pledge firms' stock price crash risk. We find that pledgee competition increases pledge firms' future crash risk. Prolonged bad news hoarding through tone management in annual reports can lead to severely overvalued stock prices. However, there is a limit to the amount of bad information that a firm can hide from the market. When the accumulated bad news reaches a tipping point, it is suddenly released to the market all at once, causing the stock price to crash (Jin and Myers, 2006; Hutton et al., 2009; Kim et al., 2016). Hence, the impact of pledgee competition on future crash risk offers corroborative evidence that competitive pressure induces pledgees to lower their monitoring incentives.

To address the potential endogeneity problem, we take advantage of the enforcement of the Guidelines in 2013, which introduced an exogenous shock that lowered the barriers to the share pledging market and increased pledgee competition. If the high annual report tone management (crash risk) of pledge firms results from the fact that competition pressures pledgees to lower their monitoring incentives, the positive relationship between pledgee competition and annual report tone management (crash risk) should be exacerbated after the enforcement of the Guidelines. We conduct a difference-in-differences design and find consistent evidence.

We perform several supplemental tests to support our primary results. First, to rule out alternative explanations, we investigate whether the sensitivity of tone management and crash risk to the pledged amount changes after the Guidelines. Two alternative explanations for our results exist. The first alternative explanation is that increased competition forces pledgees to lower their screening standards. That is, the competition attracts more poor-quality borrowers and it is endogenous that we observe firms experiencing poorer reporting quality (greater tone management) and greater crash risk. Under the first alternative explanation, we predict the sensitivity of tone management and crash risk to the pledged amount to increase from the pre- to post-Guideline period. The second alternative explanation is that it becomes easier to borrow against

pledging due to the competition and that managers hide more bad news to support stock prices due to a greater amount of pledging. Following this reasoning, we expect the sensitivity of tone management and crash risk to the pledged amount to remain the same after the Guidelines. Thus, we investigate whether the sensitivity of tone management and crash risk to the pledged amount changed after the Guidelines. We find a decreased sensitivity from the pre- to post-Guideline period, which is inconsistent with the two alternative explanations above.

Second, to further examine the impact of the Guidelines on pledgee competition, we investigate whether the pledging activities of each pledgee increased from the pre- to post-Guideline period. We find consistent evidence supporting the conjecture that the Guidelines increase competition and that competition requires pledgees to develop new business. In turn, they cannot spend much time monitoring their existing business.

Our results contribute to two lines of research. First, we enhance our understanding of how the pledgees' monitoring effect varies with competition. Studies show how competition affects banks' monitoring and screening practices, finding higher competition to be associated with more low-quality borrowers obtaining financing (Marquez, 2002), the increased risk of banks' loan portfolios (Dell'Ariccia and Marquez, 2006), the increased stand-alone risk of individual banks, the increased sensitivity of a bank's downside equity risk to system-wide distress (Bushman et al., 2016), and the decreased use of financial statement verification (Lisowsky et al., 2017). An important difference with our research is that unlike loan contracts without collateral, competition typically changes pledgees' behavior in loan contracts with collateral (i.e., share pledge contracts). We document that greater competition can lower pledgees' monitoring incentives. To our knowledge, our study is one of the few, if not the first, to provide evidence on the negative impact of competition on pledgees' monitoring role.

Second, we provide evidence on how share pledges affect firms' strategic narrative discourse. We find an economically significant link between pledgee competition and pledge firms' tone management. Studies find that pledge firms manipulate earnings and only focus on quantitative information (Tan and Wu, 2013; Asija et al., 2016; Huang and Xue, 2016). Given that quantitative information alone provides investors with an incomplete picture of a firm's economic circumstances (Huang et al., 2014) and that tone can be used as a tool to bury adverse news in long documents (Ertugrul et al., 2017) and affect investors' perceptions of the firm (Davis et al., 2012; Baginski et al., 2016), we investigate whether pledge firms engage in tone management for strategic purposes. We extend the literature on earnings management in pledge loan contracts by providing evidence of the use of qualitative tone management.

The remainder of this paper proceeds as follows. Section 2 reviews the background and develops the hypotheses. Section 3 introduces the sample and research design. Section 4 provides the empirical evidence. Section 5 performs additional analyses. Section 6 concludes.

2. Institutional background and hypothesis development

2.1. Institutional background

2.1.1. Development of share pledges in the Chinese capital market

The controlling shareholders of listed firms may pledge their personal stockholdings as collateral for a loan, thus enabling them to easily raise funds. This allows them to avoid selling their stock and helps them maintain their control rights.

As pledging represents loan contracts with payoffs contingent on a firm's share price, a large decrease in stock price may trigger default. In China, as in many other countries, loan contracts with pledged stocks include the terms of a collateral maintenance ratio. If the value of the collateral does not meet the requirement, the pledgee can terminate the loan contract and sell the pledged shares as part of its recovery. Therefore, the controlling shareholders may have incentives to engage in activities that focus on maintaining stock prices (Huang and Xue, 2016; Xie et al., 2016, 2017).

In the Chinese capital market, share pledges are widely used by controlling shareholders. As shown in column 1 of Table 1, the number of pledge firms increased from 31 in 2003 to 1363 in 2016. This is consistent with share pledges being more extensively used by the controlling shareholders of Chinese listed firms over time. The percentage of the market represented by pledge firms, in terms of the number of observations, increased

Table 1
Share pledge trend in the Chinese capital market.

Year	(1) No. of pledge firms	(2) Pledge firms in the total market (%)	(3) Market capitalization of pledged shares (billion RMB)	(4) Pledge ratio (%)
2003	31	2.45	11.71	19.89
2004	112	8.26	38.74	21.82
2005	193	14.28	49.42	22.02
2006	200	13.94	69.97	20.02
2007	208	13.43	208.70	20.06
2008	268	16.72	193.79	19.22
2009	313	17.87	300.73	21.23
2010	331	15.71	326.88	17.42
2011	447	19.09	440.57	17.22
2012	545	22.06	445.50	17.88
2013	699	27.79	579.94	17.81
2014	853	32.41	966.19	18.19
2015	1158	41.02	2281.38	17.07
2016	1363	43.73	2926.43	18.58
Total	6721	–	–	–

This table reports the share pledge trend in the Chinese capital market. Pledge firms are those whose controlling shareholders pledge their shares in year *t*. The pledge ratio is the percentage of pledged shares in the controlling shareholders' shareholdings.

from 2.45% in 2003 to 43.73% in 2016, as shown in column 2. The increase in the percentage of pledge firms is stronger after 2013, when the Guidelines came into effect. In addition, the market capitalization of pledged shares increased from RMB11.71 billion in 2003 to RMB2, 926.43 billion in 2016, as shown in column 3. The average pledge ratio is shown in column 4. It shows a time-series average of 19.17% from 2003 to 2016.

2.1.2. Deregulation of the share pledging market

To further enhance the financing channel through share pledging, the Chinese government decided to start share pledge repo transactions in 2013, with the goal of improving the efficiency of the registration and settlement process and reducing the cost of pledging. As described in Section 1, the Guidelines came into effect in May 2013. Since then, securities companies have been assigned to engage in the share pledge repo transactions business and have been allowed to enter the pledge market.

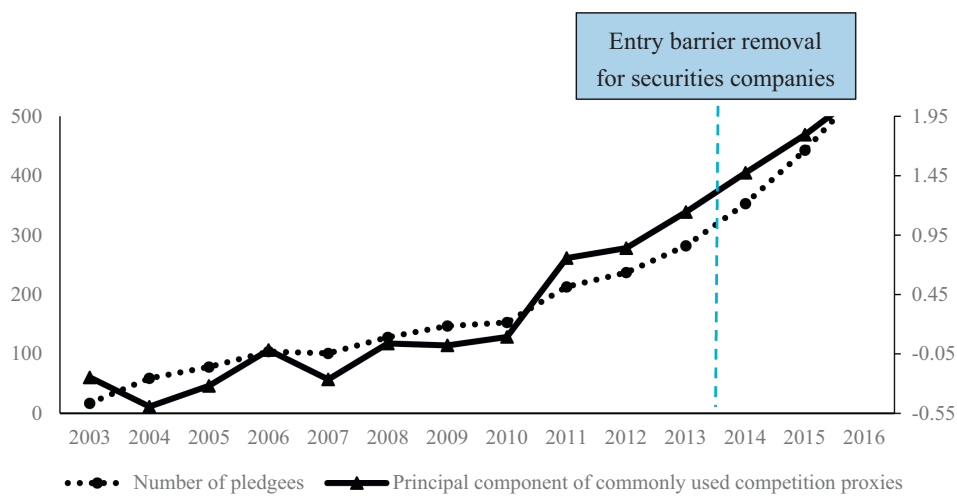

Fig. 1. Pledgee market competition trend. This figure plots two competition measures from 2003 to 2016: (i) the number of pledgees engaging in share pledging and (ii) the principal component of three commonly used proxies of competition, namely, market concentration (measured as the Herfindahl–Hirschman Index), the four-pledgee concentration ratio, and the total number of pledgees. It also highlights when the Shanghai and Shenzhen Stock Exchanges removed the entry barrier for securities companies to the share pledging market via the Guidelines (i.e., in 2013).

Fig. 1 plots two competition measures from 2003 to 2016: (i) the number of pledgees engaging in share pledging and (ii) the principal component of three commonly used proxies of competition, namely market concentration (measured as the Herfindahl–Hirschman Index), the four-pledgee concentration ratio, and the total number of pledgees. Both lines exhibit a noticeable upward trend, especially after the removal of the entry barrier for securities companies to the share pledging market through the Guidelines in 2013.

2.2. Hypothesis development

Pressure from new and existing rivals may diminish a pledgee's ability to earn profits. Pledgees are likely to respond to increased pressure by making strategic operating decisions. To maintain good relationships with their existing clients, pledgees may lower monitoring requirements to reduce the default risk of the pledge firms in an effort to undercut their competitors and maintain their market share. Bushman et al. (2016) find that banks respond to increased competitive pressure by altering their lending practices, such as by reducing the number of covenants in loan contracts.

As readable and clear narrative information is an important input into lenders' lending and monitoring practices (Ertugrul et al., 2017), the negative impact of higher competition may result in pledgees being less likely to require clear narrative information to learn about the pledge firms. Meanwhile, a positive tone in the annual report helps increase share price and keep the value of collateral above the maintenance requirement, thus reducing the default risk and the likelihood of shares being liquidated to recover the loss. As a result, higher competition is negatively related to the ex-post monitoring of pledgees, thus inducing pledge firms to use tone management. [3]Thus, we derive the following hypothesis:

H1. Pledge firms engage in more annual report tone management when pledgee competition is higher.

The negative impact of the Guidelines on pledgees' monitoring incentives may be more pronounced for clients with higher default risk. Given that the low credit quality of pledge firms increases the risk of default and the risk of pledgees' loan portfolios, pledgees may further reduce monitoring to avoid the default of those clients. Such actions may lead to more tone management by pledge firms with the goal of maintaining collateral value above the maintenance requirement. Based on the above discussions, we derive the following hypothesis:

H1.1. The effect of pledgee competition on pledge firms' annual report tone management is more pronounced for pledge firms with lower credit quality.

In addition, the controlling shareholders of non-SOEs are more vulnerable to default risk than SOEs for two reasons. First, in the case of default, pledgees may be forced to liquidate the pledged shares to recover the loss. However, it may be difficult to liquidate SOEs' shares due to legal restrictions and government interference (Xie et al., 2016). Second, in the case of default, pledgees may ask the pledge firms to deposit extra funds to meet the maintenance requirement, rather than liquidate the pledged shares. However, it is more difficult for the shareholders of non-SOEs to obtain external funds, as they are discriminated against in both equity financing and loan financing (e.g., Aharony et al., 2000; Brandt and Li, 2003; Wang et al., 2008). Therefore, for non-SOE pledge firms, pledgees may exert fewer monitoring efforts to reduce their default risk, inducing the controlling shareholders of non-SOEs to engage in more tone management. Therefore, we hypothesize the following:

H1.2. The effect of pledgee competition on pledge firms' annual report tone management is more pronounced for non-SOEs.

[3] We consider the example of Jiangxi Lianchuang Electronics Company Limited (600363.SH) (JLE). The controlling shareholders of JLE pledged their shares in 2012, 2013, and 2014. This firm demonstrated similar performance from 2012 to 2014, with its return on assets remaining at 6%. However, after the 2013 Guidelines, the firm used more positive words (approximately eight) to describe its operations in the Management's Discussion and Analysis (MD&A) section of its 2013 annual report (we consider the first paragraph) than in its 2012 annual report (only one word). The firm also used more positive words (approximately seven) to describe its operations in the MD&A section of its 2014 report than in its 2012 annual report.

The negative impact of competition may also increase pledge firms' stock price crash risk. As discussed above, pledgees respond to higher competition by lowering their monitoring incentives, leading to pledge firms obscuring adverse news by using positive language in their annual reports. Overall, an overly positive tone results from pledge firms' incentive to conceal bad news or release biased good news. However, the amount of bad information that a company can hide from the market is limited. Once the firm releases the accumulated bad news to the market with a significant amount of information, rational investors immediately revise their original expectation down to a new expectation and this sharp reduction in expected earnings leads to a rapid decrease in the stock price (e.g., Jin and Myers, 2006; Piotroski et al., 2015; Kim et al., 2016). As a result, a stock price crash occurs. For example, Ertugrul et al. (2017) highlight that firms with a higher proportion of uncertain and weak modal words in 10-Ks have stricter loan contract terms and greater future stock price crash risk. Zhou et al. (2018) also show that a more optimistic tone leads to higher future stock price crash risk, especially when the truthfulness of the tone is lower. Therefore, we hypothesize the following:

H2. Pledge firms' future stock price crash risk increases when pledgee competition is higher.

3. Research design

3.1. Sample and data sources

Our sample covers all nonfinancial firms traded on China's A-share market from 2003 to 2016. We require pledge firms (treatment sample) to have controlling shareholders pledging their shares, as controlling shareholders hold highly concentrated ownership of Chinese listed firms (Liu and Lu, 2007; Jiang et al., 2010) and are capable of influencing the firms' decisions, including disclosure choice. We hand collect information on whether shareholders with share pledges are controlling shareholders based on the pledge data from the WIND database. [4]For each firm-year, we obtain the annual report through the homepage of the CNINF, [5] where all listed firms are required to file registration statements, periodic reports, and other forms electronically, and functions as the U.S. EDGAR system. We use PERL to extract the Management's Discussion and Analysis (MD&A) section from the annual reports. Following Li (2008) and Loughran and Mcdonald (2011), we exclude the annual reports with a total number of words in the MD&A section less than 1% of the sample distribution. Firms with missing financial information or negative book equity values are also excluded. The final sample consists of 2710 unique firms and 20,998 firm-year observations, including 5439 pledge firm-year observations (treatment sample) and 15,559 non-pledge firm-year observations (control sample).

Panel A of Table 2 summarizes the distribution of the sample firms by year. The number of pledge firms in the Chinese capital market increased from 25 in 2003 to 1104 in 2016. This is consistent with share pledges being more extensively used over time. The percentage of the market represented by pledge firms, in terms of observation numbers, increased from 3% in 2003 to 47% in 2016. Panel B shows that pledge firms are mainly in the industries of information technology, real estate, and public facilities and other services.

3.2. Pledgee competition and pledgee firms' tone management (H1)

To investigate the influence of pledgee competition over pledge firms' tone management, we use the following difference-in-differences design in the empirical investigation:

$$Tone_{i,t}(AbTone_{i,t}) = \alpha_0 + \alpha_1 Pledge_{i,t} + \alpha_2 Post_t + \alpha_3 Pledge_{i,t} * Post_t + \alpha_4 OWN_{i,t} + \alpha_5 SOE_{i,t} + \alpha_6 Size_{i,t} + \alpha_7 MB_{i,t} + \alpha_8 LEV_{i,t} + \alpha_9 ROA_{i,t} + \alpha_{10} Industry + \alpha_{11} Province + \varepsilon \quad (1)$$

[4] The WIND database collects data from the interim reports of listed firms and reports data on pledged and frozen shares separately. Therefore, we can identify the pledging activities of Chinese listed firms directly.

[5] http://www.cninfo.com.cn (in Chinese).

Table 2
Sample distribution.

Panel A: Sample distribution by year

Year	Total	No. of pledge firm-year observations	No. of non-pledge firm-year observations
2003	853	25	828
2004	952	87	865
2005	1038	168	870
2006	996	163	833
2007	1032	158	874
2008	1169	211	958
2009	1281	258	1023
2010	1363	255	1108
2011	1719	378	1341
2012	2015	469	1546
2013	2162	627	1535
2014	2049	691	1358
2015	2034	845	1189
2016	2335	1104	1231
Total	20,998	5439	15,559

Panel B: Sample distribution by industry

Industry	Total	No. of pledge firm-year observations	No. of non-pledge firm-year observations
Farming, forestry, animal husbandry, and fishing	326	89	237
Mining	612	142	470
Manufacturing	11,865	3277	8588
Utilities	1020	138	882
Construction	576	154	422
Transportation and warehousing	796	49	747
Information technology	1678	541	1137
Wholesale and retail trades	1475	286	1189
Real estate	1254	400	854
Public facilities and other services	802	233	569
Communication and cultural industries	333	82	251
Conglomerates	261	48	213
Total	20,998	5439	15,559

This table reports the distribution of pledge firm-year observations. Panels A and B report the distribution by year and industry, respectively.

We follow Huang et al. (2014) and measure annual report tone management using two measures. The first measure is the firm's tone ($Tone_{i,t}$) in the MD&A section of the annual report. [6]We use the word list of the Taiwan University NTUSD Vocabulary for Sentiment Analysis to classify the frequency of optimistic versus pessimistic words appearing in the MD&A section. Furthermore, we define $Tone_t$ as the frequency difference between positive and negative words scaled by the total number of positive and negative words in the MD&A section. The second measure is the discretionary component of tone ($AbTone_{i,t}$) estimated using the following cross-sectional regression:[7]

[6] Following Feldman et al. (2010), Li (2010), and Muslu et al. (2014), we choose the MD&A section, as it is arguably the most widely read and most important component of the financial section (Tavcar, 1998). Furthermore, sell-side financial analysts most frequently rely on the MD&A section when preparing their reports (Knutson, 1993; Rogers and Grant, 1997).

[7] In this model, we exclude two variables: the number of business segments (*BUSSEG*) and geographic segments (*GEOSEG*). Specifically, information about business segments and geographic segments is not available in China.

$$Tone_{i,t} = \beta_0 + \beta_1 * ROA_{i,t} + \beta_2 * RET_{i,t} + \beta_3 * Size_{i,t} + \beta_4 * BM_{i,t} + \beta_5 * STD\_RET_{i,t} + \beta_6 * STD\_ROA_{i,t} + \beta_7 * AGE_{i,t} + \beta_8 * LOSS_{i,t} + \beta_9 * \triangle ROA_{i,t} + \varepsilon \quad (2)$$

where $ROA_{i,t}$ is the return on assets; $RET_{i,t}$ is the contemporaneous annual stock return; $Size_{i,t}$ is the logarithm of market capitalization; $BM_{i,t}$ is the book-to-market ratio; $STD\_RET_{i,}$ is the standard deviation of monthly stock returns over the year; $STD\_ROA_{i,t}$ is the standard deviation of the quarterly return on assets over the year, with at least three observations; $AGE_{i,t}$ is the logarithm of 1 plus the number of years since the listing of firm i; $LOSS_{i,t}$ is an indicator that equals 1 when $ROA_{i,t}$ is negative and 0 otherwise; and $\triangle ROA_{i,t}$ is the change in the return on assets. Discretionary tone ($AbTone_{i,t}$) is the residual of Eq. (2). A higher $Tone_{i,t}$ or $AbTone_{i,t}$ indicates greater annual report tone management.

We set the indicator variable *Pledge* to 1 for the pledge firm-year observations and to 0 otherwise. *Post* is an indicator that equals 1 after the enforcement of the Guidelines in 2013 and 0 otherwise.

Following the literature (e.g., Huang et al., 2014), we include control variables that affect annual report tone management: the ownership held by the controlling shareholder (OWN_t); an SOE indicator variable (SOE_t); the market-to-book ratio (MB_t); the leverage ratio (LEV_t), defined as total debt over total assets; the return on assets (ROA_t); and the logarithm of firm size ($Size_t$).

3.3. Pledgee competition and pledgee firms' future crash risk (H2)

To investigate the influence of pledgee competition over pledge firms' stock price crash risk, we use the following regression design in the empirical investigation:

$$NCSKEW_{t+1}(DUVOL_{t+1}) = \alpha_0 + \alpha_1 Pledge_{i,t} + \alpha_2 Post_t + \alpha_3 Pledge_{i,t} * Post_t + \alpha_4 NCSKEW_{i,t} + \alpha_5 DTURN_{i,t} + \alpha_6 RET_{i,t} + \alpha_7 SIGMA_{i,t} + \alpha_8 OWN_{i,t} + \alpha_9 SOE_{i,t} + \alpha_{10} Size_{i,t} + \alpha_{11} MB_{i,t} + \alpha_{12} LEV_{i,t} + \alpha_{13} ROA_{i,t} + \alpha_{14} ABSDA_{i,t} + \alpha_{15} Industry + \alpha_{16} Province + \varepsilon \quad (3)$$

To better identify the source of the impact of pledgee competition on pledgee firms' future crash risk, we test whether this increase varies predictably with the annual report tone of pledge firms. We estimate the following model:

$$NCSKEW_{t+1}(DUVOL_{t+1}) = \alpha_0 + \alpha_1 Pledge_{i,t} + \alpha_2 Post_t + \alpha_3 HIGHTone_{i,t} + \alpha_4 Pledge_{i,t} * Post_t + \alpha_5 Pledge_{i,t} * HIGHTone_{i,t} + \alpha_6 Post_t * HIGHTone_{i,t} + \alpha_7 Pledge_{i,t} * Post_t * HIGHTone_{i,t} + \alpha_8 NCSKEW_{i,t} + \alpha_9 DTURN_{i,t} + \alpha_{10} RET_{i,t} + \alpha_{11} SIGMA_{i,t} + \alpha_{12} OWN_{i,t} + \alpha_{13} SOE_{i,t} + \alpha_{14} Size_{i,t} + \alpha_{15} MB_{i,t} + \alpha_{16} LEV_{i,t} + \alpha_{17} ROA_{i,t} + \alpha_{18} ABSDA_{i,t} + \alpha_{19} Industry + \alpha_{20} Province + \varepsilon \quad (4)$$

Specifically, the annual report tone of pledged firms (*HIGHTone*) is defined, in turn, as *High_Tone* or *High_AbTone*. *High_Tone* (*High_AbTone*) is an indicator variable that equals 1 if the firm's annual report tone *Tone* (*AbTone*) is in the top quintile of the industry distribution in year t.

Following past studies (e.g., Jin and Myers, 2006; Kim et al., 2016), we use two measures of stock price crash risk: (i) the negative coefficient of skewness of firm-specific daily returns (*NCSKEW*) and (ii) the down-to-up volatility of firm-specific daily returns (*DUVOL*). We exclude firm-years with less than 120 daily observations.

To calculate the stock price crash risk, we first estimate the firm-specific daily returns for each firm in each year using the market model of Gul et al. (2010):

$$r_{j,\tau} = \alpha + \beta_1 Market_\tau + \beta_2 Market_{\tau-1} + \beta_3 Industry_{m,\tau} + \beta_4 Industry_{m,\tau-1} + \varepsilon_{j,\tau} \quad (5)$$

where $r_{j,\tau}$ is the return on stock j on day τ, $Market_\tau$ is the value-weighted market return for China's A-share market on day τ, and $Industry_{m,\tau}$ is the value-weighted return for industry m on day τ.

The negative coefficient of skewness (*NCSKEW*) is computed as follows:

$$NCSKEW_{j,t} = \frac{-(n(n-1)^{\frac{3}{2}}\sum R_{j,\tau}^{3})}{((n-1)(n-2)(\sum R_{j,\tau}^{2})^{\frac{2}{3}})} \quad (6)$$

where the firm-specific daily return, $R_{j,\tau}$, is the natural log of 1 plus the residual return from Eq. (5) and n is the number of $R_{j,\tau}$ in year t. A minus sign is added so that an increase in *NCSKEW* corresponds to a stock being more "crash prone."

In constructing the down-to-up volatility (*DUVOL*), we first label days with $R_{j,\tau}$ above (below) the mean of the year as "up" ("down") days. Then, for each stock j over year t, we divide the standard deviation of $R_{j,\tau}$ during the down days by the standard deviation of $R_{j,\tau}$ during the up days:

$$DUVOL_{j,t} = \log\left\{\frac{(n_u-1)\sum_{DOWN}R_{j,\tau}^{2}}{(n_d-1)\sum_{UP}R_{j,\tau}^{2}}\right\} \quad (7)$$

where n_u and n_d are the number of up and down days in year t, respectively. Similar to *NCSKEW*, a higher value of *DUVOL* suggests that the stock has a higher crash risk. Therefore, a higher α_3 in Eq. (3) indicates the positive relationship between pledgee competition and pledge firms' crash risk.

Following the literature (e.g., Hutton et al., 2009; Kim et al., 2016), we control variables that affect the crash risk: the change in monthly share turnover ($DTURN_t$), defined as the average monthly share turnover in fiscal year t minus that in year *t-1*; [8]the lagged negative coefficient of skewness for firm-specific daily returns ($NCSKEW_t$); the lagged standard deviation and average of firm-specific daily returns during the year, or $SIGMA_t$ and RET_t; the financial reporting quality measure (*ABSDA*), defined as the absolute value of the modified Jones (1991) discretionary accruals; and the control variables in Model (1). We also winsorize all of the continuous variables at the top and bottom 1% levels. All of the accounting data and return data are obtained from the CSMAR database. Both province- and industry-fixed effects are also controlled.

4. Empirical results

4.1. Impact of pledgee competition on pledge firms' annual report tone management

We expect higher competition to pressure pledgees to lower their monitoring incentives, leading to pledge firms engaging in more annual report tone management. In this section, we examine the impact of pledge competition on pledge firms' annual report tone management.

In Table 3, we split the sample into subsamples based on the enforcement of the Guidelines, or *Post*. For pledge firms, the difference in *Tone* and *AbTone* from the pre- to post-Guideline period is −0.024 and 0.005, respectively. Both are higher than that of the non-pledge firms and the difference-in-differences in *Tone* and *AbTone* are significantly positive at the 5% level. This evidence supports our hypothesis that pledgee competition increases pledge firms' annual report tone management, which may result from pledgees responding to a competitive environment.

We further estimate the regression in Eq. (1) to examine the relationship between pledge competition and pledge firms' annual report tone management, relative to that of the control group. The results are reported in Table 4. The coefficient on our variable of interest, *Pledge* * *Post*, is significantly positive in both columns 1 and 2 ($t = 3.18$ and 2.50, respectively). This suggests that the relationship between pledge competition and pledge firms' annual report tone management for pledge firms is significantly greater than that for non-pledge firms. It is worth noting that the coefficients on *Pledge* are significantly positive in Table 4. Such evidence is consistent with the findings of Xie et al. (2016, 2017) that pledge firms have lower financial report quality than non-pledge firms.

Overall, the results reported in Tables 3 and 4 reveal that the presence of higher pledgee competition is significantly positively associated with pledge firms' annual report tone management, which is consistent with the argument that the monitoring effect of pledgees weakens as pledgee competition increases.

[8] The monthly share turnover is calculated as the total value of tradable shares traded scaled by the total value of tradable shares over the month.

Table 3
Summary statistics.

Pledge firms	Pre-Guidelines ($Post = 0$) Mean	Post-Guidelines ($Post = 1$) Mean	Difference in mean (1)	Diff-in-Diff (1)–(2)
$Tone_t$	0.633	0.609	−0.024	0.015
(t-value)			−9.42***	4.71***
$AbTone_t$	0.007	0.012	0.005	0.006
(t-value)			2.17**	2.24**
Obs.	2172	3267		
Non-pledge firms	Mean	Mean	(2)	
$Tone_t$	0.629	0.590	−0.039	
(t-value)			24.01***	
$AbTone_t$	0.000	−0.001	−0.001	
(t-value)			−0.82	
Obs.	10,246	5313		

This table reports the summary statistics of annual report tone management from 2003 to 2016. We split the sample into two subsamples based on the enforcement of the Guidelines. *, **, and *** represent a statistically significant difference at the 10%, 5%, and 1% levels, respectively.

Table 4
Influence of pledge competition on pledge firms' annual report tone management.

	(1) $Tone_t$	(2) $AbTone_t$
Intercept	0.570***	0.034***
	(46.97)	(2.94)
$Pledge_t$	0.006***	0.009***
	(3.11)	(4.56)
$Post_t$	−0.040***	0.002
	(−23.49)	(1.16)
$Pledge_t * Post_t$	0.009***	0.007**
	(3.18)	(2.50)
OWN_t	−0.000***	−0.000***
	(−5.03)	(−7.85)
SOE_t	0.001	0.004***
	(0.39)	(2.82)
$Size_t$	0.001*	−0.003***
	(1.66)	(−4.08)
MB_t	0.000*	−0.000
	(1.85)	(−1.56)
LEV_t	0.020***	0.027***
	(5.10)	(7.34)
ROA_t	0.465***	0.045***
	(35.94)	(3.67)
Province & Industry	YES	YES
N	20,998	20,998
adj. R^2	0.166	0.024

This table examines the influence of pledge competition on pledge firms' annual report tone management. The t-statistics, computed with robust standard errors, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

4.2. Cross-Sectional analyses of the impact of pledgee competition on pledge firms' annual report tone management

Section 4.1 provides evidence that pledgee competition contributes to the higher annual report tone management of pledge firms, which may result from the fact that competition lowers pledgees' ex-post monitoring.

We further argue that the influence of pledgee competition may not be constant across firms. It may be conditional on (i) pledge firms' credit quality and (ii) whether pledge firms are non-SOEs. Accordingly, we examine this cross-sectional variation in this section.

4.2.1. Pledge firms' credit quality

As discussed in Section 1, if the positive relationship between the pledgee competition on pledge firms' annual report tone management indeed results from pledgees lowering their monitoring incentives, such a positive relationship should be more (less) evident when pledge firms' credit quality is lower (higher). Following Bushman et al. (2016), we use firms' *Z-score*, derived from the Altman (1968) model, to measure credit quality. Accordingly, we partition our sample firms based on credit quality and estimate the baseline model specified in Eq. (1) in each subsample. The results are reported in Panel A of Table 5.

Panel A presents the results of the subsample tests based on credit quality. In columns 1 and 2, where firms with low credit quality are examined, the coefficients on the interaction term *Pledge* * *Post* are both significantly positive at the 5% level ($t = 2.88$ and 2.20, respectively). In columns 3 and 4, where firms with high credit quality are examined, the coefficients on *Pledge* * *Post* are indistinguishable from zero.

Table 5
Cross-sectional analyses.

Panel A: Pledge firms' credit quality

	Low credit quality		High credit quality	
	(1)	(2)	(3)	(4)
	$Tone_t$	$AbTone_t$	$Tone_t$	$AbTone_t$
Intercept	0.597***	0.065***	0.532***	0.000
	(35.98)	(4.08)	(28.26)	(0.03)
$Pledge_t$	0.007**	0.009***	0.006**	0.009***
	(2.52)	(3.35)	(1.96)	(3.03)
$Post_t$	−0.045***	−0.003	−0.036***	0.006**
	(−18.82)	(−1.14)	(−14.85)	(2.39)
$Pledge_t$ * $Post_t$	0.012***	0.009**	0.005	0.004
	(2.88)	(2.20)	(1.11)	(1.07)
Control variables in Table 4	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	10,485	10,485	10,513	10,513
adj. R^2	0.201	0.040	0.138	0.020

Panel B: Non-SOE pledge firms

	Non-SOEs		SOEs	
	(1)	(2)	(3)	(4)
	$Tone_t$	$AbTone_t$	$Tone_t$	$AbTone_t$
Intercept	0.498***	−0.051***	0.605***	0.084***
	(28.96)	(−3.03)	(37.47)	(5.40)
$Pledge_t$	0.008***	0.010***	0.008**	0.011***
	(3.42)	(4.26)	(2.33)	(3.17)
$Post_t$	−0.032***	0.004*	−0.045***	−0.000
	(−13.77)	(1.94)	(−20.09)	(−0.09)
$Pledge_t$ * $Post_t$	0.007**	0.007**	−0.010	−0.010*
	(1.99)	(2.15)	(−1.64)	(−1.67)
Control variables in Table 4	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	10,075	10,075	10,923	10,923
adj. R^2	0.168	0.040	0.209	0.048

This table examines the cross-sectional variation in the influence of pledgee competition over pledge firms' annual report tone management. In Panel A, the conditioning variable is credit quality and the low and high groups are partitioned based on the median. In Panel B, the conditioning variable is whether firms are SOEs. The control variable coefficients are suppressed for brevity. The *t*-statistics, computed with robust standard errors, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

In sum, the above evidence suggests that pledgees operating in a more competitive environment may lower ex-post monitoring for firms with low credit quality, thus resulting in more annual report tone management for those firms. This further supports our argument that competition changes pledgees' monitoring practices.

4.2.2. Non-state-owned enterprise pledge firms

We further examine whether the influence of pledgee competition on pledge firms' annual report tone management is stronger for non-SOEs. As discussed in Section 1, we expect non-SOE pledge firms to be more vulnerable to losing control rights and to thus engage in more tone management when competition induces pledgees to lower their monitoring incentives. Accordingly, we partition our sample firms based on whether they are SOEs and estimate Eq. (1) in each subsample. The results are reported in Panel B of Table 5.

Panel B presents the results of the subsample tests based on whether firms are SOEs. In columns 1 and 2, where non-SOEs are examined, the coefficients on the interaction term *Pledge* * *Post* are both significantly positive at the 5% level ($t = 1.99$ and 2.15, respectively). In columns 3 and 4, where SOEs are examined, the coefficients on *Pledge* * *Post* are negative.

The above evidence suggests that for non-SOEs, which are more vulnerable to losing control rights, pledgees operating in a more competitive environment may reduce the monitoring of those firms to reduce default risk.

4.3. Impact of pledgee competition on pledge firms' stock price crash risk

In Section 4.1, we document that pledgee competition affects pledgees' lending practices by examining pledge firms' annual report tone management. In this section, we investigate whether pledgee competition increases the stock price crash risk of pledge firms and further identify the source of the impact of pledgee competition on future crash risk.

The results are reported in Table 6. Panel A of Table 6 reports the results of Eq. (3). The coefficients on *Pledge* * *Post* are significantly positive in both columns 1 and 2 ($t = 4.38$ and 5.19, respectively), suggesting that the relationship between pledge competition and pledge firms' future crash risk is significantly greater than that for non-pledge firms. Notably, the coefficient on *Pledge* is significantly negative in Panel A. This suggests that the average crash risk of the treatment group is lower than that of the control group, which is consistent with the findings of Xie et al. (2016) that pledge firms obscure the information environment to

Table 6
Influence of pledge competition on pledge firms' stock price crash risk.

Panel A: Influence of pledge competition on pledge firms' stock price crash risk

	(1) $NCSKEW_{t+1}$		(2) $DUVOL_{t+1}$	
Intercept	−0.904***	(−9.67)	−0.639***	(−13.18)
$Pledge_t$	−0.043***	(−3.07)	−0.033***	(−4.46)
$Post_t$	−0.136***	(−11.79)	−0.104***	(−17.47)
$Pledge_t$ * $Post_t$	0.087***	(4.38)	0.054***	(5.19)
$NCSKEW_t$	0.054***	(8.38)	0.037***	(11.19)
$DTURN_t$	−0.030***	(−2.98)	−0.041***	(−7.94)
RET_t	134.849***	(5.71)	5.213	(0.44)
$SIGMA_t$	7.112***	(5.56)	−0.836	(−1.32)
OWN_t	−0.000	(−0.69)	−0.000	(−1.52)
SOE_t	−0.045***	(−4.12)	−0.017***	(−3.08)
$Size_t$	0.011**	(1.99)	0.017***	(6.22)
MB_t	0.022***	(11.60)	0.015***	(14.54)
LEV_t	−0.020	(−0.75)	−0.050***	(−3.64)
ROA_t	0.580***	(6.73)	0.169***	(3.74)
$ABSDA_t$	0.123**	(2.15)	0.102***	(3.49)
Province & Industry		YES		YES
N		20,998		20,998
adj. R^2		0.039		0.059

(*continued on next page*)

Table 6 (*continued*)

Panel B: Influence of the annual report tone of pledge firms

	(1) $NCSKEW_{t+1}$	(2) $DUVOL_{t+1}$	(3) $NCSKEW_{t+1}$	(4) $DUVOL_{t+1}$
Intercept	−0.984***	−0.689***	−0.978***	−0.686***
	(−10.54)	(−14.28)	(−10.48)	(−14.21)
$Pledge_t$	−0.035**	−0.027***	−0.037**	−0.028***
	(−2.32)	(−3.37)	(−2.46)	(−3.50)
$Post_t$	−0.134***	−0.104***	−0.136***	−0.106***
	(−10.78)	(−16.34)	(−10.95)	(−16.54)
$Pledge_t * Post_t$	0.070***	0.044***	0.068***	0.044***
	(3.25)	(3.98)	(3.18)	(3.93)
$High\_Tone_t$	0.000	0.005		
	(0.01)	(0.56)		
$Pledge_t * High\_Tone_t$	−0.061*	−0.048**		
	(−1.70)	(−2.43)		
$Post_t * High\_Tone_t$	−0.011	0.001		
	(−0.36)	(0.09)		
$Pledge_t * Post_t * High\_Tone_t$	0.127**	0.069**		
	(2.26)	(2.37)		
$High\_AbTone_t$			−0.015	−0.002
			(−0.85)	(−0.28)
$Pledge_t * High\_AbTone_t$			−0.045	−0.040**
			(−1.24)	(−2.02)
$Post_t * High\_AbTone_t$			0.001	0.009
			(0.03)	(0.59)
$Pledge_t * Post_t * High\_AbTone_t$			0.139**	0.074**
			(2.46)	(2.51)
$NCSKEW_t$	0.054***	0.037***	0.054***	0.037***
	(8.39)	(11.21)	(8.39)	(11.22)
$DTURN_t$	−0.030***	−0.041***	−0.030***	−0.041***
	(−2.96)	(−7.94)	(−2.96)	(−7.92)
RET_t	134.616***	4.956	134.153***	4.694
	(5.70)	(0.42)	(5.68)	(0.40)
$SIGMA_t$	7.099***	−0.848	7.075***	−0.861
	(5.55)	(−1.34)	(5.53)	(−1.36)
OWN_t	−0.000	−0.000	−0.000	−0.000
	(−0.68)	(−1.51)	(−0.71)	(−1.53)
SOE_t	−0.044***	−0.018***	−0.044***	−0.017***
	(−4.09)	(−3.11)	(−4.03)	(−3.06)
$Size_t$	0.011**	0.017***	0.011*	0.017***
	(1.98)	(6.25)	(1.95)	(6.21)
MB_t	0.022***	0.015***	0.022***	0.015***
	(11.60)	(14.50)	(11.64)	(14.55)
LEV_t	−0.020	−0.050***	−0.020	−0.050***
	(−0.76)	(−3.66)	(−0.76)	(−3.66)
ROA_t	0.580***	0.167***	0.581***	0.169***
	(6.73)	(3.69)	(6.75)	(3.75)
$ABSDA_t$	0.123**	0.102***	0.123**	0.102***
	(2.15)	(3.48)	(2.16)	(3.48)
Province & Industry	YES	YES	YES	YES
N	20,998	20,998	20,998	20,998
adj. R^2	0.039	0.059	0.039	0.059

This table examines the influence of pledge competition on pledge firms' stock price crash risk. Panels A and B report the results of Models (3) and (4), respectively. The *t*-statistics, computed with robust standard errors, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

reduce crash risk. This evidence helps alleviate concerns over the endogeneity problem that pledgees in a competitive environment may extend loans to firms with higher crash risk in the first place.

Panel B of Table 6 reports the results of Eq. (4). In columns 1 and 2 of Panel B, we show that *Pledge* * *Post* * *High_Tone* is positively significant at the 5% level ($t = 2.26$ and 2.37, respectively). This result suggests that pledge competition increases pledge firms' future crash risk in firms with more positive annual report tone. Furthermore, columns 3 and 4 of Panel B show that *Pledge* * *Post* * *High_AbTone* is positively significant at the 5% level ($t = 2.46$ and 2.51, respectively). This supports our argument that pledgee competition leads to pledge firms obscuring adverse news through positive language in their annual reports and that such actions result in stock price crash.

In sum, the results reported in Table 6 reveal that pledgee competition is significantly positively associated with pledge firms' stock price crash risk and that this relationship increases with the annual report tone of pledge firms. Such evidence corroborates the argument that pledgees lower ex-post monitoring in response to competition.

5. Additional analyses

5.1. Alternative explanations

Our analysis shows that pledgee competition is positively associated with pledge firms' annual report tone management and future crash risk. We argue that the competition requires pledgees to develop new business. Furthermore, with limited resources, pledgees cannot spend much time monitoring their existing business, which results in pledge firms' greater opportunistic behavior to support stock prices.

However, two alternative explanations for our results exist. The first alternative explanation is that increased competition forces pledgees to lower their screening standards. This means that poor-quality pledge firms are able to pledge and obtain loans. Therefore, it is endogenous that pledge firms experience greater tone management and greater crash risk. Under this condition, we predict that the sensitivity of tone management and crash risk to the pledged amount increased from the pre- to post-regime. The second alternative explanation is that borrowing against pledging becomes easier due to the competition and that managers have greater incentive to hide bad news to support stock prices due to a greater amount of pledging. Following this reasoning, we predict that the sensitivity of tone management/crash risk to the pledged amount remains the same after the Guidelines.

To rule out the above alternative explanations, we investigate whether the sensitivity of tone management/crash risk to the pledged amount changes after the Guidelines. Based on our conjecture, if pledgees cannot spend much time monitoring their business and lower their ex-post monitoring, then pledge firms can enjoy the slack, which leads to a decreased sensitivity of tone management/crash risk to the pledged amount after the Guidelines. We use the following model to investigate the change:

$$Tone_{i,t}(AbTone_{i,t,}NCSKEW_{t+1}, DUVOL_{t+1}) = \alpha_0 + \alpha_1 VPledge_{i,t}(RPledge_{i,t}) + \alpha_2 Post_t + \alpha_3 VPledge_{i,t}(RPledge_{i,t}) * Post_t + Control + \varepsilon \quad (8)$$

where we measure the pledged amount of pledge firms using two proxies: (i) the logarithm of 1 plus the total market capitalization of pledged shares by the controlling shareholders in year t (*VPledge*) and (ii) how many times the controlling shareholders pledge their shares in year t (*NPledge*).

Table 7 reports the results. The significantly negative coefficients on $VPledge_i$ * *Post* across columns 1 and 2 and on *NPledge* * *Post* across columns 3 and 4 confirm that the sensitivity of tone management/crash risk to the pledged amount decreases after the Guidelines. These results are inconsistent with the two alternative explanations above.

5.2. Impact of guidelines on pledging activities

We assume that after the Guidelines, the quality of pledge firms remains the same, the contract terms remain the same, and only the ex-post monitoring of the pledgees changes, which results in pledge firms' greater opportunistic behavior to support stock prices. The underlying assumption is that pledgees have limited resources and competition requires them to develop new business. As such, they cannot spend much time

Table 7
Ruling out alternative explanations.

Panel A: Change in the sensitivity of tone management to the pledged amount after the Guidelines

	(1) $Tone_t$	(2) $AbTone_t$	(3) $Tone_t$	(4) $AbTone_t$
Intercept	0.128	0.182	0.466***	−0.324**
	(0.74)	(0.32)	(11.19)	(−2.34)
$Post_t$	−0.049*	0.138	−0.007	0.123**
	(−1.69)	(1.34)	(−0.38)	(2.02)
$VPledge_t$	0.022*	−0.056		
	(1.74)	(−1.27)		
$VPledge_t * Post_t$	−0.002***	−0.004*		
	(−2.59)	(−1.75)		
$NPledge_t$			−0.010	−0.076**
			(−0.95)	(−2.31)
$NPledge_t * Post_t$			−0.003**	−0.006*
			(−2.15)	(−1.81)
Control variables in Table 4	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	5439	5439	5439	5439
adj. R^2	0.174	0.070	0.173	0.071

Panel B: Change in the sensitivity of crash risk to the pledged amount after the Guidelines

	(1) $NCSKEW_{t+1}$	(2) $DUVOL_{t+1}$	(3) $NCSKEW_{t+1}$	(4) $DUVOL_{t+1}$
Intercept	0.806	1.763	0.431	0.269
	(0.64)	(1.71)	(1.35)	(1.01)
$Post_t$	0.311	0.289*	0.104	0.128**
	(1.47)	(2.14)	(0.80)	(2.36)
$VPledge_t$	−0.052	−0.136*		
	(−0.57)	(−2.05)		
$VPledge_t * Post_t$	−0.024***	−0.006**		
	(−3.56)	(−2.27)		
$NPledge_t$			−0.087	−0.103***
			(−1.23)	(−3.17)
$NPledge_t * Post_t$			−0.021**	−0.006**
			(−2.47)	(−2.29)
Control variables in Table 6	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	5439	5439	5439	5439
adj. R^2	0.054	0.071	0.053	0.071

This table examines whether the sensitivity of tone management (Panel A) and crash risk (Panel B) to the pledged amount changed from the pre- to post-Guideline period. The control variable coefficients are suppressed for brevity. The *t*-statistics, computed with robust standard errors, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

monitoring their existing business. For this assumption to be true, the first order effect is to examine whether the pledging activities of each pledgee increase after the deregulation, which allows greater competition. Then we use the following model to investigate the change:

$$Value_t(Count_t) = \alpha_0 + \alpha_1 Post_t + Control + \varepsilon \quad (9)$$

where $Value_t$ ($Count_t$) is the total pledging volume of each pledgee in each year. Specifically, $Value_t$ is the logarithm of 1 plus the total market capitalization and $Count_t$ is the logarithm of 1 plus the frequency. *Post* is an indicator that equals 1 after the enforcement of the Guidelines in 2013 and 0 otherwise. The control variables include yearly investor sentiment measures: the number of investor accounts ($NumofAccount_t$), the consumer consumption index ($ConsumerConfidence_t$), the stock market turnover ratio ($Turn_t$), and the loose monetary policy indicator ($MPDummy_t$). *MPDummy* is an indicator that equals 1 if the currency circulation (M2) growth is higher than that of the GDP and 0 otherwise.

The results in Table 8 support our predictions. The significantly positive coefficients on $Post_t$ in columns 1 and 2 ($t = 17.25$ and 15.95, respectively) suggest that the total pledging volume of each pledgee significantly increases after the Guidelines. This is consistent with our conjecture that the Guidelines lead to increased competition and that competition requires pledgees to develop new business.

5.3. Robustness checks

5.3.1. Propensity-score matching and two-stage least squares

To further address the endogeneity issue, we use propensity-score matching (PSM) to select a firm whose controlling shareholder does not pledge shares (the control group) for each pledge firm (the treatment group). We require the control firm to (i) be in the same industry in the same year as the treatment firm and (ii) have the closest odds of pledging shares as the treatment firm. We estimate the odds of pledging shares using the following logistic regression model, where *Pledge* is the dependent variable. We also include the firm characteristics associated with the likelihood of pledging shares (Xie et al., 2016).

$$Pledge_t = \alpha_0 + \alpha_1 OWN_{t-1} + \alpha_2 SOE_{t-1} + \alpha_3 Size_{t-1} + \alpha_4 MB_{t-1} + \alpha_5 LEV_{t-1} + \alpha_6 ROA_{t-1} + \alpha_7 Year + \alpha_8 Industry + \varepsilon \quad (10)$$

This matching procedure yields 10,876 firm-year observations, of which 5438 are treatment firms and 5438 are control firms. We then re-estimate Eq. (1) and Eq. (3) based on the 10,876 firm-year observations. Columns 1 and 2 in Panel A and B of Table 9 present the results of Eq. (1) and Eq. (3), respectively.

Columns 1 and 2 in Panel A show that the coefficients on *Pledge* * *Post* remain significantly positive. This suggests that our findings that pledgee competition is significantly positively related to pledge firms' annual report tone management is unlikely to be driven by potential endogeneity. The results in columns 1 and 2 of Panel B are qualitatively similar to those in Table 6. This alleviates the concern about the endogeneity issue that pledgees in a competitive environment may tend to lend money to firms with high crash risk.

To address the endogeneity concern, we further examine whether our main findings are robust to the use of two-stage least squares (2SLS) regressions. We replace the variable *Pledge* in Eq. (1) and Eq. (3) with the predicted value (*Pledge_R*) of Eq. (10) and the interaction term *Pledge_R* * *Post*. Columns 3 and 4 in Panel A and B of Table 9 present the results of Eq. (1) and Eq. (3), respectively. The results in columns 3 and 4 in Panels A and B are qualitatively similar to those in Tables 4 and 6, respectively. This alleviates the concern about the

Table 8
Influence of the Guidelines on the pledging activities of each pledgee.

	(1) *Value*	(2) *Count*
Intercept	−11.758***	−1.461***
	(−15.59)	(−14.18)
$Post_t$	1.914***	0.259***
	(17.25)	(15.95)
$NumofAccount_t$	−0.001	−0.000
	(−0.62)	(−0.28)
$ConsumerConfidence_t$	0.134***	0.017***
	(17.13)	(15.61)
$Turn_t$	0.431	0.008
	(0.88)	(0.12)
$MPDummy_t$	−0.418***	−0.046***
	(−5.68)	(−4.82)
N	15,568	15,568
adj. R^2	0.109	0.092

This table examines whether the pledging activities of each pledgee increased from the pre- to post-Guideline period. The *t*-statistics, computed with robust standard errors, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

Table 9
Robustness checks (PSM and 2SLS).

Panel A: Influence of pledge competition on pledge firms' annual report tone management

	(1) PSM	(2)	(3) 2SLS regressions	(4)
	$Tone_t$	$AbTone_t$	$Tone_t$	$AbTone_t$
Intercept	0.508***	−0.026*	0.584***	0.041***
	(31.02)	(−1.65)	(47.79)	(3.48)
$Pledge_t$	0.011***	0.011***		
	(4.61)	(4.96)		
$Post_t$	−0.038***	0.002	−0.042***	−0.003
	(−15.55)	(0.71)	(−17.49)	(−1.43)
$Pledge_t * Post_t$	0.008**	0.007**		
	(2.35)	(2.12)		
$Pledge\_R_t$			−0.083***	−0.029***
			(−9.30)	(−3.37)
$Pledge\_R_t * Post_t$			0.053***	0.037***
			(7.52)	(5.55)
Control variables in Table 4	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	10,876	10,876	20,998	20,998
adj. R^2	0.185	0.034	0.167	0.022

Panel B: Influence of pledge competition on pledge firms' stock price crash risk

	(1) PSM	(2)	(3) 2SLS regressions	(4)
	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
Intercept	−0.867***	−0.657***	−0.811***	−0.593***
	(−6.34)	(−9.26)	(−8.61)	(−12.18)
$Pledge_t$	−0.030*	−0.030***		
	(−1.71)	(−3.27)		
$Post_t$	−0.114***	−0.101***	−0.197***	−0.146***
	(−5.99)	(−10.22)	(−12.04)	(−17.39)
$Pledge_t * Post_t$	0.066***	0.050***		
	(2.67)	(3.87)		
$Pledge\_R_t$			−0.668***	−0.310***
			(−10.55)	(−9.29)
$Pledge\_R_t * Post_t$			0.515***	0.287***
			(10.66)	(11.51)
Control variables in Table 6	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	10,876	10,876	20,998	20,998
adj. R^2	0.034	0.057	0.044	0.064

This table presents the results of using PSM and 2SLS. Panels A and B examine the influence of pledge competition on pledge firms' annual report tone management and crash risk, respectively. The control variable coefficients are suppressed for brevity. The *t*-statistics, computed with robust standard errors, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

endogeneity issue that competition induces pledgees to lend money to firms with high annual report tone management or crash risk.

5.3.2. Alternative pledgee competition and share pledge measures

We also examine whether our main findings are robust to the use of alternative pledgee competition measures. The alternative measures are commonly used proxies of competition: (i) the total number of pledgees (*NUM*) and (ii) market concentration, via the Herfindahl–Hirschman Index (*HHI*). We re-estimate Eq. (1) and Eq. (3) with *NUM* or *HHI* as the pledgee competition measure and report the results in Table 10. With

Table 10
Robustness checks (alternative pledgee competition measures).

Panel A: Influence of pledge competition on pledge firms' annual report tone management

	(1) $Tone_t$	(2) $AbTone_t$	(3) $Tone_t$	(4) $AbTone_t$
Intercept	0.544***	0.032***	0.512***	0.033***
	(44.19)	(2.71)	(39.32)	(2.68)
$Pledge_t$	0.001	0.005	0.015***	0.019***
	(0.46)	(1.64)	(4.98)	(6.61)
NUM_t	−0.000***	0.000		
	(−24.70)	(0.08)		
$Pledge_t * NUM_t$	0.000***	0.000***		
	(4.24)	(2.94)		
HHI_t			−0.224***	0.005
			(−23.23)	(0.56)
$Pledge_t * HHI_t$			0.030*	0.046***
			(1.70)	(2.68)
Control variables in Table 4	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	20,998	20,998	20,998	20,998
adj. R^2	0.171	0.024	0.166	0.024

Panel B: Influence of pledge competition on pledge firms' stock price crash risk

	(1) $NCSKEW_{t+1}$	(2) $DUVOL_{t+1}$	(3) $NCSKEW_{t+1}$	(4) $DUVOL_{t+1}$
Intercept	−1.005***	−0.576***	−1.054***	−0.626***
	(−10.70)	(−11.72)	(−10.81)	(−12.26)
$Pledge_t$	−0.153***	−0.106***	0.082***	0.037***
	(−7.30)	(−9.55)	(3.74)	(3.36)
NUM_t	−0.001***	−0.000***		
	(−13.81)	(−13.37)		
$Pledge_t * NUM_t$	0.001***	0.000***		
	(8.10)	(9.78)		
HHI_t			−0.743***	−0.382***
			(−10.93)	(−11.11)
$Pledge_t * HHI_t$			0.563***	0.334***
			(4.71)	(5.35)
Control variables in Table 6	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	20,998	20,998	20,998	20,998
adj. R^2	0.044	0.055	0.038	0.051

This table presents the results of using alternative measures of pledgee competition. Panels A and B examine annual report tone management and crash risk, respectively. The control variable coefficients are suppressed for brevity. The *t*-statistics, computed with robust standard errors, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

the alternative pledgee competition measures, the results are qualitatively similar to those in Tables 4 and 6. This suggests that our findings are robust to the use of alternative pledgee competition measures.

One may argue that there are measurement errors associated with the share pledge indicator variable, *Pledge*. To address this concern, we construct alternative share pledge measures using two proxies: (i) how many times the controlling shareholders pledge their shares in 1 year (*NPledge*) and (ii) the pledge ratio (*RPledge*), computed as the percentage of pledged shares in the controlling shareholders' shareholdings. We re-estimate Eq. (1) and Eq. (3) with *NPledge* or *RPledge* as the share pledge measure and report the results in Table 11. The results are similar to those in Tables 4 and 6, suggesting that our findings are not driven by measurement errors.

Table 11
Robustness checks (alternative share pledge measures).

Panel A: Influence of pledge competition on pledge firms' annual report tone management

	(1) $Tone_t$	(2) $AbTone_t$	(3) $Tone_t$	(4) $AbTone_t$
Intercept	0.575***	0.040***	0.567***	0.031***
	(47.36)	(3.44)	(46.64)	(2.66)
$NPledge_t$	0.006***	0.008***		
	(3.31)	(4.86)		
$Post_t$	−0.040***	0.002	−0.038***	0.004**
	(−24.18)	(1.25)	(−22.93)	(2.23)
$NPledge_t * Post_t$	0.006***	0.004**		
	(2.72)	(2.06)		
$RPledge_t$			0.002**	0.003***
			(2.33)	(3.57)
$RPledge_t * Post_t$			0.003**	0.002
			(2.13)	(1.37)
Control variables in Table 4	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	20,998	20,998	20,998	20,998
adj. R^2	0.167	0.026	0.165	0.022

Panel B: Influence of pledge competition on pledge firms' stock price crash risk

	(1) $NCSKEW_{t+1}$	(2) $DUVOL_{t+1}$	(3) $NCSKEW_{t+1}$	(4) $DUVOL_{t+1}$
Intercept	−0.898***	−0.638***	−0.907***	−0.639***
	(−9.60)	(−13.16)	(−9.69)	(−13.16)
$NPledge_t$	−0.040***	−0.030***		
	(−3.48)	(−5.00)		
$Post_t$	−0.137***	−0.105***	−0.133***	−0.102***
	(−12.24)	(−18.05)	(−11.71)	(−17.32)
$NPledge_t * Post_t$	0.074***	0.046***		
	(5.08)	(6.10)		
$RPledge_t$			−0.019***	−0.014***
			(−3.11)	(−4.41)
$RPledge_t * Post_t$			0.039***	0.023***
			(4.14)	(4.59)
Control variables in Table 6	YES	YES	YES	YES
Province & Industry	YES	YES	YES	YES
N	20,998	20,998	20,998	20,998
adj. R^2	0.039	0.059	0.039	0.059

This table presents the results of using alternative measures of share pledge. Panels A and B examine annual report tone management and crash risk, respectively. The control variable coefficients are suppressed for brevity. The *t*-statistics, computed with robust standard errors, are reported in parentheses. *, **, and *** represent significance at the 10%, 5%, and 1% levels, respectively.

6. Conclusions

We find that pledgee competition is positively associated with pledge firms' annual report tone management. The evidence is in line with the view that competition pressures pledgees to lower their monitoring incentives to remain competitive.

We further examine the cross-sectional variation in the influence of pledgee competition on pledge firms' annual report tone management from two perspectives: (i) pledge firms' credit quality and (ii) whether pledge firms are non-SOEs. We find the positive relationship between pledgee competition and the annual report tone management of pledge firms to be more evident for pledge firms with lower credit quality and pledge firms that are non-SOEs. This finding suggests that when pledge firms have a higher default risk or are more vulnerable to losing control rights, competition lowers pledgees' monitoring incentives to a greater extent.

We further show that higher pledgee competition results in the higher future crash risk of pledge firms. This relationship increases with the annual report tone of pledge firms, which corroborates the evidence that competition changes pledgees' monitoring practices and thus induces pledge firms to withhold bad news.

We perform a series of tests to address concerns over potential endogeneity. These tests include utilizing an exogenous shock to investigate the effect of pledgee competition, ruling out alternative explanations, using PSM to choose the control sample, and exploiting 2SLS regressions. All of these tests produce consistent results that support our main findings, suggesting that our results are unlikely to be driven by potential endogeneity.

Acknowledgements

Xiaoxi Li acknowledges the financial support from National Natural Science Foundation of China (NSFC Project Number 71802094). Kemin Wang acknowledges financial support from National Natural Science Foundation of China (NSFC Project Numbers 71272072, 71572042).

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China Journal of Accounting Research 12 (2019) 293–313

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Contents lists available at ScienceDirect

China Journal of Accounting Research

journal homepage: www.elsevier.com/locate/cjar

Reputation repair and corporate donations: An investigation of responses to regulatory penalties

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ARTICLE INFO

Article history:
Received 15 October 2018
Accepted 6 June 2019
Available online 10 July 2019

Keywords:
Regulatory penalty
Donation
Reputation repair

ABSTRACT

According to the risk management and reputation insurance theory of corporate social responsibility, corporate donations can help a company to repair its reputation after a crisis. This study uses a propensity score matching–difference in difference (PSM + DID) methodology to investigate the charitable donation activities of companies that have been subject to regulatory penalties. The analysis of a sample of A-share listed companies in the 2004–2016 period shows that companies significantly increase their charitable donations after regulatory penalties, but this effect weakens over time. Further analysis reveals that non-state-owned companies, companies with higher ownership concentrations, and companies receiving severer penalties are more motivated to make donations after regulatory penalties. By studying the reputation repair behavior of companies that have been subject to regulatory penalties, this study offers further support for the risk management and reputation insurance theory of corporate social responsibility. It also enriches our understanding of companies' active responses to regulatory penalties and provides insights into companies' motives for making charitable donations.

1. Introduction

After the Wenchuan Earthquake in 2008, the charitable donations made by China's listed companies reached an unprecedented level (Ran et al., 2010; Xu et al., 2011), sparking a wider discussion on companies'

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https://doi.org/10.1016/j.cjar.2019.06.001
1755-3091/

charitable donations. A charitable donation is one dimension of corporate social responsibility (CSR). CSR is a complex concept with multiple dimensions (Gao et al., 2012). The pyramid model of Carroll (1991) splits CSR into four components: economic responsibilities, legal responsibilities, ethical responsibilities, and charitable (or philanthropic) responsibilities. The first three are mandatory responsibilities: for example, a company's economic responsibilities are part of its basic function. Carroll places charitable responsibilities at the top of the pyramid, as they are optional.

According to traditional CSR theory, a charitable donation is an altruistic behavior that is not related to a company's ability to make a profit (Berman et al., 1999). However, a company, as a rational economic organization, aims to maximize shareholders' value. Accordingly, altruism cannot fully explain donation behavior (Xu et al., 2011; Li et al., 2016). In the strategic donation view (Logsdon et al., 1990), charitable donations are a vital component of a company's overall strategy (Post and Waddock, 1995). Specifically, making charitable donations can help a company to obtain tax preferences (Navarro, 1988), advertise itself (Brown et al., 2006; Shan et al., 2008), establish or maintain political connections (Sánchez, 2000; Jia and Zhang, 2010; Liang et al, 2010; Zhang et al, 2013; Dai et al., 2014), enhance market competitiveness (Mescon and Tilson, 1987; Porter and Kramer, 2002), etc. Furthermore, according to the agency theory, managers can exploit donations for personal rather than shareholders' interests (Werbel and Carter, 2002; Masulis and Reza, 2015).

Recently, a growing number of studies have used the risk management perspective to examine how CSR can address potential reputation loss. Godfrey (2005) shows that CSR enhances and generates moral capital, which protects firms' relationship-based intangible assets. In this view, charitable donations can help to mitigate the potential reputation loss caused by negative shocks. Accordingly, CSR can be considered an *ex-ante* risk management behavior to cope with future negative incidents; it is like insurance on a company's reputation (Bebbington et al., 2008; Minor and Morgan, 2011; Shiu and Yang, 2017; Luo et al., 2018; Hogarth et al., 2018).

The risk management view of CSR considers CSR to be insurance against rainy days. However, a company can also make charitable donations after a negative event to prevent further loss of reputation (Koehn and Ueng, 2010; Gao et al., 2012; Dai et al., 2016; Li et al., 2016; Fu and Ji, 2017). In other words, a charitable donation can be used to repair a damaged reputation. Few studies have used this reputation perspective to examine companies' donation behavior after negative events.

It is unclear whether companies increase charitable donations to repair damaged reputations. With the continuous advances and improvements in China's capital market, the government is continuously working to improve its regulatory system and facilitate the enforcement of regulations. As a result, the immoral behavior (corporate fraud) of a growing number of companies has been detected and punished. The regulatory penalties imposed on companies engaged in corporate fraud (Gu et al., 2016) cause severe damage to the companies' reputations, which is associated with a significantly negative stock price reaction (Chen and Gao, 2005; Yang et al., 2008). Furthermore, the financing capacity and profitability of these companies decline significantly in the long run (Karpoff and Lott, 1993; Graham et al., 2008; Chen et al., 2011; Johnson et al., 2014; Liu and Chen, 2018), which significantly decreases their value. According to the image restoration theory (Benoit, 1995), reputation is an organization's most important asset, and it is strategically important for a company to maximize its reputation (or public image).

This study investigates whether companies use donations to reduce stakeholders' hostility and repair damaged reputations. We use a sample of Chinese A-share non-financial listed companies from the 2004 to 2016 period to examine changes in charitable donations after negative events. Using a propensity score matching-difference in difference (PSM + DID) design to control for self-selection bias, we find a significant increase in donations by companies that have been subject to regulatory penalties. However, this increase is only significant in the first year after the penalty, suggesting that the donation is used as an instrument to repair the damaged reputation. The effect of regulatory penalties on donations is stronger when the penalty is more severe and in non-state-owned companies. In addition, the alignment effect of large shareholders increases companies' motivation and ability to make donations after being subjected to regulatory penalties. We further demonstrate the reputation repair effect of donations by showing a positive association between donations and companies' bank loan financing.

This study makes several contributions. First, the risk management view of CSR considers donations to be insurance investments that should be made *before* negative events occur. Extending this view, we suggest that a

company will also increase donations *after* a negative event to repair a damaged reputation. This study provides empirical support for this argument by showing a significant increase in donations by companies that have been punished for committing fraud. Second, this study enriches our understanding of the economic consequences of regulatory enforcement. Previous studies have focused on the behavior of outside stakeholders (e.g. investors and customers) after regulatory penalties (Chen et al., 2005; Chen and Gao, 2005; Gu et al., 2016). This study extends this line of research by examining how companies respond to reputation-damaging events. Finally, the study provides a new perspective for understanding and evaluating companies' donation behavior.

2. Theoretical analysis and research hypothesis

There is a heated debate about whether CSR improves a company's value (Jones, 1995; Preston and O'Bannon, 1997; Porter and Kramer, 2002; Godfrey, 2005). As a critical part of strategic CSR, charitable donations are assumed to directly or indirectly enhance value (Zucker, 1986; Fombrun and Shanley, 1990; Cornwell and Coote, 2005).

Studies of Western institutions have explored companies' motivations for making charitable donations. Zhang et al. (2010) have identified four types of motivations for donations: strategic, political, altruistic, and managerial utility. Some studies argue that donating is an expression of a company's devotion to others and is not self-serving (Campbell et al., 1999; Cooter and Broughman, 2005), whereas other studies shed light on less altruistic motives. Strategically, a donation can serve as an advertisement or as propaganda, helping a company to gain strategic resources (e.g., market reputation) (Harbaugh, 1998; Strahilevitz, 1999; Porter and Kramer, 2002; Brown et al., 2006). Politically, a donation helps build and increase trust between the company and the government, which in turn helps the company to gain political resources (Sánchez, 2000; Scherer and Palazzo, 2007; Wang and Qian, 2011). For the managerial utility, a company may improve its social image by making donations, which can significantly improve the manager's fame and status (Atkinson and Galaskiewicz, 1988; Galaskiewicz, 1997).

A growing number of scholars are becoming interested in the donation behavior of Chinese companies. Unlike Western countries, which have well-constructed market economic systems, China is a transforming economy where substantial amounts of resources are still controlled by the government. Given the institutional constraints, Chinese companies have multiple motives for making donations, such as establishing or maintaining political connections (Jia and Zhang, 2010; Liang et al., 2010; Zhang et al., 2013; Dai et al., 2014), gaining debt financing benefits (Li et al., 2015), or avoiding policy uncertainty (Zhong, 2007; Tang et al., 2014).

Several recent studies have proposed reputation repair as a motive for charitable donations. Studies have shown that companies increase donations after failures in employee responsibility (Gao et al., 2012), environmental protection or production security (Chen et al., 2008), or when they make financial restatements (Koehn and Ueng, 2010), suffer performance decline or loss (Li et al., 2016), or litigation risk (Dai et al., 2016; Fu and Ji, 2017). Corporate fraud is much more damaging to a company's reputation than these negative events, as corporate fraud includes operational misbehavior, information disclosure violations, and misconduct in the capital market (e.g. stock price manipulation). Moreover, regulatory penalties for fraud affect investors' evaluations of a company's quality and reputation (Feroz et al., 1991; Chen and Gao, 2005; Yang et al., 2008). Thus, understanding the interaction between regulatory penalties and companies' donation behavior has theoretical and practical value.

There are two possible ways that charitable donations can repair the reputations of companies that have received regulatory penalties due to fraud. First, a donation has a signaling effect on the market. Stakeholders (e.g., banks, customers, and suppliers) hold the resources that companies need to develop (Donaldson and Preston, 1995), and they will have doubts about the financial condition of companies that have committed fraud. This will damage the partnerships between a company and its stakeholders, resulting in reduced profits (Karpoff and Lott, 1993; Johnson et al., 2014) and bank loans (Chen et al., 2011; Liu and Chen, 2018) and increased financing costs (Klein and Leffler, 1981; Chen et al., 2011). As donations represent an outflow of cash, donations cannot be implemented unless there are disposable cash resources (Li et al., 2016); therefore, making a donation after a regulatory penalty can be a signal that the company is in a good financial condition

with a positive attitude to future performance (Shapira, 2012; Lys et al., 2015). This, in turn, improves stakeholders' confidence in the company's future performance and protects the company's reputation.

Second, according to the risk management view, a donation can form and improve a company's moral capital. As they are voluntary, charitable donations can generate stronger social effects than other CSR activities. Godfrey (2005) documents that CSR activities generate positive moral capital, which work as insurance on firms' relationship-based intangible assets and increase the value of the company. A number of studies (Godfrey, 2005; Bebbington et al., 2008; Godfrey et al., 2009) have provided evidence that making donations during negative events helps to conceal the events or divert the public's attention away from the company's misconduct or lack of CSR (Campbell, 2007; Koehn and Ueng, 2010), and then helps to repair the damaged reputation (Godfrey et al., 2009; Koehn and Ueng, 2010; Fu and Ji, 2017). Studies also show that when faced with a negative event, higher donations are associated with lower stock price reductions (Godfrey et al., 2009; Minor and Morgan, 2011; Shiu and Yang, 2017).

Based on the above analysis, we propose the following hypothesis.

Hypothesis 1. Companies that receive a regulatory penalty for fraudulent activities will make more charitable donations than companies that have not been penalized.

3. Research design

3.1. Empirical model and variable definitions

Building on Luong et al. (2017), we use a PSM + DID methodology to investigate the donation behavior of companies that have been given regulatory penalties. First, we use a propensity score matching method to match each donation observation from a company that has been penalized for fraud ($Fraud = 1$), with an observation from a company that has never been penalized ($Fraud = 0$). In such a way, we obtain a matched treatment group and control group. Then, we set a time variable, *Post*, that equals one in the year following each regulatory penalty event. For each company in the control group, the value of *Post* is the same as its matching treatment group company. We use the following pooled OLS model to identify the relationship between regulatory penalty and donation:

$$Dona_{it} = \beta_0 + \beta_1 Post_{it} + \beta_2 Fraud_{it} + \beta_3 Fraud_{it} \times Post_{it} + \sum Controls_{it-1} + \sum Ind + \sum Year + \varepsilon_{it}. \quad (1)$$

In Model (1), the dependent variable $Dona_{it}$ measures the charitable donation of firm i in year t as the natural logarithm of the amount of the company's donation. $Post_{it}$ is the post-regulatory penalty time variable. $Fraud_{it}$ is a binary variable that distinguishes a fraud company ($Fraud = 1$) from a non-fraud company ($Fraud = 0$). *Controls* is a set of control variables, including firm size (*Size*), asset-liability ratio (*Lev*), sales expenses to assets (*Sales Fee*), patent applications (*Patent*), board size (*Board Size*), cash holding (*Cash*), return on assets (*ROA*), growth potential (*TobinQ*), if state-owned (*SOE*), firm age (*Age*), GDP per capita (*GDPPC*, 10,000 Yuan per person), board independence (*Board Inde*), and duality of the president and CEO (*Dual*). In addition, industry and year fixed effects are controlled in Model 1. See Table 1 for detailed variable definitions.

Further, to control potential individual firm factors, we refer to Beck et al. (2010) and adopt the following model to examine companies' donations after being given a regulatory penalty:

$$Dona_{it} = \beta_0 + \beta_1 Fraud_{it} \times Post_{it} + \sum Controls_{it-1} + \sum Firm + \sum Year + \varepsilon_{it}. \quad (2)$$

3.2. Data source and sample selection

Our initial sample consists of China's A-share non-financial listed companies from the 2004 to 2016 period. Donation data are from the CSMAR database. To eliminate the variation caused by multi-regulatory penalties, we delete companies that have been penalized for fraud more than once. We also delete firm-year

Table 1
Variable definitions.

Dona	Company donation; equals the natural logarithm of (donation amount + 1)
Post	Equals 1 if the observation is after (not including) the year of the regulatory penalty, and otherwise 0. For companies that were not penalized, *Post* is the same value as their matched penalized company
Fraud	If a company is penalized in any year, all of the observations of that company are equal to 1. If the company has never been penalized, all of the observations of that company are equal to 0
Size	The natural logarithm of a company's total assets at the end of the year
Lev	Leverage; equals the total liabilities divided by total assets at the end of the year
Sales Fee	Sales expense; equals sales expenses divided by total assets at the end of the year
Patent	Patent application; equals the natural logarithm of (number of patent applications + 1)
Board Size	The natural logarithm of the number of board members.
Cash	Cash holdings; equal to the cash and cash equivalents divided by (total assets- cash and cash equivalents)
ROA	Return on assets; equal to the net profit divided by total assets at the end of the year
TobinQ	Tobin's Q measures a company's growth potential as equal to the market value divided by book value of assets at the end of the year
SOE	A dummy variable that equals 1 if the firm is state-owned, and 0 otherwise
Age	Firm age; equal to the natural logarithm of (years since IPO + 1)
GDPPC	GDP per capita, which equals 10,000 Yuan per person
Dual	Board duality; equals 1 if the board president and the CEO is the same person, and otherwise 0
Board Inde	Board independence; equals the number of independent directors divided by the number of board members

observations that are missing data on donations, and observations that are missing data on firm-specific control variables. Our final research sample consists of 6349 observations. All of the continuous variables are winsorized at their 1% and 99% quantiles.

4. Descriptive analysis

4.1. Characteristics of penalized firms

In Table 2, we report the characteristics of our sample observations. Panel A of Table 2 gives the distribution of the sample by year, and Panel B gives the distribution by penalty type. Panel A shows that in the pre-2010 period penalties are relatively rare, but they increase in the post-2011 period. On average, about 50 companies (2.54%) are penalized each year. Panel B shows that about 73% of the penalized firms have an *other* penalty type, leaving about one quarter with a specific penalty type. The *other* penalty category primarily refers to non-administrative penalties such as proposed rectification, rectification reports, and enhanced learning. Specific penalties are administrative penalties imposed by supervisory bodies. They have a relatively higher deterrence power and a higher penalty effect.

4.2. Descriptive statistics

Fig. 1 shows the trend in the total amount of donations (CNY, Yuan) over the sample period. There is a big increase in 2008 (the year of the Wenchuan earthquake).[1] After 2008, the total amount of donations stabilizes at a higher level than before the earthquake.

Table 3 reports the correlation coefficients and descriptive statistics for the variables in Models 1 and 2. The correlation between regulatory penalty (*Post*) and donation (*Dona*) is positive but not significant, revealing that after a penalty for fraud, firms are likely to increase their charitable donations. To clarify the relation between *Post* and *Dona*, it is necessary to examine the differences between the control and treatment groups. The correlations between the other variables have absolute values under 0.5, suggesting there is no serious

[1] To eliminate the impact of extreme events on companies' donations, we follow previous studies and delete observations from 2008 and re-run the analysis. Our results remain similar.

Table 2
Characteristics of penalized firms.

Panel A: Distribution by year				*Panel B: Distribution by penalty type*			
Year	Number of listed companies	Frequency of regulatory penalty	Percentage of regulatory penalty (%)	Type of regulatory penalty	Number of listed companies	Frequency (%)	Cumulative frequency (%)
2004	1048	15	1.43	Other	501	72.93	72.93
2005	1051	16	1.52	Criticism	86	12.52	85.44
2006	1114	3	0.26	Confiscation	2	0.29	85.74
2007	1192	11	0.92	Confiscation & Other	1	0.15	85.88
2008	1230	14	1.13	Confiscation & Fines	1	0.15	86.03
2009	1471	15	1.01	Fines	29	4.22	90.25
2010	1705	18	1.05	Fines & Other	6	0.87	91.12
2011	1877	55	2.93	Fines & Confiscation	3	0.44	91.56
2012	1983	123	6.2	Warning	2	0.29	91.85
2013	2022	110	5.44	Warning & Fines	19	2.77	94.61
2014	2129	66	3.1	Warning & Fines & Other	2	0.29	94.91
2015	2299	80	3.47	Blame	34	4.95	99.85
2016	2574	118	4.58	Blame & Fines	1	0.15	100
Average	1669	50	2.54	Total	687	100	

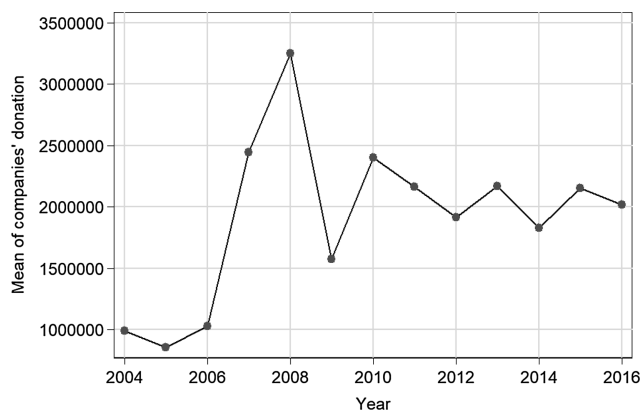

Fig. 1. Total amount of donations (CNY, Yuan) over the sample period.

collinearity problem among our variables. The descriptive statistics in Table 3 show reasonable results for all of the variables.

4.3. Univariate analysis before PSM

We compare the median differences between donations before and after a company was penalized for fraud. Panels A and B, Table 4 show the results for the logarithm of and total amount of donations, respectively. The results indicate that the median donation in a year after a penalty for fraud is significantly larger than in the year the penalty was given. Moreover, in the two- to three-year period after the penalty, the median donation continues to increase, although this change is not significant. Table 4 shows similar results when the median donation amounts are compared with the medians of a year before the penalty: the median donation one year after the penalty is significantly larger, and the median donation two and three years after the penalty are larger, but not significantly. These results suggest that when a company is subject to regulatory penalties, it increases its charitable donations. However, this increase is usually short-term, suggesting that the donations are made for instrumental reasons.

Table 3
Correlation coefficients and descriptive statistics.

	Dona (1)	*Post* (2)	*Size* (3)	*Lev* (4)	*Sales Fee* (5)	*Patent* (6)	*Board Size* (7)	*Cash* (8)	*ROA* (9)	*TobinQ* (10)	*SOE* (11)	*Age* (12)	*GDPPC* (13)	*Dual* (14)	*Board Inde* (15)
(1)	1.000														
(2)	0.002	1.000													
(3)	0.273***	0.028**	1.000												
(4)	0.102***	0.045***	0.530***	1.000											
(5)	0.126***	0.021*	−0.057***	−0.078***	1.000										
(6)	0.129***	0.016	0.376***	0.130***	0.114***	1.000									
(7)	0.086***	−0.052***	0.268***	0.196***	0.007	0.040***	1.000								
(8)	−0.072***	−0.115***	−0.281***	−0.497***	0.036***	−0.056***	−0.088***	1.000							
(9)	0.138***	−0.077***	−0.064***	−0.420***	0.235***	0.050***	0.005	0.251***	1.000						
(10)	−0.058***	−0.021*	−0.381***	−0.458***	0.166***	−0.113***	−0.166***	0.265***	0.440***	1.000					
(11)	−0.023*	−0.045***	0.358***	0.363***	0.003	0.050***	0.265***	−0.178***	−0.147***	−0.239***	1.000				
(12)	0.062***	0.127***	0.449***	0.483***	0.105***	0.113***	0.140***	−0.462***	−0.213***	−0.275***	0.435***	1.000			
(13)	0.000	0.065***	0.068***	−0.132***	−0.040***	0.049***	−0.174***	−0.004	0.029**	0.118***	−0.217***	−0.043***	1.000		
(14)	−0.019	−0.020	−0.183***	−0.202***	0.014	0.039***	−0.179***	0.158***	0.066***	0.133***	−0.257***	−0.241***	0.111***	1.000	
(15)	0.004	0.036***	0.031**	−0.017	0.012	0.067***	−0.445***	0.009	−0.026**	0.045***	−0.060***	−0.039***	0.063***	0.109***	1.000
Obs.	6349	6349	6349	6349	6349	6349	6349	6349	6349	6349	6349	6349	6349	6349	6349
Mean	11.147	0.134	21.812	0.387	0.047	2.584	2.280	0.351	0.052	2.366	0.357	1.626	5.347	0.283	0.369
Std.	4.390	0.341	1.210	0.201	0.053	1.255	0.170	0.441	0.049	1.919	0.479	0.871	2.338	0.451	0.052
Min	0.000	0.000	18.812	0.050	0.000	0.693	1.792	0.003	−0.327	0.150	0.000	0.000	0.432	0.000	0.182
Max	17.123	1.000	26.487	1.603	0.278	8.412	2.773	2.408	0.202	12.115	1.000	3.178	10.796	1.000	0.571

Note: *** and ** indicate significance at the 1% and 5% levels, respectively.

Table 4
Donations before and after a regulatory penalty.

Panel A: Natural logarithm of (donation amount + 1)					
t	−1	0	+1	+2	+3
Median	11.905	11.918	12.429	12.003	12.055
Compared with the year of the regulatory penalty			(+1)–(0)	(+2)–(0)	(+3)–(0)
			0.511***	0.09	0.085
Compared with one year before the regulatory penalty			(+1)–(−1)	(+2)–(−1)	(+3)–(−1)
			0.524***	0.098	0.150
Panel B: Donation amount					
t	−1	0	+1	+2	+3
Median	148000.000	150000.000	249997.500	163200.000	171892.300
Compared with the year of the regulatory penalty			(+1)–(0)	(+2)–(0)	(+3)–(0)
			99997.500**	13200.000	21892.330
Compared with one year before the regulatory penalty			(+1)–(−1)	(+2)–(−1)	(+3)–(−1)
			101997.500***	15200.000	15200.000

Note: *** and ** indicate significance at the 1% and 5% levels, respectively.

5. Empirical analysis

5.1. PSM process

We use the PSM method to match each observation of a company that has been penalized with an observation from the same year from an unpenalized company. Specifically, we use the nearest neighbors matching process with 1 to 3 matching to meet the balance hypothesis, which is discussed below. The result is paired treatment and control groups. Then, we set the *Post* of companies in the control group to have the same value as their matched treatment companies.

5.1.1. Balancing assumption

We follow Gu et al. (2016) and choose a set of matching variables. Their differences before and after the PSM process are listed in Table 5. As shown in Table 5, before the PSM, there are significant differences between the treatment and control groups for almost all of the variables, whereas these differences become insignificant after the PSM process, suggesting that the balancing assumption is well satisfied.

5.1.2. Common support assumption

Figs. 2 and 3 display the kernel density function before and after the PSM process, respectively. Fig. 2 shows clear differences in the kernel density functions of the treatment and control groups, indicating that the results may be biased if the whole sample is analyzed without a matching process. Fig. 3 shows that after the matching process, the kernel density functions of the two samples almost completely coincide, indicating that there is no obvious difference between the treatment and control groups after the PSM process. These results suggest that the common support assumption is well satisfied.

5.1.3. Parallel trend assumption

Before the DID analysis, it is necessary to ensure that the trends in donations in the treatment and control groups are parallel. Fig. 4 displays the trend in donations before and after the fraud penalties in the treatment and control groups after the PSM process. The trends in the donations of the treatment and control groups before any penalties are basically the same. After a penalty, the trend in the control group is stable, whereas in the treatment group there is a sharp increase in the first year after the penalty, followed by a pullback in the second year after the penalty. After two years, the treatment group and control group again have similar trends in donations. Fig. 4 supports the instrumental donation argument, which suggests that companies

Table 5
Balancing assumption of the PSM.

Variable	Definition	Period	Treatment	Control	Bias	|Bias| reduced	T-value
OwnCon	Ownership concentration; the total squares of the three largest shareholders' shareholdings	Before	0.162	0.178	−12.9		−2.91
		After	0.162	0.163	−1	92.3	−0.17
Dual	Board duality; equals 1 if the board director and the CEO is the same person, and otherwise 0	Before	0.264	0.220	10.2		2.44
		After	0.264	0.272	−2.1	79.8	−0.33
Insti	Shareholdings ratio of institution	Before	0.212	0.217	−2.6		−0.6
		After	0.212	0.214	−1	59.9	−0.18
Topmanah	Shareholdings ratio of top managers	Before	0.076	0.055	15.4		3.92
		After	0.076	0.079	−2.2	85.6	−0.35
SalaryBoard3	Natural logarithm of the total salary of the top three board members	Before	13.840	13.781	4.2		0.89
		After	13.840	13.828	0.8	79.9	0.15
Sharetop1	Shareholdings ratio of the largest shareholder	Before	34.973	36.834	−12.4		−2.82
		After	34.973	35.067	−0.6	95	−0.11
Board Size	Natural logarithm of the number of board members	Before	2.262	2.286	−13.5		−3.14
		After	2.262	2.256	3.2	76.7	0.54
Board Inde	Number of independent directors divided by total number of board members	Before	0.370	0.367	6		1.39
		After	0.370	0.371	−0.1	98	−0.02
Size	Company assets; equals the natural logarithm of total assets at the end of the year	Before	21.833	21.995	−12.7		−2.85
		After	21.833	21.860	−2.1	83.3	−0.37
Lev	Leverage; equals total liabilities divided by total assets at the end of the year	Before	0.447	0.427	9.1		2.19
		After	0.447	0.447	0.1	98.7	0.02
ROE	Return on equity; equals the net profit divided by total equity at the end of the year.	Before	0.052	0.078	−19		−5.04
		After	0.052	0.058	−4.2	77.8	−0.63
Growth	Growth rate of net profit	Before	−0.847	−0.096	−16.8		−4.71
		After	−0.847	−0.670	−4	76.4	−0.6
SOE	Equals 1 if the company is state-owned, and 0 otherwise	Before	0.353	0.491	−28.1		−6.41
		After	0.353	0.341	2.5	91.1	0.44

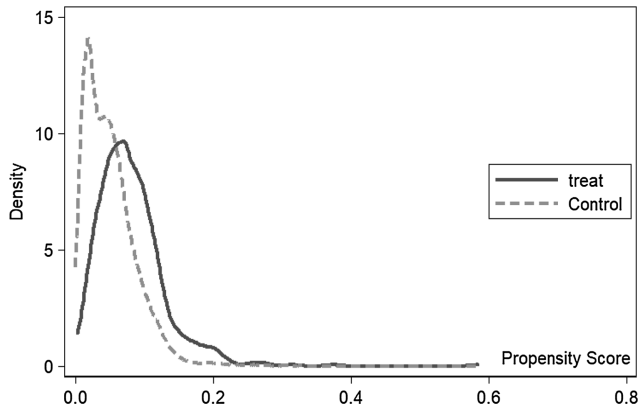

Fig. 2. Kernel density functions before PSM.

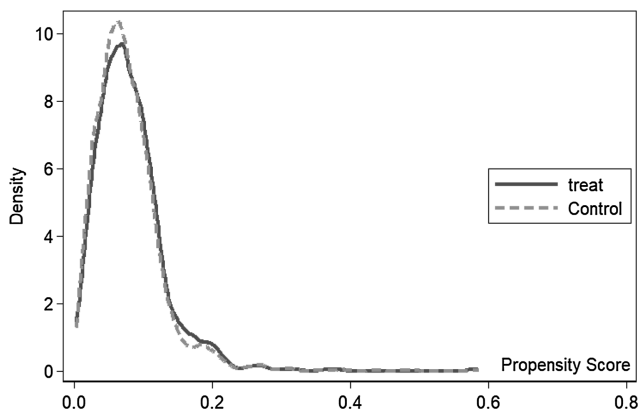

Fig. 3. Kernel density functions after PSM.

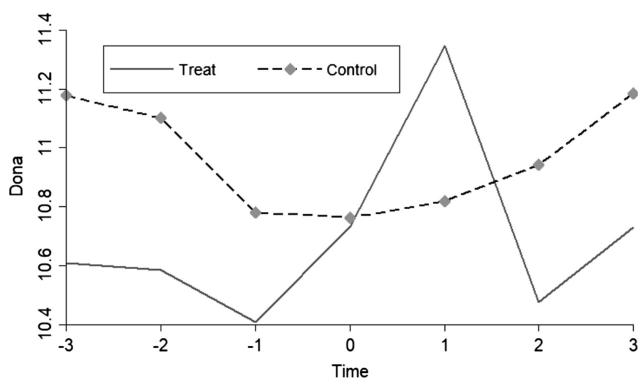

Fig. 4. Donation trends in the treatment and control groups. The Y-axis presents the natural logarithm of the amount of the company's donation; The X-axis presents the time variable before or after the regulatory penalty.

attempting to repair a damaged reputation only increase donations for a short period (one year) after the penalty before returning to a normal level.

Next, we follow Beck et al. (2010) and set a series of time dummies: two years before the penalty (*before2*), one year before the penalty (*before1*), the penalty year (*current*), one year after the penalty (*after1*), two years after the penalty (*after2*), and three years after the penalty (*after3*). Next, we summarize the net effect of the time variables on donations. As shown in Fig. 5, in the years before a penalty, there is no significant change in

donations, but in the first year after the penalty, there is an increase in donations. Fig. 5 shows some support for the parallel trend assumption and for a causal relation between regulatory penalties and donations.

We also implement other parallel trend tests proposed by Beck et al. (2010). The untabulated results show parallel trends in the treatment and control group before the penalties.

5.2. Univariate analysis after PSM

Using the PSM sample, we compare the median differences in donations before and after regulatory penalties. Table 6, Panels A and B show the results for the logarithm of and original amounts of donations, respectively. Panel A shows a significant increase in donations only in the first year after the penalty; Panel B shows no significant increases. Panels A and B both show a significant increase from one year before the penalty to one year after the penalty; however, there is no significant change in subsequent years. These results suggest that after being penalized for fraud, a company increases its charitable donation, but only in the short term, indicating the instrumental role of such donations.

5.3. DID results for the PSM sample

Table 7 reports the results of Models 1 and 2 for the PSM sample. We investigate trends in donations one year, two years, and three years around a penalty event (but not the year of the penalty). The coefficients of the

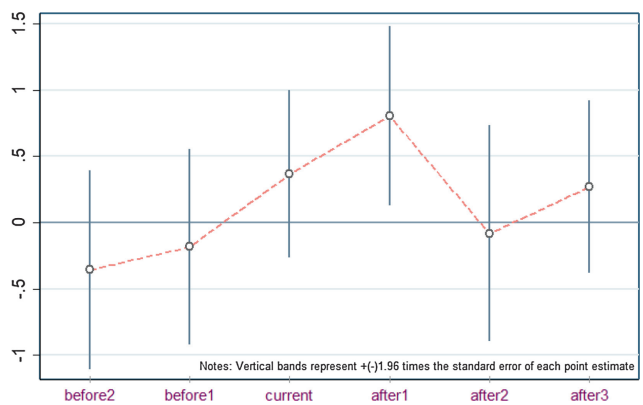

Fig. 5. Dynamic effect of regulatory penalties on donations.

Table 6
Donations before and after a regulatory penalty in the PSM sample.

Panel A: Natural logarithm of (donation amount + 1)					
t	−1	0	+1	+2	+3
Median	−0.405	−0.275	0.099	−0.195	−0.129
Compared with the year of the regulatory penalty			(+1)–(0)	(+2)–(0)	(+3)–(0)
			0.374**	0.081	0.081
Compared with one year before the regulatory penalty			(+1)–(−1)	(+2)–(−1)	(+3)–(−1)
			0.505***	0.211	0.276
Panel B: Donation amount					
t	−1	0	+1	+2	+3
Median	160000.000	179525.000	201536.400	194367.200	200000.000
Compared with the year of the regulatory penalty			(+1)–(0)	(+2)–(0)	(+3)–(0)
			22011.430	14842.195	20475.000
Compared with one year Before the regulatory penalty			(+1)–(−1)	(+2)–(−1)	(+3)–(−1)
			41536.430**	34367.195	40000.000

Note: *** and ** indicate significance at the 1% and 5% levels, respectively.

Table 7
DID results for the PSM sample.

	(1)	(2)	(3)	(4)	(5)	(6)
	[−1, +1]		[−2, +2]		[−3, +3]	
	OLS	FE	OLS	FE	OLS	FE
	Dona	*Dona*	*Dona*	*Dona*	*Dona*	*Dona*
Fraud × Post	0.964**	0.855**	0.595*	0.517*	0.432	0.403
	(0.019)	(0.021)	(0.075)	(0.086)	(0.135)	(0.145)
Post	−0.210		−0.109		0.013	
	(0.457)		(0.618)		(0.946)	
Fraud	−0.175		−0.307		−0.363*	
	(0.493)		(0.156)		(0.065)	
Size	1.092***	0.907	1.054***	0.261	1.068***	0.616
	(0.000)	(0.293)	(0.000)	(0.684)	(0.000)	(0.129)
Lev	0.059	−1.501	−0.182	−0.602	−0.091	−0.980
	(0.943)	(0.506)	(0.791)	(0.700)	(0.877)	(0.422)
Sales Fee	4.979**	20.425*	6.914***	10.512	7.488***	6.788
	(0.015)	(0.076)	(0.000)	(0.125)	(0.000)	(0.210)
Patent	0.277***	0.344*	0.231***	0.204	0.154**	0.133
	(0.002)	(0.092)	(0.002)	(0.147)	(0.019)	(0.223)
Board Size	0.197	−2.193	0.333	−0.418	0.283	−1.217
	(0.805)	(0.338)	(0.588)	(0.770)	(0.596)	(0.287)
Cash	−0.357	−0.085	−0.668***	−0.581	−0.653***	−0.640*
	(0.206)	(0.896)	(0.006)	(0.170)	(0.002)	(0.067)
ROA	10.899***	3.842	12.866***	4.008	12.138***	5.010
	(0.001)	(0.434)	(0.000)	(0.257)	(0.000)	(0.101)
TobinQ	−0.128	−0.277*	−0.195**	−0.057	−0.214***	−0.028
	(0.184)	(0.082)	(0.014)	(0.605)	(0.002)	(0.765)
SOE	−1.335***	−0.576	−1.102***	−1.112	−1.178***	−0.822
	(0.000)	(0.599)	(0.000)	(0.127)	(0.000)	(0.102)
Age	−0.331*	−0.688	−0.475***	−0.417	−0.406***	−0.755**
	(0.053)	(0.378)	(0.001)	(0.353)	(0.001)	(0.029)
GDPPC	0.062	0.866	0.037	0.576	0.003	0.249
	(0.260)	(0.352)	(0.421)	(0.221)	(0.946)	(0.439)
Dual	0.083	0.048	0.074	0.083	0.069	0.047
	(0.711)	(0.942)	(0.688)	(0.849)	(0.667)	(0.891)
Board Inde	−2.098	6.855	−1.308	2.104	−0.510	2.276
	(0.357)	(0.243)	(0.458)	(0.540)	(0.741)	(0.384)
_cons	−10.056***	−1.677	−10.116***	8.609	−10.149***	3.117
	(0.002)	(0.929)	(0.000)	(0.512)	(0.000)	(0.719)
Year	Control	Control	Control	Control	Control	Control
Industry	Control	–	Control	–	Control	–
Firm	–	Control	–	Control	–	Control
N	1773	1773	2710	2710	3490	3490
r2_a	0.132	0.409	0.135	0.397	0.135	0.351

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

DID variable *Fraud* × *Post* are significantly positive at the 5% or 10% levels one year and two years around the penalty, indicating that companies significantly increase their donations shortly after a regulatory penalty. The coefficients of *Fraud* × *Post* in the three years around the penalty are positive but not significant, suggesting that the effect of regulatory penalties on donations weakens over time. Further, the significance and the magnitude of *Fraud* × *Post* decreases over time, also suggesting that increasing donations after a regulatory penalty is a short-term behavior. Overall, the results suggest that companies increase donations to repair reputations damaged by regulatory penalties.

6. Mechanism tests

6.1. Effect of ownership type on relations between donations and regulatory penalty

In the Chinese market economy, there are obvious differences in the resource endowments of SOEs and non-SOEs, leading to differences in donation behaviors. Listed SOEs obtain high-quality resources from the state sector, and therefore can better afford regulatory penalties and suffer a relatively slight negative impact from these penalties (Haß et al., 2019). Moreover, the donation behavior of non-SOEs is more likely to be aimed at acquiring access to external resources (Li, 2012; Zhang et al., 2018) and gaining more marginal benefits (Kao et al., 2018). As a result, non-SOEs, due to their relative disadvantage in the capital market, are more motivated to make donations to reduce the negative impact of a regulatory penalty. To test this argument, we investigate the moderating effect of different ownership types. Panels A and B of Table 8 show the results for the non-SOEs and SOEs subsamples, respectively. Similar to Table 7, we report the results for one year, two years, and three years around the penalty (not including the year of the penalty) in columns 1 to 6.

Panel A shows that in the non-SOEs subsample, there are significantly positive coefficients of *Fraud* × *Post* in the three years around the regulatory penalty. Panel B shows that in the SOEs subsample the coefficients on *Fraud* × *Post* are insignificant. These results suggest that non-SOEs are more motivated to repair reputations damaged by regulatory penalty than SOEs, and thus non-SOEs are more likely to increase their donations for a longer time after a regulatory penalty.

6.2. Alignment effect of large shareholders

When a company suffers a reputation loss due to regulatory penalties, managers can make the decision to donate money to charity to repair the company's reputation without shareholders' consent, especially if they have large shareholders' support. In addition, as ownership concentration increases, the interest alignment effect provides greater motivation and ability to repair a damaged reputation through donations. Table 9 reports the moderating effect of interest alignment, as measured by the largest shareholder's holding ratio.[2] We divide the sample into two groups[3] based on high and low largest shareholder's holding ratio and re-run the analyses. The results are shown in Panels A and B of Table 9, respectively. The results reported in column 1 and 2 of Panel B show that the coefficient of *Fraud* × *Post* is only significant in the sample with higher largest shareholder's holding ratio. This indicates that the interest alignment of larger shareholders gives the company a higher incentive to repair the reputation after regulatory penalties.

6.3. Effect of penalty severity

A more serious fraud leads to a severer penalty and is associated with a greater loss of reputation. Therefore, a company given a severe penalty is expected to be more motivated to repair its reputation through charitable donations. As the penalties are generally symbolic (Chen et al., 2005; Song et al., 2011; Li and Ren, 2017), we find it is quite difficult to separate the heterogenous effects of penalty severity. As shown in Table 2, only about a quarter of the penalized companies are given a specific administrative penalty, and the other

[2] An alternative measurement of interest alignment, the holding ratio of the top three shareholders, gives the same results.

[3] As a robustness test, we divide the sample into three groups by the largest shareholder's holding ratio and only use the highest and lowest groups, in other words, we delete the middle group. The results remain similar.

Table 8
Moderating effect of ownership type.

	(1) OLS *Dona*	(2) FE *Dona*	(3) OLS *Dona*	(4) FE *Dona*	(5) OLS *Dona*	(6) FE *Dona*
Panel A: Non-SOEs subsample						
	[−1, +1]		[−2, +2]		[−3, +3]	
Fraud × *Post*	1.113**	1.042**	0.839**	0.708**	0.622*	0.578*
	(0.015)	(0.013)	(0.026)	(0.043)	(0.061)	(0.073)
Post	−0.439		−0.216		−0.075	
	(0.184)		(0.403)		(0.746)	
Fraud	0.059		−0.066		−0.186	
	(0.838)		(0.795)		(0.428)	
N	1286	1286	1938	1938	2465	2465
r2_a	0.134	0.384	0.131	0.373	0.125	0.327
Panel B: SOEs subsample						
	[−1, +1]		[−2, +2]		[−3, +3]	
Fraud × *Post*	0.310	0.266	−0.518	−0.078	−0.386	−0.118
	(0.751)	(0.773)	(0.479)	(0.906)	(0.525)	(0.844)
Post	0.426		0.327		0.304	
	(0.454)		(0.441)		(0.403)	
Fraud	−0.739		−0.821*		−0.716*	
	(0.220)		(0.070)		(0.068)	
N	487	487	772	772	1025	1025
r2_a	0.128	0.463	0.154	0.450	0.169	0.413
Other Control Variables	Control	Control	Control	Control	Control	Control
Year	Control	Control	Control	Control	Control	Control
Industry	Control	–	Control	–	Control	–
Firm	–	Control	–	Control	–	Control

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

three-quarters only get slight penalties in the *other* category. We divide the sample into subsamples of specified penalties and other penalties and re-run the regression. We expect that the increase in donations after a penalty is more common in companies that have received specific penalties, as they entail a more severe reputation loss.

Table 10 reports the results of the above analyses. Panel A shows that in the specific penalty subsample all of the coefficients of the DID variable *Fraud* × *Post* (except the one year around regression using FE) are significantly positive. Panel B shows that in the *other* penalties subsample, the coefficients of the DID variable *Fraud* × *Post* are all insignificant. These results suggest that companies that suffer severer penalties are more likely to increase charitable donations.

6.4. Consequences of donations

We argue that making charitable donations is a type of goodwill gesture aimed at repairing a company's reputation. We further expect that such donations will have a positive effect on a company's financing behavior. Dai et al. (2016) demonstrate the reputation enhancement effect of donations by showing a positive relation between donations and debt financing. We investigate the effect of donations on companies' bank loan contracts to show the role of donations in repairing damaged reputations. The results are shown in Table 11. Columns 1 and 2 show the positive effect of donations (*Dona*), the negative effect of penalty (*Post*), and the positive effect of the interaction (*Dona* × *Post*) on achieving short-term bank loans. Columns 3 and 4 show similar effects of *Dona*, *Post*, and *Dona* × *Post* on companies' credit loans. Thus, donations not only help com-

Table 9
Moderating effect of the largest shareholder's holding ratio.

	(1) OLS *Dona*	(2) FE *Dona*	(3) OLS *Dona*	(4) FE *Dona*	(5) OLS *Dona*	(6) FE *Dona*
Panel A: Companies with low largest shareholder's holding ratio						
	[−1, +1]		[−2, +2]		[−3, +3]	
Fraud × *Post*	0.619	0.287	0.704	0.496	0.490	0.262
	(0.270)	(0.610)	(0.132)	(0.233)	(0.214)	(0.507)
Post	0.104		−0.234		−0.021	
	(0.782)		(0.437)		(0.939)	
Fraud	−0.525		−0.720**		−0.455*	
	(0.155)		(0.020)		(0.097)	
N	922	922	1401	1401	1787	1787
r2_a	0.180	0.504	0.166	0.472	0.162	0.411
Panel B: Companies with high largest shareholder's holding ratio						
	[−1, +1]		[−2, +2]		[−3, +3]	
Fraud × *Post*	1.533**	1.080*	0.560	0.101	0.449	0.439
	(0.013)	(0.085)	(0.241)	(0.837)	(0.292)	(0.316)
Post	−0.659		−0.161		−0.104	
	(0.130)		(0.618)		(0.713)	
Fraud	−0.002		−0.069		−0.417	
	(0.996)		(0.825)		(0.150)	
N	851	851	1309	1309	1703	1703
r2_a	0.111	0.350	0.124	0.341	0.130	0.325
Other Control Variables	Control	Control	Control	Control	Control	Control
Year	Control	Control	Control	Control	Control	Control
Industry	Control	–	Control	–	Control	–
Firm	–	Control	–	Control	–	Control

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

panies to achieve bank loans, but also to mitigate the negative effect of regulatory penalties on achieving bank loans. That is, increasing donations can improve a company's reputation and help repair the reputation damage induced by regulatory penalties. The results given in Table 11 provide additional support for our argument that donations can be used to repair reputations.

7. Robustness tests

7.1. Placebo test

If increases in charitable donations are responses to regulatory penalties, then there should not be any significantly positive associations in a randomly chosen year. To perform such a placebo test, we choose either three years before or three years after the actual event year as the pseudo regulation year, and re-run the regression. The results are shown in Table 12. As shown in columns 1 to 3, in the three years before the pseudo-shock year the coefficient on the DID variable *Dona* × *Post* are all negative but insignificant. The results for three years after the pseudo regulation year, given in columns 4 to 5, show the coefficients of *Dona* × *Post* are not significant two years or three years around the pseudo regulation year, but are significantly negative at the 10% level one year around the pseudo regulation year. These results provide additional evidence for a causal relation between donations and regulatory penalties, as they suggest that a pseudo regulation event has no impact on companies' donations.

Table 10
Moderating effect of penalty severity.

	(1) OLS *Dona*	(2) FE *Dona*	(3) OLS *Dona*	(4) FE *Dona*	(5) OLS *Dona*	(6) FE *Dona*
Panel A: Specific penalties subsample						
	[−1, +1]		[−2, +2]		[−3, +3]	
Fraud × *Post*	1.538*	0.302	1.951***	1.386*	1.862***	1.476*
	(0.090)	(0.727)	(0.009)	(0.082)	(0.002)	(0.051)
Post	−0.187		−0.171		−0.005	
	(0.667)		(0.617)		(0.985)	
Fraud	−0.550		−0.835*		−0.622	
	(0.341)		(0.076)		(0.124)	
N	563	563	855	855	1118	1118
r2_a	0.160	0.433	0.156	0.382	0.165	0.365
Panel B: Other penalties subsample						
	[−1, +1]		[−2, +2]		[−3, +3]	
Fraud × *Post*	0.422	0.640	0.142	0.327	0.136	0.333
	(0.297)	(0.107)	(0.671)	(0.285)	(0.644)	(0.243)
Post	0.284		0.216		0.221	
	(0.258)		(0.294)		(0.247)	
Fraud	0.088		−0.147		−0.229	
	(0.740)		(0.514)		(0.267)	
N	1962	1962	2962	2962	3806	3806
r2_a	0.150	0.397	0.150	0.401	0.149	0.374
Other Control Variables	Control	Control	Control	Control	Control	Control
Year	Control	Control	Control	Control	Control	Control
Industry	Control	–	Control	–	Control	–
Firm	–	Control	–	Control	–	Control

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 11
Effect of donations on bank loans.

	(1) *Short Loan*	(2) *Short Loan*	(3) *Credit Loan*	(4) *Credit Loan*
Dona	0.001**	0.001*	0.004*	0.003
	(0.016)	(0.057)	(0.066)	(0.157)
Post		−0.024*		−0.175*
		(0.080)		(0.075)
Dona × *Post*		0.002*		0.014*
		(0.064)		(0.092)
Other Control Variables	Control	Control	Control	Control
Year	Control	Control	Control	Control
Firm	Control	Control	Control	Control
N	4293	4293	4293	4293
r2_a	0.573	0.573	0.199	0.199

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

7.2. Probability of donation

The above analysis tests the relation between the amount of donations and regulatory penalties. As a robustness test, we investigate the impact of regulatory penalties on the probability of charitable donations.

Table 12
Placebo test.

	(1)	(2)	(3)	(4)	(5)	(6)
	t = −3 as a pseudo-regulation year			t = +3 as a pseudo regulation year		
	[−4, −2] *Dona*	[−5, −1] *Dona*	[−6, 0] *Dona*	[2, 4] *Dona*	[1, 5] *Dona*	[0, 6] *Dona*
Fraud × *Post*	−0.698	−0.322	−0.304	−1.001*	−0.383	−0.455
	(0.236)	(0.459)	(0.430)	(0.077)	(0.383)	(0.232)
Other Control Variables	Control	Control	Control	Control	Control	Control
Year	Control	Control	Control	Control	Control	Control
Firm	Control	Control	Control	Control	Control	Control
N	975	1676	2449	1269	1980	2726
r2_a	0.397	0.375	0.375	0.421	0.386	0.386

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Specifically, we change the dependent variable in Model 1 to a dummy variable that indicates whether the company makes any donation (*Dona_D*), and then we conduct a Logit regression using the PSM sample. The results are given in Table 13. For the one year period around the penalty, the DID variable *Dona* × *Post* is significantly positive at the 1% level indicating the increased probability of a donation. However, the significance and the magnitude of *Dona* × *Post* decline over time. These results support the argument that a company is more likely to make a donation shortly after being subject to a regulatory penalty.

7.3. More control variables

To further control for biases created by missing variables, we add the variables from the PSM process to Model 2. CEO turnover may occur after a regulatory penalty; thus, we further control for CEO turnover (*CEO Turn*) in Model 1. The donation behavior in the penalty year may be related to the previous year's behavior; thus, we also control for the one year lagged donation (*L_Dona*). Table 14 reports the results of the regressions with these extra control variables. The results for *Dona* × *Post* are similar to those given in Table 7.

7.4. Eliminating the structural impact of the Wenchuan earthquake

To eliminate the structural shock of the Wenchuan Earthquake on companies' donation behavior, we follow Dai et al. (2014) and delete all of the observations in 2008. Table 15 reports the results of Models 1 and 2 with this alternate sample. The results are similar to those for *Dona* × *Post* shown in Table 7.

Table 13
Probability of donations.

	(1) [−1, +1] *Dona_D*	(2) [−2, +2] *Dona_D*	(3) [−3, +3] *Dona_D*
Fraud × *Post*	1.105***	0.562*	0.346
	(0.009)	(0.056)	(0.173)
Other Control Variables	Control	Control	Control
Year	Control	Control	Control
Industry	Control	Control	Control
N	1037	1990	2729
r2_p	0.102	0.086	0.074

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 14
DID results with additional control variables.

	(1) [−1, +1] *Dona*	(2) [−2, +2] *Dona*	(3) [−3, +3] *Dona*
Fraud × *Post*	0.757**	0.595**	0.464*
	(0.030)	(0.048)	(0.094)
L_Dona	−0.455***	−0.310***	−0.271***
	(0.000)	(0.000)	(0.000)
CEO Turn	−0.191	0.108	0.080
	(0.496)	(0.622)	(0.666)
_cons	−1.677	8.609	3.117
	(0.929)	(0.512)	(0.719)
Other control variables in model 2	Control	Control	Control
Other control variables	Control	Control	Control
Year	Control	Control	Control
Firm	Control	Control	Control
N	1773	2710	3490
r2_a	0.409	0.397	0.351

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 15
DID results for sample without Wenchuan earthquake shock.

	(1)	(2)	(3)	(4)	(5)	(6)
	[−1, +1]		[−2, +2]		[−3, +3]	
	OLS *Dona*	FE *Dona*	OLS *Dona*	FE *Dona*	OLS *Dona*	FE *Dona*
Fraud × *Post*	0.942**	0.877**	0.591*	0.525*	0.422	0.435
	(0.024)	(0.018)	(0.080)	(0.086)	(0.151)	(0.121)
Post	−0.187		−0.092		0.036	
	(0.517)		(0.680)		(0.857)	
Fraud	−0.167		−0.302		−0.361*	
	(0.518)		(0.168)		(0.073)	
Other control variables	Control	Control	Control	Control	Control	Control
Year	Control	Control	Control	Control	Control	Control
Industry	Control	–	Control	–	Control	–
Firm	–	Control	–	Control	–	Control
N	1744	1744	2671	2671	3416	3416
r2_a	0.129	0.409	0.133	0.394	0.131	0.351

Note: The p-values are calculated with robust standard errors in parentheses. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

8. Conclusions

It has been argued that a penalty for fraud motives a listed company to make charitable donations to repair its damaged reputation. This study examines the evidence for this reputation repair motivate. Using a sample of Chinese non-financial A-share listed companies, this study analyzes the relation between regulatory penalties and charitable donations. We also investigate the moderating effects of ownership type, ownership concentration, and penalty severity. The results show there is a significant increase in donations after regulatory penalties. However, this increase only lasts for a short time, indicating that such increases could be a tool for repairing companies' reputations. This effect is stronger for companies that are non-SOEs, have higher ownership concentration, and are subject to severer penalties.

This study helps to broaden our understanding of the risk management theory of CSR by providing empirical evidence that companies will increase charitable donations to repair their reputations after a negative event. This study also enriches the literature on the consequences of regulation and offers insights into the underlying mechanism by analyzing the moderating effects of property type and governance characteristics. Finally, this study enhances our understanding of companies' motivations for making charitable donations.

Acknowledgments

We appreciate the constructive comments and valuable suggestions made by our anonymous reviewers. We thank the seminar participants at the 10th Anniversary Symposium of the China Journal of Accounting Research, and give special thanks to the discussant, Professor Hongqi Yuan. We acknowledge financial support from the China National Social Science Foundation Key Research Project (Project No. 17ZDA086).

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China Journal of Accounting Research 12 (2019) 315–335

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China Journal of Accounting Research

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Reward meritocracy or nepotism: The case of independent financial advisors appointed by Chinese listed companies

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ARTICLE INFO

Article history:
Received 13 May 2017
Accepted 5 March 2019
Available online 15 April 2019

Keywords:
Independent financial advisors
Transaction role
Authentication role
Industry experience
Relationship

ABSTRACT

As independent financial advisors, securities firms are the core intermediaries in major asset reorganization (MAR) of listed companies. Furthermore, they play the dual roles of transaction and authentication. Based on this institutional background, this paper studies how listed companies choose between industry experience ("meritocracy") and relationships ("nepotism"). Using the MAR of A-share listed companies from 2008 to 2013 as the sample, this paper shows that higher transaction costs (i.e., greater demand for the transaction function of advisors) are related to the higher possibility of advisors with weaker relationships and more industry experience being hired. It also shows that higher suspicion of tunneling (i.e., greater demand for the signal of fairness associated with advisors' authentication function) is related to the higher possibility of advisors with weaker relationships being hired, but it is not significantly related to whether advisors have more or less industry experience. This paper also shows that reputation has a certain governance effect on the negative consequences of relationship. For the most part, listed companies reward meritocracy but not nepotism when appointing independent financial advisors.

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https://doi.org/10.1016/j.cjar.2019.03.001
1755-3091/

1. Introduction

The mergers and acquisitions (M&A) of listed companies are important in building corporate strength and promoting industrial upgrading. In addition, the role of major asset reorganization (MAR), with a larger transaction scale and more far-reaching impacts on the fundamentals of the companies involved, is especially prominent when listed companies seek overall business transformation. Although the majority of listed companies do not lack M&A experience, they resort to M&A as a means of strategic deployment or as an investment tactic far less than other business activities. Furthermore, the expertise of specialists remains indispensable, even for those most experienced in M&A (Sleptsov et al., 2013). Information disclosure, transaction terms, implementation processes, and many other aspects of MAR fall under the scrutiny of the China Securities Regulatory Commission (CSRC), which continues to roll out new laws and regulations to regulate relevant activities. Therefore, it is very difficult for enterprises to implement innovation in business practices while trying to meet regulation requirements on their own. Additionally, negative impacts from the failure of restructuring may be amplified due to the larger transaction scale. The above facts highlight the necessity of hiring independent financial advisors or other agencies with expertise and knowledge in this field to help reduce transaction costs.

Securities companies serve as the independent financial advisors and core agencies in MAR. According to the Measures for the Administration of Financial Advisory Business of M&A and Restructuring of Listed Companies and the Measures for the Administration of Major Asset Reorganization of Listed Companies, independent financial advisors play dual roles. Their first role concerns transaction,[1] which refers to the entire process of their participation in MAR, from planning and preparation to integration. They identify and determine the target, provide advice on the terms of transaction, including pricing, and assist listed companies in avoiding risks (e.g., transaction risks and regulatory risks), disclosing information, and responding to CSRC inquiries. Their second role concerns authentication, which means that from an impartial and independent perspective, they examine the fairness of the objectives, schemes, and pricing of the restructuring and evaluate the clarity of the asset ownership, the asset integrity, the ability of the listed companies to sustain their operation and profitability, whether the profit forecast can be realized, whether the company has maintained its business independence, and whether the interests of minority shareholders are infringed upon. All of these elements are shown in independent financial advisors' reports. Once a listed company hires a securities company as its independent financial advisor, it must simultaneously undertake both the transaction role and authentication role. In this paper, these roles are identified as the dual roles of an independent financial advisor. The dual roles of independent financial advisors are similar to the two services offered by investment banks in the U.S. market—the financial advisory service and the service of fairness opinions. The financial advisory service resembles the transaction role in that they both try to ensure that the transaction is successfully completed and provide their assistance in the process. The service of fairness opinions resembles the authentication role in that they both offer unbiased opinions, with the exception that investment banks focus more on the fairness of consideration (Kisgen et al., 2009), whereas independent financial advisors must assess whether any possibility of unfairness exists throughout the restructuring process from the perspectives of the motives, terms, and implementation of the restructuring. Moreover, in terms of the connotations of a fair transaction, the U.S. market focuses on the possibility of establishing a business empire, which falls into the scope of the first type of agency problem. However, the Chinese market mainly focuses on the second type of agency problem of whether restructuring will become a tool for major shareholders to encroach upon the resources of listed companies.

The influence of independent financial advisors on MAR starts with their employment by the listed companies. Therefore, how listed companies make their hiring decisions is the first step toward "unlocking" the "black box" that contains the functioning mechanisms and effects of independent financial advisors. Generally, two important factors must be considered when a company decides to hire a third-party agency: connections and experience. Establishing connections begins with the business cooperation between the company and

[1] This paper summarizes the transaction and authentication roles. However, they are not explicitly listed in the *Measures for the Administration of Financial Advisory Business of M&A and Restructuring of Listed Companies* or the *Measures for the Administration of Major Asset Reorganization of Listed Companies*.

the agency, and the mutual trust that results from such connections helps information be communicated efficiently and at a low cost (Chen et al., 2016; Liu and Tang, 2009). Experience is accumulated as the agency builds up its business in a certain field within a given period, such that rich experience signifies the expertise of the third-party agency and, thus, predictable valuable advice and assistance services (Liu et al., 2010; Song et al., 2016). The foreign literature suggests that companies engaging in M&A consider the traits of investment banks in terms of connections and experience when making hiring decisions (Francis et al., 2014; Wang et al., 2014). What makes the study of independent financial advisors distinct is that unlike the agencies offering specialty services, such as auditors, asset appraisers, and lawyers, independent financial advisors undertake dual roles and listed companies may prefer independent financial advisors with better connections with them or, in other circumstances, those with more experience in the trade. The key determinant is which of the company's needs prevails. The competence of independent financial advisors to fulfill their dual roles is naturally doubted. In addition, the validity of their authentication is compromised, as they are self-evaluated, which may negatively affect the hiring decisions of listed companies. For these reasons, this paper's research question requires separate examination of the dual roles of transaction and authentication played by independent financial advisors and consideration of how listed companies choose between connections and experience.[2]

This paper is significant for three reasons. First, it supplements the empirical literature on the study of independent financial advisors and the hiring decisions of listed companies, including the hiring of general financial advisors. Currently, in the Chinese literature, only Li et al. (2017) discuss, based on a sample of M&A events from 2009 to 2014, the mechanisms of financial advisors in different relationships with listed companies and the relevant influences on the economic consequences of M&A. Chen et al. (2015) also talk about the impacts of the reputation of financial advisors on the market reaction on listed companies' M&A announcement days. However, neither of them discusses the hiring decisions of listed companies, and both focus on general financial advisors that do not share the dual role trait of independent financial advisors. This paper, nevertheless, draws conclusions about the motives of listed companies in their hiring of independent financial advisors. Accordingly, it provides policymaking guidance on how to optimize the policy constraints related to independent financial advisors, regulate the M&A activities of listed companies, and curb the opportunistic behavior of independent financial advisors.

Second, this paper analyzes the motives of listed companies in their hiring of independent financial advisors from the perspectives of the dual roles of transaction and authentication and connections versus experience simultaneously. Contrarily, the foreign literature is limited to the discussion of the influence of connections or experience on the decision making of listed companies from the perspective of investment banks serving as financial advisors (Chang et al., 2016; Francis et al., 2014; Wang et al., 2014). Furthermore, such studies on the fairness-opinion service provided by investment banks only involve the characteristics of acquirers or the reputations of investment banks (Cain and Denis, 2013; Chen, 2010; Kisgen et al., 2009; Makhija and Narayanan, 2007). However, this paper, based on the traits of listed companies and the characteristics of MAR, distinguishes the scenarios between those in which listed companies need the transaction role of independent financial advisors more and those in which they need the authentication role more before examining how listed companies' choose between "nepotism" and "meritocracy" in their hiring of independent financial advisors. In this sense, this paper expands the research scope of the foreign literature by fully exposing the motives of listed companies in hiring independent financial advisors.

Third, distinct from the U.S. market, the mandatory Chinese regulation on the dual roles of independent financial advisors also provides an exogenous setting for the hiring motives of listed companies. Thus far, no foreign studies have examined the situation in which one investment bank is hired to offer both the financial advisory service and fairness opinion service, how the board of directors makes the decision, or whether any difference in preference exists if they separately hire financial advisors. The board of directors may have absolute discretion in the hiring of investment banks and may have doubts in hiring one investment bank to provide two services (e.g., doubts about information sharing between the two services or that someone in the

[2] It must be stressed that because this paper discusses the hiring decisions of listed companies, its theoretical construction and hypothetical derivation are based on the realistic needs of listed companies for independent financial advisors and the signals that said advisors send to the outside. This paper does not discuss the economic impacts of independent financial advisors with certain types of characteristics on MAR or on the fundamentals of listed companies.

company may easily reach agreement with the investment bank offering both services). Therefore, in the U.S. context, whether the board of directors hires the same investment bank and what kind of investment banks it hires are actually two interconnected research questions. However, it is difficult to define clear boundaries between them. In the Chinese context, the exogenous setting of the dual roles of independent financial advisors can help focus our research on how listed companies choose between nepotism and meritocracy and thus help address the motives behind their choices.

The remainder of this paper is organized as follows. Section 2 introduces the regulatory background. Section 3 establishes the theoretical framework and proposes a hypothesis. Furthermore, it separates the transaction and authentication roles of independent financial advisors and analyzes the influences of connections and experience independently. Section 4 introduces the research design. Section 5 lists the empirical results and provides the analysis. Section 6 summarizes the entire paper.

2. Institutional background

In China, listed companies can decide whether they want to hire financial advisors if the M&A or structuring is only of general significance. However, an independent financial advisor is required if they are planning an MAR. The *Measures for the Administration of Major Asset Reorganization of Listed Companies* specifies the duties of independent financial advisors, indicating that they shall "prudently check whether the MAR constitutes a related-party transaction and express a clear opinion on the basis of the facts confirmed through inspection. Where a MAR involves a related-party transaction, the independent financial advisor shall express a clear opinion on the impact of the restructuring on the non-related shareholders of the listed company." Additionally, after the CSRC approves the MAR, they shall "inspect and verify the compliance and risks during the implementation process of MAR, asset transfer and related follow-up matters, and deliver clear concluding observations." Similar regulations can also be found in the *Measures for the Administration of Financial Advisory Business of M&A and Restructuring of Listed Companies*: "For matters concerning the MAR of a listed company, the financial advisor shall pay attention to: the purpose of restructuring, the restructuring plan, the fairness of the transaction pricing, the clarity of asset ownership, the integrity of the assets, whether the business operation and profitability of the listed company are sustainable after the restructuring, the achievability of the profit forecast, the independence of the company's operation, and whether there is the possibility that the party engaging in the restructuring is using the restructuring to infringe the interests of the listed company." Moreover, "As per the regulations on the M&A and structuring by CSRC, the financial advisor is responsible to offer continuous authentication within the prescribed time limit after-. . .the completion of MAR. . .and other matters." To summarize the services of independent financial advisors mentioned above, they must verify the fairness of the entire MAR process, ranging from planning to implementation, which is referred to as the authentication role of independent financial advisors in this paper. Due to this role, independent financial advisors differ from other financial advisors in general M&A and restructuring cases in that they must maintain an independent identity and a neutral standing with no interest in the listed company in the forms including but not limited to holding shares of, acting as guarantor for, or taking a part-time job at the listed company, and they should not provide financial advisory services for the counterparty in the transaction according to the *Measures for the Administration of Financial Advisory Business of M&A and Restructuring of Listed Companies*. These measures also assert that the general business scope of financial advisors (not limited to independent financial advisors) includes but is not limited to due diligence and valuation, helping listed companies avoid risks (including trading risks and regulatory risks), designing the transaction structure, sending the report materials to the CSRC, and assisting the listed company in information disclosure. This covers almost all aspects of the M&A transaction and is collectively referred to as the transaction role of independent financial advisors in this paper. Therefore, according to the regulations from the policy level, independent financial advisors hired by listed companies for MAR must play the dual roles of transaction and authentication simultaneously.

In the institutional background of China, the distinctiveness of independent financial advisors lies in their mandatory dual roles, between which there exists an endogenous conflict. The supervisory role requires independent financial advisors to evaluate the fairness of the transaction in which they are deeply involved. However, in reality, they are not motivated to truly discover and disclose their own dereliction of duty. Moreover,

the motivation to pursue the completion of the transaction (to obtain commissions[3]) also makes them unwilling to spend extra time and money on identifying the terms of the transaction that may harm the interests of the minority shareholders and require the listed company to make modifications. Foreign research has reached a consistent conclusion. For example, Kisgen et al. (2009) find that the purchase of fair opinions by the board of directors of the acquirer results in a negative market reaction and that hiring an investment bank that does not act as a financial advisor helps reduce the loss of shareholder value. Chen (2010) finds the market response to be even worse when the investment bank that is hired to provide a fairer opinion also serves as a financial advisor than when it does not provide financial advice, whether it is on the announcement day or 6 months after. It must be acknowledged that in the Chinese context, where the market does not attach importance to the true value of a company, the authentication mechanism is not perfect and is not sufficiently strict and listed companies do not have the motivation to actively require "being regulated." They are most likely to reach a consensus with independent financial advisors that will do the "surface work" of their authentication role, the objective of which may very likely be to beautify the restructuring to pass the resolution of the shareholders' meeting and the review of the CSRC and to obtain good market feedback.

In summary, the institutional background in China serves as a special setting for the close inspection of the hiring decisions of listed companies. That is, cases in which the two roles of independent financial advisors have endogenous conflicts and their authentication role is likely to be ineffective, different preferences may exist for the different roles of independent financial advisors in the hiring of listed companies.

3. Theoretical analysis and hypotheses

This paper uses the following method of analysis. Based on the characteristics of listed companies and MAR, it first distinguishes between the situations in which listed companies need the transaction role of independent financial advisors more and those in which they need the authentication role more. It then discusses how listed companies choose between the connections and experience of independent financial advisors in these situations.

3.1. Transaction role of independent financial advisors and hiring decisions of listed companies

The higher the transaction costs of restructuring, the more listed companies need the transaction role of independent financial advisors. Transaction costs in restructuring include information search, contract making, and bargaining. Transaction costs are mainly shown in two aspects. First, information asymmetry between the M&A company and the target company causes risks during the processes of target selection, valuation, and integration (Servaes and Zenner, 1996). Second, both parties must pay for the expenses and time needed to communicate and negotiate during the transaction (Boeh, 2011). However, independent financial advisors can reduce the cost of information search in the process of locating the target (Wang et al., 2014), accurately analyze and judge the detailed information of the target (Hayward, 2003; Reuer and Koza, 2000; Singh and Montgomery, 1987), and reduce the costs of consultation and negotiation in the transaction process (Kesner et al., 1994; Thomas, 1995). That is, independent financial advisors reduce the transaction costs in restructuring mainly through their transaction role. The following subsection separately analyzes how listed companies choose between nepotism and meritocracy in considering their needs for the transaction role of independent financial advisors.

3.1.1. Nepotism: Influences of connections

From the perspective of the transaction role, connections that already exist between independent financial advisors and listed companies are conducive to enhancing the former's services. With connections established,

[3] The literature shows that a large part of the commissions for financial advisors in the U.S. M&A market is calculated as a percentage of the total transaction price and that most commissions are paid after a transaction is completed (Kesner et al., 1994). No study has investigated the form of commission received by financial advisors or independent financial advisors in China. However, considering that China has drawn on the experience of the U.S. for almost all aspects of its M&A and investment banking systems, it can be speculated that the commissions of independent financial advisors are calculated similarly in China.

financial advisors can better understand the resources, strategy, culture, and goals of listed companies, thus making their information services more pertinent and increasing the efficiency of their screening targets (Sleptsov et al., 2013). The transaction role of independent financial advisors also covers the following services: valuation, negotiation, consultation of the terms of the transaction, and assistance to listed companies in preparing report materials and information disclosure. In addition, connections also enhance the ability of independent financial advisors by promoting the flow of specific and professional information (Mesquita et al., 2008; Vasudeva et al., 2013), which reduces the costs of information collecting and filtering.

However, turning the analytical perspective from the function of their relationship to the behavioral motives of independent financial advisors, the securities companies of the independent financial advisors always seek to maximize the profit rather than the value of listed companies. Lack of motivation or conflict of interest can limit the role of financial advisors, which is referred to as the "agency conflict" between financial advisors and companies engaging in M&A (Hayward, 2003; Kesner et al., 1994; Rau, 2000).

Agency conflict is demonstrated in two ways. First, in China, the financial advisory business accounts for only a small portion of the income of securities companies. It is not realistic to obtain large commissions from a single customer. Therefore, with the motive of maximizing profits, it is reasonable for them to follow the enthusiasm of the market in M&A and restructuring and to attract new customers by providing high-quality services. This is the only way that the future development of independent financial advisors can be guaranteed. As connections between old customers and independent financial advisors have already been established, a certain reduction in the energy and resources allocated to old customers would not lead to a loss in this group of customers. As Hayward (2003) argues, establishing relationships strengthens companies' dependence on financial advisors and reduces the possibility of them changing financial advisors. Therefore, establishing connections actually substantially weakens the incentive of financial advisors to provide high-quality services and to create value for old customers. In addition, as such connections augment the influence of financial advisors on listed companies, financial advisors deem successive business cooperation as a reward for the past services they have delivered (Eccles and Crane, 1988). Therefore, beyond the necessary work they must do, they do not exert extra effort to secure the opportunity for further business cooperation. All of these motives result in them providing nonoptimal services to old customers (Sleptsov et al., 2013).

Second, establishing connections may itself stem from the purpose of independent financial advisors to guide the behavior of listed companies to maximize their own interests. Relationships can cause companies to become dependent on agencies. Specifically, agencies may lead companies into complex transactions that require specialized knowledge, as complex services means higher agency fees (Abrahamson and Fairchild, 1999; Hayward, 2003). It is not difficult for securities companies specializing in underwriting and M&A to guide the behavior of listed companies, as the latter usually only focus on their own businesses and are less likely to be familiar with the trading methods of capital markets,[4] which means that they need advice from professional institutions. Independent financial advisors must invest in building relationships, which increases their costs but also allows them to secure subsequent business orders and benefit from a stronger position in negotiating commissions (Berger et al., 1972; Levinthal and Fichman, 1988).

In summary, the higher the transaction costs of MAR, the higher the need of listed companies for independent financial advisors to assist in completing the restructuring. They may hire independent financial advisors out of trust or change to a different independent financial advisor to obtain better services. In cases where both possibilities exist, this paper proposes the following hypotheses:

H1a. When other conditions remain unchanged, the higher the transaction costs of MAR, the more likely a listed company is to hire an independent financial advisor with which it has connections.

[4] Of course, with increased awareness of market value management, listed companies may also increase their knowledge and skills concerning capital markets by hiring the former employees of securities companies. Pan and Dai (2013) note that such direct and indirect relationships, including interpersonal and monetary relationships, may be expressed as stable cooperation between listed companies and specific investment banks. Therefore, the connections mentioned in this paper are actually a synthesized indicator of both direct and indirect relationships.

H1b. When other conditions remain unchanged, the higher the transaction costs of MAR, the more likely a listed company is to hire an independent financial advisor with which it does not have connections.

3.1.2. Meritocracy: Influences of experience

Apart from established connections, the industry experience of independent financial advisors can also influence the hiring decisions of listed companies. The more experience an independent financial advisor has, the stronger its expertise is in acting as a go-between and assisting in the completion of transactions and the greater its ability is to master innovative transaction models. However, if the majority of its customers come from a specific industry, the independent financial advisor can better identify the needs of its customer with its well-established personal and information network resources and the industrial knowledge it has mastered (e.g., policy and regulation, the development direction of the industry, the position of the customer in the industry, and value chain). In this case, it has a greater advantage in screening targets and predicting synergies for listed companies (Chang et al., 2016). In their analysis of individual investment banks, Ertugrul and Krishnan (2014) find that industry experience is associated with better M&A performance, shorter transaction time, and higher probability of M&A success. Wang et al. (2014) find financial advisors' experience in the target industry to be positively associated with market responses, especially in cases of diversified M&A, a lack of M&A experience by the companies engaging in M&A, and the low information transparency of the target industry. Financial advisors can also obtain access to information from industry analysts at a low cost and deepen their understanding of industrial information (Kadan et al., 2012). In foreign countries, boutique investment banks specializing in one or several industries have occupied a stable market share. Song et al. (2013) find that in complex M&A transactions, companies are more likely to hire boutique investment banks as financial advisors because they have more specialized industry experience.

Therefore, the higher the transaction costs of MAR, the more listed companies need independent financial advisors with rich industry experience to leverage their expertise and network resources to achieve the smooth completion and maximum value of the restructuring. Chang et al. (2016) find that the rich industry experience of financial advisors increases their probability of being hired, especially when the M&A case is complex and the information asymmetry between the two parties is high. However, they also found that although industry experience is associated with higher M&A success rates, companies may reject hiring financial advisors that have worked for their peers for fear of information leakage. It is clear that the relationship between industry experience and the probability of independent financial advisors' being hired remains an empirical issue. Considering all of the above reasons, the following hypothesis is proposed:

H2. When other conditions remain unchanged, the higher the transaction costs of MAR, the more likely a listed company is to hire an independent financial advisor with industry experience.

3.2. Authentication role of independent financial advisors and hiring decisions of listed companies

In the case of the transaction role, listed companies may be motivated to hire independent financial advisors to reduce their transaction costs. However, in the case of the authentication role, they do not have the motivation to actively seek authentication in the current context, where the mechanism of information disclosure is imperfect and other regulatory mechanisms remain underdeveloped. However, their need for independent financial advisors' authentication role still exists, as investors may have negative feedback on possible agency problems within listed companies (Lin et al., 2011; Nain and Yao, 2013). Minority shareholders may also reject M&A proposals that may harm their own interests by voting against them in the general shareholders' meeting.[5] Furthermore, the image of "being authenticated" can convey a signal to the outside world, including

[5] For example, in 2012, the shareholders' meeting of Greatwall Computer (000066) rejected the proposal to acquire the shares of TPV Technology Co., Ltd., because the minority shareholders believed that the actual acquisition motive of the major shareholder was to pass the investment loss on to the minority shareholders. In 2011, the proposal of asset injection by the major shareholders of Guangdong Provincial Expressway Development Company Limited (000429) was also rejected by the shareholders' meeting, mainly because the acquisition premium was as high as 767% and the interests of the minority shareholders were infringed upon.

investors and the CSRC, that the MAR is under no influence of agency problems and that the trading is fair. In this sense, it would help the MAR pass the reviews of the shareholders' meeting and the CSRC and obtain good feedback from investors. The following section analyzes how listed companies, with the motive of signaling the fairness of restructuring to the outside world, choose between independent financial advisors with close ties and those with competence.

3.2.1. Nepotism: Influences of connections

If MAR is essentially a channel for major shareholders to siphon resources from a listed company, then their most vital concern (as the leaders of the restructuring) would be that the transaction successfully passes the resolution of the company's board of directors and the review of the CSRC. To obtain their commissions, independent financial advisors would also hope for the transaction to be completed smoothly. In this case, established connections between the two parties provide convenience for the listed companies (or rather the major shareholders leading the restructuring) and independent financial advisors to privately reach consensus to pursue their personal interests. Independent financial advisors do not restrict the behavior of major shareholders when it infringes upon the interests of listed companies through the MAR. In contrast, they are more likely to use their expertise in the "packaging and beautification" of information to ensure that the proposal is approved.

If a listed company has already been plagued by the second type of agency problem before the restructuring, MAR may arouse strong suspicion of their tunneling assets from the company, which would then give rise to distrust among the investors and a high probability of being rejected by the CSRC. In this case, the listed company would be motivated to ensure the successful completion of the restructuring through the expertise of the independent financial advisor in packaging and beautification. Therefore, it is possible for the company to hire an independent financial advisor that has established a good relationship with itself, but it is also possible for it to hire someone without connections or with weak connections to "avoid suspicion" by indicating the fairness of the transaction to minority shareholders and the CSRC. The foreign literature has yet to analyze the impact of connections on the fair opinion business of investment banks. For the independence of investment banks, Chen (2010) finds that if an investment bank is hired to provide both the financial advisory service and fair opinion service, the market reaction is even worse than in the case of an independent investment bank. Kisgen et al. (2009) also find that the purchase of fair opinions by the board of directors of the merger worsens market reaction, but hiring multiple investment banks or one that does not act as a financial advisor helps reduce the loss of shareholder value. These findings suggest that the market shows concern over whether investment banks that provide fair opinions can maintain their independence, at least in form.

To conclude, a listed company may hire an independent financial advisor with good connections and use its expertise in packaging and beautification to ensure that the restructuring passes the resolution of the shareholders' meeting and the review by the CSRC. However, it may also take the initiative to avoid suspicion by engaging independent financial advisors without connections to communicate the signal that the restructuring is fair to the outside world. In cases where both possibilities exist, this paper proposes the following hypotheses:

H3a. When other conditions remain unchanged, the greater the suspicion of major shareholders' tunneling is, the more likely a listed company is to hire an independent financial advisor with connections.

H3b. When other conditions remain unchanged, the greater the suspicion of major shareholders' tunneling is, the more likely a listed company is to hire an independent financial advisor without connections.

3.2.2. Meritocracy: Influences of experience

When listed companies have strong incentives to signal the fairness of the restructuring to the outside world, they may prefer to hire independent financial advisors with more industry experience. Veteran independent financial advisors are better at providing high-quality authentication service, as they are supposed to have more experience to tell whether the listed company has intentionally hidden or twisted any information, whether there is any inconsistency in the statement, and which parts of the transaction may best expose injus-

tice. As a result, the industry experience of independent financial advisors can convey to the outside world a favorable signal that the restructuring is subject to strict authentication.

However, when an independent financial advisor must perform both the transaction and authentication roles, one's "self-regulation" is bound to trigger endogenous conflict. The authentication role requires the independent financial advisor to evaluate the fairness of the transaction in which it is deeply involved. Thus, it is reasonable that it would not have the motivation to truly discover and disclose its own dereliction of duty. The motivation for completing the transaction to obtain the commissions also objectively exists, making the independent financial advisor reluctant to spend extra time and money to identify the unfair terms of the transaction that may harm the interests of the minority shareholders or to require modification from the listed company. Moreover, different from the transaction role, the direct consequences of which can be reflected by the success of the transaction and the transaction speed, the effect of the authentication role is not as easy to observe directly. The listed company or other regulators do not have clear standards for evaluating this role. Therefore, the work of authentication from the independent financial advisor is likely to be in vain. Good industry experience can be measured by the performance of independent financial advisors in their transaction role, but may not necessarily be shown in their authentication role. If the outside world, including investors and the CSRC, also reach consensus regarding the endogenous conflict between the two roles, listed companies may not hire an independent financial advisor with greater industry experience to signal that the restructuring is fair.

In summary, due to the endogenous conflict between the two businesses, whether a listed company hires an independent financial advisor with industry experience to signal that the restructuring is fair is an empirical problem. This paper proposes the following hypothesis[6]:

H4. When other conditions remain unchanged, the greater the suspicion of major shareholders' tunneling is, the more likely a listed company is to hire an independent financial advisor with industry experience.

4. Research design

4.1. Samples

This paper uses MAR events in the nonfinancial industry in the Chinese A-share market as a sample, excluding general M&A events. The reasons are listed as follows. First, financial advisors in general M&A are not subject to the *Measures for the Administration of Major Asset Reorganization of Listed Companies*, nor do all M&A have to provide authentication opinions as required by the *Measures for the Administration of Financial Advisory Business of M&A and Restructuring of Listed Companies*.[7] Therefore, it is uncertain whether the financial advisors play the authentication role in general M&A cases. Second, MAR indicates a substantial change in the structure of a company, the impact of which is more significant on listed companies than that of general M&A, thus highlighting the role of independent financial advisors. In addition, it can help avoid the subjectivity of the general M&A samples in which the scale of target companies is restricted.[8] Third, the information disclosure of listed companies is more standardized and comprehensive in cases of MAR, as the CSRC has more stringent requirements for the information disclosure of MAR. This is conducive to the data collection in this paper. For other general M&A events, due to incomplete information disclosure, it is difficult to identify whether it is possible for a listed company to hire a financial advisor or an independent financial advisor but not disclose information. This paper also avoids the problem of missing samples by choosing the samples of MAR.

[6] A set of opposing hypotheses is not presented here. According to the analysis above, another possibility is not that listed companies tend to hire independent financial advisors without industry experience but that the preference of listed companies for industry experience cannot be observed.

[7] This is according to Article 24 of the *Measures for the Administration of Financial Advisory Business of M&A and Restructuring of Listed Companies*, including the acquisition of listed companies, tender offers, MAR, and the issuance of shares to purchase assets.

[8] For example, as too small-scale M&A would not have a material impact on listed companies, the general literature excludes samples with consideration paid in the amount of 1 million yuan or less.

The time interval for the samples of MAR is 2008 to 2013. The starting year is 2008, as the important document regulating the behavior of independent financial advisors, *Measures for the Administration of Financial Advisory Business of M&A and Restructuring of Listed Companies*, was implemented in 2008. The ending year is 2013 due to the implementation of channel reform for M&A review in 2013. The Securities Association of China issued the *Guidelines for the Professional Evaluation of Practice Ability of Securities Companies in Financial Advisory Business in Mergers and Acquisitions of Listed Companies* and the *2013 Professional Evaluation Results of Practice Ability of Securities Companies in Financial Advisory Business in Mergers and Acquisitions of Listed Companies*, which may subsequently exert influence over the hiring preferences of listed companies.[9]

4.2. Model setting and variable definition

The following probit models (1) and (2) test H1 and H2, respectively. When a listed company makes a hiring decision, it is also making a choice between nepotism and meritocracy. That is, hiring an independent financial advisor with connections does not rule out the possibility that the independent financial advisor also has industry experience and vice versa. Therefore, the residuals of models (1) and (2) are likely to be relevant. To reduce the deviation of the model, this paper learns from the method of Reid and Carcello (2017). Furthermore, it uses seemingly unrelated regression (SUR) to simultaneously estimate models (1) and (2) and test the difference in β_1 in models (1) and (2) to examine the different preferences for nepotism and meritocracy when listed companies are more in need of independent financial advisors' transaction role.

$$Same = \beta_0 + \beta_1 Transaction + ControlVariables + \varepsilon \tag{1}$$

$$Exper = \beta_0 + \beta_1 Transaction + ControlVariables + \varepsilon \tag{2}$$

H3 and H4 are examined using the following probit models (3) and (4), respectively. SUR is also used to estimate models (3) and (4) simultaneously and to test the different preferences for nepotism and meritocracy when listed companies are more in need of independent financial advisors' authentication role.

$$Same = \beta_0 + \beta_1 Tunneling + ControlVariables + \varepsilon \tag{3}$$

$$Exper = \beta_0 + \beta_1 Tunneling + ControlVariables + \varepsilon \tag{4}$$

Among the dependent variables of the above models, *Same* represents the connections between listed companies and independent financial advisors: before the M&A in the sample, some listed companies hired the same financial advisors from securities companies for businesses that may be M&A, restructuring, IPO underwriting, related party transactions, and equity incentives. In addition to setting up the virtual variable *Same* to examine the existence of connections, this paper also subdivides the characteristics of the connections: the number of connections (*Same_number*) to measure the strength of the connections and the ratio of connections (*Same_ratio*) to measure the exclusiveness of the services offered by the independent financial advisor from the securities company to the listed company. *Exper* represents the industry experience of independent financial advisors: if the securities companies have participated in the M&A of listed companies in the same industry (or possibly the sample listed companies themselves) as the financial advisors, they are considered to have industry experience.[10] In addition to setting up the virtual variable *Exper* to examine the existence of industry experience, this paper subdivides the characteristics of industry experience: the number of experiences (*Exper_number*) to measure the strength of experience and the ratio of experiences (*Exper_ratio*) to measure the concentration of independent financial advisors' experience in the industry.

[9] The professional evaluation results of the practice ability in the financial advisory business may replace connections or industry experience as a major factor affecting the decision making of listed companies. For example, in Article 8 of the newly revised *Measures for Administration of Major Asset Restructuring of Listed Companies* in 2014, in the CSRC review, the content and procedures may be reduced based on the ability and quality of financial advisors. Therefore, when other conditions remain unchanged, listed companies tend to hire independent financial advisors with better professional evaluation results to ensure the smooth and rapid CSRC approval of restructuring.

[10] Among all of the samples in this paper, only a couple of listed companies hire independent financial advisors from two agencies for their MAR. This paper treats the situation as follows: as long as one of the two agencies has the feature of connections, it is deemed that the given listed company hires an independent financial advisor with connections for MAR. The same is true in the case of industry experience.

Table 1
Variable definitions.

Type	Name	Variable	Definition and description
Dependent variables	Existence of connections	*Same*	If the securities company of the independent financial advisor has provided services (e.g., M&A, IPO underwriting, related party transactions, and equity incentives) to the listed company within the 5 years before the current period, this variable equals 1. Otherwise, it equals 0
	Number of connections	*Same_number*	This variable equals the number of services (e.g., M&A, IPO underwriting, related party transactions, and equity incentives) offered by the securities company of the independent financial advisor to the listed company within the 5 years before the current period. If no service has been provided within these 5 years, it equals 0
	Ratio of connections	*Same_ratio*	This variable equals *Same_number* divided by the sum of the number of businesses for which the listed company requires financial advisory services. This variable measures the exclusiveness of the services offered by the securities company of the independent advisor to the listed company
	Existence of industry experience	*Exper*	If the independent financial advisor has served as the financial advisor for the M&A business of other companies in the same industry as the listed company within the 5 years before the current period, this variable equals 1. Otherwise, it equals 0
	Number of experiences	*Exper_number*	This variable equals the number of times the independent financial advisor has served as the financial advisor for the M&A business of companies in the same industry as the listed company within the 5 years before the current period. If it has not served within these 5 years, it equals 0
	Ratio of experience	*Exper_ratio*	This variable equals *Exper_number* divided by the sum of the number of times the financial advisor has offered financial advisory services for the M&A of all listed companies within the 5 years before the current period. This variable measures the independent financial advisor's experience in the industry
Explanatory Variables	Restructuring scale (measuring transaction costs)	*Pay*	This variable equals the natural logarithm of the consideration. The larger the value is, the larger the scale of the restructuring is and the greater the transaction costs are (Servaes and Zenner, 1996; Song et al., 2013; Wang et al., 2014)
	Unrelated restructuring (measuring transaction costs)	*Ifunrelate*	If the target is in an industry not related to that of the listed company (i.e., unrelated restructuring), this variable equals 1. Otherwise, it equals 0. The less related the two industries, the greater the transaction costs are (Servaes and Zenner, 1996; Sleptsov et al., 2013; Song et al., 2013)
	Related-party restructuring (measuring the suspicion of major shareholders' tunneling)	*Relate*	If the MAR is a related party restructuring, this variable equals 1. Otherwise, it equals 0. According to Chen and Xu (2012) and Deng (2011), the related party M&A are likely to be a means for major shareholders to expropriate the listed companies
	Separation of ownership and control (measuring the suspicion of major shareholders' tunneling)	*Divert*	The annual-industrial median of the past year is used as the standard. If the listed company's separation of ownership and control in the previous period is not less than this median, this variable equals 1. Otherwise, it equals 0. According to Tang et al. (2012), the separation of ownership and control equals control rights divided by cash-flow rights

(*continued on next page*)

Table 1 (*continued*)

Type	Name	Variable	Definition and description
Control variables	Target type	*Target_type*	If stock shares are included in the target, this variable equals 1; otherwise, it equals 0 (Servaes and Zenner, 1996)
	Return on assets	*ROA*	The net profit of the previous period/the average balance of the total assets of the previous period, the average balance of total assets = (total assets at the end of the period + total assets at the end of the previous year)/2
	Company age	*Age*	The current year minus the year in which the listed company was established plus 1
	Share-based payment	*Payment*	If the payment methods include share-based payment, this variable equals 1; otherwise, it equals 0 (Servaes and Zenner, 1996)
	Asset size	*Size*	The natural logarithm of the operating income in the previous period (Zhang and Yuan, 2013)
	Asset-to-liability ratio	*Lev*	The asset-liability ratio in the previous period (Golubov et al., 2012)
	Experience in MAR	*First*	If the listed company's first MAR occurs during the sample period, this variable equals 1; otherwise, it equals 0 (Servaes and Zenner, 1996)
	Nature of property	*Soe*	If the actual controller of the company in the previous period is a state-owned enterprise, this variable equals 1. Otherwise, it equals 0
	Management shareholding	*Ma_stock*	The shareholding ratio of the management in the previous period
	Growth	*Growth*	The operating profit growth rate
	Year	*Year*	If the observed value is in the year, this variable equals 1
	Industry	*Industry*	If the observed value is in the industry, this variable equals 1
	Province	*Province*	If the observed value is in the province, this variable equals 1

Among the explanatory variables of the above models, *Transaction* represents the transaction costs of the restructuring, measured by the scale and unrelatedness of the restructuring. When the scale of restructuring is relatively large, both the transaction parties would be extremely cautious in determining the true value of the target to avoid negative impacts from unreasonable consideration. However, large scale also means great difficulty in integration. The job to integrate the target with a complete business model and management structure into itself to form synergies requires the acquirer to have a strong ability of integration. The less related the acquirer and the target, the less likely the M&A is to create synergies (Anand and Singh, 1997) and the less familiar the acquirer may be with the strategic steps of integrating the target to create synergies (Hoskisson and Hitt, 1994). Tunneling indicates that major shareholders are suspected of emptying out the company through MAR and is measured by separation of ownership and control in the related restructuring and the listed company. According to Chen and Xu (2012) and Deng et al. (2011), related-party M&A are likely to become a means for major shareholders to expropriate listed companies. Moreover, the high separation of ownership and control gives major shareholders more capability (great controlling rights) and motivation (small cash-flow rights) to encroach on the interests of listed companies (Yu et al., 2014).

In the regression model, this paper also controls the characteristic variables of other listed companies and the restructuring and the year-, industry-, and region-fixed effects.

The MAR samples come from the CSMAR M&A database. The data on the connections and industry experience of independent financial advisors come from the announcements at http://www.cninfo.com.cn and are collated manually by the author. The data relevant to the restructuring, such as the names of independent advisors, the industry of the target company, and the payment of consideration, are collected and sorted by the author based on the announcements published at http://www.cninfo.com.cn. Furthermore, the other data about the characteristics of listed companies come from the M&A/structuring database of the CSMAR. In particular, as connections and industry experience involve independent financial advisors'

business in previous years, this paper also considers such events as the name change, acquisition, and business takeover of the securities company of the independent financial advisor.

Table 1 presents the definitions and descriptions of the variables discussed in this paper.

5. Empirical results

5.1. Descriptive statistics

Table 2 shows the descriptive statistical results of the variables listed in this paper. The average value of *Same* is 0.122, indicating that the listed companies hire independent financial advisors with connections in only 12% of the MAR events. The maximum value of *Same_number* is only 2, which also indicates that the listed companies frequently change the securities companies they hire. The average value of *Exper* is 0.564, the average value of *Exper_number* is 2.728, and the maximum value of *Exper_number* is 21, indicating the universality of industry experience. The average value of *Ifunrelate* is 0.330, indicating that many MAR targets are from industries that are not related to the listed companies, which increases the difficulty of identifying the value of the targets and necessitates the transaction role of independent financial advisors. The average value of *Relate* is 0.856, indicating that the vast majority of MAR events occur between related parties, which increases the possibility of major shareholders' tunneling and highlights the importance of the authentication role of independent financial advisors.

5.2. Multivariate analysis

The test results of H1 to H4 are listed in Table 3. The second to fifth columns are the test results of H1 and H2. The second and third columns test H1 and H2 with the restructuring scale (*Expense*) as the explanatory variable. The coefficient of *Expense* in the second column is significantly negative, the coefficient of *Expense* in the third column is significantly positive, and the coefficient between the two groups is significant at the 1% level. The fourth and fifth columns test H1 and H2 with unrelated restructuring (*Ifunrelate*) as the explanatory variable. The results are similar to those in the second and third columns. The coefficient of *Ifunrelate* in the fourth column is significantly negative, the coefficient of *Ifunrelate* in the fifth column is significantly positive,

Table 2
Descriptive statistics.

Variables	N	Mean	SD	Median	Min	Max
Same	312	0.122	0.328	0.000	0.000	1.000
Same_ratio	312	0.108	0.301	0.000	0.000	1.000
Same_number	312	0.128	0.354	0.000	0.000	2.000
Exper	312	0.564	0.497	1.000	0.000	1.000
Exper_ratio	312	0.158	0.192	0.100	0.000	1.000
Exper_number	312	2.728	4.222	1.000	0.000	21.000
Expense	312	21.091	1.127	21.193	17.701	24.095
Ifunrelate	312	0.330	0.471	0.000	0.000	1.000
Relate	312	0.856	0.352	1.000	0.000	1.000
Divert	312	0.369	0.483	0.000	0.000	1.000
Target_type	312	0.894	0.308	1.000	0.000	1.000
ROA	312	0.021	0.102	0.026	−0.313	0.255
Age	312	15.279	4.578	15.000	5.000	25.000
Payment	312	0.837	0.370	1.000	0.000	1.000
Size	312	21.078	1.311	20.922	18.751	25.800
Lev	312	0.566	0.353	0.521	0.048	1.677[1]
First	312	0.936	0.245	1.000	0.000	1.000
Soe	312	0.574	0.495	1.000	0.000	1.000
Ma_stock	312	0.026	0.087	0.000	0.000	0.533
Growth	312	−0.437	4.526	−0.058	–22.709	19.964

[1] Observations with leverage higher than 1 are not excluded, as financial crisis is a key reason why listed firms make M&A.

Table 3
Test results for H1 to H4.

	Same	Exper	Same	Exper	Same	Exper	Same	Exper
Expense	−0.536***	0.184**						
	(−3.89)	(2.21)						
Test of differences Chi^2		**20.71*** **						
Ifunrelate			−0.588**	0.453**				
			(−2.02)	(2.14)				
Test of differences Chi^2				**8.58*** **				
Relate					−0.745***	0.430		
					(−2.61)	(1.55)		
Test of differences Chi^2						**8.92*** **		
Divert							−0.504**	0.214
							(−1.98)	(1.32)
Test of differences Chi^2								**5.57****
Target_type	0.074	0.195	−0.102	0.447	−0.021	0.235	−0.023	0.055
	(0.17)	(0.67)	(−0.27)	(1.55)	(−0.05)	(0.80)	(−0.06)	(0.22)
ROA	1.095	0.974	−0.877	0.788	1.291	0.840	1.986	0.550
	(0.71)	(1.15)	(−0.62)	(0.94)	(0.95)	(1.00)	(1.43)	(0.71)
Age	−0.031	−0.027	−0.025	−0.011	−0.029	−0.029	−0.040	−0.031*
	(−1.12)	(−1.29)	(−1.00)	(−0.58)	(−1.09)	(−1.39)	(−1.50)	(−1.70)
Payment	−0.225	0.187	−0.247	0.223	−0.152	0.153	−0.133	−0.001
	(−0.67)	(0.79)	(−0.83)	(0.96)	(−0.48)	(0.65)	(−0.43)	(−0.00)
Size	0.123	−0.049	−0.123	0.123	−0.022	−0.007	−0.003	−0.090
	(1.01)	(−0.61)	(−1.20)	(1.51)	(−0.21)	(−0.09)	(−0.03)	(−1.36)
Lev	−0.464	0.181	−0.537	−0.006	−0.488	0.225	−0.793*	0.320
	(−1.03)	(0.68)	(−1.21)	(−0.02)	(−1.21)	(0.85)	(−1.87)	(1.36)
First	−1.800***	−0.517	0.263	−0.540	−1.319***	−0.561	−1.285***	−0.361
	(−4.08)	(−1.36)	(1.15)	(−1.48)	(−3.26)	(−1.53)	(−2.94)	(−1.10)
Soe	−0.416	0.219	−0.246	0.147	−0.295	0.149	−0.814***	0.373**
	(−1.46)	(1.09)	(−0.94)	(0.78)	(−1.05)	(0.73)	(−2.74)	(1.96)
Ma_stock	3.112**	0.970	3.087***	1.196	3.253***	1.068	1.764*	2.312**
	(2.51)	(0.82)	(2.70)	(1.09)	(2.66)	(0.87)	(1.90)	(2.07)
Growth	0.047	0.024	0.732***	0.029	0.032	0.025	0.020	0.022
	(1.22)	(1.36)	(3.17)	(1.63)	(0.91)	(1.44)	(0.54)	(1.33)
Constant	8.520**	−3.075	2.089	−3.437*	0.799	−0.275	0.360	2.600*
	(2.55)	(−1.33)	(0.89)	(−1.81)	(0.32)	(−0.15)	(0.14)	(1.65)
Year	yes	yes	yes	yes	yes	yes	yes	yes
Industry	yes	yes	yes	yes	yes	yes	yes	yes
Province	yes	yes	yes	yes	yes	yes	yes	yes
LR chi^2		182.112		149.643		167.600		81.675
N		312		312		312		312

Note: This table reports the regression results for H1 to H4. All of the variables are defined in Table 1. The figures in parentheses are robust z-statistics adjusted for heteroskedasticity.

* Significance at the 10% level (two-tailed test).
** Significance at the 5% level (two-tailed test).
*** Significance at the 1% level (two-tailed test).

and the coefficient between the two groups is significant at the 1% level. The above results show that with respect to the transaction role of independent financial advisors, listed companies tend to hire those without connections but with industry experience when making hiring decisions. That is, meritocracy overweighs nepotism. Thus, H1b and H2 are supported.

The sixth to ninth columns of Table 3 are the test results of H3 and H4. In the sixth and seventh columns, the related party restructuring (*Relate*) is used as the explanatory variable to test H3 and H4. In the sixth column, the coefficient of *Relate* is significantly negative. In the seventh column it is positive, but not significant.

The coefficient between the two groups is significant at the 1% level. The eighth and ninth columns test H3 and H4 with the separation of ownership and control (*Divert*) as the explanatory variable, the results of which are similar to those of the sixth and seventh columns. The *Divert* coefficient in the eighth column is significantly negative. In the ninth column, the coefficient of *Divert* is positive, but not significant. The coefficient between the two groups is significant at the 5% level. The above results indicate that for the authentication role of independent financial advisors, listed companies tend to hire independent financial advisors without connections when making hiring decisions, but there is no evidence to support that listed companies tend to hire independent financial advisors with industry experience. They avoid nepotism but do not necessarily choose meritocracy. Thus, H3b is supported, whereas H4 is not.

The two following reasons may explain why H4 is not supported. First, from the perspective of the motives of independent financial advisors, as mentioned above, there is an endogenous conflict between their dual roles. To successfully and smoothly complete the restructuring, they have the motivation to issue a fair evaluation opinion even for unfair restructuring. Although better industry experience means a higher number of transactions completed in the past, the transaction completion can only directly manifest the fulfillment of the transaction role. The authentication role is more similar to an obligation imposed on the independent financial advisors that they have to perform and it is understandable that this role becomes reduced to a kind of formalism. Thus, abundant industry experience does not necessarily mean that the authentication role of the independent financial advisors' is of high quality. Second, from the perspective of the motives of listed companies, different from the U.S., where the board of directors hires investment banks to provide fair opinions as a manifestation of duty of care, in China, it is mandatorily required by the CSRC that independent financial advisors provide the authentication, rather than out of the needs of listed companies or other relevant stakeholders. For Chinese listed companies still with an imperfect corporate governance mechanism, it is common for major shareholders to control and tunnel companies. In the current context, where the information disclosure mechanism is not perfect and other regulatory mechanisms remain underdeveloped, listed companies do not have the motivation to actively seek authentication from the authorities and authentication is only an obligation imposed on them. Therefore, they only have the motivation to "superficially" transmit the signal that the restructuring is fair. Thus, they may avoid hiring an independent financial advisor with connections to avoid suspicion, but would not actively ask for authentication and restriction from independent financial advisors. As a result, even if industry experience can measure the quality of the independent financial advisors' authentication role to a certain extent, listed companies lack the motivation to actively seek substantive authentication from independent financial advisors.

5.3. Further study

5.3.1. Effect of reputation

The test results for H1 and H3 all show that listed companies tend to hire independent financial advisors without connections, which means that connections have negative impacts on both the transaction and authentication role of independent financial advisors. Independent financial advisors can establish connections as a means to pursue self-interest in both their transaction role and authentication role. In this sense, maximizing their own interests rather than maximizing the interests of listed companies becomes their primary goal, which is the root cause for the adverse impacts of connections. A series of studies notes that reputation mechanisms can alleviate conflicts of interest between principals and agents (Kesner et al., 1994; McLaughlin, 1996; Sharma, 1997). Specifically, when the present value of future earnings after the execution of the contract is higher than the gains from breaching the current contract, the parties in the transaction trade in good faith and commit to establishing and maintaining their reputation (Klein et al., 1978; Williamson, 1979). This is the value of reputation. Another series of studies finds that financial advisors with a strong reputation can create greater value for M&A shareholders (Golubov et al., 2012; Kale et al., 2003). Thus, it can be inferred that the higher the reputation of independent financial advisors is, the more importance they would attach to constraining opportunistic behavior to present a good image that they are representing the interests of principals (Thomas, 1995). This can then reduce the adverse effects of connections and increase the possibility of listed companies hiring independent financial advisors with connections.

Table 4
Effect of reputation.

	Same High reputation group	Same Low reputation group	Same High reputation group	Same Low reputation group	Same High reputation group	Same Low reputation group	Same High reputation group	Same Low reputation group
Expense	−0.473	−0.525***						
	(−1.56)	(−3.09)						
Ifunrelate			−0.545	−0.788**				
			(−0.83)	(−2.00)				
Relate					0.038	−0.670*		
					(0.05)	(−1.75)		
Divert							0.446	−0.672**
							(0.86)	(−2.11)
Target_type	0.547	−0.562	−0.286	−0.416	−0.096	−0.231	−0.072	−0.095
	(0.58)	(−1.03)	(−0.42)	(−0.81)	(−0.12)	(−0.41)	(−0.11)	(−0.19)
ROA	−2.180	4.260**	−9.076**	1.533	0.442	4.138**	−8.081*	2.477
	(−0.48)	(2.30)	(−2.03)	(0.94)	(0.11)	(2.13)	(−1.91)	(1.38)
Age	−0.086	−0.010	−0.045	−0.034	−0.076	−0.004	−0.056	−0.036
	(−1.23)	(−0.29)	(−0.80)	(−1.07)	(−1.07)	(−0.10)	(−0.99)	(−1.14)
Payment	0.867	−0.429	1.008	−0.523	1.268	−0.508	0.848	−0.442
	(0.77)	(−1.04)	(1.01)	(−1.38)	(0.85)	(−1.15)	(0.84)	(−1.19)
Size	0.615*	−0.149	0.395	−0.391**	0.500	−0.226	0.409	−0.234
	(1.92)	(−0.87)	(1.40)	(−2.33)	(1.59)	(−1.23)	(1.48)	(−1.44)
Lev	−1.335	0.367	−2.989*	0.237	−1.048	−0.017	−2.662*	−0.243
	(−0.99)	(0.64)	(−1.87)	(0.43)	(−0.93)	(−0.03)	(−1.80)	(−0.42)
First	−2.755***	−1.209**	1.261**	−0.210	−2.573**	−1.003	1.031*	−1.316**
	(−2.95)	(−1.96)	(2.51)	(−0.66)	(−2.53)	(−1.48)	(1.91)	(−1.98)
Soe	−1.333*	−0.418	−0.300	−0.470	−1.352	−0.591	−0.268	−0.619*
	(−1.69)	(−1.17)	(−0.52)	(−1.39)	(−1.48)	(−1.46)	(−0.46)	(−1.79)
Ma_stock	4.717	3.405**	3.304	2.972**	4.292	3.962***	4.196	2.318*
	(1.42)	(2.41)	(1.29)	(2.21)	(1.49)	(2.65)	(1.61)	(1.72)
Growth	0.104	0.117	1.638**	0.534**	0.077	0.089	1.453***	0.596**
	(1.23)	(1.58)	(2.51)	(2.00)	(0.75)	(1.24)	(2.58)	(2.11)
Constant	−4.022	14.903***	−9.945	8.489**	−15.871	5.404	−10.520*	6.366*
	(−0.52)	(2.94)	(−1.59)	(2.21)	(−0.02)	(1.33)	(−1.72)	(1.75)
Year	yes	yes	yes	yes	yes	yes	yes	yes
Industry	yes	yes	yes	yes	yes	yes	yes	yes
Province	yes	yes	yes	yes	yes	yes	yes	yes
Pseudo R^2	0.467	0.313	0.323	0.238	0.450	0.303	0.323	0.258
LR chi^2	35.696	47.235	24.717	35.905	34.421	45.676	24.716	38.874
N	136	176	136	176	136	176	136	176

Note: This table reports the regression results for the effect of reputation. All of the variables are defined in Table 1. The figures in parentheses are robust z-statistics adjusted for heteroskedasticity.

* Significance at the 10% level (two-tailed test).
** Significance at the 5% level (two-tailed test).
*** Significance at the 1% level (two-tailed test).

Table 5
The transaction role and firms' hiring decisions: Using ratio and number of connections/experience as dependent variables.

	Same_ratio	*Exper_ratio*	*Same_ratio*	*Exper_ratio*	*Same_number*	*Exper_number*	*Same_ number*	*Exper_number*
Expense	−0.497***	0.166**			−0.510***	0.151**		
	(−3.43)	(1.97)			(−3.81)	(2.23)		
Test of differences Chi^2		**16.80*****				**19.95*****		
Ifunrelate			−0.520*	0.429**			−0.607**	0.472**
			(−1.67)	(2.09)			(−1.97)	(2.39)
Test of differences Chi^2				**6.66*****				**8.79*****
Target_type	−0.800*	0.091	−0.108	0.546**	−0.223	−0.068	−0.092	0.414
	(−1.96)	(0.45)	(−0.25)	(1.97)	(−0.50)	(−0.30)	(−0.21)	(1.62)
ROA	0.922	0.986	−1.019	0.395	1.880	0.247	−0.814	−0.667
	(0.59)	(1.19)	(−0.68)	(0.49)	(1.20)	(0.33)	(−0.51)	(−0.91)
Age	−0.036	−0.007	−0.029	−0.008	−0.041	0.003	−0.024	−0.026
	(−1.19)	(−0.35)	(−1.06)	(−0.40)	(−1.38)	(0.16)	(−0.87)	(−0.05)
Payment	−0.318	0.142	−0.234	0.252	−0.208	0.147	−0.148	0.257
	(−0.80)	(0.57)	(−0.73)	(1.12)	(−0.57)	(0.80)	(−0.45)	(1.24)
Size	0.092	0.020	−0.082	0.077	0.108	−0.148**	−0.150	0.126*
	(0.74)	(0.24)	(−0.74)	(0.97)	(0.90)	(−2.39)	(−1.34)	(1.94)
Lev	−0.256	−0.031	−0.717	0.004	−0.343	−0.064	−0.805	−0.018
	(−0.56)	(−0.12)	(−1.48)	(0.02)	(−0.77)	(−1.54)	(−1.61)	(−0.37)
First	−1.763***	−0.676*	0.235	−0.348	−1.951***	−0.163	0.170	−0.295
	(−3.77)	(−1.67)	(0.92)	(−1.01)	(−4.35)	(−0.60)	(0.67)	(−1.55)
Soe	−0.377	0.106	−0.220	0.135	−0.483	0.114	−0.285	−0.106
	(−1.19)	(0.55)	(−0.79)	(0.74)	(−1.52)	(0.71)	(−0.96)	(−0.59)
Ma_stock	3.209**	1.397	2.909**	1.757	2.585**	2.560***	3.464***	0.458
	(2.45)	(1.26)	(2.48)	(1.63)	(2.06)	(3.02)	(2.76)	(0.82)
Growth	0.063	0.023	0.800***	0.034*	0.032	−0.063	0.888***	−0.057
	(1.26)	(1.28)	(3.05)	(1.92)	(0.75)	(−0.96)	(3.38)	(−0.32)
Constant	10.138***	−3.704*	1.354	−2.379	–	–	–	–
	(2.89)	(−1.67)	(0.53)	(−1.32)	–	–	–	–
Year	yes	Yes	yes	yes	yes	yes	yes	yes
Industry	yes	Yes	yes	yes	yes	yes	yes	yes
Province	yes	Yes	yes	yes	yes	yes	yes	yes
LR chi^2	167.527			133.444		155.549		228.824
N		312		312		312		312

Note: This table reports the regression results for using ratio and number of connections/experience as dependent variables. All of the variables are defined in Table 1. The figures in parentheses are robust z-statistics adjusted for heteroskedasticity.
* Significance at the 10% level (two-tailed test).
** Significance at the 5% level (two-tailed test).
*** Significance at the 1% level (two-tailed test).

This paper then re-examines H1 and H3 based on different groupings of the independent financial advisors' reputation. The results are shown in Table 4. The reputation data are collected from the League table in the Mergermarket database, which is a limited company that provides information about the M&A market. The number and size of projects in which the independent financial advisors have acted as financial advisors for all the Chinese acquirers in M&A events from 1998 to 2013 are ranked. If an independent financial advisor is in the top 10 in both rankings, it is deemed as a high-reputation independent financial advisor. Otherwise, it is a low-reputation independent financial advisor. The results in Table 4 show that the negative correlation between the transaction costs of the restructuring and the connections exists only in the low-reputation group. The negative correlation between the major shareholders' tunneling and the connections also exists only in the

Table 6
The authentication role and firms' hiring decisions: Using ratio and number of connections/experience as dependent variables.

	Same_ratio	*Exper_ratio*	*Same_ratio*	*Exper_ratio*	*Same_number*	*Exper_number*	*Same_number*	*Exper_number*
Relate	−0.661**	0.108			−0.710**	0.195		
	(−2.21)	(0.44)			(−2.38)	(0.97)		
Test of differences Chi^2		**4.33****				**6.64*****		
Divert			−0.619**	0.129			−0.715**	0.050
			(−2.05)	(0.77)			(−2.03)	(0.37)
Test of differences Chi^2				**4.71****				**4.04****
Target_type	−0.828**	0.213	−1.050***	0.229	−0.233	0.157	−1.245***	0.158
	(−2.20)	(1.16)	(−2.59)	(1.23)	(−0.55)	(1.02)	(−2.71)	(1.04)
ROA	0.755	0.337	1.923	0.548	1.664	−0.082	1.609	−0.098
	(0.55)	(0.43)	(1.21)	(0.68)	(1.16)	(−0.13)	(0.88)	(−0.15)
Age	−0.022	−0.009	−0.045	−0.025	−0.035	0.005	−0.052	0.008
	(−0.78)	(−0.51)	(−1.49)	(−1.34)	(−1.21)	(0.32)	(−1.53)	(0.57)
Payment	−0.346	0.116	−0.313	0.160	−0.166	0.068	−0.326	0.080
	(−0.95)	(0.53)	(−0.84)	(0.72)	(−0.48)	(0.37)	(−0.78)	(0.44)
Size	−0.044	−0.032	0.035	−0.079	−0.009	−0.006	−0.028	−0.006
	(−0.40)	(−0.52)	(0.28)	(−1.20)	(−0.09)	(−0.12)	(−0.21)	(−0.11)
Lev	−0.466	0.050	−0.812*	0.219	−0.456	−0.039	−0.688	−0.029
	(−1.09)	(0.22)	(−1.65)	(0.91)	(−1.11)	(−0.21)	(−1.62)	(−0.15)
First	−1.348***	−0.264	−1.249**	−0.196	−1.644***	−0.365	−2.140***	−0.321
	(−3.17)	(−0.82)	(−2.47)	(−0.59)	(−3.83)	(−1.44)	(−3.21)	(−1.27)
Soe	−0.252	0.147	−0.792**	0.312	−0.376	0.064	−0.779*	0.115
	(−0.85)	(0.83)	(−2.31)	(1.64)	(−1.21)	(0.44)	(−1.95)	(0.77)
Ma_stock	3.493***	2.480**	2.444**	2.005*	3.024**	3.161***	1.853	3.112***
	(2.77)	(2.31)	(2.30)	(1.80)	(2.46)	(3.99)	(1.56)	(3.91)
Growth	0.049	0.020	0.029	0.022	0.024	0.014	0.035	0.014
	(1.18)	(1.20)	(0.61)	(1.30)	(0.59)	(0.97)	(0.61)	(1.00)
Constant	−3.147	0.842	−4.018	2.046	–	–	–	–
	(−0.00)	(0.59)	(−0.00)	(1.34)	–	–	–	–
Year	yes	Yes	yes	yes	yes	yes	yes	yes
Industry	yes	Yes	yes	yes	yes	yes	yes	yes
Province	yes	Yes	yes	yes	yes	yes	yes	yes
LR chi^2		83.840		95.089		93.000		117.371
N		312		312		312		312

Note: This table reports the regression results for using ratio and number of connections/experience as dependent variables. All of the variables are defined in Table 1. The figures in parentheses are robust z-statistics adjusted for heteroskedasticity.
* Significance at the 10% level (two-tailed test).
** Significance at the 5% level (two-tailed test).
*** Significance at the 1% level (two-tailed test).

low-reputation group. Thus, the above inference that reputation can alleviate the adverse effects of connections can be confirmed to a certain extent.

5.3.2. Using ratio and number of connections/experience as dependent variables

In the above tests of H1 to H4, the existence of connections (*Same*) and the existence of industry experience (*Exper*) have been chosen as the dependent variables. This paper also expands the connotation of connections (industry experience) and considers the ratio and number of connections (experience). The higher the ratio or the greater the number is, the stronger the connections (experience). The dependent variables of models (1)–(4) are replaced with ratio and number and SUR is used to estimate the OLS model and the ordered probit model, respectively. The results are shown in Tables 5 and 6. The results reflect those in Table 3. In both cases, when

the dependent variable is replaced by ratio and number, the higher the transaction costs of the restructuring, the more the listed companies tend to hire independent financial advisors with weaker connections and more industry experience. Furthermore, the greater the suspicion of the major shareholders' tunneling is, the more likely the listed companies are to hire independent financial advisors with weaker connections. There is no significant preference for industry experience.

5.4. Robustness test

The following tests are also carried out, but the regression results are not reported to conserve space. First, based on the findings of Chang et al. (2016), the connections and the industry experience variables in the above analysis are limited to the previous 5 years. In the robustness test, the time limit is eased. The time interval for connection as a variable is changed from the earliest date when the data are accessible at http://www.cninfo.-com.cn (i.e., January 1, 2000) to the previous year of the sample's year. Furthermore, the time interval for industry experience as a variable is changed from the time when the CSMAR M&A database can provide eligible samples (i.e., January 1, 1999) to the previous year of the sample's year. H1 to H4 are re-examined and the test results are consistent with the previous. Second, as the reputation of financial advisors affects the probability of being hired (Francis et al., 2014), the reputation of independent financial advisors is controlled in models (1) to (4) in this paper. The results remain unchanged. Third, the results of Table 4 stem from using SUR to estimate the probit model. Here, the logit model is used to estimate models (1)–(4). The results remain unchanged.

6. Conclusions

After providing a description of the institutional background related to independent financial advisors, this paper studies how listed companies in MAR choose between industry experience (meritocracy) and connections (nepotism) in hiring independent financial advisors. Based on the empirical tests of the MAR of A-share listed companies in 2008 to 2013, this paper finds that the higher the transaction costs of restructuring are (i.e., the more the listed companies need the transaction role of independent financial advisors), the more they are inclined to hire independent financial advisors with weaker connections and better industry experience. Furthermore, the greater the suspicion of major shareholders' tunneling is (i.e., the more listed companies need the authentication role of independent financial advisors to pass the signal of fairness), the more they tend to hire independent financial advisors with weaker connections, although no significant preference for industry experience has been found. Further research finds that reputation has a certain governance effect on the adverse impacts of connection and that the negative correlation between connections and the probability of hiring of listed companies exists only in the group of independent financial advisors with low reputation.

The bonding from established connections can foster mutual trust and thus facilitate information communication. However, the fundamental motivation for the behavior of independent financial advisors is to pursue the maximization of their own interests, which is the root cause of the negative correlation between connections and the probability of hiring by the listed companies. It is also why the governance effect of reputation helps alleviate the negative impacts of connections and increase the probability that independent financial advisors with connections get hired. Industry experience is related to the capabilities of independent financial advisors. However, due to the endogenous conflict between the transaction role and the authentication role, it is difficult for independent financial advisors to maintain an independent and objective position in playing the authentication role. Greater industry experience means only that the independent financial advisor has greater ability in his/her transaction role, which is not necessarily so in his/her authentication role. This is the main reason why the industry experience of independent financial advisors is not related to the probability of them being hired when there is a high suspicion of major shareholders' tunneling. This indicates the need for further study to address whether the scope of independent financial advisors' business is reasonably set and the authentication role under the mandatory policy is truly effective. Future research may focus on ways to mitigate the endogenous conflict between the two roles and improve the effectiveness of the authentication role.

Acknowledgments

We thank the anonymous reviewers, Feng Liu, Minghai Wei, and Ying Zheng for their helpful comments. We also appreciate the financial support of the National Natural Science Foundation of China (Nos. 71802095, 71672204, 71702038) and Cen Wu's China Postdoctoral Science Foundation Grant (No. 2018M640888).

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