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CHINA JOURNAL OF ACCOUNTING RESEARCH

Family firm research – A review☆

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ABSTRACT

This article reviews family firm studies in the finance and accounting literature, primarily those conducted using data from the United States and China. Family owners have unique features such as concentrated ownership, long investment horizon, and reputation concerns. Given the distinguishing features of family ownership and control, family firms face unique agency conflicts. We discuss the agency problems in family firms and review the findings of recent family firm studies. We call for more research to understand the unique family effects and encourage more research on Chinese family firms.

Part I of the article discusses the fundaments of family firms: the prevalence of and the agency conflicts within family firms. Part II summarizes the findings of recent U.S. family firm studies. It reviews the evidence on the family firm premium (how, which, and when family firms are associated with a valuation premium), the manifestation of the agency conflict between majority and minority shareholders in family firms, earnings quality and corporate disclosure, and the determinants of family ownership and control. Part III discusses the prevalence and characteristics of Chinese family firms and reviews the findings of related studies. The article concludes with some suggestions for future research.

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1. Fundamentals of family firms

1.1. The prevalence and uniqueness of family firms

A family firm is a firm in which the founders or descendants of the founding family continue to hold positions in the top management, serve on the board, or are blockholders.[1] As an important organizational form, family firms account for 44% of large firms in Western Europe (Faccio and Lang, 2002), over two-thirds of firms in East Asian countries (Claessens et al., 2000), and 33% and 46% of the Standard and Poor (S&P) 500 and 1500 index companies, respectively (e.g., Anderson and Reeb, 2003; Chen et al., 2008a). Family firms also operate in a broad range of industries. Among the S&P 1500 companies, family firms account for two-thirds of firms in the high-tech industries (e.g., pharmaceutical products, electronic equipment), wholesale and retail, transportation, and printing and publishing. Even among capital-intensive industries (steel works, machinery, automobile, petroleum, and natural gas), regulated industries (banking and insurance companies), and the business supplies industry, which are the least likely to be family controlled, over 30% are family firms (Chen et al., 2008a).

Compared to nonfamily owners and other blockholders, family owners have some unique characteristics. First, founding families hold poorly diversified portfolios due to their concentrated ownership in family firms. Within family firms in the S&P 1500 index, founding families hold 17% of the shares in their firms on average. Moreover, 69.5% of founding families hold more than 5% ownership in their firms, and 24.7% of them hold more than 25%. Due to their high ownership and low diversification, founding families enjoy the benefit of good corporate decisions and at the same time bear the consequences of bad corporate decisions, and thus family owners have strong incentives to increase firm value.

Second, family owners have longer investment horizons than other shareholders. They generally regard their ownership as an asset to pass on to future generations. For example, when William Lauder, grandson of the founder of Estee Lauder, stepped down, he made the following comment: "I am committed to the company. It's the vast majority of my personal wealth and my family's personal wealth – and we fully expect to be actively involved with this company going forward" (The *Wall Street Journal* Nov 9, 2007, 'Lauder Scion Way Out, P&G Executive Way In'). Such long-term commitment implies that family owners care about the long-term value of the firm, rather than the short-term gain.

Third, family members are actively involved in the management of their firms, either as top executives or as directors. On average, founding families hold the CEO position in 62% of family firms within the S&P 1500. Moreover, 98.4% of founding families appoint at least one family member to their boards, 54.6% of them appoint two family members, and 22.9% of them appoint three or more family members. Founding families' substantial involvement in their firms' management teams ensures that their preferences are reflected.

Not all family firms are the same. The most important classification within family firms is the identity of the CEO. Depending on the identity of the CEO, family firms can be classified as (1) founder CEO firms, (2) descendant CEO firms, and (3) other family firms, usually referred to as professional, or hired, CEO family firms.[2] Founder CEOs are usually charismatic and visionary leaders with great management skills. They also tend to have a strong will and an undisputed and powerful status in their firms. In contrast, descendants are often criticized for being spoiled brats and less skilled. This classification is critical to the understanding of the agency problems in family firms, as discussed in the next section.

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[1] This definition is widely used in family firm studies conducted using U.S. data (e.g., Anderson and Reeb, 2003; Villalonga and Amit, 2006; Ali et al., 2007). Using this commonly used definition is important for several reasons. First, it facilitates comparison of the results across studies. Second, it is less subject to researchers' discretion in the classification of family. Third, to the extent that the family owners in some of the classified family firms have weak influence in the firms, it would introduce a conservative bias to the results. A more restrictive definition (e.g., requiring multiple generations to be involved in the firm) makes the results less generalizable. One should keep in mind the tradeoff between using a more restrictive versus a more lenient definition and the most appropriate definition is likely to be country specific. See Villalonga and Amit (2010, pp. 866–867) for a further discussion of family firm definition.

[2] The name of the third category does not imply that founder CEOs or descendant CEOs are not professional; nor does it imply that founder CEOs and descendant CEOs are not hired.

The unique characteristics of family owners and family firms motivate many of the interesting topics in family firm research. This is the key reason for the emerging line of research on family firms in the past decade. This review focuses primarily on family firm studies published in leading accounting and finance journals.

1.2. Agency problems in family firms

The foundation on which most family firm studies are built is the agency conflict framework. The unique characteristics of family firms affect the nature and extent of agency problems, which also vary with the type of family firm. There are two main agency problems in public companies: the conflict between managers and shareholders and the conflict between majority and minority shareholders. Below we discuss the two types of agency problems that apply to family firms relative to non-family firms.

1.2.1. The conflict between managers and shareholders

In the classic owner-manager conflict, as described in Jensen and Meckling (1976), the separation of managers from shareholders may lead to managers not acting in the best interest of the shareholders. We refer to this type of agency problem as the Type I agency problem. However, the extent of Type I agency problems is reduced in family firms for several reasons.

First, as discussed above, family owners tend to hold concentrated and under-diversified ownership of their firms. As a result, family owners are likely to have strong incentives to monitor managers, reducing the free rider problem that is prevalent among other firms. [The benefit of monitoring does not outweigh the cost of monitoring for small atomistic shareholders, and as such, they tend to free ride on others' monitoring (Shleifer and Vishny, 1986).] Given the under-diversification of their portfolios, family owners bear the idiosyncratic risk associated with the firm and are thus concerned with the cash flows it generates. Founding families' long tenure and substantial involvement in management imply that they are knowledgeable about their firms' activities, which in turn enables them to provide better monitoring of managers.

Second, founding families tend to have much longer investment horizons than other shareholders. Their long-term presence in the firm implies that family owners are willing to invest in long-term projects. Thus, family owners can help to mitigate the managerial myopia problem (Stein, 1988, 1989). Because the founding family views the firm as an asset to pass on to future generations rather than as wealth to be consumed during their lifetimes (James, 1999), firm survival is an important concern. Hence, family owners have even stronger incentives to monitor than other large and long-term shareholders.

Third, founding families are concerned with the family's reputation. They are more willing to build and protect their reputation, which is likely to have long-term effects on third parties, and hence the family business. Founding families are likely to deal with other stakeholders, such as banks, suppliers, and customs, for longer periods. This also gives family firms stronger incentives to execute effective monitoring than other large shareholders.

Lastly, in founder and descendant CEO firms, the owner and the CEO are one and thus there is no incentive misalignment and no Type I agency problem. Recall that Type I agency problems arise when the owners' and the managers' interest are not aligned.

In summary, compared to non-family firms, family firms face less severe Type I agency problems arising from the separation of ownership and control.

1.2.2. The conflict between majority and minority shareholders

The second type of agency problem is the conflict between majority and minority shareholders. As they hold substantial ownership and have controlling positions in the firm, majority shareholders may seek private benefits at the expense of minority shareholders (Shleifer and Vishny, 1986). We refer to this type of agency problem as the Type II agency problem. Family firms have a large shareholder (the family owner) and a fringe of small shareholders. As such, family firms are subject to severe agency problems between family owners and minority shareholders.

The primary source for this type of agency problem is founding families' concentrated equity holdings and substantial control in their firms, which gives them the opportunity to extract private benefits at the expense of other shareholders. Private benefits may be both the monetary and the non-monetary benefits from running a

firm. For example, when discussing the CEO turnover decision in Ford Corporation, *Business Week* (August 21–28, 2006) comments that "[given his poor performance,] CEO Bill Ford would have been fired by now by most boards if his name were Smith." Families are also capable of expropriating wealth from the firm through excessive compensation, related-party transactions, or special dividends (Burkart et al., 2003).

Another important source of potential family entrenchment is the difference between their control rights and cash-flow rights. Villalonga and Amit (2009) show that founding families are the primary type of blockholders to hold control rights in excess of their cash-flow rights in U.S. corporations. Based on 3006 U.S firm-year observations from 515 firms between 1994 and 2000, they find that founding families on average own 15.3% of the shares (cash flow rights), but control 18.8% of the votes in those firms. The wedge is primarily due to the issuance of dual-class shares. For example, Google's co-founders, Sergey Brin and Larry Page, own super-voting class B shares, which have 10 votes per share. Other high-tech firms, such as Facebook, have similar dual-class structures. Founding owners also obtain disproportionally higher control via disproportionate board representation, voting agreements, and pyramid ownership structures. Such a wedge provides them with the incentive and ability to pursue private benefits. While families may take actions that maximize their personal benefit, many of these actions can lead to suboptimal corporate decisions that reduce the value to minority shareholders.

In summary, compared to non-family firms, family firms face more severe agency conflicts between majority and minority shareholders.

1.2.3. Tension within the family

Compared to Type I and Type II agency problems, the intricate relationships within families are even more unique and interesting. Family feuds can exist between founders and descendants and, more commonly, between descendants, due to differences in their interest and vision.

One example of a family feud between founders and descendants is the Redstone family. Sumner Redstone, an American media magnate who is the controlling shareholder and chairman of the National Amusement theater chain, shoved a succession of 'heirs apparent' out of the door. His daughter, Shari Redstone, was set to assume his role. However, in 2007, when Sumner Redstone was 84 years old, they feuded publicly over issues of corporate governance and the future of the cinema chain.[3]

Another example of a family feud is the discord in the Georgina Rinehart family. Georgina Rinehart's farther, Lang Hancock, established the Hope Margaret Hancock Trust before his death, nominating Georgina Rinehart as the trustee and his four grandchildren as beneficiaries.[4] However, in 2011, Rinehart's three older children brought legal action in the Supreme Court of New South Wales, Australia, to have Georgina Rinehart removed as sole trustee due to a commercial dispute.[5,6]

The tensions within the family have not yet been fully investigated. A case study, rather than a large sample study, is better suited for such investigations.

2. What have we learned from recent family firm research?

2.1. Valuation premium

One fundamental finding in the family firm research is that family firms on average perform better than non-family firms. Anderson and Reeb (2003) document in their seminal work that family firms have higher returns on assets and Tobin's Q than non-family firms. This finding is confirmed by later studies (e.g., Villalonga and Amit, 2006; Maury, 2006; Andres, 2008) and suggests that family ownership is an effective organizational structure. The questions then are how, which, and when family firms create value.

First, how do family firms create more value? Anderson and Reeb (2003) attribute the family firm valuation premium to the reduction in agency problems associated with managerial opportunism, or Type I agency problems. They and others find that family firms perform better when family members serve as the CEO

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[3] Jenn Abelson, "Redstone says he relies on his instinct," *The Boston Globe*, September 19, 2007.

[4] Hall, Louise and Pennells, Steve. "Rinehart's children win first round," *The Sydney Morning Herald*, October 8, 2011.

[5] Hall, Louise. "Family feud details to stay secret for at least five more weeks," *The Sydney Morning Herald*, February 2, 2012.

[6] Amy Dale. "Days away from being billionaires, Gina Rinehart locks trust for half a century," *The Daily Telegraph*, March 13, 2012.

(Anderson and Reeb, 2003; Maury, 2006; Andres, 2008), suggesting that active family involvement and control can readily align managers' interest with that of the family. Anderson et al. (2003) further investigate the issue from the angle of the cost of debt. They find that founding family ownership is associated with lower cost of debt. This result is consistent with the notion that agency conflicts between equity and debt claimants are also lower in family firms, and/or the notion that family owners' reputations and long horizons are beneficial and can reduce the transaction costs of dealing with other stakeholders.

Another reason family firms perform better is that they are less likely to destroy value through mergers and acquisitions. Caprio et al. (2011) investigate 777 large European companies during the 1998–2008 period and show that family firms are less likely to make acquisitions and that their acquisitions are of higher quality. Focusing a sample of Japanese firms, Shim and Okamuro's (2011) analysis also shows that family firms are less likely to conduct mergers than non-family firms.

Second, who creates value in family firms? Some studies show that founders create value and descendants destroy value (Villalonga and Amit, 2010). Founder CEOs can bring innovative and value-enhancing expertise to the firm (Morck et al., 1988). Villalonga and Amit (2006) find that family ownership creates value only when the founder serves as the CEO of the family firm or as the Chairman with a hired CEO. Fahlenbrach (2009) documents that 11% of the largest U.S. public firms are headed by founder CEOs, and these firms invest more in research and development, have higher capital expenditures, make more focused mergers and acquisitions, and earn a benchmark-adjusted annual return of 8.3% during the 1993–2002 period.

Pérez-González (2006) observes that compared with professional CEO family firms, descendant CEO firms underperform in terms of operating profitability and market-to-book ratio. Bertrand et al. (2008) also document lower firm performance associated with greater involvement by founders' sons, especially after the founders pass away. Cucculelli and Micucci (2008) find similar results based on a sample of Italian family firms.

The underperformance by descendant CEO firms is largely attributed to their lack of managerial skills. These descendants are chosen as the CEO not because they are the best candidates for the position, but because they are the descendants of the founders. To use Warren Buffett's analogy, picking executives from the small pool of family heirs would be like "choosing the 2020 Olympic team by picking the eldest sons of the gold-medal winners of the 2000 Olympics."[7]

The third question is, when do family firms create value? As founding families can use their power to accrue private benefits at the expense of minority shareholders, the checks and balances on founding families' power can help to reduce Type II agency problems. Anderson and Reeb (2004) find that family firms perform best when the power of the founding family is balanced by the presence of independent directors. Family firms, on average, only out-perform when there is no dual-class structure or over representation on their boards (Villalonga and Amit, 2009). Anderson et al. (2009) further document that publicly traded firms exploit opacity to extract private benefits at the expense of minority shareholders. They find that founder- and descendant-controlled firms outperform other firms only when the information environment is of high quality. Evidence from Western European countries shows that family control is associated with higher firm value mainly in economies with better shareholder protection and country-level legal infrastructure, which reduce Type II agency problems (Maury, 2006).

2.2. Evidence of Type II agency problems in family firms

Because founding families enjoy substantial control as a result of their concentrated equity holdings, family firms have more severe Type II agency problems than non-family firms, as discussed above. The valuation premium enjoyed by family firms is consistent with the notion that the benefit from the reduction in Type I agency problems outweighs the cost from the more severe Type II agency problems. However, several recent studies provide some direct evidence that family firms are subject to more severe Type II agency problems.

Villalonga and Amit (2006) find that the use of control-enhancing mechanisms, e.g. dual-class structures, pyramids, and voting agreements, reduce founder CEO firms' valuation premium. Similarly, Anderson and Reeb (2004) find that in firms with concentrated founding-family ownership and relatively few independent

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[7] David C. Johnston, "Dozens of Rich Americans Join in Fight to Retain the Estate Tax," *New York Times*, February 14, 2001.

directors, firm performance is significantly worse than in non-family firms. These results indicate that the Type II agency problem is particularly severe for family firms with control-enhancing mechanisms and less effective monitoring of family members.

More direct evidence comes from the investigation of specific corporate decisions. Anderson et al. (2012) examine the information content of short sales in family and non-family firms and find that founding families are involved in more aggressive informed trading than other large shareholders. Moreover, Chen et al. (2013a) observe that both founder and descendant CEO family firms are less likely to let the CEO go after their firms perform poorly. CEO turnover–performance sensitivity, a measure of agency problems in the CEO turnover setting, is lower for family CEO firms than for professional CEO family firms. When the family ownership is higher, family CEO turnover is even less sensitive to firm performance. Their evidence suggests that the Type II agency problem manifests itself in the CEO turnover setting and the problem increases with family owner-ship and control. They also find that CEO turnover–performance sensitivity is higher in professional CEO family firms than in non-family firms. Overall, they find that family ownership/control is a double-edged sword: it leads to Type II agency problems when family ownership is combined with family control and reduces Type I agency problems when family ownership is separated from control. The effects increase with the level of family ownership.

2.3. Accounting phenomenon

The unique ownership structure of family firms has important implications for their financial reporting and disclosure practices. In terms of earnings quality, Wang (2006) argues that the incentives for founding families to expropriate wealth from other shareholders leads to lower earnings quality (the entrenchment effect), while greater monitoring by founding families implies higher earnings quality (the alignment effect). He shows that founding family ownership is associated with lower abnormal accruals, greater earnings informativeness, and less persistence of transitory loss components in earnings, suggesting higher earnings quality in family firms. Ali et al. (2007) further suggest that family firms can address agency problems through direct monitoring rather than rewarding managers based on accounting performance, such that managers are less likely to manipulate the earnings. Consistent with this notion, they find that family firms report higher earnings quality, including lower discretionary accruals, higher predictability of cash flows, and higher earnings response coef-ficients, thus corroborating the results reported by Wang (2006).

In addition to the quality of mandatory reporting, studies also examine the voluntary disclosure policies adopted by family firms. Ali et al. (2007) argue that maintaining the opacity of corporate governance practices may facilitate family members' entrenchment. They find that family firms make fewer disclosures about their corporate governance practices. Chen et al. (2008a) further argue that family owners have a longer investment horizon than other shareholders; hence, they do not enjoy the benefit of timely disclosure but bear the cost of disclosure due to their high ownership. Consistent with their prediction, they find that managers are less likely to provide earnings forecasts and hold fewer conference calls. However, withholding bad news is costly for the firm and shareholders because of the potential litigation costs. Given founding families' concentrated and under-diversified equity holdings, they are more concerned with the litigation and reputation costs. Consistent with their conjecture, Chen et al. (2008a) document that family firms provide more earnings warnings than non-family firms.

Because tax avoidance activities are complex and opaque, they can be used to hide losses or rent extraction by the majority shareholders (Desai and Dharmapala, 2006). Building on this line of logic, Chen et al. (2010) find that family firms are less tax aggressive than their non-family counterparts. They suggest that family own-ers are willing to forgo tax benefits to avoid the non-tax cost of a potential price discount. As family firms are characterized by a unique agency conflict between dominant and small shareholders, family owners enjoy greater share price discounts if they are more tax aggressive, which can be viewed as masking rent extraction activities. In addition, due to their much larger equity ownership and their much longer investment horizons, family owners are more concerned with the potential penalties imposed by the IRS and the reputation damage from being involved in a tax-related lawsuit.

Overall, the extant literature finds that family firms generally have better financial reporting quality, are more likely to issue earnings warnings, and are less tax aggressive.

2.4. Determinants of family ownership

Because the decision to control a firm is endogenous, a crucial issue in the study of family firms is what determines the ownership and control structure of family firms. The current evidence suggests that both micro and macro factors shape the family ownership concentration and the wedge between family control and ownership.

The majority of firms start as family firms. Whether the founders or later generations decide to maintain family ownership and control depends on the costs and benefits of doing so, and on the structure of the founding family. Bennedsen et al. (2007) find that the gender of the departing family CEO's eldest child strongly influences the decision to appoint a family member or an outsider as the CEO. The frequency of appointing a family CEO is 29% when the eldest child is female, but 39% when the eldest child is male, suggesting that founding families are more likely to maintain control when they have sons. Bertrand et al. (2008) document a positive association between family size and family ownership and control. Such evidence is corroborated by anecdotal evidence and reflects the general culture of letting the son take over the family business. In addition, Bertrand and Schoar (2006) suggest that the family values in a culture play an important role in shaping how businesses are organized and their efficiency.

At the macro level, family ownership is found to be related to the institutional and market environment. Burkart et al. (2003) show that family ownership is negatively correlated with the level of investor protection in a country: when investor protection is weak, family ownership is high. In their international study, Franks et al. (2012) observe that family firms gradually evolve into widely held companies in countries with developed financial markets and strong investor protection. In contrast, family control is prevalent in countries with less developed financial markets and weak investor protection.

Studies of how family business groups are structured come to a similar conclusion: pyramids are formed to allow a family to achieve control of the business group using only a small cash flow stake (e.g., Claessens et al., 2000; Almeida and Wolfenzon, 2006). In an empirical study of family-controlled business groups in 45 countries, Masulis et al. (2011) document that family groups, especially those structured as pyramids, are more prevalent in markets with low capital availability, suggesting that group structures emerge not only to maintain control, but also to alleviate financing constraints.

Additional evidence from King and Peng (2009) shows that family ownership concentration varies with industry characteristics. Founding-family firms in cyclical, capital intensive, and growth businesses have significantly shorter control spans than other family firms.

In sum, whether the founding family can maintain control and high ownership depends on the level of investor protection at the country level, the characteristics of the business at the industry level, the capital needs at the firm level, and the structure of the founding family at the family level.

3. Family firms and family firm research in China

The above discussion focuses primarily on studies using U.S. data and some international studies. In this section, we briefly discuss the characteristics of Chinese family firms and review the literature on these firms in the area of accounting and finance.

3.1. Family firms in China

Compared to family firms listed on the U.S. exchanges, Chinese family firms are still at an early stage. Since China started to transform from a planned economy to a socialist market economy in 1992, family firms have grown rapidly in both prevalence and size. To obtain a basic understanding of the characteristics of Chinese family firms, we examine those listed on the Shenzhen and Shanghai Stock Exchanges in the 2003–2012 period.[8] Because Chinese listed firms have been required to disclose their control structure and ultimate ownership since 2003, our sample period starts in that year. Disclosure of the control structure makes it possible to

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[8] We only include A-share family firms here. There are only about eight B-share family firms and most of them also issue A-shares.

Table 1
The distribution of Chinese family firms.

Year	Chinese listed firms	Family listed firms	Type of founding family owner	
			Chinese citizen	Hong Kong/Macao/Taiwan/overseas citizen
Panel A. Chinese family firms clustered by year				
2003	1249	170	157	13
2004	1349	329	312	17
2005	1346	349	331	18
2006	1406	430	405	25
2007	1520	514	483	31
2008	1597	574	537	37
2009	1684	661	618	43
2010	2031	961	902	59
2011	2303	1243	1171	72
2012	2460	1373	1284	89

Panel B. Chinese family firms clustered by industry

Industry	N	Industry	N	Industry	N
Agriculture	24	Iron/steel mills	107	Trade	55
Mining	19	Machinery	309	Banking/insurance	7
Brewage/food	51	Pharmaceutical	95	Real estate	66
Textile/apparel	52	Other manufacturing	23	Tourism	39
Wood/furniture	12	Utilities	8	Media	12
Paper/printing	31	Construction	26	Conglomerate	18
Petro-chemical	155	Transportation	10		
Electronic	108	Telecommunication	146	Total	1373

Panel C. Chinese family firms clustered by province

Province	N	Province	N	Province	N
Anhui	36	Heilongjiang	16	Shanxi	7
Beijing	94	Hubei	41	Shanxi	9
Chongqing	16	Hunan	35	Shanghai	79
Fujian	59	Jilin	18	Sichuan	55
Gansu	11	Jiangsu	169	Tianjin	9
Guangdong	250	Jiangxi	12	Xizang	7
Guangxi	15	Liaoning	36	Xinjiang	12
Guizhou	6	Neimeng	14	Yunnan	6
Hainan	17	Ningxia	6	Zhejiang	188
Hebei	23	Qinghai	5		
Henan	34	Shandong	88	Total	1373

Note: The sample consists of firms issuing A-shares and listed on the Shanghai and Shenzhen Exchanges in the 2003–2012 period. Industry classification is based on the industry classification guideline issued by the China Security Regulation Committee.

identify whether a listed firm is controlled by the government, an institution, or a family. We use the same definition as discussed in Section 1 to classify family firms.[9]

3.1.1. The distribution of Chinese family firms

Table 1 presents the distribution of Chinese family firms. Several features emerge. First, the majority of Chinese family firms are founded by mainland Chinese citizens. A small proportion of them are controlled by citizens from Hong Kong, Macao, Taiwan, or overseas (Table 1, Panel A).[10]

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[9] This definition is different from others in that it extends the definition of "family" to include not only founding families but also individual investors or families that are not (related to) the founder. See Villalonga and Amit (2010, p. 867).

[10] Note that based on the data available from the database, it is impossible to completely separate firms into single-family firms, multi-family firms (where founders are not related to each other), and multi-generation family firms (held by multiple members of the same family). It is also difficult to identify firms controlled by the founder or the descendent. Such data need to be hand-collected.

Second, the number of family firms was small compared to the number of state-owned firms in the early years. This is consistent with the notion that the Chinese stock market was established to help state-owned firms to obtain capital and to reform, and that it was difficult for family firms to obtain IPO approval from the regulators in the early years. From 1992 to 2002, 17% of IPOs are family firms (not tabulated). The number of family firm IPOs gradually increased after May 2004 when the small- and medium-sized enterprise board was established and increased dramatically after October 2009 when the growth enterprise board was founded. As shown in Panel A of Table 1, the number of Chinese family listed firms increased from 170 in 2003 to 1373 in 2012. Given the strict IPO criteria for family firms in the early years, most of them went public by taking over a listed firm and then relying on the seasoned equity offerings to obtain capital.

Third, although family firms operate in a wide range of industries, most are in industries that have enjoyed growth in recent years, such as petro-chemical, electronic, iron/steel mills, machinery, pharmaceutical, telecommunication, and real estate (see Panel B of Table 1).

Fourth, most Chinese family firms are clustered in the more developed provinces, as shown in Panel C of Table 1. Over 60% of Chinese family firms are located in coastal provinces and regions: Guangdong (250), Zhejiang (188), Jiangsu (169), Beijing (94), Shandong (88), and Shanghai (79). Very few family firms are located in interior provinces such as Qinghai (5), Ningxia (6), Yunnan (6), and Guizhou (6). The heterogeneous marketization across provinces provides a good opportunity to study how the institutional and market environment affects Chinese family firms. Are family firms the main driver of growth in the region, or does the infrastructure in the region help the growth of family firms? Does the social and commercial culture affect the formation and evolvement of family firms?

3.1.2. Ownership structure, corporate governance and financial characteristics

Table 2 presents some basic descriptive statistics for Chinese family firms. Several points are noteworthy.

First, Panel A of Table 2 shows that Chinese family firms have average assets of US$393.3 million (median of US$206.7 million) and an average market value of US$594.2 million (median of US$324.3 million).[11] Chen et al. (2008a) report that during the 1996–2000 period, S&P 1500 firms had average assets of US$1,152.9 million (median of US$982.4 million) and an average market value of US$6266 million (median of US$1150 million). In terms of profitability, the average return on assets of Chinese family firms is 3.36% (median of 4.39%), while the average return on assets in the S&P 1500 family firms is 5% (median of 6%). With respect to growth opportunities, the average market to book ratio is 4.32 (median of 3.19) for Chinese family firms and 4.31 (median of 2.64) for S&P 1500 family firms. While not exactly comparable, Chinese family firms are smaller and less profitable and have higher growth than their U.S. counterparts.

Second, the ownership concentration is very high in Chinese family firms. Panel B of Table 2 shows that the average ownership among family owners is 34.59% (median of 31.36%), which is about twice the proportion among S&P 1500 family owners (Chen et al., 2008a). Considering the pyramid structure, Chinese founding families own an average of 28.32% (median of 24.74%) of the cash flow rights and 36.44% (median of 33.33%) of the voting right in their firms, while Villalonga and Amit (2009) report that the founding families of Fortune 500 companies own an average of 15.3% of the shares and 18.8% of the votes in their firms.[12] Chinese family firms present a much higher level of ownership concentration and higher degrees of separation between cash flow rights and voting rights.[13]

Third, as Panel B of Table 2 shows, only 30% of CEOs in family firms serve as the Chairman of the board in Chinese family firms.[14] A typical board has nine members, three of whom are independent. This fraction is much lower than it is in U.S. family firms. Chen et al. (2008a) report that 62% of the directors on the boards

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[11] We use the official 2012 exchange rate of US$1 = RMB6.39.

[12] If a family owns 60% of firm A, which then owns 40% of firm B, which is listed on one of the exchanges, then the family's direct ownership in firm B is considered to be 40% and the cash flow right in firm B is considered to be 24% (=60% × 40%). These terms are commonly used in the literature on pyramid structures. The direct ownership and cash flow right are naturally the same in cases without a pyramid structure. Cash flow rights differ from voting rights when some shares have different voting and cash flow rights.

[13] The ownership, cash flow rights, and voting rights reported here are those of the controlling family owners. Because family ownership consists of controlling ownership and other family ownership, the amounts of family ownership, family cash flow rights, and family voting rights would be even greater than those reported here.

[14] Recently, the founder of the Alibaba Group, Ma Yun, resigned from the CEO position while still serving as the chairman of the board.

Table 2
Descriptive statistics for Chinese family firms.

	Family firms		Non-family firms		p-Value for the differences	
	Mean	Median	Mean	Median	Mean	Median
Panel A. Financial characteristics						
Assets ($million)	393.32	206.67	2,349.77	397.65	0.000	0.000
Sales ($million)	244.11	110.39	992.83	230.44	0.000	0.000
Market value ($million)	594.24	324.28	2,637.48	560.12	0.000	0.000
Debt ratio	0.49	0.43	0.53	0.53	0.000	0.000
ROA (%)	3.36	4.39	2.76	2.92	0.000	0.000
ROE (%)	5.81	7.49	4.93	6.64	0.003	0.000
Market to book ratio	4.32	3.19	3.61	2.57	0.974	0.000
Tobin's q	1.94	1.43	1.54	1.22	0.000	0.000
Panel B. Ownership structure and corporate governance						
Family direct ownership (%)	34.59	31.36				
Family cash flow rights (%)	28.32	24.74				
Family voting rights (%)	36.44	33.33				
CEO duality	0.30	0.00	0.10	0.00	0.000	0.000
Board size	8.64	9.00	9.68	9.00	0.000	0.000
Board independence	0.37	0.33	0.35	0.33	0.000	0.000
Incentive plan	0.21	0.00	0.07	0.00	0.000	0.000

Note: The sample consists of firms issuing A-shares and listed on the Shanghai and Shenzhen Exchanges in the 2003–2012 period. *Assets* is the total assets at the year-end. *Sales* is the total sales during year t. *Market value* is the market value of common stock plus the market value of debt, where the value of non-tradable stock and non-tradable debt is measured by book value. *Debt ratio* is the ratio of debt to total assets at the year-end. *ROA* is the ratio of net income to total assets in year t. *ROE* is the ratio of net income to equity in year t. *Market to book ratio* is the ratio of the market value of the tradable stock to the book value of the stock. *Tobin's q* is the ratio of the market value to the book value of total assets. *Direct ownership* is the ownership held by the controlling shareholder. *Cash flow rights* is the product of the ownership stakes along the control chain. If an ultimate owner controls a firm via multiple control chains, cash flow rights is the sum of the products of the ownership stakes along each chain. *Voting rights* is the weakest link in the control chain. If an ultimate owner controls a firm via multiple control chains, voting rights is the sum of voting rights along each chain. *CEO duality* is a dummy variable that equals 1 if the CEO also serves as the chairman, and 0 otherwise. *Board size* is the number of directors serving on the board. *Board independence* is the ratio of independent directors to the total number of directors. *Incentive plan* is a dummy variable that equals 1 if the firm has a stock incentive plan in place for the top executives. The variables are Winsorized at the 1% and 99% levels.

of S&P 1500 family firms are independent. Furthermore, a mere 21% of Chinese family firms have implemented equity-based incentive plans for their CEOs.

Fourth, compared to non-family firms, family firms are smaller and have lower leverage, better performance, and higher growth potential. Family firms are also more likely to have CEOs serving as the chairman of the board, have smaller boards, and are more likely to use incentive-based compensation for their CEOs.

These statistics suggest that Chinese family firms are smaller and younger than U.S. firms. At this stage, the ownership, control, and management are mainly centralized in the hands of the founders and their immediate family members. The family members of Chinese founding families are likely to have much greater influence on their firms' corporate governance and financial decisions than family members of U.S. family firms. Hence, the "family effect" is likely to be much more prominent in Chinese than in U.S. family firms.

3.2. Chinese family firm research

To date, there are very few studies of Chinese family firms. A search on Google Scholar for studies published in the international accounting and financial journals[15] revealed only three papers that focus exclusively

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[15] The academic accounting journals include *The Accounting Review*, *Journal of Accounting & Economics*, *Journal of Accounting Research*, *Review of Accounting Studies*, *Contemporary Accounting Research*, *Journal of Accounting & Public Policy*, *Journal of Accounting, Auditing and Finance*, and *Journal of Business Finance and Accounting*. The academic financial journals include *Journal of Finance*, *Journal of Financial Economics*, *Review of Financial Studies*, *Journal of Financial and Quantitative Analysis*, *Journal of Banking and Finance*, *Journal of Corporate Finance* and *Financial Management*. Because the *Asia-Pacific Journal of Accounting & Economics* and *China Journal of Accounting Research* mainly focus on the Asia-Pacific and Chinese markets, we also include these two journals in the Google search.

on Chinese family firms and 27 papers that investigate the differences between state-owned enterprises (SOEs) and non-SOE firms, most of which are family firms. Research on family firms is also limited in the Chinese academic journals. This lack of research is puzzling given how prevalent Chinese family firms are and how different SOEs and family firms are in terms of their ownership structures and managers' incentives. Below we discuss some important findings based on these studies and offer some suggestions for future research.

3.2.1. Corporate valuation and firm performance

Similar to those in the U.S. market, Chinese family firms outperform non-family firms in the Chinese markets. Allen et al. (2005) find that the private sector in China grows much faster than other sectors and is the primary driver behind most of the country's economic growth. Similarly, Chen et al. (2008b) document that when control of a firm is passed to a private entity, the firm's performance improves.

Given that family firms perform better than non-family firms, one natural question is why family firms are more efficient in an economy where the legal and market environments are far from perfect. This question is particularly interesting because SOEs enjoy most of the financing and political advantages. One possible reason is the better incentive mechanism in Chinese family firms, although the evidence is scarce at the moment. Some studies argue that Chinese family firms establish incentive systems for profit maximization. Firth et al. (2006) find that firms owned by private blockholders link the CEO's pay to stock and accounting performance. Chen et al. (2012b) find that family firms use relative performance evaluation for top executives' compensation. Cheng et al. (2008) find that turnovers in family firms are negatively associated with core earnings. More research can be done to examine whether there are other drivers of family firms' outperformance.

3.2.2. Type II agency problems in Chinese family firms

Some recent studies examine Type II agency problem in Chinese family firms. Compared to SOEs, family firms appear to be less likely to use related party transactions for "tunneling" (Peng et al., 2011; Ying and Wang, 2013). However, Chinese family owners have a significant wedge between voting rights and cash flow rights, which can motivate the founding family to tunnel corporate resources at the expenses of minority shareholders.

To date, most of the studies examining Type II agency problems in family firms are published in Chinese journals. The general conclusions are as follows: (1) founding families use group companies, internal capital markets, and pyramid structures to tunnel resources from their listed companies (Shao and Liu 2007; Liu et al., 2008; Jiang et al., 2010); (2) the investment efficiency is low in family firms where the founding family has excessive control rights and low cash flow rights (Han et al., 2007; Chen et al., 2012a); and (3) family firms have a lower cash dividend payout ratio and a lower propensity to pay dividends than non-family firms (Wei et al., 2011). Extant studies also examine the consequences of such agency problems and they find that (1) family firms with a higher degree of separation between control and cash flow rights are associated with lower firm value (Su and Zhu, 2003; Zhang et al., 2004; Ye et al., 2007; Yang and Su, 2009); (2) family firms with a multiple-layer corporate structure and a higher degree of separation between control and cash flow rights are associated with higher bid-ask spreads (Lei et al., 2013); and (3) auditors charge higher fees for family firms that have a higher degree of separation between control and cash flow rights, a disproportionally high number of family directors on the board, and a family member as the CEO (Hu et al., 2012; Liu and Subramaniam, 2013).

3.2.3. Financial reporting quality

In contrast to their counterparts in the U.S. market, Chinese family firms exhibit lower financial reporting quality than non-family firms. Huang and Zhang (2011) and Wang and Yung (2011) document that Chinese family firms have higher abnormal accruals, lower earnings predictability, and lower conservatism. They attribute their findings to the weak investor protection in China and Type II agency problems in family firms. In contrast, Xu and Lv (2011) indicate that when family members are appointed as top executives, financial reporting quality is higher.

Some studies examine how market intermediaries affect the extent of earnings management. Chen et al. (2011a) find that the effects of audit quality on earnings management and the cost of equity capital are more pronounced for non-SOEs (primarily family firms) than for SOEs. Chen et al. (2013b) also find a significantly

negative relationship between underwriter reputation and pre-IPO earnings management for non-SOE issuers. This negative relationship is due either to reputable underwriters' selection process or to their active monitoring and intervention in the pre-IPO stage.

3.2.4. Financing decision and the governance structure of family firms

The Chinese capital markets are characterized by (1) an uneven level of marketization across provinces; (2) weak investor protection and legal infrastructure; (3) strong governmental intervention; (4) uneven resource allocation between SOEs and non-SOEs; and (5) a lack of trust among market participants. These characteristics affect the formation and development of Chinese family firms.

In terms of financing, Chinese family firms achieve tremendous growth despite the limited support from state-owned banks. This finding provides a unique setting to test how firms in a country with poorly developed financial institutions fund their growth opportunities. Ge and Qiu (2007) find that compared to SOEs, non-SOEs use more trade credit for financing. Lu et al. (2012) find that non-SOEs have a greater propensity to hold significant ownership in commercial banks, and such ownership helps them to reduce interest expenses and obtain short-term loans when the government's monetary policy is tight.

The uneven resource allocation system in China also motivates Chinese family firms to establish political connections. Chen et al. (2011c) find that in regions where the local economy is less market-oriented or where the government has more discretion in allocating economic resources, non-SOEs are more likely to establish political connections. Wu et al. (2012) also show that family firms with politically connected managers enjoy tax benefits and outperform those without such managers.

In terms of governance structure, Li et al. (2008) find that the discrimination of state-owned banks against non-SOEs encourages the founding families to build a pyramid ownership structure to reduce their financial constraints. Chen et al. (2011b) find that the layers of pyramids and the wedge between voting and cash flow rights decrease with the quality of government services. The early stage of Chinese family firms and the poor legal infrastructure in China provide great opportunities for future research to examine how the governance structure of family firms evolves.

3.2.5. The allocation and effects of family authority

Although it is widely accepted that the involvement of family members in the family business is the most unique feature of family firms (Chua et al., 1999), little research has been done in this area. Data availability is the biggest challenge. Nevertheless, as suggested above, Chinese family firms are still young and family members still hold large ownerships and are involved in their firms' boards and management teams. These unique attributes provide great opportunities to explore how the founding family controls the firm, how the allocation of family authority affects operating efficiency and corporate governance, and how the conflicts among family members affect firm operations. Field research and case studies might be more appropriate for such research than a large sample study.

Some recent studies have started to explore these issues. He et al. (2010a,b) and He and Lian (2009) examine the composition of family firms in terms of core family members, close relatives, and distant relatives. Lian et al. (2011) find that ownership of the firm is more likely to be held by core family members, but only capable family members or professional CEOs are assigned to the management team. He and Lian (2009) and He et al. (2010b) show that conflicts among family members are induced when a family member's ownership and management position do not match, and such conflicts reduce firm value. He et al. (2010a,b) find that the conflict among core family members is the lowest, and the majority of conflicts are between distant relatives or between close and distant relatives. These studies collectively provide some initial evidence on how the characteristics of the founding family affect the ownership, corporate governance, and valuation of a family business.

4. Concluding remarks and opportunities for future research

Family firms are very common around the world. Founding family ownership exhibits unique characteristics. Family owners have concentrated and under-diversified ownership. They also have longer investment horizons than other shareholders, including other blockholders. Family owners are usually actively involved

in firms' management, serving as directors and/or managers. These characteristics imply that family firms have less severe agency conflicts between owners and managers, but more severe agency conflicts between family owners and non-family minority shareholders. Family firms are also affected by the tensions or conflicts among family members. These agency conflicts affect the operations, financial reporting, and valuation of family firms.

The low-hanging fruits have been picked in the last decade, although opportunities for further research still bound. First, it would be of particular interest to explore the potentially "disguised" family effects. Some phenomena documented in prior research might be due to family firm effects. For example, many studies have examined the effect of a dual class structure. However, as most dual class shares are owned by founding family members, is it possible to separate the dual class effect from the family firm effect?

Second, the founding family is treated as a black box and is assumed to be homogeneous. As indicated by Bertrand and Schoar (2006), "much can be learned by investigating the 'family' part of 'family firms'." Understanding the nexus within the family and its influence on firm operations would move the literature forward. Such studies would also be useful for family owners in improving the governance, succession planning, and operations of their firms.

Third, more data are needed to provide additional insights. An interesting example along this line is a study by Bunkanwanicha et al. (2013). They compile a unique and comprehensive data set of family firms in Thailand and find that family firms' stock prices increase when one family member marries a member from a prominent business or political family.

Fourth, case studies are quite limited in the family firm literature and might provide the most value-added in future research. While such studies are more difficult to publish due to the lack of generalizability, the collective evidence from such studies can provide much needed insights into the operation of family firms and provide guidance for family owners who are concerned with governance, operation, and succession.

Finally, international studies are helpful in understanding how different cultural norms and legal infrastructures affect the evolvement of family firms. Morck et al. (2011), Masulis et al. (2011), and Franks et al. (2012) are some recent examples. Of course, both authors and readers must be mindful of the heterogeneity across countries, which imposes challenges for research design and might affect the interpretation of results.

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Political connections, media monitoring and long-term loans[☆]

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A B S T R A C T

We analyze data on Chinese non-state-listed firms and find that it is easier for firms with political connections to obtain long-term loans with extended debt maturities than it is for firms without political connections. Our investigation indicates that this phenomenon is significantly less common with increased media monitoring. Houston et al. (2011) find strong evidence that the state ownership of media is associated with higher levels of bank corruption in China, but our study shows that, to a certain extent, media monitoring can curb corruption.

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1. Introduction

Some researchers have found that non-state-owned firms with political connections can secure preferential access to financing and tax breaks (e.g. Johnson and Mitton, 2003; Claessens et al., 2008; Li et al., 2008; Luo and Zhen, 2008; Wang and Wang, 2013; Yu and Pan, 2008). Yet there are also disadvantages to firms setting

up political connections. Some empirical studies have shown that political connections may improve or reduce firm value and performance (Liu et al., 2010). For example, Fisman (2001), Johnson and Mitton (2003), and Faccio and Parsley (2009) find that political connections can improve firm performance and value. However, other studies come to the opposite conclusion, such as Fan et al. (2007), who find that the accounting and market performance of firms with political connections are significantly lower than those of other firms after initial public offerings (IPOs), due to a lack of managerial capabilities. Thus, further study is clearly needed to determine why these empirical results diverge and to identify the internal mechanisms of political connections that affect firms.

There are at least two theories that can explain the existence and mechanisms of political connections. First, reputation theory emphasizes the importance of relationships, using a reputation enhancement argument that suggests that the political connections of firm executives serve as an alternative channel for establishing firm reputation when quality disclosure is absent (Sun et al., 2005; Yu and Pan, 2008). Second, rent-seeking theory also explains political connections by arguing that firms use them to engage in activities that influence the government's approval decisions and government officials then show partiality to firms whose executives promise these officials personal favors. In other words, the approval decision process is influenced by officials desire to seek rents (e.g., Fan et al., 2007).

Which theory more effectively explains the existence and mechanisms of political connections in the Chinese stock market? In this study, we attempt to answer this question from a media monitoring perspective. Based on the extant research, we investigate how media monitoring affects the relationship between political connections and long-term loans. We anticipate that firms with political connections can more easily obtain long-term loans with extended debt maturities. On the surface, the phenomenon can be explained by both theories, so determining which is more significant requires deeper study. If the reputation theory is more significant, then we would expect the relationship between political connections and long-term loans to be reinforced by improved media monitoring, because firms' reputations can be strengthened by media exposure. If the rent-seeking theory is more significant, we expect the relationship to be reduced by improved media monitoring because most rent-seeking behavior is unlawful and irrational, and thus the role of political connections should be weakened by media exposure.

Using data for Chinese non-state-owned listed firms from 2006 to 2012, we find that firms with political connections have easier access to long-term loans with extended debt maturities. This result suggests that political connections facilitate firms' financing. We also find that the relationship between political connections and long-term loans is significantly reduced with improved media monitoring. Overall, our findings support the rent-seeking theory.

This study contributes to the literature in several ways. First, previous studies have not distinguished between these two theories, such that research based on one cannot exclude the other. This study differentiates between these two theories and analyzes which is better suited to the Chinese stock market. Second, the role of the media in China is highly suspect due to a higher degree of government intervention. Houston et al. (2011) note a strong correlation between state-funded media and banking corruption. According to their study, it is difficult for the Chinese media to play a role in suppressing corruption, but we observe that it can play an important role in inhibiting rent-seeking, which can be explained by the market-oriented media reform of recent years. Our empirical evidence therefore provides some support for the role of the media in China, which subsequent studies can further investigate.

2. Institutional background, theoretical analysis and hypothesis development

2.1. Institutional background

Due to ideological factors and compared with state-owned firms, non-state-owned firms face unfair market conditions, also known as "tilted playing field" problems. The constraints on non-state-owned firm development mainly include legal obstacles, government intervention or administration and financing difficulties (Bai et al., 2003). Another problem for non-state-owned listed firms is related to stock market development. The Chinese stock market is a burgeoning traditional planned economy and socialist market economic system pursuing state-owned enterprise (SOE) reform. The central and local governments have rapidly recognized the

stock market's potential to facilitate SOE reform. In the early 1990s, the stock market's SOE reform burden was the result of the SOEs general inefficiency, which led to the stock-issuing system and the complication of SOE reforms. This indicates that SOEs inevitably dominate the Chinese stock market. Although non-SOEs can list through mergers and acquisitions (M&A) and management buyout (MBO) markets, SOEs still dominate the stock market because the M&A and MBO markets are largely controlled by governments and SOEs. Thus, the majority of Chinese listed firms are ultimately under government control (Liu et al., 2003). Hence, non-state-owned listed firms naturally face tilted playing field problems such as those listed below.

First, there are several legal and administrative barriers for non-state-owned listed firms. According to Chen et al. (2008), the proportion of non-state-owned listed firms is less than 20% in high-barrier industries such as automotive, marine and road and rail transportation—far below the proportion of SOEs. The proportion of non-state-owned listed firms in moderate- and low-barrier industries is about 30–50% and/or exceeds that of SOEs, respectively. These results reflect the ubiquity of barriers, such as legal and administrative, for non-state-owned listed firms in high-barrier industries.

Second, non-state-owned listed firms in China are developing serious financing difficulties in that they are unable to gain adequate external financing in the stock market or from the banking system, the latter of which exhibits credit discrimination. Banks, especially those that are state-owned, prefer to provide loans to SOEs rather than to non-state-owned listed firms. In the past 10 years, while non-state-owned firms contribution to Chinese GDP exceeded 70%, they obtained less than 20% of the bank loans (Lu and Yao, 2004). On the stock market, in the early 1990s, non-state-owned firms could not easily achieve listing directly through IPOs due to the stock market's burden in serving the SOE reform. Given the reform, some non-state-owned firms had to initially list through the takeover market or buy shell resources[1] from SOEs, but the quality of such resources was typically low because SOEs and governments preferred not to sell high-quality shell resources (Wang et al., 2001). These details explain why non-state-owned listed firms profitability is generally not as good as that of SOEs, despite the former's superior system design, corporate government and ownership structure. Gaining a low-quality shell does not solve non-state-owned listed firms financing problems, and neither does equity refinancing, according to Chen et al. (2008), due to low benefits and government intervention.

Given non-state-owned listed firms tilted playing field problems, they should use the following measures to avoid constraints. First, they should seek political connections to avoid the negative effects of laws and governmental regulations (Fan et al., 2007). Second, they should solve their financing difficulties through political connections and the leakage effect to seek informal financial support (Lu and Yao, 2004; Yu and Pan, 2008).

2.2. Theoretical analysis and hypothesis development

The two theories considered in this study—reputation and rent-seeking—are used to analyze the relationship between political connections and long-term loans.

Based on reputation theory, Sun et al. (2005) suggest that firms' political connections are important aspects of their reputations that are likely to prompt government intervention. Moreover, while it may help firms avoid trouble, government intervention is not always to a firm's benefit, nor does it line up with the firm's social goals or official interests (Shleifer and Vishny, 1994). La Porta et al. (2002) demonstrate that firms with political connections easily gain government subsidies when they are not facing difficulties in their business operations.

Against the background of the public property system, political connections affect firms long-term loans and debt maturities in the following ways. First, firms with political connections can easily acquire long-term loans because they can use subsidies to reduce the possibility of default. Likewise, banks prefer to give them loans because the possibility of default is relatively low.

Second, firms with political connections can directly influence bank lending decisions and gain more long-term loans to avoid the uncertainty inherent in the rotation of officials (Sun et al., 2005). Thus, our first hypothesis is:

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[1] Shell resources refer to listed firms that are small in size or exhibit poor performance or operational difficulties.

Hypothesis 1. Non-state-owned listed firms with political connections are more likely to gain long-term loans and have longer debt maturities than non-state-owned listed firms without political connections.

Similarly, the rent-seeking theory also supports H1, but unlike the reputation theory, it stresses that managers should establish and use political connections to gain excess profits, which is commonly regarded as a non-productive activity and as unfair social behavior. Rent-seeking behavior leads to government intervention and non-state-owned listed firms with political connections can gain more long-term loans through their rent-seeking for governments or banks, especially state-owned banks.

Although H1 is supported by both theories, the reputation theory emphasizes political connections as a positive reaction to market and legal failures, and as an effective alternative to the formal system. In contrast, the rent-seeking theory suggests that firms with political connections are likely to take advantage of government intervention and slip through policies, such that there is a close relation between political connections and corruption.

We address which theory more effectively explains political connections and their functional mechanisms by distinguishing between them from a media supervision perspective. First, we introduce the background of media monitoring in the Chinese stock market. In recent years, the media as an important external governance mechanism has received widespread attention for its influence over the stock market in China. The following are the most important characteristics of media monitoring in the Chinese stock market.

First, the influence of state-owned media is significantly higher than that of other media (Yang and Ling, 2011) because the four major securities newspapers—regarded as the most influential—are state-owned.

Second, most media, especially state-owned media, involve multi-tasking—the presence of which creates a mixture of administration and marketing. Media coverage not only needs to obey government control requirements, but also has to adapt to the market's development while meeting readers needs.

Third, the depth and breadth of media reports are improving as the stock market develops.

Although the media in China must operate under government controls, they can still pursue their own utility maximization for market purposes, typically by exhibiting a preference for inflammatory news, social hot spots and contentious phenomena. The media's behavior has been reported as influencing corporations and corporate governance (Dyck et al., 2008; Miller, 2006; Houston et al., 2011; Li and Shen, 2010; Yang and Zhao, 2012). According to Dyck et al. (2008), the media influences corporate governance through supervision or reputation mechanisms. Under the supervision mechanism, the media reveals improper behavior with the aid of administrative and external supervision and internal governance that ultimately constrain firms' misconduct (Li and Shen, 2010). Under the reputation mechanism, the media influences managers' reputations, which is considered an important governance function. Managers considering future employment and wages actively respond to media reports that might affect their reputations.

If the rent-seeking theory more effectively explains the presence and function of political connections, then we would expect media monitoring to reduce the role played by political connections due to the close relation between corruption and rent-seeking behavior. As a non-productive activity, rent-seeking should decrease as media coverage increases.[2]

Hypothesis 2a. The relationship between political connections and long-term loans decreases as media coverage increases.

In contrast, if political connections are better explained by reputation theory, then we can draw an alternative hypothesis to H2a, because a firm's political relationships are seen as its reputation. The behavior of establishing and using political relationships is, in essence, market oriented. We argue that such behavior is not restricted by media coverage.

Hypothesis 2b. The relationship between political connections and long-term loans is not significantly reduced by increased media coverage.

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[2] According to Dyck et al. (2008) and Miller (2006), media coverage is considered to be a proxy variable for media monitoring.

3. Data and research design

3.1. Data

We draw our sample from A-share non-state-owned listed firms in the 2006–2012 period, during which the numbers of non-financial listed companies provided by the WIND database were 1420, 1521, 1575, 1721, 2072, 2301 and 2422, respectively. On this basis, after deleting those in the growth enterprises market (GEM), those that were state-owned and those missing the main variable, our final sample is comprised of 5215 firms that met the data requirements for our hypotheses testing. The observations by year are 500, 562, 619, 673, 846, 978 and 1037, respectively. The data in this study consist of political connections that were manually collected by reading annual reports (the definitions for political connections appear in Table 1) and the media monitoring or coverage details and other financial data, which were manually collected from the WIND database. The WIND database includes everyday news reports on Chinese listed firms from more than 100 important newspapers. According to Yang and Zhao (2012), the data on media monitoring or coverage in the WIND database mainly cover the financial media reports of Chinese listed firms.

3.2. Research design

We use the following model to test H1:

$$\text{Bank}_{i,t} = \alpha + \beta_1 \text{ZG}_{i,t} + \beta_2 \text{ROA}_{i,t} + \beta_3 \text{Grow}_{i,t} + \beta_4 \text{Liq}_{i,t} + \beta_5 \text{TobinQ}_{i,t} + \beta_6 \text{Tangible}_{i,t} + \beta_7 \text{Size}_{i,t} + \varepsilon \qquad (1)$$

where subscript i is the sample firm, subscript t is the year in the sample period and Bank is a dependent variable comprising Bank1 and Bank2. According to Yu and Pan (2008), the first dependent variable is Bank1, which equals long-term loans. Sun et al. (2005) argue that the second dependent variable is Bank2, which equals debt maturities.

ZG is an independent variable that measures political relations, and comprises ZG1, ZG2, ZG3 and ZG4, which are calculated as follows. ZG1 equals 1 if the chairman or the CEO of the firm is a current or former government official, and 0 otherwise. ZG2 equals 1 if the chairman or the CEO of the firm is a current or former government official, or a current or former National People's Congress (NPC) official or the Chinese People's Political Consultative (CPPC) official, and 0 otherwise. ZG3 equals 3, 2 or 1 if the chairman or the

Table 1
Variable definitions.

Variable	Definition
BANK1	Long-term loans divided by total assets
BANK2	Long-term loans divided by the sum of long-term loans, short-term loans and short-term accounts payable
ZG1	ZG1 equals 1 if the chairman or the CEO of the firm is a current or former government official, and 0 otherwise
ZG2	ZG2 equals 1 if the chairman or the CEO of the firm is a current or former government official, or National People's Congress (NPC) official or Chinese People's Political Consultative (CPPC) official, and 0 otherwise
ZG3	ZG3 equals 3, 2 or 1 if the chairman or the CEO of the firm is a current or former central, provincial or city and county government official, respectively, and 0 otherwise
ZG4	ZG4 equals 3, 2 and 1 if the chairman or the CEO of the firm is a current or former central, provincial or city and county government official (including NPC and CPPC officials), respectively, and 0 otherwise
MC	LN(the number of media coverage + 1)
MCZG1	The interaction between MC and ZG1
MCZG2	The interaction between MC and ZG2
MCZG3	The interaction between MC and ZG3
MCZG4	The interaction between MC and ZG4
ROA	Return on assets
Grow	Sales growth
Liq	Liquidity ratio
TobinQ	Tobin's Q ratio
Tangible	The sum of fixed assets and accumulated depreciation divided by total assets
Size	Ln(total assets)

Table 2
Descriptive statistics for political connections.

	ZG1	ZG2	ZG3	ZG4
Mean	0.187	0.452	0.280	0.838
Median	0	0	0	0
Standard deviation	0.390	0.498	0.655	1.068
Max	1	1	3	3
Min	0	0	0	0
N	5215	5215	5215	5215

Table 3
Descriptive statistics for other variables.

Sample	Bank1	Bank2	MC	ROA	Grow	Liq	TobinQ	Tangible	Size
ZG1 = 0	0.038	0.178	3.552	7.215	19.589	2.605	2.556	0.226	21.188
	0.000	0.035	3.479	6.740	13.640	1.530	1.979	0.200	21.129
	0.068	0.257	0.783	8.284	49.061	3.357	1.958	0.155	1.019
	4242	3618	4242	4242	4242	4242	4242	4242	4242
ZG1 = 1	0.045	0.215	3.486	6.735	20.152	2.517	2.615	0.215	21.126
	0.000	0.061	3.401	6.180	11.950	1.590	1.957	0.188	21.129
	0.075	0.281	0.780	8.967	58.025	3.146	2.066	0.161	1.001
	973	838	973	973	973	973	973	973	973
Total sample	0.039	0.185	3.539	7.125	19.694	2.589	2.567	0.224	21.176
	0.000	0.040	3.466	6.650	13.360	1.540	1.977	0.198	21.129
	0.070	0.262	0.783	8.417	50.848	3.318	1.978	0.156	1.016
	5215	4456	5215	5215	5215	5215	5215	5215	5215
T	−2.785***	−3.327***	2.374**	1.603	−0.315	0.748	−0.838	2.128**	1.725*
Z	−2.16**	−2.728***	2.261**	2.017**	1.447	0.143	−0.161	2.792***	1.265

Note: The T statistic is for mean tests between the groups ZG1 = 0 and ZG1 = 1; the Z statistic is for Wilcoxon tests between the groups ZG1 = 0 and ZG1 = 1.
* Significance at the 10% level (two-sided).
** Significance at the 5% level (two-sided).
*** Significance at the 1% level (two-sided).

CEO of the firm is a current or former central, provincial or city and county government official, respectively, and 0 otherwise. ZG4 equals 3, 2 or 1 if the chairman or the CEO of the firm is a current or former central, provincial or city and county government official (including NPC or CPPC officials), respectively, and 0 otherwise. This design facilitates our ability to quantize political relations.

If the regression coefficients of ZG1, ZG2, ZG3 and ZG4 are significantly positive in model (1), then H1 is supported.

In model (1), we choose control variables according to Sun et al. (2005) and Lu et al. (2008). The specific definitions of the control variables are shown in Table 1.

We use the following model to test H2:

$$\text{Bank}_{i,t} = \alpha + \beta_1 \text{ZG}_{i,t} + \beta_2 \text{MC}_{i,t} + \beta_3 \text{MCZG}_{i,t} + \beta_4 \text{ROA}_{i,t} + \beta_5 \text{Grow}_{i,t} + \beta_6 \text{Liq}_{i,t} + \beta_7 \text{TobinQ}_{i,t}$$
$$+ \beta_8 \text{Size}_{i,t} + \varepsilon \tag{2}$$

where subscript i is the sample firm, subscript t is the year in the sample period, Bank's definition is identical to that in model (1), MC is an independent variable reflecting media monitoring following Dyck et al. (2008) and Core et al. (2008) and MCZG1, MCZG2, MCZG3 and MCZG4 represent interactions between MC and ZG1, ZG2, ZG3 and ZG4, respectively. The control variables in models (1) and (2) are identical.

If H2a (H2b) is supported, the regression coefficients of MCZG1, MCZG2, MCZG3 and MCZG4 should be significantly negative (positive) in model (2).

Table 4
Regression results for model (1).

Variable	The explanatory variable is Bank1				The explanatory variable is Bank2			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	−0.404***	−0.398***	−0.402***	−0.394***	−1.465***	−1.434***	−1.458***	−1.419***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
ZG1	0.0083**				0.0409***			
	(0.0438)				(0.0058)			
ZG2		0.0050*				0.0224		
		(0.0618)				(0.3243)		
ZG3			0.0038				0.0212**	
			(0.1103)				(0.0183)	
ZG4				0.0021*				0.0086**
				(0.0538)				(0.0453)
ROA	−0.0004*	−0.0004*	−0.0004*	−0.0004*	0.0002	0.0001	0.0002	0.0001
	(0.0814)	(0.0669)	(0.0864)	(0.0710)	(0.8194)	(0.8645)	(0.8063)	(0.8608)
Grow	0.0001**	0.0001**	0.0001**	0.0001**	0.0002	0.0002	0.0002	0.0002*
	(0.0356)	(0.0329)	(0.0350)	(0.0312)	(0.1030)	(0.1009)	(0.1004)	(0.0946)
Liq	−0.0016***	−0.0016***	−0.0016***	−0.0016***	0.0195***	0.0191***	0.0195***	0.0192***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
TobinQ	−0.0000	0.0000	−0.0000	−0.0000	0.0042	0.0042	0.0040	0.0040
	(0.9994)	(0.9692)	(0.9755)	(0.9885)	(0.2156)	(0.2318)	(0.2419)	(0.2659)
Tangible	0.0383**	0.0377**	0.0383**	0.0376**	0.0422	0.0387	0.0428	0.0387
	(0.0211)	(0.0230)	(0.0215)	(0.0236)	(0.4107)	(0.4487)	(0.4065)	(0.4497)
Size	0.0207***	0.0204***	0.0206***	0.0202***	0.0743***	0.0728***	0.0740***	0.0722***
	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)	(0.0000)
Industry	Control	Control	Control	Control	Control	Control	Control	Control
N	5215	5215	5215	5215	4456	4456	4456	4456
Adj. R-sq	0.114	0.113	0.113	0.113	0.102	0.100	0.101	0.099

Note: The reported p-statistics in parentheses are two-way clustered at the firm and year levels.
* Significance at the 10% level (two-sided).
** Significance at the 5% level (two-sided).
*** Significance at the 1% level (two-sided).

We also use subsample regressions to test H2a and H2b. Based on the media coverage median, our sample can be divided into two groups: high (higher than the sample's median) and low media coverage.

If H2a is supported, the relationship between political connections and long-term loans and extended debt maturities should be stronger (weaker) in the low (high) media coverage subsample. If H2b is supported, the relationship between political connections and long-term loans and extended debt maturities should be weaker (stronger) in the low (high) media coverage subsample.

3.3. Descriptive statistics

Table 2 provides the descriptive statistics for political connections: 18.7% of the firms had a chairman or CEO that was a current or former government official—45.27% when NPC and CPPC officials are included. This suggests that having political connections is fairly popular.

Table 3, which provides the descriptive statistics of the other variables, shows that non-state-owned listed firms with political connections have significantly more long-term loans and longer debt maturities than those without political connections, in addition to lower MC and better performance (ROA). All of the continuous variables are winsorized at the 1st and 99th percentiles.

4. Empirical analysis

Table 4 reports the regression results of model (1). After controlling for other factors, the results show that politically connected firms have access to extended debt maturities and more long-term loans. The regression

Table 5
Regression results for model (2).

Variable	The explanatory variable is Bank1				The explanatory variable is Bank2			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-0.441^{***}	-0.446^{***}	-0.442^{***}	-0.441^{***}	-1.420^{***}	-1.458^{***}	-1.422^{***}	-1.459^{***}
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ZG1	0.010 (0.311)				0.048 (0.244)			
ZG2		0.019^{**}				0.112^{***}		
		(0.017)				(0.001)		
ZG3			0.011^{*}				0.054^{**}	
			(0.073)				(0.029)	
ZG4				0.008^{**}				0.061^{***}
				(0.023)				(0.000)
Mc	-0.002	-0.000	-0.001	-0.001	0.009 (0.129)	0.019^{***}	0.011^{*}	0.020^{***}
	(0.261)	(0.853)	(0.386)	(0.606)		(0.005)	(0.062)	(0.002)
MCZG1	-0.002				-0.010			
	(0.380)				(0.408)			
MCZG2		-0.004^{*}				-0.027^{***}		
		(0.079)				(0.002)		
MCZG3			-0.003^{*}				-0.013^{*}	
			(0.071)				(0.051)	
MCZG4				-0.002				-0.015^{***}
				(0.107)				(0.000)
ROA	-0.000	-0.000	-0.000	-0.000	0.001^{**}	0.001^{**}	0.001^{**}	0.001^{**}
	(0.358)	(0.342)	(0.354)	(0.353)	(0.029)	(0.031)	(0.030)	(0.030)
Grow	0.000^{***}	0.000^{***}	0.000^{***}	0.000^{***}	0.000 (0.137)	0.000 (0.138)	0.000 (0.128)	0.000 (0.128)
	(0.003)	(0.003)	(0.002)	(0.002)				
Liq	-0.001^{**}	-0.001^{**}	-0.001^{**}	-0.001^{**}	0.024^{***}	0.024^{***}	0.024^{***}	0.024^{***}
	(0.037)	(0.026)	(0.036)	(0.025)	(0.000)	(0.000)	(0.000)	(0.000)
TobinQ	-0.001	-0.001	-0.001	-0.001	0.000 (0.919)	0.000 (0.925)	0.000 (0.922)	0.000 (0.984)
	(0.193)	(0.185)	(0.200)	(0.156)				
Tangible	0.083^{***}	0.083^{***}	0.083^{***}	0.083^{***}	0.233^{***}	0.232^{***}	0.232^{***}	0.232^{***}
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.022^{***}	0.022^{***}	0.022^{***}	0.022^{***}	0.067^{***}	0.067^{***}	0.067^{***}	0.067^{***}
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry	Control	Control	Control	Control	Control	Control	Control	Control
N	5215	5215	5215	5215	4456	4456	4456	4456
Adj. R-sq	0.233	0.235	0.234	0.235	0.228	0.230	0.228	0.230

Note: The reported *p*-statistics in parentheses are two-way clustered at the firm and year levels.
* Significance at the 10% level (two-sided).
** Significance at the 5% level (two-sided).
*** Significance at the 1% level (two-sided).

results in columns (1)–(8) of Table 4, in which the explanatory variables are Bank1 and Bank2, show that the ZG (including ZG1, ZG2, ZG3 and ZG4) coefficients are positive at the 10% significance level, with the exception of columns (3) and (6). However, the results in Table 4 can be used to support the reputation theory; specifically, that firms with political connections tend to be regarded as having good reputations and thus banks are willing to provide them with more long-term loans. The results can also be used to support the rent-seeking theory; specifically, that firms with political connections gain more long-term loans and extended debt maturities through rent-seeking.

Two methods are used to test H2. The first is model (2), and the relevant regression results are shown in Table 5. The regression coefficients of ZG1, ZG2, ZG3 and ZG4 are positive, which indicate that politically connected firms get more long-term loans and extended debt maturities. The coefficients of MCZG1, MCZG2, MCZG3 and MCZG4 are negative and nearly all pass the significance test.

The second method is subsample regressions based on the median of MC. If MC is greater (less) than the median, it is in the group with strong (weak) media monitoring. Then, we perform regressions using model (1)

Table 6
Subsample regression results for model (1).

Variable	The explanatory variable is Bank1								The explanatory variable is Bank2							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
Constant	−0.332***	−0.495***	−0.332***	−0.493***	−0.331***	−0.494***	−0.329***	−0.489***	−1.187***	−1.533***	−1.190***	−1.530***	−1.185***	−1.527***	−1.172***	−1.540***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ZG1	0.007**	−0.003							0.029**	0.001						
	(0.024)	(0.311)							(0.019)	(0.925)						
ZG2			0.005**	0.005**							0.027**	0.004				
			(0.044)	(0.048)							(0.011)	(0.711)				
ZG3					0.004**	−0.003*							0.022***	−0.005		
					(0.014)	(0.090)							(0.003)	(0.491)		
ZG4							0.002*	0.002*							0.016***	−0.002
							(0.064)	(0.067)							(0.002)	(0.633)
ROA	−0.000	−0.000*	−0.000	−0.000*	−0.000	−0.000*	−0.000	−0.000*	0.000	0.001**	0.000	0.001**	0.001	0.001**	0.000	0.001**
	(0.970)	(0.070)	(0.923)	(0.064)	(0.990)	(0.066)	(0.928)	(0.068)	(0.471)	(0.040)	(0.504)	(0.040)	(0.436)	(0.041)	(0.484)	(0.040)
Grow	0.000***	0.000	0.000***	0.000	0.000***	0.000	0.000***	0.000	0.000**	−0.000	0.000**	−0.000	0.000**	−0.000	0.000**	−0.000
	(0.001)	(0.923)	(0.001)	(0.234)	(0.001)	(0.224)	(0.001)	(0.235)	(0.025)	(0.668)	(0.022)	(0.661)	(0.000)	(0.674)	(0.000)	(0.677)
Liq	−0.001*	−0.000	−0.001*	−0.000	−0.001*	−0.000	−0.001*	−0.000	0.020***	0.039***	0.020***	0.039***	0.020***	0.039***	0.019***	0.039***
	(0.071)	(0.227)	(0.057)	(0.595)	(0.068)	(0.611)	(0.054)	(0.623)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.020)	(0.000)
TobinQ	−0.000	−0.002*	−0.000	−0.002*	−0.000	−0.002*	−0.000	−0.002**	0.005	−0.008*	0.005	−0.008*	0.005	−0.007*	0.005	−0.007**
	(0.888)	(0.068)	(0.886)	(0.051)	(0.840)	(0.073)	(0.849)	(0.046)	(0.160)	(0.035)	(0.174)	(0.035)	(0.183)	(0.038)	(0.207)	(0.038)
Tangible	0.085***	0.077***	0.085***	0.077***	0.085***	0.076***	0.084***	0.077***	0.277***	0.207***	0.278***	0.207***	0.278***	0.207***	0.278***	0.207***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size	0.017***	0.024***	0.017***	0.023***	0.017***	0.024***	0.017***	0.023***	0.060***	0.072***	0.060***	0.071***	0.060***	0.071***	0.059***	0.072***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control	Control
N	2655	2560	2655	2560	2655	2560	2655	2560	2192	2264	2192	2264	2192	2264	2192	2264
Adj. R-sq	0.174	0.285	0.174	0.285	0.174	0.285	0.173	0.285	0.184	0.272	0.185	0.272	0.185	0.272	0.186	0.272

Note: The reported *p*-statistics in parentheses are two-way clustered at the firm and year levels.
Columns (1), (3), (5), (7), (9), (11), (13) and (15) are the results for the low media coverage group (coverage is lower than the median) and the others are the results for the high media coverage group.

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

Table 7
Regression results for model (1) (using lagged variables).

Variable	The explanatory variable is Bank1				The explanatory variable is Bank2			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	−0.344***	−0.337***	−0.343***	−0.326***	−1.125***	−1.084***	−1.119***	−1.044***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ZG1_lag	0.006 (0.125)				0.041**			
					(0.015)			
ZG2_lag		0.010***				0.041***		
		(0.007)				(0.004)		
ZG3_lag			0.004 (0.167)				0.024**	
							(0.016)	
ZG4_lag				0.006***				0.021***
				(0.003)				(0.005)
ROA_lag	−0.000	−0.000	−0.000	−0.000	0.002*	0.002*	0.002*	0.002*
	(0.643)	(0.601)	(0.657)	(0.616)	(0.075)	(0.074)	(0.073)	(0.072)
Grow_lag	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000	−0.000
	(0.792)	(0.776)	(0.797)	(0.778)	(0.143)	(0.122)	(0.148)	(0.124)
Liq_lag	−0.002***	−0.002***	−0.002***	−0.002***	0.006**	0.006**	0.006**	0.006**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.024)	(0.025)	(0.026)	(0.026)
TobinQ_lag	−0.001	−0.001	−0.001	−0.001	0.000 (0.975)	−0.000	0.000 (1.000)	−0.001
	(0.663)	(0.613)	(0.650)	(0.541)		(0.972)		(0.911)
Tangible_lag	0.024 (0.144)	0.023 (0.154)	0.024 (0.144)	0.023 (0.151)	−0.030	−0.035	−0.028	−0.034
					(0.589)	(0.515)	(0.613)	(0.527)
Size_lag	0.018***	0.018***	0.018***	0.017***	0.061***	0.059***	0.061***	0.057***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry	Control	Control	Control	Control	Control	Control	Control	Control
N	4175	4175	4175	4175	3586	3586	3586	3586
Adj. R-sq	0.086	0.089	0.086	0.091	0.061	0.063	0.061	0.064

Note: The reported p-statistics in parentheses are two-way clustered at the firm and year levels.
"_lag" indicates a lagged variable.
* Significance at the 10% level (two-sided).
** Significance at the 5% level (two-sided).
*** Significance at the 1% level (two-sided).

for the different groups. Table 6 provides the relevant regression results, which indicate that in the weak media monitoring group (columns (1), (3), (5), (7), (9), (11), (13) and (15)), the regression coefficients of ZG1, ZG2, ZG3 and ZG4 are significantly positive. Comparing the results between the groups (columns (1) vs (2), (3) vs (4), (5) vs (6), (7) vs (8), (9) vs (10), (11) vs (12), (13) vs (14) and (15) vs (16)), we find the regression coefficients of ZG in the weak media monitoring group are nearly all significantly higher than in the strong media monitoring group.

The results in Tables 5 and 6 verify H2a. Using political connections to obtain long-term loans should be understood as rent-seeking behavior. Given that rent-seeking behavior can be unreasonable or even illegal, in a strong media monitoring environment, the use of political connections to obtain long-term loans is significantly reduced.

5. Robustness tests

5.1. Variables

Following Fan et al. (2007), we consider whether only the CEO of the firm is a current or former government official and the conclusions are not substantially changed.

We summarize the current or ex-government bureaucrat situations of both the CEO and chairman to obtain new ZG1, ZG2, ZG3 and ZG4 variables. For example, ZG1 equals 2 if both the CEO and the chairman are current or former government officials. Similarly, ZG4 equals 5 if the CEO of the firm is a current or for-

Table 8
Regression results for model (2) (using lagged variables).

Variable	The explanatory variable is Bank1				The explanatory variable is Bank2			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	0.409***	0.412***	0.410***	0.407***	1.228***	1.262***	1.232***	1.276***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
ZG1_lag	0.006				0.060 (0.209)			
	(0.589)							
ZG2_lag		0.013				0.100***		
		(0.159)				(0.008)		
ZG3_lag			0.009				0.063**	
			(0.212)				(0.028)	
ZG4_lag				0.008*				0.073***
				(0.062)				(0.000)
Mc_lag	−0.001	−0.001	−0.001	−0.001	0.013**	0.019***	0.015**	0.022***
	(0.497)	(0.698)	(0.642)	(0.597)	(0.043)	(0.009)	(0.021)	(0.002)
MCZG1_lag	−0.002*				−0.015			
	(0.092)				(0.282)			
MCZG2_lag		−0.002*				−0.024**		
		(0.085)				(0.022)		
MCZG3_lag			−0.003*				−0.016**	
			(0.077)				(0.046)	
MCZG4_lag				−0.001				−0.017***
				(0.249)				(0.000)
ROA_lag	0.000	0.000	0.000	0.000	0.002***	0.002***	0.002***	0.002***
	(0.407)	(0.407)	(0.411)	(0.392)	(0.000)	(0.000)	(0.000)	(0.000)
Grow_lag	−0.000	−0.000	−0.000	−0.000	−0.000**	−0.000**	−0.000**	−0.000**
	(0.437)	(0.424)	(0.451)	(0.428)	(0.044)	(0.041)	(0.049)	(0.044)
Liq_lag	0.001***	0.001***	0.001***	0.001***	0.010***	0.010***	0.010***	0.010***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)
TobinQ_lag	0.000	0.000	0.000	0.000	0.005 (0.111)	0.005 (0.118)	0.005 (0.111)	0.004 (0.135)
	(0.822)	(0.872)	(0.808)	(0.969)				
Tangible_lag	0.071***	0.072***	0.071***	0.072***	0.172***	0.172***	0.173***	0.173***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Size_lag	0.021***	0.020***	0.021***	0.020***	0.058***	0.059***	0.058***	0.059***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Industry	Control	Control	Control	Control	Control	Control	Control	Control
N	4175	4175	4175	4175	3586	3586	3586	3586
Adj. R-sq	0.215	0.216	0.215	0.217	0.216	0.217	0.216	0.219

Note: The reported p-statistics in parentheses are two-way clustered at the firm and year levels.
"_lag" indicates a lagged variable.
* Significance at the 10% level (two-sided).
** Significance at the 5% level (two-sided).
*** Significance at the 1% level (two-sided).

mer central government official and the chairman of the firm is a current or former provincial government official. We rebuild ZG1, ZG2, ZG3 and ZG4 and then test H1 and H2, and the conclusions are not substantially changed.

We also control for other variables such as the level of regional markets and earnings management, with no substantial changes.

5.2. Endogeneity

We address the possibility of an endogeneity problem in two ways. First, we adopt lagged variables to perform regressions using models (1) and (2). Obviously, a firm's long-term loans in the present year do not affect the political connections of the previous year. The regression results reported in Table 7 are consistent with

Table 9
Regression results for model (1) (using instrumental variables).

Variable	The explanatory variable is Bank1		The explanatory variable is Bank2	
	(1)	(2)	(3)	(4)
Constant	−0.4441***	−0.1336	−1.6607***	−0.0303
	(0.0000)	(0.4383)	(0.0000)	(0.9606)
ZG1	0.1096		0.5412*	
	(0.1602)		(0.0608)	
ZG2		0.5420*		2.8686**
		(0.0709)		(0.0200)
ROA	−0.0002 (0.2427)	−0.0005**	0.0008	−0.0005
		(0.0362)	(0.3201)	(0.5453)
Grow	0.0001*	0.0002***	0.0002	0.0007***
	(0.0514)	(0.0033)	(0.1485)	(0.0013)
Liq	−0.0013***	−0.0055**	0.0210***	−0.0008 (0.9369)
	(0.0000)	(0.0272)	(0.0000)	
TobinQ	−0.0002 (0.8344)	0.0020 (0.1533)	0.0033 (0.3376)	0.0148**
				(0.0125)
Tangible	0.0483***	0.0601***	0.0923*	0.1596**
	(0.0042)	(0.0024)	(0.0907)	(0.0171)
Size	0.0215***	−0.0036	0.0783***	−0.0546
	(0.0000)	(0.8122)	(0.0000)	(0.3192)
Industry	Control	Control	Control	Control
N	5215	5215	4456	4456
Adj. R-sq	0.113	0.113	0.100	0.101

Note: The reported *p*-statistics in parentheses are two-way clustered at the firm and year levels.
  * Significance at the 10% level (two-sided).
  ** Significance at the 5% level (two-sided).
  *** Significance at the 1% level (two-sided).

those in Table 4. The regression coefficients of ZG1_lag, ZG2_lag, ZG3_lag and ZG4_lag are significantly positive at the 10% significance level, with the exception of columns (1) and (3).

The regression results reported in Table 8 are also consistent with those in Table 5. The regression coefficients of MCZG1_lag, MCZG2_lag, MCZG3_lag and MCZG4_lag) are negative and nearly all pass the significance test.

Second, we perform a two-stage regression based on instrumental variables. According to Sun et al. (2005), the institutional environment can affect a firm's political connections and access to long-term loans and debt maturities (Sun et al., 2005; Yu and Pan, 2008). Thus, we use a regional marketization index as an instrumental variable for political connections, and while we expect it to affect long-term loans and debt maturities, it is exogenous, such that long-term loans and debt maturities do not affect the regional marketization level.

Following Hung et al. (2012), we perform an analysis using a two-stage regression. We begin by estimating a first-stage model and regressing the endogenous political connections variables (including ZG1 and ZG2) on our instruments and controls. The explanatory variable is ZG1 (ZG2) and the regression variables include the regional marketization index and the other control variables of model (1). We then use the predicted value of ZG1 (ZG2) from the first stage as the instrumental variable for this variable in the second stage. Table 9 shows the results and hypothesis 1 is still supported.

6. Conclusion

This study uses a media supervision perspective to extend the research on political connections. We find that firms with political connections are more likely to gain long-term loans with extended debt maturities, relative to other non-state-owned listed firms. The results suggest that it is popular for firms with political connections to use them to access debt financing. We further find that this behavior decreases with increasing media coverage, indicating that media monitoring restricts the use of political connections to a certain degree.

This research also has theoretical significance. Both the reputation and rent-seeking theories can be used to analyze political connections, and despite their apparent differences, previous research has not managed to distinguish between them. Our study shows that the rent-seeking theory is more suitable for explaining the presence and functional mechanisms of political connections. That is, it is more reasonable to consider firms' political relations as rent-seeking behavior than as a reputation effect in the Chinese stock market.

In addition, this research has practical significance. In China, the media's role is highly suspect due to the degree of government intervention. Houston et al. (2011) argue that the Chinese media should not play an important role in curbing corruption, but we show that, to a certain extent, media monitoring can curb corruption.

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"Swimming Ducks Forecast the Coming of Spring"—The predictability of aggregate insider trading on future market returns in the Chinese market

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ABSTRACT

This study systematically examines the ability of aggregate insider trading to predict future market returns in the Chinese A-share market. After controlling for the contrarian investment strategy, aggregate executive (large shareholder) trading conducted over the past six months can predict 66% (72.7%) of market returns twelve months in advance. Aggregate insider trading predicts future market returns very accurately and is stronger for insiders who have a greater information advantage (e.g., executives and controlling shareholders). Corporate governance also affects the predictability of insider trading. The predictability of executive trading is weakest in central state-owned companies, probably because the "quasi-official" status of the executives in those companies effectively curbs their incentives to benefit from insider trading. The predictive power of large shareholder trading in private-owned companies is higher than that in state-owned companies, probably due to their stronger profit motivation and higher involvement in business operations. This study complements the literature by examining an emerging market and investigating how the institutional context and corporate governance affect insider trading.
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1. Introduction

Insiders include a company's corporate officers, directors, supervisors (all referred to as "executives" hereafter) and large shareholders (those with ownership of 5% or more of the company's stock). Insider trading based on a superior information advantage can influence the efficiency and fairness of the financial market, and thus presents a thorny regulatory challenge.

When the Chinese A-share market was initially established, it had a dual share structure comprising tradable and non-tradable shares. Shares owned by large shareholders and executives were basically non-tradable as they were prohibited from being traded on the secondary stock market. As such, insider trading was very rare at that time. Since the end of 2005, with the market reform of non-tradable shares, market segmentation between tradable and non-tradable shares has been gradually removed. To mitigate the supply pressure on the secondary market, the reform prevented non-tradable shares from being sold immediately, and instituted a lock-up period of one to three years. Some locked-up shares have been "lifted" since the beginning of 2007. By the end of 2011, almost all of the non-tradable shares became tradable and insiders began to trade their stocks more frequently, a new occurrence that has attracted a lot of attention. The A-share market is still emerging and its efficiency requires improvement. The quality of its corporate information disclosure is generally not high, its information intermediaries (analysts) have yet to mature and the information asymmetry between insiders and outsiders is still relatively large. These limitations have undoubtedly provided insiders with more trading opportunities. Furthermore, a regulatory system has not yet been developed, making insider trading a potentially serious and complicated challenge.

Based on media reports, insiders from different companies often trade in the same direction during the same period. When the market index is high or rapidly rising, insiders often consistently decrease their holdings. When the market index is in a slump, insiders often uniformly increase their holdings. The "mainstream" aggregate insider trading matches "cleverly" with market movements, suggesting that it is ideal in terms of market timing.

Using A-share market insider transaction data from January 2007 to August 2011, we empirically examine the predictability of aggregate insider trading on market returns. We find that after controlling for contrarian trading, the past six months of aggregate executive (large shareholder) trading can predict 66% (72.7%) of market returns twelve months in advance. We also examine the effect of information hierarchy on predictive power and find that the predicative power of aggregate trading is significantly higher for insiders with more business operation involvement and a higher position in the information hierarchy (e.g., executives and controlling shareholders) than for insiders with a lower position (e.g., supervisors and important shareholders). This evidence strongly supports that an information advantage, beyond being a simple contrarian trading strategy, is the root cause of the strong predictive power of aggregate insider trading. Stemming from their high involvement in business operations, insiders can aggregately form a stronger ability to predict macroeconomic trends and detect deviations in systematic valuation in the stock market (referred to as the "macro information advantage") and use this advantage when trading.

As a typical form of agency conflict, insider trading behavior is affected systematically by corporate governance (Gunny et al., 2008). Corporate governance affects the information content of insider transactions in two ways. First, the ownership structure affects the distribution of control rights and decision-making power between shareholders and executives, thus affecting the information distribution and advantages of specific insiders. Second, insider trading behavior is monitored differently under different corporate governance structures, and corporate governance affects the motives of insiders and thus the possibility that insiders will use their information advantage in trading.

In this study, we examine the effect of corporate governance on the predictive power of aggregate insider trading. Depending on the nature of the largest shareholder's ownership, companies can be divided into three categories: private, local state-owned and central state-owned. Local state-owned companies are controlled by the local State-owned Assets Supervision and Administration Commission (SASAC). Central state-owned companies are controlled by either the central SASAC or central government departments. These three types of companies have systematically different agency problems and governance structures. As investor protection is weak in the A-share stock market, the largest shareholder in most privately owned companies has highly concentrated ownership and even controlling ownership for self-protection purposes. Because these large

shareholders are actively involved in business operations and have strong incentives and the ability to monitor managers, there is only a small agency conflict between shareholders and managers. However, the large private shareholder has a strong incentive to expropriate the interests of small shareholders. He or she can gain lucrative private benefits of control via insider trading in the secondary market, related party transactions and the pyramid shareholding structure. In state-owned companies, the ultimate shareholders can be traced up to local or central SASAC, which always delegates bureaucrats as board chairmen, resulting in serious governance problems such as investor phantoms and manager control. Management occupies a large number of seats on these boards, creating a self-monitoring problem. Despite their high concentration of ownership, large state shareholders have an information disadvantage due to their low participation in business operations. There are also significant differences between the central and local state-owned companies. Central state-owned companies are usually super-large companies tightly controlled by the central SASAC in strategically important industries, such as China Mobile, the four largest state-owned banks, China Petroleum and China Railway Group. These large central state-owned companies tend to have a corresponding administrative hierarchy and serve more political purposes, such as achieving financial and price stability. For example, China Petroleum and China Petrochemical are ministerial-level companies and their executives often have "quasi-official" status along with opportunities for promotion to the provincial or ministerial government levels. Therefore, these executives are under recessive but powerful government administrative control.

In this study, we examine how the nature of ownership affects the predictive power of insider trading. We find that the predictive power of executive trading in central state-owned companies is the weakest. The "quasi-official" status of the executives in this type of company weakens its motivation to profit through trading, forcing it to give up opportunities to trade based on an information advantage. The predictive power of large shareholder trading in private-owned companies is significantly higher than that in state-owned companies, as the shareholders in private-owned companies have a stronger profit motivation and higher involvement in business operations.

This study makes the following contributions to the insider trading literature. First, most of the literature has focused on the information content of insider trading from a micro perspective. It has observed that insiders can use their firm-level information advantage to time trades and that their trading activities can predict their companies' future stock movements. We examine the information content of aggregate insider trading from a macro perspective and find that aggregate insider trading can predict future market movements and that information hierarchy and corporate governance affect the predictability of aggregate insider trading. Second, most insider trading studies focus on mature markets, especially the U.S. market, and provide limited insights into emerging markets with different institutional environments. This study complements previous studies by focusing on an emerging market and provides interesting findings that are different from those observed in mature markets. The general finding in mature markets is that insider buying has higher information content than insider selling and that large shareholder trading has lower information content than executive trading. However, we obtain different findings for the A-share market due to its different institutional context and governance structure. Third, this study expands the research related to how corporate governance affects insider trading. Insider trading activities are not only influenced by statutory laws and law enforcement at the national level, but also affected by corporate governance. The diverse types of corporate governance structures on the Chinese A-share market provide an excellent setting for studying the effects of corporate governance on insider trading. Fourth, our findings provide valuable insights into forming investment strategies. As aggregate insider trading has significant power in predicting future stock returns, external investors can use insider trading activities to forecast future stock movements. As the famous Chinese poem says, "Although winter wind blows briskly, ducks forecast the coming of spring and begin to swim in the lake." Much like swimming ducks help to forecast the change in season, aggregate insider trading helps to predict the movement of the market.

2. Literature review

Insiders are special traders who possess highly accurate information at a very low access cost. Company executives are more familiar with their own companies than any analyst on Wall Street. They know when a new product will be launched, an inventory will begin to stack, profit margins will expand or product costs will improve. As Seyhun (1998) observes, if you want to find smart investors, these are smart investors.

Insiders have different kinds of information advantages. First, they know in advance which major events will affect stock prices. This type of advantage disappears after the events are announced, usually within a short time. Furthermore, direct use of event-related inside information is often prohibited in many countries. Second, insiders can better assess the company's earnings prospects and growth potential than outsiders. This type of information advantage is usually long term and does not rely on specific events. Third, insiders can better assess the intrinsic value of a company than outsiders and can thus identify and exploit opportunities when the stock market overvalues or undervalues the company. Fourth, insiders have a better sense of industry and macro-economy trends and thus tend to predict future macroeconomic directions more accurately. The first three types of advantages can increase insiders' ability to predict firm-level price movement more precisely. They seem to always be able to cash in when the price is high and purchase when the price is low. The fourth advantage increases aggregate insiders' ability to time the market.

Whether and how insiders use their information advantage to trade is the core issue of empirical studies. These questions may be answered by analyzing the relationship between stock price movements and insider trades, and examining the timing and profitability of the trades. Studies with a micro perspective examine the relationship between insider trades and the corresponding company's stock price movements to verify whether insiders use firm-level private information to trade. In contrast, studies with a macro perspective examine the relationship between aggregate insider trading and future market movements to verify whether insiders have an overall ability to time the market.

2.1. Micro perspective: can insider trades predict future stock returns?

The micro perspective widely involves the event study method to investigate a company's share price movements shortly before and after an insider trade is made to determine the insider's ability to obtain abnormal returns. Insiders accurately time trades over the short term (Friedrich et al., 2002). Furthermore, many studies find that insider trading can predict a company's future long-term price movements. Stock prices tend to go up (down) in the long run after insider purchases (sales) are made. This predictability suggests that insiders exploit important private information in advance that affects future stock prices (Givoly and Palmon, 1985; Seyhun, 1998; Pettit and Venkatesh, 1995; Lakonishok and Lee, 2001; Jeng et al., 2003; Ravina and Sapienza, 2010).

Research has verified in different ways that an information advantage accounts for the accurate timing and abnormal returns associated with insider trades. The profitability of insider trades is closely related to the information hierarchy that insiders belong to; the higher the information hierarchy, the higher the profitability. In the U.S., large shareholders' trading profitability is found to be significantly lower than that of executives. Because large shareholders often do not own large proportions of the shares and are rarely directly involved in business decisions, they have less of an information advantage than executives (Lakonishok and Lee, 2001). Even executives have an information hierarchy, with CEOs at the top, other managers in the middle and board directors at the bottom. The trading profitability of different groups is positively correlated with such an information hierarchy (Seyhun, 1998). However, Jeng et al. (2003) find that although CEOs have more information, their trading activities are more likely to be monitored by shareholders and regulators, and therefore their trading profitability is not necessarily significantly higher than that of other managers. In addition, studies consistently find that the profitability of executives' sales is weaker than that of purchases. Executives' purchases are mainly based on private information. In contrast, with the popularity of equity incentives, executives often sell stocks to meet liquidity or diversification needs, and this non-information-driven selling dilutes the overall information content for sales.

2.2. Macro perspective: can aggregate insider trading predict future market trends?

There is some evidence that aggregate insider trading coincides with market price movements. Seyhun (1990) finds through a case study that shortly after the stock market crash in October 1987, insiders aggregately purchased shares and accurately predicted the market rebound. Seyhun (1992) also finds that during 1975–1989, the net insiders' purchase index of the past 12 months predicted 16% (61%) of the next 6 (12) months of market returns. It seems that when future market returns are positive (negative), aggregate insider

trading activities exhibit optimistic purchases (pessimistic sales). Lakonishok and Lee (2001) design different net purchase measures and control for the effects of a simple contrarian strategy. They also find that aggregate insider trading can accurately predict future market returns. The one-year-ahead market return gap between the months with the highest and lowest net purchases index is about 11%, and the aggregate trading of executives exhibits better predictability than that of large shareholders. Overall, empirical studies show that aggregate insider trading is an important leading indicator of future stock market movements and can accurately predict future market returns.

Why does aggregate insider trading effectively predict future market trends? Seyhun (1998) finds that insiders as a group can correctly anticipate the direction of the future real economy and react to changes in future economic trends nearly a year ahead of the stock market. Jiang and Zaman (2007) study the causes of aggregate insider trading's predictability of future market returns and find that although such trading is strongly correlated with cash flow information unexpected by the market, expected cash flow information does not lead to large waves of insider trading. These studies suggest that aggregate insider trading is not simply contrarian trading, but is rather based on insiders' effective assessment of future macroeconomic trends.

Most of the research on China focuses on the micro perspective. Studies consistently find that insider trades can predict both short- and long-term stock movements, and that insiders have the ability to time trades and earn high abnormal returns. In terms of executive trading, researchers find that executive sales can predict the fall of a company's stock price within a short time window (Zeng, 2008; Zhang and Zeng, 2011). Zhu et al. (2011a,b) investigate the long-term profitability of executive trading and find that executive sales and purchases exhibit a strong predictability of stock price movement six months in advance. In terms of large shareholder trading, studies also find that large shareholder sales are accurately timed within a short window (Zhu et al., 2011a,b; Cai and Wei, 2009; Lin and Qu, 2010; Wu and Wu, 2010; Shen et al., 2011). However, the timing ability of shareholder purchases is not obvious and purchase activities are not strongly correlated with future performance indicators (Li et al., 2011).

These Chinese studies have adopted the micro perspective and often focus on executives or large shareholders as a single group, or on "buy or sell" as a one-way transaction. This is the first study to examine the information content of aggregate insider trading in the Chinese A-share stock market from a macro perspective. It comprehensively compares the information content of trades in different directions and trades made by different types of insiders, and offers in-depth analysis of how information hierarchies and corporate governance affect the information content of insider trading.

3. Research hypotheses

At first glance, the public and insiders both observe the same changes in macroeconomic policies. Although insiders have more private company information, it seems that they should only be able to predict the stock movement of their own companies. Insiders have no additional advantage overall for predicting stock market movement.

In fact, insiders at the front line of operations can often perceive macroeconomic trend changes earlier. For example, they can observe changes in inflation earlier through company material and product price movements. In contrast, the public has to wait until the end of the month for such inflation statistics to be released. More importantly, even if insiders and the public were to observe the same macroeconomic policy changes, based on their experience with business operations, insiders have a deeper understanding of the effect of changes on the company, the industry and future macroeconomic performance. Thus, insiders have better analytical capabilities than outside investors in interpreting macroeconomic information. For example, although insiders and the public observe the same changes in interest rates, insiders can better interpret the effect of the changes on the company and industry's future performance. Without knowing the company's specific financing structure, outsiders would have difficulty calculating the effect of the changes on the company's profit (Seyhun, 1992). As insiders are involved at the forefront of business operations, they are able to detect macro and industry changes earlier and more accurately interpret the effect of these changes on the future performance of the company, industry and macro-economy, and can better predict future market movement and follow their predictions when trading. Seyhun (1998) finds that insider trading can reflect future changes in the real economy one year earlier than the stock market.

In addition to better predictability of macroeconomics and industry changes, insiders are more able to detect systemic bias in their stock market valuations. Because investors can be emotional and irrational at times, the market sometimes systematically overvalues or undervalues stocks, providing uniform opportunities for insider trades. In an overheated bull market, when the prices of most stocks are high, the insiders of different companies appear to decrease their holdings uniformly and thus pool into selling waves. The market eventually returns to rational valuations in the future, resulting in negative future market returns. Insiders also conversely take advantage of systematic market undervaluations to uniformly increase holdings. Aggregate insider trading reacts to both systematic market overvaluations and undervaluations.

In summary, insiders have an evident information advantage when predicting macroeconomic movements and detecting systematic deviations in market valuation. This macro information advantage is not a result of insiders obtaining macro private information (e.g., changes in interest rates) sooner than outsiders. Rather, it stems from insiders' high involvement in business operations, which gives them a superior ability to analyze and interpret macro information, predict macroeconomic trends and identify systematic deviations in market valuation. Most insiders use their macro information advantage when trading and aggregate insider trading can be used to predict future market movements.

The predictability of aggregate insider trading is not a simple summary of insiders' ability to time trades based on private firm-level information. Assuming that insiders use only firm-level information to trade, different companies would report good and bad news during the same period. As such, insiders from different companies would make purchases and sales at the same time, and therefore the aggregated trading should be zero. However, if the majority of the insiders uniformly choose to buy or sell during the same period, it is likely that the information they are using is based on their prediction of future macro-level movements.

Hypothesis 1. Aggregate insider trading can predict future market movements and this predictability reflects insiders' macro information advantage.

Insiders are divided into two major categories: large shareholders and executives. Large shareholders can be subdivided into the largest shareholder and important shareholders (more than 5% stock ownership but excluding the largest shareholder). Executives can be subdivided into board directors, managers and supervisors. There are significant differences in operational involvement and the level of information advantage among insiders. The largest shareholders have an important influence on strategic decisions and can directly appoint directors and managers. Therefore, their operational involvement and level of information advantage are stronger than those of important shareholders. Among executives, directors (especially non-executive and independent directors) are mainly responsible for monitoring managers and making strategic decisions. Because they meet only a few times a year, their involvement in business operations and thus their information advantage is less than that of managers. Chinese companies normally add another position to the executives group: that is supervisors, whose primary responsibility is to perform a compliance check after major decisions are made. Most supervisors are staff delegates or outside retired persons working part time. Thus, their operational involvement is significantly less than that of managers and directors (Zhu et al., 2011a,b).

Insiders' macro information advantage stems from their superior ability to interpret macro information and predict macroeconomic trends as a result of their high involvement in business operations. Therefore, the more insiders are involved in business operations and the higher their position in the information hierarchy (e.g., largest shareholders and managers), the more obvious their macro-information advantage and the stronger the predictive power of their trading activities for future market returns.

Hypothesis 2 (*information hierarchy hypothesis*). The aggregate trading of insiders with higher levels of operational involvement and information hierarchy positions (e.g., largest shareholders and managers) has more predictive power for future market returns than that of insiders with lower information hierarchy positions (e.g., important shareholders and supervisors).

As a type of agency conflict and wealth misappropriation, insider trading is affected by corporate governance. The essence of corporate governance is to limit insiders' self-interest behavior and motivate them to maximize the wealth of their companies through a variety of formal and informal control mechanisms (Gunny et al., 2008). Good corporate governance can help decrease illegal trades and the inappropriate use of an information advantage. At the company level, corporate governance can reinforce the advance approval

of insider trades, develop a comprehensive process for information management and disclosure, set a strict lockout period before news announcements and impose harsh punishments for rule violations. Ravina and Sapienza (2010) confirm that corporate governance can significantly affect the profitability of insider trades. Although insiders of companies with good corporate governance are not able to obtain significant abnormal returns, those of companies with poor corporate governance can obtain abnormal returns up to a level of 21%. Fidrmuc et al. (2006) find that the information content of executive trading for companies with external large shareholder oversight is less than that for companies with dispersed ownership.

In the Chinese A-share market, executive trading is dominated by sales. Executives' excessive sales can have a significant negative effect on stock prices and market confidence and can be detrimental to the interests of large shareholders. In addition, due to the historical low popularity of equity incentives, original executive holdings are normally low and large decreases in executive holdings decrease the congruence of interest between executives and shareholders, weakening large shareholders' control over executives and increasing agency conflicts. Therefore, large shareholders must control the decreases in executive holdings within an acceptable range.

The largest shareholders play a key oversight role in executive trading. In private-owned companies, the largest shareholders are more concerned about their own interests and stock prices, and are more willing and have a stronger ability to explicitly or implicitly control executives' excessive sales and illegal trading. This may constrain executives' freedom to exploit their information advantage when trading. Rather, due to investor phantoms and insider control, shareholders' oversight of executive trading is relatively weak in state-owned companies and thus self-interested executive trading is expected to be more serious than that in private-owned companies.

State-owned companies can be further separated into central and local state-owned companies. Despite the weak oversight of their large shareholders, central state-owned companies have a strong alternative administrative control over executives. Executives of central state-owned companies have the status of quasi-government officials. The appointment, promotion and demotion of these executives occur under a strict and opaque administrative control system and are not determined by the professional market of corporate executives. Character and integrity are important aspects of how executives are evaluated. Profitable executive trading may damage the reputation of political executives and their "clean" image, negatively affecting their evaluation by governmental organizations and thus their political futures. With this hidden but powerful administrative control, executives are likely to restrain their profitable trading activities. Chen et al. (2011) provide empirical evidence that supports this argument. They examine the executive stock options held by executives in large red-chip state-owned companies listed on the Hong Kong Stock Exchange (mainly central state-owned companies). They find that lucrative stock options are rarely exercised and state-owned executives give up the opportunity to profit legally from stock options. These executives face a number of "hidden rules." Because they are not only executives but also quasi-government officials, they must comply with a strict personnel system designed for "cadres." As a result, the quasi-government official role of these executives is expected to weaken their motive to trade for profit, forcing them to give up opportunities to use their information advantages (including their macro information advantage) when trading. This in turn decreases the predictive power of aggregate executive trading in central state-owned companies.

Several expectations arise. In local state-owned companies, especially those below the provincial level, executives are more akin to professional managers with fewer "hidden" administrative rules to follow. In addition, because large shareholder oversight of the management in this type of company is relatively weak, executive trading in local state-owned companies is higher than executive trading in private- and central state-owned companies. Executives in local state-owned companies are more likely to exploit their information advantage when trading, including their macro information advantage. Consequently, the aggregate trading of these executives has the highest predictive power.

Hypothesis 3 (*effect of corporate governance on executive trading predictability*). The executive trading of local state-owned companies has the highest predictive power due to ineffective large shareholder and administrative oversight of these executives. In contrast, the executive trading of central state-owned companies has the lowest predictive power, as the "quasi-official" status of these executives limits their motivation to profit from their information advantage.

Large shareholder trading is significantly affected by the ownership nature of the shareholders. There are significant differences among the large shareholders of state-owned versus private-owned companies in terms of interest orientation and operational involvement. These differences can significantly affect the motivation and ability of large shareholders who are trading for profit. Large shareholders of private-owned companies have a stronger motivation to benefit from trading in the secondary market. In contrast, large shareholders of state-owned companies cannot truly retain any profit gained from trading. Because the profits are delivered to the SASAC, the large shareholders' motivation to trade for profit is weaker than that of private-owned shareholders. In addition, because large shareholders of central state-owned companies have political objectives, they cannot focus only on profitability goals when trading. For example, during the 2008 financial crisis, large central state-owned listed companies actively responded to the call for maintaining financial market stability by increasing their holdings of listed companies. This type of "politically driven" purchase is not profit driven. The central government also requires state-owned shareholders to preserve their controlling holdings in strategically important industries and gradually phase out their holdings in non-strategic, competing industries. Therefore, large shareholders of state-owned companies cannot be completely free in their trading decisions. From the perspective of operational involvement, large shareholders of private-owned companies often serve as executive directors or have family members serve as executive directors and managers so that they can be actively involved in major strategic decisions and daily operations. In contrast, large shareholders of state-owned companies often delegate their control and decision-making authority to managers and indirectly acquire their information advantage from directors who are appointed to the companies. From both perspectives of profit motivation and operational involvement, large shareholders of private-owned companies have more incentives to time their trading and maximize returns based on their ability to predict future macroeconomic trends and identify systematic market value deviations.

Hypothesis 4 (*effect of corporate governance on trading predictability of large shareholders*). Due to the greater operational involvement and stronger profit motivation, trades made by large shareholders of private-owned companies have a higher predictive power than those made by large shareholders of state-owned companies.

4. Sample selection and descriptive statistics

4.1. Sample selection

From a macro perspective, this study examines the ability of aggregate insider trading to predict future market returns based on trading data taken from the Chinese A-share market during January 2007 to August 2011. We measure market returns based on the Shanghai Stock Exchange A-share Index. We obtained executive trading data from the Exchange website.[1] After removing executive transactions below 20,000 yuan and adding up multiple transactions made by the same executive on the same day, 9384 transactions remained in the final sample of executive transactions. Large shareholder trading data were taken from the Wind database. We began by manually coding the ownership nature of large shareholder transactions. We also differentiated controlling shareholders from other important shareholders. Controlling shareholders include the largest shareholder and ultimate owner, and other important shareholders include shareholders with more than a 5% stock ownership (non-controlling shareholders) and shareholders who are closely related to the controlling shareholder, even if they have less than 5% ownership. For the large shareholder transaction data, we deleted transactions through a block trading platform[2] and retained transactions through the secondary market. We

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[1] Data are available on the Exchange's website under "Listed Company Creditability Records" and in the column titled "Directors, Supervisors and Managers Changes in Holdings of Company Shares."

[2] On April 20, 2008, the Commission issued its "Guidance on Transferring Lifted Restrictive Shares of Listed Company," which requires that certain lifted restrictive shares be traded through the stock exchange block trading system when the trading shares in a month are projected to be more than 1% of the total shares. The block trading platform system is different from the secondary market's centralized auction trading system. Membership is required to participate in the block trading platform system. The transaction time is limited to weekdays from 15:00 to 15:30. The participants are mostly institutions and large shareholders. A transaction application is required and the trading price is not included in the market index. Because only a few entities are involved, the block trading platform system is not active and lacks liquidity.

then deleted small transactions below 50,000 yuan and transactions with long trading periods (over 90 days from the transaction's start to end). There are 5553 shareholder transactions in the final sample. Due to the large difference in transaction scale, we examine the executive and shareholder trading samples separately.

4.2. Empirical model

We measure aggregate insider trading using the net purchase ratio (NPR). First, based on the month of the transaction, we combine all of the executive (large shareholder) buying and selling transactions conducted within the same month to obtain the total monthly purchases (BUY_k) and sales (SELL_k) amounts for the executives (large shareholder). Using the following formula, we then calculate the NPR:

$$\text{NPR6}_t = \frac{\sum_{k=t-5}^{t}\text{BUY}_k - \sum_{k=t-5}^{t}\text{SELL}_k}{\sum_{k=t-5}^{t}\text{BUY}_k + \sum_{k=t-5}^{t}\text{SELL}_k} \tag{1}$$

NPR6 aggregates the insider trading activities performed over the past six months. It is a comprehensive macro-level indicator, calculated as the net of the buying and selling amount divided by the total amount of the two types of activities. NPR can be calculated for three, six or twelve months. We mainly provide the results for six months (NPR6). NPR6 is calculated for executives and large shareholders separately. According to our hypothesis, NPR6^i will be calculated for a specific subgroup of companies or subclass of insiders (i), such as NPR6-private, which is calculated using only the trading data from private-owned companies.

We use a model similar to that used by Lakonishok and Lee (2001). The model controls for the reversal feature of market returns over a long period to more accurately measure whether aggregate insider trading has incremental predictive power for future market returns. Our model also controls for the inertia feature of market returns within a short interval.

The model is equated as follows:

$$\text{FR6}_t^i = \alpha + \beta\text{NPR}_t^i + \chi\text{BR6}_t^i + \delta\text{BR12}_t^i + \varepsilon_t$$

$$\text{FR6}_t^i = \prod_{k=t+1}^{t+6}(1+R_k^i) - \prod_{k=t+1}^{t+6}(1+R_k^f), \quad \text{BR6}_t^i = \prod_{k=t-5}^{t}(1+R_k^i) - 1, \quad \text{BR12}_t^i = \prod_{k=t-11}^{t}(1+R_k^i) - 1$$

where R_k^i is the return for group i in month k, calculated as the equally weighted average return for the group i companies in month k, and R_k^f is the central bank's one-year benchmark interest rate transferred into a monthly rate and serves as a proxy for the risk-free rate. i can measure the entire market or a specific subgroup of companies. FR6_t^i represents group i's cumulative abnormal returns over the next six months. The future period can be three, nine or twelve months in duration (FR3, FR9 or FR12). This study shows the results for FR6.

BR6_t^i and BR12_t^i represent the abnormal returns for group i during the past six and twelve months, respectively. We use BR6_t to control for the market return inertia over the short term, and BR12_t to control for the market return reversal over the long term. NPR_t^i represents the aggregated net insider trading for group i.

Our insider trading data covers January 2007 to August 2011. Although there would normally be 56 NPR6_t observations, because data are missing from the FR6 and FR12 calculations, the actual number of observations in the final sample is less than 56.

4.3. Descriptive statistics

Fig. 1 shows the relationship between the aggregate insider trading NPR6 and the Shanghai A-share Index trend during the sample period, and visually demonstrates that aggregate insider trading has the ability to time the market. NPR6 is calculated for both the executives and large shareholders for each month. As seen in Fig. 1, the two lines representing NPR6-Executive and NPR6-Shareholder are almost parallel to each other, exhibiting similar trends. In addition, aggregate insider trading activities are inversely related to the market index. When the market index is low (high) in a month, NPR6 increases (decreases). For example, during September to December 2008, when the index drops to a historic low point of 2000, NPR6 for executives
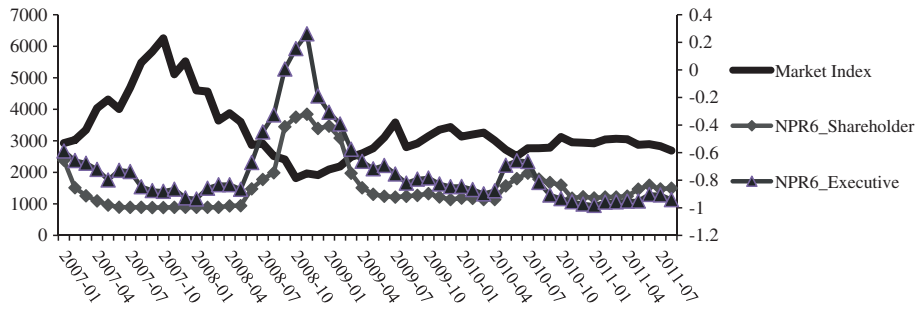
Figure 1. Aggregate insider trading NPR and the Shanghai A-share market index.

and large shareholders spikes. During the period of May to July 2010, when the index is at a localized low, NPR6 spikes again. In hindsight, we can see that insiders can successfully time the market when trading in most cases.

Fig. 2 presents the relationship between aggregate insider trading NPR6 and future market returns FR6. Net insider purchasing activities move in the same direction as future market returns consistently during the sample period. When NPR6 increases, there is a corresponding increase in FR6. On the contrary, when NPR6 is close to −1, FR6 is mostly negative. Therefore, the NPR6 indicator can effectively predict future market returns.

As shown in Table 1, there are 6925 executive sales transactions worth a total of 25.525 billion yuan and 2459 executive purchase transactions worth a total of 1.153 billion yuan. The ratio of purchases to sales is 1:22.14. On average, the amount for each selling transaction is also much higher than that for each purchasing transaction. Therefore, executive sales are both much higher in terms of frequency and amount than purchases.

As shown in Table 2, there are 5048 large shareholder sales transactions worth a total of 259.4 billion yuan and only 505 purchase transactions worth a total of 16.27 billion yuan. The ratio of purchases to sales is 1:16.3. Furthermore, the amount for each sales transaction is higher than that for each purchase transaction. The prevalence of sales and the inactivity of purchases in the A-share market is due to the removal of restrictions on non-tradable shares.
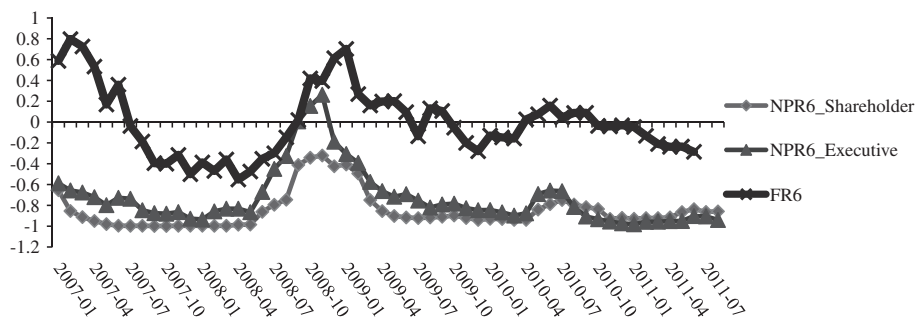
Figure 2. Aggregate insider trading NPR6 and future market returns FR6.

Table 1
Executive transaction analysis.

	Number of transactions	Amount of transactions (in 10,000 yuan)				Number of shares (in 10,000 yuan)			
		Total	Mean	Median	Std.	Total	Mean	Median	Std.
Sell	6925	2,552,541.50	368.60	46.07	1664.67	158,078.19	22.83	2.54	99.67
Buy	2459	115,301.84	46.89	10.55	255.05	9666.07	3.93	1.00	16.10

Table 2
Large shareholder transaction analysis.

	Number of transactions	Amount of transactions (in 10,000 yuan)				Number of shares (in 10,000 yuan)			
		Total	Mean	Median	Std.	Total	Mean	Median	Std.
Sell	5048	25,942,183.84	5139.10	2263.24	12245.41	2,099,230.67	415.85	200.00	910.54
Buy	505	1,627,165.94	3222.11	782.54	9211.89	195,252.42	386.64	100.15	1158.70

Note: Each large shareholder transaction announcement in the Wind database is counted as one transaction.

Table 3
Market returns and NPR analysis.

	Market returns					Aggregate executive trading		Aggregate shareholder trading	
	FR6	FR9	FR12	BR6	BR12	NPR3	NPR6	NPR3	NPR6
Mean	−0.005	−0.027	−0.072	0.117	0.329	−0.696	−0.718	−0.847	−0.848
Median	−0.040	−0.112	−0.075	0.072	0.070	−0.804	−0.818	−0.923	−0.916
Std.	0.332	0.390	0.370	0.408	0.779	0.357	0.276	0.204	0.179
Min.	−0.552	−0.636	−0.750	−0.531	−0.709	−0.994	−0.982	−1.000	−0.998
Max.	0.797	1.112	0.776	1.089	2.237	0.684	0.262	−0.153	−0.321

In Table 3, the mean and median of the future market returns are both negative and the standard deviation is large due to the sudden switch from a bull market to a bear market during 2007–2011 and the long bear market period since 2008. The means and medians of the aggregate executive and shareholder trades are all negative, indicating net sales for both types of insiders. The NPRs are more negative for shareholders than for executives, suggesting that net sales are relatively stronger for shareholders.

According to our hypothesis, NPR6 must be calculated for the subgroup of companies or subclass of insiders. As shown in Table 4, the mean and median of NPR6-Manager are less negative than that of NPR6-Director and NPR6-Supervisor, indicating that executive net sales are relatively weaker for managers. Table 4 also shows that the mean and median of NPR6-Private are more negative than those of NPR6-Local and NPR6-Central, indicating that executive net sales are stronger in private-owned companies. The mean and median of NPR6 are similar for the three different company sizes.

As reported in Table 5, the mean and median of NPR6-Important are more negative, indicating that the net selling tendency is stronger for important shareholders than for controlling shareholders. Table 5 also reports that the mean and median of NPR6-Private are more negative than those of NPR6-Local and NPR6-Central, indicating that the net sales of large shareholders are stronger in private-owned companies than in state-owned companies. The mean and median of NPR6 are similar for the three different company sizes.

Table 4
NPR for executive trading by executive type, ownership structure and company size.

	Executive type			Ownership structure			Company size		
	NPR6-Manager	NPR6-Director	NPR6-Supervisor	NPR6-Private	NPR6-Local	NPR6-Central	NPR6-Small	NPR6-Medium	NPR6-Large
Mean	−0.485	−0.753	−0.744	−0.765	−0.385	−0.434	−0.741	−0.690	−0.711
Median	−0.581	−0.893	−0.721	−0.813	−0.649	−0.491	−0.852	−0.770	−0.805
Std.	0.381	0.304	0.152	0.201	0.483	0.361	0.393	0.266	0.321
Min.	−0.968	−0.983	−0.991	−0.951	−0.946	−0.970	−0.997	−0.986	−0.976
Max.	0.665	0.358	−0.415	0.112	0.799	0.489	0.821	0.066	0.395

Note: NPR6-Manager is the net purchasing ratio for managers, calculated using only manager transaction data. NPR6-Director is the net purchasing ratio for directors. NPR6-Supervisor is the net purchasing ratio for supervisors. NPR6-Private is the net purchasing ratio for executives in private-owned companies. NPR6-Local is the net purchasing ratio for executives in local state-owned companies. NPR6-Central is the net purchasing ratio for executives in central state-owned companies. NPR6-Small is the net purchasing ratio for executives in small companies. NPR6-Medium is the net purchasing ratio for executives in medium-sized companies. NPR6-Large is the net purchasing ratio for executives in large companies. A company's size is determined by its market value (total shares * price per share) at the beginning of each year. The companies are then evenly divided into three groups (small, medium and large) depending on their size.

Table 5
NPR for shareholder trading by shareholder type, ownership structure and company size.

	Shareholder type		Ownership structure			Company size		
	NPR6-Control	NPR6-Important	NPR6-Private	NPR6-Local	NPR6-Central	NPR6-Small	NPR6-Medium	NPR6-Large
Mean	−0.705	−0.914	−0.935	−0.824	−0.764	−0.908	−0.894	−0.808
Median	−0.859	−0.945	−0.967	−0.876	−0.875	−0.942	−0.947	−0.889
Std.	0.424	0.086	0.091	0.173	0.302	0.131	0.127	0.224
Min.	−0.996	−1.000	−1.000	−1.000	−1.000	−1.000	−1.000	−1.000
Max.	0.526	−0.683	−0.622	−0.391	0.122	−0.334	−0.486	−0.168

Note: NPR6-Control is the net purchasing ratio for controlling shareholders. NPR6-Important is the net purchasing ratio for important shareholders. NPR6-Private is the net purchasing ratio for large shareholders in private-owned companies. NPR6-Local is the net purchasing ratio for large shareholders in local state-owned companies. NPR6-Central is the net purchasing ratio for large shareholders in central state-owned companies. NPR6-Small is the net purchasing ratio for large shareholders in small companies. NPR6-Medium is the net purchasing ratio for large shareholders in medium-sized companies. NPR6-Large is the net purchasing ratio for large shareholders in large companies.

5. Empirical results

5.1. The information content of aggregate insider trading

Tables 6 and 7 examine the predictive power of aggregate executive trading for future market returns. Table 6 does not control for historical market returns BR6 and BR12, and Table 7 does. In Table 6, NPR6 explains 25% of FR6 and 58.4% of FR12. As such, aggregate executive trading exhibits fairly good predictive power for future market returns. In Table 7, after controlling for BR6 and BR12, NPR3 and NPR6 continue to provide significant incremental explanatory power of future market returns, indicating that executives use their macro information advantage to time the market. When comparing the results of NPR3 and NPR6, we can see that the t statistics and Adj-R^2 values are higher for NPR6 than NPR3. Therefore, aggregation over the longer term increases the predictability of insider trading.

Furthermore, according to Table 7, as the forecast period is extended from three to twelve months, the predictability of NPR increases, which is reflected in the increasing NPR t statistics and Adj-R^2 values. It is worth mentioning that the NPR6 model explains 66.9% of FR12. The coefficients of BR6 are significantly positive in all of the models, consistent with the short-term market inertia explanation. All of the BR12 coefficients are significantly negative, consistent with the long-term market reversal explanation.

Tables 8 and 9 exhibit the power of aggregate shareholder trading to predict future market returns. Regardless of whether BR6 and BR12 are controlled for, the NPR coefficients are consistently significantly positive in all of the models, indicating that aggregate shareholder trading has a significant ability to predict future mar-

Table 6
Aggregate executive trading and future market returns without controlling for BR6 and BR12.

	(1) FR3	(2) FR6	(3) FR9	(4) FR12	(5) FR3	(6) FR6	(7) FR9	(8) FR12
Intercept	0.0175	0.173[*]	0.338[***]	0.323[***]	0.146[*]	0.440[***]	0.631[***]	0.631[***]
	(0.28)	(1.79)	(3.28)	(3.56)	(1.90)	(3.99)	(5.57)	(6.82)
NPR3	**0.0187**	**0.256[**]**	**0.534[***]**	**0.593[***]**				
	(0.23)	**(2.07)**	**(4.01)**	**(4.96)**				
NPR6					**0.197[*]**	**0.619[***]**	**0.932[***]**	**1.020[***]**
					(1.97)	**(4.32)**	**(6.24)**	**(8.19)**
Adj. R^2	**−0.018**	**0.058**	**0.231**	**0.334**	**0.052**	**0.250**	**0.431**	**0.584**
F	0.05	4.27	16.04	24.62	3.90	18.67	38.93	67.06
N	54	54	51	48	54	54	51	48

[*] Significance at the level of 10% or less.
[**] Significance at the level of 5% or less.
[***] Significance at the level of 1% or less.

Table 7
Aggregate executive trading and future market returns controlling for BR6 and BR12.

	(1) FR3	(2) FR6	(3) FR9	(4) FR12	(5) FR3	(6) FR6	(7) FR9	(8) FR12
Intercept	0.0772	0.274***	0.415***	0.317***	0.202***	0.521***	0.675***	0.579***
	(1.32)	(3.19)	(4.40)	(3.81)	(2.94)	(5.65)	(6.56)	(6.68)
NPR3	**0.115**	**0.403***	**0.623***	**0.484***				
	(1.42)	**(3.39)**	**(4.68)**	**(4.00)**				
NPR6					**0.295***	**0.750***	**0.986***	**0.873***
					(3.11)	**(5.90)**	**(6.79)**	**(6.89)**
BR6	0.385***	0.716***	0.679***	0.377**	0.375***	0.659***	0.579***	0.294**
	(3.74)	(4.74)	(4.10)	(2.58)	(3.99)	(5.25)	(4.16)	(2.54)
BR12	−0.115**	−0.249***	−0.295***	−0.311***	−0.090*	−0.195***	−0.230***	−0.236***
	(−2.16)	(−3.21)	(−3.47)	(−4.07)	(−1.79)	(−2.90)	(−3.08)	(−3.71)
Adj. R^2	**0.181**	**0.326**	**0.414**	**0.496**	**0.286**	**0.511**	**0.567**	**0.669**
F	4.91	9.54	12.79	16.44	8.08	19.47	22.81	32.72
N	54	54	51	48	54	54	51	48

Note: The dependent variable FR3 (FR6, FR9, FR12) represents the three-month-ahead (six-month-ahead, nine-month-ahead, twelve-month-ahead) cumulative abnormal return of the Shanghai Stock Exchange Composite Index. The independent variable NPR3 (NPR6) is the net purchasing ratio for executives over the past three (six) months. The control variables BR6 and BR12 represent the cumulative abnormal market returns for the past six and twelve months, respectively. The t values of the coefficients are included in parentheses.

* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

Table 8
Aggregate shareholder trading and future market returns without controlling for BR6 and BR12.

	(1) FR3	(2) FR6	(3) FR9	(4) FR12	(5) FR3	(6) FR6	(7) FR9	(8) FR12
Intercept	0.0211	0.368*	0.754***	0.908***	0.307**	0.865***	1.291***	1.307***
	(0.17)	(1.94)	(3.75)	(5.63)	(2.34)	(4.64)	(7.22)	(9.52)
NPR3	**0.0196**	**0.440**	**0.923***	**1.162***				
	(0.14)	**(2.03)**	**(4.00)**	**(6.27)**				
NPR6					**0.357**	**1.025***	**1.556***	**1.637***
					(2.35)	**(4.77)**	**(7.54)**	**(10.28)**
Adj. R^2	**−0.019**	**0.055**	**0.230**	**0.449**	**0.079**	**0.291**	**0.528**	**0.690**
F	0.02	4.10	15.97	39.26	5.55	22.77	56.84	105.75
N	54	54	51	48	54	54	51	48

* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

ket returns. Furthermore, the predictability of NPR increases as the forecast period is extended (from three to twelve months). The NPR6 model explains almost 73% of the variation in FR12, suggesting that aggregate large shareholder trading has a strong ability to predict future market returns.

The findings shown in Tables 8 and 9 differ from prior empirical evidence identified for the U.S. market. Literature focusing on the U.S. market has unanimously found that large shareholder transactions have low information content, mainly because ownership is more dispersed and the holdings of large shareholders are generally low in the U.S. market. Large shareholders are usually not involved in business operations, but rely on compensation contracts, the corporate management job market, independent directors and other means to indirectly control management. As such, they are mostly passive shareholders and have a much weaker information advantage than executives. However, due to the lack of investor protection in the Chinese A-share market, concentrated ownership is an alternative for shareholders' self-protection. Furthermore, due to the imperfections that corporate managers and independent directors face in the job market and other

Table 9
Aggregate shareholder trading and future market returns controlling for BR6 and BR12.

	(1) FR3	(2) FR6	(3) FR9	(4) FR12	(5) FR3	(6) FR6	(7) FR9	(8) FR12
Intercept	0.221*	0.720***	1.017***	0.888***	0.517***	1.186***	1.510***	1.233***
	(1.71)	(3.85)	(4.87)	(5.16)	(4.12)	(7.42)	(8.88)	(8.18)
NPR3	**0.272***	**0.878***	**1.241***	**1.087***				
	(1.72)	**(3.85)**	**(4.85)**	**(5.12)**				
NPR6					0.637***	1.451***	1.847***	1.520***
					(4.17)	(7.45)	(8.89)	(8.16)
BR6	0.402***	0.761***	0.722***	0.440***	0.370***	0.642***	0.549***	0.274**
	(3.88)	(5.10)	(4.35)	(3.22)	(4.20)	(5.71)	(4.61)	(2.60)
BR12	−0.102*	−0.211***	−0.246***	−0.268***	−0.0474	−0.106*	−0.122*	−0.162**
	(−1.91)	(−2.74)	(−2.87)	(−3.73)	(−0.96)	(−1.68)	(−1.81)	(−2.66)
Adj. R^2	0.196	0.360	0.428	0.569	0.368	0.607	0.680	0.727
F	5.29	10.95	13.47	21.71	11.28	28.30	36.39	42.67
N	54	54	51	48	54	54	51	48

Note: FR3 (FR6, FR9, FR12) is the three-month-ahead (six-month-ahead, nine-month-ahead, twelve-month-ahead) cumulative abnormal return of the Shanghai Stock Exchange Composite Index. NPR3 (NPR6) is the net purchasing ratio for large shareholders over the past three (six) months. BR6 and BR12 represent cumulative abnormal market returns for the past six and twelve months, respectively. The *t* values of the coefficients are included in parentheses.
* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

governance mechanisms, large shareholders are usually more actively involved in strategic decisions and operations. This allows them to ensure that they have a firm grasp of the control rights so that other shareholders or managers do not harm their interests. These large shareholders have both the ability and willingness to obtain access to information. In particular, the largest shareholder often plays a central role in corporate governance, as he or she can appoint board members and managers. Therefore, his or her trading should have relatively high information content.

In Fig. 3, we use the estimated coefficients of the NPR6 model (including BR6 and BR12) to calculate the predicted FR6 for each month and then compare the predicted FR6 curve with the corresponding actual FR6 curve. As shown in Fig. 3, the predicted FR6 values based on both the executive and large shareholder models match closely with the actual FR6 value. The results suggest that the predictability of aggregate insider trading is very high.

5.2. Empirical tests of the direction of trade

To further determine whether buying or selling has more predictive power, we divide the transactions into "buy" and "sell" and replace the NPR with LNBUY6 and LNSELL6, as shown in Table 10. Because the
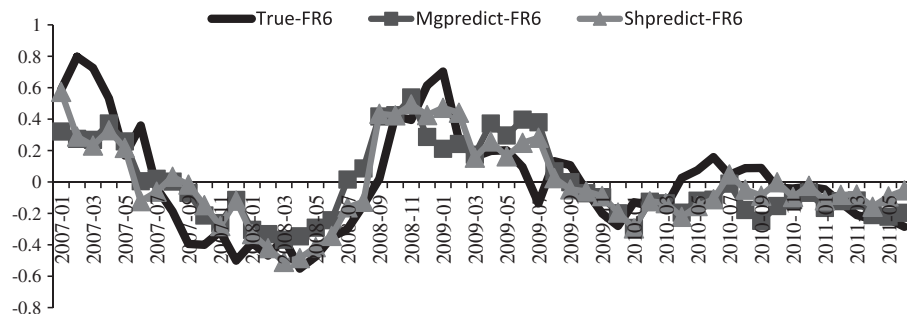

Figure 3. Comparison of actual and projected future market returns. *Note:* True-FR6: the actual FR6 (six-month-ahead market returns). Mgpredict-FR6: predicted FR6 (six-month-ahead market returns) using the executive NPR6 model. Shpredict-FR6: predicted FR6 (six-month-ahead market returns) using the large shareholder NPR6 model.

Table 10
Predictive power by trading direction for the executive sample.

	(1) FR6	(2) FR6	(3) FR6	(4) FR6
Intercept	−1.003	1.864***	−0.0918	2.159***
	(−0.82)	(2.91)	(−0.07)	(3.93)
LNBUY6	**0.0548**		**0.0059**	
	(0.82)		**(0.09)**	
LNSELL6		**−0.0917*****		**−0.105*****
		(−2.92)		**(−3.91)**
BR6			0.597***	0.659***
			(3.61)	(4.59)
BR12			−0.275***	−0.305***
			(−2.96)	(−4.06)
Adj. R^2	**−0.006**	**0.125**	**0.171**	**0.365**
F	0.67	8.55	4.63	11.14
N	54	54	54	54
Model		(1) vs. (2)		(3) vs. (4)
Vuong Z		−2.328**		−2.470**
p-Value		0.020		0.014

Note: LNBUY6 (LNSELL6) is the natural logarithm of the total amount of executives' buying (selling) transactions over the past six months. The Vuong test examines the significance of the differences in terms of the Adj. R^2 value.
* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

original yuan amount of the purchase and sales transactions for each month varies widely, we use the natural logarithm of the yuan amount.

$$\text{LNBUY6}_t = \text{LN}\left(\sum_{k=t-5}^{t} \text{BUY}_k\right), \quad \text{LNSELL6}_t = \text{LN}\left(\sum_{k=t-5}^{t} \text{SELL}_k\right)$$

Table 10 compares the executives' purchases and sales. The coefficients of LNSELL6 are significant in both models 2 and 4, with or without BR6 and BR12. In contrast, the coefficients of LNBUY6 are not significant in models 1 and 3. Next, we use the Vuong test (1989) to examine the significance of the differences in R^2 values. The results suggest that aggregate executive selling activities have more predictive power than buying activities. These findings are different from prior studies that use U.S. market data. Prior studies of the U.S. market have consistently found that executive buying has more information content than selling. In the U.S., equity incentives are often the largest components of executive compensation. Executives often decrease their holdings for liquidity or diversification reasons, which dilutes the information content of selling. In contrast, their buying is usually driven by private information and has high information content. However, executives in the Chinese A-share market do not have equivalent equity incentives like their counterparts in the United States. Executive holdings are also often very low,[3] so selling is more likely to be based on an information advantage. In contrast, executive buying is sparse and often occurs for diverse reasons. For example, executives may increase their holdings for political reasons,[4] to increase the stock price shortly before a seasoned equity offering[5] or because doing so is mandated by equity incentive plans.[6] These types of purchases undoubtedly dilute the information content of executive buying (Zhu et al., 2011a,b).

[3] The average stock ownership of board directors, executives and supervisors in companies listed on the Shenzhen Stock Exchange was only 0.06% in 2008.
[4] For example, during the 2008 financial crisis, large central state-owned listed companies actively responded to the call to maintain financial market stability by increasing their insider holdings of listed companies.
[5] Companies may want to take advantage of market participants who follow executive purchases to increase their holdings and therefore the stock price shortly before a seasoned equity offering.
[6] Executive equity incentive programs sometimes mandate that annual bonuses be used to purchase a company's stock.

Table 11 compares the large shareholders' purchases and sales. Although the coefficients of the large shareholder LNBUY6 are significant and the Adj-R^2 values of models 1 and 3 are not low, the higher coefficients of LNSELL6 and the higher Adj-R^2 values in the LNSELL6 models suggest that large shareholder selling has a much stronger predictive power than buying. Large shareholders and especially those in central state-owned companies may respond to political calls to increase their holdings during an economic crisis or in strategically important industries. Large shareholders may also increase their holdings during a control rights competition. These non-information-driven buying activities dilute the information content of aggregate shareholder buying.

5.3. The effect of an information hierarchy on the predictive power of insider trading

Executives can be divided into three categories: managers, directors and supervisors. Each of these categories has a different position on the information hierarchy. As shown in Table 12, based on the results of the Vuong tests and the significance of the coefficients, regardless of whether BR6 and BR12 are controlled for, managers have the strongest trading predictability, followed by directors and then supervisors. These findings coincide with the order of the executive information hierarchy discussed earlier. Involvement in business operations and the information hierarchy significantly affect the predictive power of insider trading. This finding strongly supports the argument that insider trading is beyond simple contrarian trading and is stronger mainly due to the macro information advantage insiders have based on their operational involvement.

We now divide large shareholders into two categories: controlling and important shareholders. These two categories have different positions on the information hierarchy. Small shareholders with less than 5% ownership and no relation to the largest shareholders as a benchmark are also included, as they normally do not have an information advantage (see Table 13).

Regardless of whether BR6 and BR12 are controlled for, the predictability of controlling shareholder trading is significantly stronger than that of important shareholder trading. When BR6 and BR12 are not controlled for, the Adj. R^2 value of the important shareholder model is only 6.2%, and that of the controlling shareholder model is 35.5%. Because NPR6-Smallsh is not significant, small shareholders' trading activities have no information content. The descending predictive power of trading belonging to controlling, important

Table 11
Predictive power by trading direction for the large shareholder sample.

	(1) FR6	(2) FR6	(3) FR6	(4) FR6
Intercept	−1.114*** (−3.45)	7.170*** (7.09)	−1.896*** (−3.91)	6.802*** (7.52)
LNBUY6	**0.0979*** (3.46)**		**0.162*** (3.96)**	
LNSELL6		**−0.489*** (−7.10)**		**−0.464*** (−7.51)**
BR6			0.368** (2.39)	0.482*** (4.27)
BR12			0.0477 (0.43)	−0.170*** (−2.81)
Adj. R^2	**0.172**	**0.482**	**0.368**	**0.610**
F	12.00	50.39	11.31	28.64
N	54	54	54	54
Model		(1) vs. (2)		(3) vs. (4)
Vuong Z		−2.210**		−2.725***
p-Value		0.027		0.006

Note: LNBUY6 (LNSELL6) is the natural logarithm of the total amount of large shareholder purchases (sales) over the past six months.
* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

Table 12
Predictive power of trading by executive type.

	(1) FR6	(2) FR6	(3) FR6	(4) FR6	(5) FR6	(6) FR6
Intercept	0.251***	0.381***	−0.0647	0.276***	0.464***	0.374
	(4.24)	(3.52)	(−0.28)	(5.88)	(4.98)	(1.56)
NPR6_Manager	**0.527*****			**0.568*****		
	(5.48)			**(7.37)**		
NPR6_Director		**0.513*****			**0.642*****	
		(3.84)			**(5.22)**	
NPR6_Supervisor			**−0.0802**			**0.466**
			(−0.26)			**(1.52)**
BR6				0.663***	0.654***	0.705***
				(5.86)	(4.97)	(4.05)
BR12				−0.254***	−0.189**	−0.349***
				(−4.29)	(−2.67)	(−3.65)
Adj. R^2	**0.354**	**0.206**	**−0.018**	**0.603**	**0.463**	**0.207**
F	30.07	14.74	0.07	27.80	16.22	5.61
N	54	54	54	54	54	54
Model	(1) vs. (2)	(2) vs. (3)	(1) vs. (3)	(4) vs. (5)	(5) vs. (6)	(4) vs. (6)
Vuong Z	1.320	2.359**	3.043***	1.940*	2.814***	4.134***
p-Value	0.187	0.018	0.002	0.052	0.005	0.000

Note: NPR6-Manager is the net purchasing ratio for managers. NPR6-Director is the net purchasing ratio for directors. NPR6-Supervisor is the net purchasing ratio for supervisors. FR6 is the dependent variable. The Vuong tests examine the significance of the differences in Adj. R^2 values.
* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

Table 13
Predictive power of trading by shareholder type.

	(1) FR6	(2) FR6	(3) FR6	(4) FR6	(5) FR6	(6) FR6
Intercept	0.329***	0.987**	0.0730	0.358***	1.903***	0.0978
	(4.65)	(2.10)	(0.73)	(6.05)	(3.85)	(1.00)
NPR6-Control	0.474***			0.554***		
	(5.49)			(6.88)		
NPR6-Important		1.086**			2.114***	
		(2.12)			(3.83)	
NPR6-Smallsh			0.125			0.149
			(0.88)			(0.94)
BR6				0.538***	0.735***	0.607***
				(4.59)	(4.98)	(3.75)
BR12				−0.106	−0.190**	−0.245**
				(−1.61)	(−2.42)	(−2.67)
Adj. R^2	**0.355**	**0.062**	**−0.004**	**0.574**	**0.358**	**0.185**
F	30.16	4.50	0.77	24.80	10.87	5.01
N	54	54	54	54	54	54
Model	(1) vs. (2)	(1) vs. (3)	(2) vs. (3)	(4) vs. (5)	(4) vs. (6)	(5) vs. (6)
Vuong Z	2.592***	2.873***	1.438	1.771*	3.524***	2.103**
p-Value	0.010	0.004	0.150	0.077	0.000	0.036

Note: NPR6-Control is the net purchasing ratio for controlling shareholders. NPR6-Important is the net purchasing ratio for important shareholders. NPR6-Smallsh is the net purchasing ratio for small shareholders (less than 5% ownership and no relation to the largest shareholder). The Vuong tests examine the significance of the differences in Adj. R^2 values.
* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

and small shareholders coincides with the order of the shareholders' information hierarchy. This finding further validates the argument that the predictability of insider trading is a result of the insiders' macro information advantage.

5.4. Effect of corporate governance on the predictive power of insider trading

To investigate the effect of corporate governance on executive trading, we divide companies into three categories: private-, local state- and central state-owned. As shown in Table 14, based on the significance of the coefficients and the Vuong tests of the Adj. R^2 values, the predictive power of executive trading is the weakest for central state-owned companies. Furthermore, it is slightly higher for local state-owned companies than for private-owned companies, but the difference is not significant. Table 15 exhibits the results of a sensitivity test where the NPR ratio is calculated using the number of transactions instead of the amount of yuan. The regression results are consistent with those shown in Table 14.

The preceding findings are partly consistent with Hypothesis 3. As expected in Hypothesis 3, given the hidden but strong administrative control, the executives in central state-owned companies are restrained from trading for profit. The "quasi-official" status of these executives weakens their profit motivation, forcing them to give up opportunities to profit from their macro information advantage. This explains the relatively low predictive power of aggregate trading by this type of executive.

The predictive power of executive trading between local state- and private-owned companies is not significantly different. Because trading based on macro information advantage would not harm the interests of large shareholders as seriously as trading based on company-level private information, large shareholders do not monitor it, even in private-owned companies. Therefore the difference in shareholder oversight between local state-owned companies and private-owned companies has no significant effect on executive trading based on a macro information advantage and the predictability of executive trading. However, as reported by Fidrmuc

Table 14
Effect of corporate governance on the predictive power of executive trading.

	(1) FR6-Private	(2) FR6-Local	(3) FR6-Central	(4) FR6-Private	(5) FR6-Local	(6) FR6-Central
Intercept	0.990***	0.307***	0.341***	0.987***	0.269***	0.397***
	(7.09)	(6.19)	(4.44)	(7.08)	(6.02)	(5.27)
NPR6-Private	**1.124*****			**1.151*****		
	(6.53)			**(6.21)**		
NPR6-Local		**0.586*****			**0.753*****	
		(6.93)			**(8.42)**	
NPR6-Central			**0.429*****			**0.483*****
			(4.14)			**(4.97)**
BR6-Portfolio				0.205*	0.293***	0.404***
				(1.90)	(3.15)	(3.30)
BR12-Portfolio				−0.0464	0.0343	−0.195***
				(−0.70)	(0.58)	(−3.00)
Adj. R^2	**0.440**	**0.470**	**0.233**	**0.461**	**0.600**	**0.356**
F	42.70	48.03	17.10	16.12	27.53	10.77
N	54	54	54	54	54	54
Model	(2) vs. (1)	(2) vs. (3)	(1) vs. (3)	(5) vs. (4)	(5) vs. (6)	(4) vs. (6)
Vuong Z	0.725	2.646***	1.738*	1.466	2.121**	1.662*
p-Value	0.469	0.008	0.082	0.143	0.034	0.097

Note: NPR6-Private is the net purchasing ratio for executives in private-owned companies. NPR6-Local is the net purchasing ratio for executives in local state-owned companies. NPR6-Central is the net purchasing ratio for executives in central state-owned companies. BR6-Portfolio and BR12-Portfolio correspond with the historical return of the company group. For example, when the dependent variable is FR6-Private, the BR6-Portfolio is BR6-private. The Vuong tests examine the significance of the differences in Adj. R^2 values.
 * Significance at the level of 10% or less.
 ** Significance at the level of 5% or less.
 *** Significance at the level of 1% or less.

Table 15
Effect of corporate governance on the predictive power of executive trading (sensitivity test).

	(1) FR6-Private	(2) FR6-Local	(3) FR6-Central	(4) FR6-Private	(5) FR6-Local	(6) FR6-Central
Intercept	0.492***	0.176***	0.139**	0.544***	0.116**	0.214***
	(4.89)	(3.60)	(2.25)	(5.72)	(2.28)	(3.34)
TRNPR6-Private	**0.700*****			**0.830*****		
	(4.23)			**(4.76)**		
TRNPR6-Local		**0.622*****			**0.897*****	
		(4.70)			**(5.85)**	
TRNPR6-Central			**0.234**			**0.540*****
			(1.55)			**(3.22)**
BR6-Portfolio				0.388***	0.378***	0.571***
				(3.16)	(3.33)	(3.56)
BR12-Portfolio				−0.131*	−0.00702	−0.238***
				(−1.86)	(−0.10)	(−3.16)
Adj. R^2	**0.242**	**0.285**	**0.026**	**0.343**	**0.426**	**0.203**
F	17.91	22.12	2.39	10.21	14.13	5.50
N	54	54	54	54	54	54
Model	(2) vs. (1)	(1) vs. (3)	(2) vs. (3)	(5) vs. (4)	(5) vs. (6)	(4) vs. (6)
Vuong Z	0.869	1.797*	1.925*	1.4127	1.850*	1.127
p-Value	0.385	0.072	0.054	0.158	0.064	0.260

Note: TRNPR6 is a net purchasing ratio measure similar to NPR6, except it is calculated based on the number of transactions instead of the amount of yuan. It is equal to the net purchase transactions within the past six months divided by the total transactions in the same six months.

* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

et al. (2006), the difference in large shareholder oversight may affect executive trading based on company-level insider information. When there is strong large-shareholder oversight, the profitability of executive trading is lower than that for executives in companies with dispersed ownership.

Table 16 examines the effect of corporate governance on large shareholder trading. The predictive power of large shareholder trading in private-owned companies is strongest when historical returns are not controlled for. As shown in model 1, when the NPR6-Private is used to predict FR6, the model can explain 54.4% of the portfolio returns. In contrast, the NPR6-Local model (2) and the NPR6-Central model (3) explain only 18.3% and 34.4% of the variation in the portfolio returns, respectively. When historical returns are controlled for, the NPR6-Private model (4) still has higher explanatory power than the NPR6-Local model (5). However, there is no significant difference in the Adj. R^2 values between the NPR6-Private model (4) and the NPR6-Central model (6), partially due to the increased explanation power of BR6 in the NPR6-Central model (6). These findings are consistent with Hypothesis 4. Because large shareholders in private-owned companies have stronger profit motivations and active roles in business operations, the information content of their trading is significantly higher than that of large shareholders in state-owned companies.

5.5. Effect of company size on the predictive power of insider trading

Several studies examine the effect of company size on the information content of insider trading (Seyhun, 1992; Lakonishok and Lee, 2001). To be consistent with those studies, we examine the size effect and the results are shown in Tables 17 and 18.

The predictive power of large company executive trading is significantly lower than that of small- and medium-sized companies. This finding is consistent with the prior literature. Because large companies tend to offer more public disclosures and can attract more attention from the public and professional investors, the chance of their stock being mispriced is smaller. As a result, executives in large companies have less private information and fewer mispricing opportunities. In addition, the literature consistently finds that the executive trading

Table 16
Effect of corporate governance on the predictive power of large shareholder trading.

	(1) FR6-Private	(2) FR6-Local	(3) FR6-Central	(4) FR6-Private	(5) FR6-Local	(6) FR6-Central
Intercept	3.337***	0.961***	0.687***	3.533***	1.092***	0.837***
	(8.28)	(3.94)	(5.74)	(8.54)	(3.95)	(7.73)
NPR6-Private	**3.437*****			**3.697*****		
	(8.01)			**(8.15)**		
NPR6-Local		**1.041*****			**1.256*****	
		(3.59)			**(3.50)**	
NPR6-Central			**0.781*****			**1.093*****
			(5.36)			(7.19)
BR6-Portfolio				0.226**	0.251*	0.433***
				(2.40)	(1.93)	(4.12)
BR12-Portfolio				−0.0201	−0.0283	−0.0258
				(−0.34)	(−0.33)	(−0.43)
Adj. R^2	**0.544**	**0.183**	**0.344**	**0.590**	**0.224**	**0.527**
F	64.18	12.86	28.74	26.38	6.09	20.70
N	54	54	54	54	54	54
Model	(1) vs. (2)	(2) vs. (3)	(1) vs. (3)	(4) vs. (5)	(5) vs. (6)	(4) vs. (6)
Vuong Z	2.990***	−1.500	1.904*	2.713***	−2.041**	0.127
p-Value	0.003	0.134	0.057	0.007	0.041	0.899

Note: NPR6-Private is the net purchasing ratio for large shareholders in private-owned companies. NPR6-Local is the net purchasing ratio for large shareholders in local state-owned companies. NPR6-Central is the net purchasing ratio for large shareholders in central state-owned companies. BR6-Portfolio and BR12-Portfolio correspond with the historical return of the company group. The Vuong tests examine the significance of the differences in Adj. R^2 values.
* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

Table 17
Effect of company size on the predictive power of executive trading.

	(1) FR6-Small	(2) FR6-Medium	(3) FR6-Large	(4) FR6-Small	(5) FR6-Medium	(6) FR6-Large
Intercept	0.649***	0.917***	0.437***	0.653***	0.907***	0.526***
	(7.96)	(8.91)	(3.30)	(8.44)	(8.69)	(4.27)
NPR6-Small	0.764***			0.795***		
	(7.85)			(7.93)		
NPR6-Medium		1.167***			1.186***	
		(8.37)			(7.85)	
NPR6-Large			0.446**			0.639***
			(2.62)			(3.59)
BR6-Portfolio				0.267***	0.116	0.493***
				(2.71)	(1.22)	(3.60)
BR12-Portfolio				−0.0756	−0.0127	−0.129*
				(−1.19)	(−0.21)	(−1.89)
Adj. R^2	**0.538**	**0.566**	**0.100**	**0.584**	**0.566**	**0.260**
F	61.61	70.11	6.87	25.36	24.07	7.21
N	53	54	54	53	54	54
Model	(1) vs. (2)	(2) vs. (3)	(1) vs. (3)	(4) vs. (5)	(5) vs. (6)	(4) vs. (6)
Vuong Z	−0.342	4.015***	4.254***	0.626	2.569**	2.839***
p-Value	0.732	0.0001	0.000	0.532	0.010	0.005

Note: NPR6-Small, NPR6-Medium and NPR6-Large are the net purchasing ratios of executive trading for small, medium-sized and large companies, respectively. Company size is determined by the market value at the beginning of the year. BR6-Portfolio and BR12-Portfolio correspond with the historical returns of the company group. The Vuong tests examine the significance of the differences in Adj. R^2 values.
* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

Table 18
Effect of company size on the predictive power of large shareholder trading.

	(1) FR6-Small	(2) FR6-Medium	(3) FR6-Large	(4) FR6-Small	(5) FR6-Medium	(6) FR6-Large
Intercept	1.719***	2.142***	0.890***	1.803***	2.471***	1.320***
	(5.34)	(7.03)	(4.55)	(5.74)	(7.34)	(6.76)
NPR6-Small	**1.792*****			**1.800*****		
	(5.11)			**(5.32)**		
NPR6-Medium		**2.257*****			**2.709*****	
		(6.73)			**(6.91)**	
NPR6-Large			**1.098*****			**1.947*****
			(4.07)			**(6.26)**
BR6-Portfolio				0.0936	0.151	0.434***
				(0.78)	(1.49)	(3.88)
BR12-Portfolio				−0.194***	0.0633	0.0462
				(−2.64)	(0.90)	(0.69)
Adj. R^2	**0.322**	**0.455**	**0.227**	**0.397**	**0.505**	**0.478**
F	26.14	45.27	16.55	12.64	19.00	17.16
N	54	54	54	54	54	54
Model	(1) vs. (2)	(2) vs. (3)	(1) vs. (3)	(4) vs. (5)	(5) vs. (6)	(4) vs. (6)
Vuong Z	−0.854	2.350**	1.624	−0.941	0.487	−0.254
p-Value	0.393	0.019	0.104	0.347	0.627	0.800

Note: NPR6-Small, NPR6-Medium and NPR6-Large are the net purchasing ratios of large shareholder trading for small, medium-sized and large companies, respectively. BR6-Portfolio and BR12-Portfolio correspond with the historical returns of the company group. The Vuong tests examine the significance of the differences in Adj. R^2 values.
* Significance at the level of 10% or less.
** Significance at the level of 5% or less.
*** Significance at the level of 1% or less.

of large companies, which may be subject to more rigorous monitoring, has less information content than that of small companies.

Without controlling for historical returns, the predictive power of large shareholder trading in large companies is significantly smaller than that of medium-sized companies. When BR6 and BR12 are controlled for, company size has no effect on the predictive power of shareholder trading. Thus, the effect of company size is more noticeable in executive trading than in shareholder trading.

We conduct a variety of sensitivity tests. First, we use the number of shares traded and the number of transactions as alternative measures to the amount of yuan in calculating the NPR index, and the conclusions stay the same. Second, we use FR9 and FR12 as alternative dependent variables, and the empirical results are consistent with the use of FR6. Third, given the significant differences in turnover, company size and listing history between the main board, small-cap and growth enterprise markets, we remove the small-cap and growth enterprise markets, leaving only the main board market, and find that all of the regression results are robust. We use another method to consider the effects of different markets on the results. We use the small-cap market index to calculate the future and prior market returns, and find that insider trading in companies listed on the small-cap and growth enterprise markets also has strong predictability for future small-cap market returns. Fourth, Zhang and Zeng (2011) find that the relatives of executives can serve as an alternate and implicit insider trading method to avoid strict monitoring and that relative trading has a similar timing ability. We conduct a sensitivity test by using NPR6-Relatives in the models and find that relative trading cannot predict future market returns. Although relatives do not seem to have a macroeconomic information advantage, their information advantage may be limited to the company level.

6. Conclusions

Using Chinese A-share market data taken from January 2007 to August 2011, we examine the predictive power of aggregate insider trading on future market returns from a macro perspective. We find that after

controlling for the contrarian investment strategy, aggregate executive (large shareholder) trading from the prior six months predicts 66% (72.7%) of market returns twelve months in advance. The predictive power is caused by insiders' information advantage in predicting macroeconomic trends and detecting deviations in stock market valuation. Compared with the results found in the U.S. market, aggregate insider trading in the A-share market has a stronger predictability, which may highlight the severity of insider trading in the A-shares market or indicate that the market may be more prone to systematic valuation bias to create more opportunities for insider trading. Furthermore, we find that the information hierarchy and corporate governance have a significant effect on the information content of aggregate insider trading. The trading of insiders who are more involved in business operations and at higher positions in the information hierarchy have significantly more predictive power. The corporate ownership structure also has a significant effect on insider trading. The predictive power of executive trading is weakest for central state-owned companies. Although there is a lack of effective large-shareholder oversight, the implicit administrative control in central state-owned companies becomes an alternative mechanism for curbing executive trading. Large shareholders in private-owned companies have stronger incentives to benefit from insider trading and have more power to control business operations. As such, the predictive power of their trading is significantly higher than that of large shareholders in state-owned companies.

The relationship between insider trading and information advantage and how external regulation and corporate governance affect insider trading have been important issues for regulators, academia and investors. This study complements prior studies by examining an emerging market and investigating how institutional context and corporate governance affect insider trading. It provides interesting findings that are different from those observed in mature markets. For example, it finds that the trading activities of large shareholders in the Chinese A-share market have much higher information content than those in mature markets. The findings differ mainly due to China's institutional background and corporate governance. Due to the weak investor protection in the Chinese A-share market, large shareholders tend to be actively involved with business operations and thus become important insiders who cannot be ignored. This study also further examines the relationship between corporate governance and insider trading. We find that private- and state-owned companies face different agency problems and governance structures, resulting in significant differences in insider trading behavior. The information content of the trading of executives in central state-owned companies is lowest because they are subject to implicit but strong administrative control. This suggests that executive trading is influenced by not only large shareholders' oversight, but also another implicit informal monitoring system such as the administrative control of an organization.

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Does high-quality auditing decrease the use of collateral? Analysis from the perspective of lenders' self-protection

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ABSTRACT

We examine the association between audit quality and the use of collateral in a sample of Chinese firms from 2005 to 2011. Using the full sample, we document a negative relationship between audit quality and the use of collateral that is consistent with lenders' interests. We also show that audit quality and collateral are regarded as alternative means of reducing debt credit risk. Our conclusions are robust after using an auditor-switching test, the Heckman two-stage model and a propensity-score matching model to address endogeneity issues. China's institutional background is also considered. First, we find that in the group of firms in which large shareholders are able to control borrowers' activities, the substitution effects between collateral and audit quality are reduced when the degree of separation between large shareholders' control and ownership is high. Second, these substitution effects are greater when the borrowers' ultimate controller is a state-owned enterprise (SOE) rather than a non-state-owned enterprise (NSOE). Third, the differences in substitution effects between NSOEs and SOEs are smaller in areas with a high market-development index. We conclude that the substitution effects are smaller in high credit risk firms than in low credit risk firms.

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1. Introduction

Bank loans play an important role in borrowers' external financing. Unlike developed foreign markets, China is undergoing economic transition, as its emerging equity market emerged as recently as 1990. In addition, its public

bond market remains undeveloped, long-term bond financing makes up only a small proportion (less than 5%) of its long-term debt. Therefore, bank loans are still vital to corporate funding in China. Chen et al. (2010) and Chen and Xiao (2012) find that despite the significant growth of China's equity market, borrowers still rely overwhelmingly on banks to satisfy their need for capital.[1] Allen et al. (2005) show that the proportion of GDP comprised by bank loans is higher in China than in other developing countries. Moreover, as important intermediaries, banks are vital to the adjustment of the allocation of capital. They provide not only capital loans, but macroeconomic regulation. Chen and Li (2011) show that the industries involved in China's 5-year support plan have preferential access to capital and exhibit better performance than industries not involved in the plan. We know that bank loans are significant not only to borrowers but to policy makers, as they make a large contribution to the development of China's economy.

Collateral, together with interest rates, debt maturity and other covenants, is widespread in debt contracts. It is used to solve the moral-hazard and adverse-selection problems caused by information asymmetry (Bester, 1985; Chan and Kanatas, 1985; Boot et al., 1991). La Porta et al. (1998) argue that collateral is central to the relationship between lenders and borrowers. Collateral requirements arise from the agency problem that afflicts financial relationships, especially with regard to debt financing. Collateral is not only an ex-ante mechanism of interest alignment but an ex-post mechanism of control allocation, used to supervise borrowers and to minimize losses when a borrower defaults on a loan repayment (Aghion and Bolton, 1992).

External auditing is a useful mechanism of both corporate governance and external supervision. High-quality auditing can improve the quality of financial information (Becker and Defond, 1998; Francis et al., 1999; Teoh and Wong, 1993; Qi, 2004; Wu and Li, 2006), increase the transparency of accounting information (Chen and Wang, 2006) and decrease a company's capital costs (Khurana and Raman, 2004; Pittman and Fortin, 2004). In addition, many empirical studies show that when making decisions, lenders consider the quality of accounting information as well as several key financial measures (Chen et al., 2010; Rao and Hu, 2005; Goncharov and Zimmerman, 2007). The quality of accounting information also affects the usefulness of a debt contract (Lu et al., 2008). As important stakeholders, lenders can use high-quality external auditing to decrease credit risk.

However, there is a trade-off between the use of collateral and the necessity of high-quality auditing. Although collateral is determined ex-ante, it may incur the costs of screening and monitoring the pledged assets, as well as disposal expenses and losses due to the sale of specialized assets (Chen et al., 2012). External audit quality may be affected by many factors, such as the purchasing of audit opinion and the collusion of auditors with borrowers, which severely depreciate external audit quality. This is not in the interests of lenders. The question arises of whether lenders use the optimal means to control credit risk when designing debt contracts?[2] We focus on collateral in this study, on the grounds that the total number of bank loans is incapable of reflecting bank-loan restrictions, as bank loans can be divided into collateral, guarantor and credit loans according to their degree of restriction.[3] We believe that the use of collateral and guarantor loans more accurately reflects our expected relationships between lenders and borrowers, leading to more reliable results. Chen (2011) uses credit loans to examine the relationship between auditor reputation and borrowers' bank loans.

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[1] Chen et al. (2012) show that the capital raised from banks each year ranged from RMB 1250 to RMB 3100 billion between 2001 and 2006, whereas the capital raised from the stock market during this period was only between RMB 30 and RMB 250 billion a year. Chen and Xiao (2012) calculate that the ratios of bank loans and capital raised from the equity market to GDP, and show that the proportion constituted by bank loans is 75 times greater than that of capital raised from the equity market.

[2] We regard collateral as a debt contract issue determined ex-ante, as borrowers use their assets or properties to pledge collateral. Compared with external auditing, collateral is a better way to prevent credit risk. However, neither collateral nor external audit is free of costs, and both have some problems. The aim of our study is to examine the degree to which lenders rely on audit quality, which is reflected in the reduction of collateral.

[3] Bank loans can be divided into the following categories, according to their level of restriction: collateral loans, guarantor loans and credit loans. Collateral involves two kinds of loans, namely pledged loans and mortgage loans. A guarantor loan is a loan for which a third party has joint or guaranteed liability, if the loan defaults. Mortgage loans are bank loans secured on the borrower's property or the property of the third party. Pledge loans are secured on the borrower's or third party's movable property or rights of claim. If the borrower defaults on the loan, the lender is permitted to dispose of the pledged or mortgaged properties to cover their losses and prevent credit risk. Therefore, we believe that collateral and guarantor loans, especially collateral loans are more effective in helping lender to avoid credit risk. We use the proportion of collateral loans in our main tests, and the proportion of collateral and guarantor loans in our sensitivity tests.

We aim to answer two main questions. First, from the perspective of self-protection, how do lenders use collateral and external auditing to minimize credit risks, and are these strategies generally substitutable or complementary? Black et al. (2004), Nikolaev (2010) and Chen et al. (2012) examine this problem, but fail to reach the same conclusions. Second, how does China's institutional background affect the relationship between audit quality and collateral? The country's firms are dominated by large shareholders, shareholders are highly concentrated and lenders are ineffectively protected (Xiao, 2007). Therefore, we consider the extent of large shareholders' control and the degree of separation of the controlling owner's control and ownership. We also address the nature of the ultimate controller and the market-development index, as we wish to determine how China's institutional background affects lenders' decisions, specifically with regard to the relationship between the use of collateral and external auditing.

The first empirical study of the ultimate controller and the agency problem between controlling owners and minority shareholders was conducted by La Porta et al. (1999). Researchers examining the role of large shareholders tend to hold two distinct views: one set of researchers emphasize alignment effects (Kanga and Shivdasani, 1995; Kahn and Winton, 1998), the other highlights entrenchment effects (Claessens et al., 2000). Xiao (2007) and La Porta et al. (1999) find that borrowers have a highly concentrated, rather than dispersed ownership structure, especially in developing countries. A large shareholder leverages control through stock pyramids or cross-shareholdings while keeping his or her level of ownership low, which results in a high level of separation between control and ownership (Luo and Tang, 2008; La Porta et al., 1999). The motivation for separating control and ownership has two further dimensions, depending on the role of the large shareholder. First, alignment and risk-diversification (Pan and Yu, 2012); and second, the agency problem and entrenchment (Claessens et al., 2002; Johnson, 2000). Although the separation of control and ownership has a considerable influence on the agency problem between large shareholders and minority shareholders (Su and Zhu, 2003; Yu and Xia, 2003a, 2003b), we should also consider the basic premise that the large shareholder has a high level of control (Pan and Yu, 2012; Fan and Wong, 2002; Morck et al., 2005). If we directly examine the relationship between the agency problem and the separation of control and ownership, without considering this important premise, we may draw unreliable conclusions. Therefore, we need to determine whether the large shareholder has a high level of control, before examining the relationship between the agency problems and the separation of control and ownership. Xiao (2007) and Chen and Wang (2010) note that the ultimate controller may be either a state-owned or non-state-owned borrower. SOEs and NSOEs have many different characteristics (Cull and Xu, 2005; Chen et al., 2010; Fan et al., 2007; Lin and Li, 2004). For instance, SOEs have more opportunities than NSOEs to obtain capital, but face a lower credit risk (Allen et al., 2005; Guariglia et al., 2011). Unlike the developed markets in Western countries, China's regional economic development is unbalanced, with vast differences between regions in terms of legal development and marketization (Yu and Pan, 2008; Fan and Wang, 2009). With greater legal development and marketization, decisions regarding bank loans are more marketized, and more independent of government power (Jiang and Li, 2006; Fang, 2007; Yu and Pan, 2008a, 2008b; Wei and Shen, 2009). As a result, SOEs face greater credit risk.

We find that the use of collateral and high-quality external auditing are regarded as substitutes by lenders making decisions about bank loans. We notice that in the group of firms whose large shareholders are capable of controlling borrowers, these substitution effects are reduced when the degree of separation of control and ownership is high. In the other group, however, the substitution effects are not found to increase. We show that the substitution effects between collateral and high-quality auditing are greater in SOEs, but we also prove that a higher market development index can reduce the differences between SOEs and NSOEs.

This study makes several potential contributions to the literature. First, we take a novel perspective in examining how lenders protect themselves by influencing borrowers' activities through high-quality auditing and collateral requirements. Most prior studies have addressed this problem from the borrower's perspective, and conclude that high-quality auditing helps borrowers to obtain bank loans and reduce the cost of borrowing. For example, Hu and Tang (2007) notes the relationship between interest rates and auditing. Liao et al. (2010) use going-concern opinions to examine the role of auditors. Our results show that lenders use high-quality auditing and collateral requirements to influence borrowers' actions; high-quality auditing and collateral are regarded as substitutes, and their substitution effects are adjusted according to the credit risk of the borrower, which depends on the institutional environment. Second, our study enriches the existing literature on the determinants of collateral. Prior researchers note that collateral is affected by the degree of information

asymmetry (Brick and Palia, 2007; Chakraborty and Hu, 2006; Jimenez et al., 2006), the relationship between lenders and borrowers (Sharpe, 1990; Rajan, 1992), the level of competition in the loan market (Besanko and Thakor, 1987), and the costs (benefits) of screening borrowers (Manove and Padilla, 1999; Manove et al., 2001). We note that high-quality external auditing decreases the use of collateral and that the extent of this decrease depends on the level of credit risk. Third, our study contributes to existing research on large shareholders' separation of control and ownership. Although Prior researchers have used the separation of control and ownership to examine entrenchment, agency or alignment effects, few studies have addressed its financial consequences, such as the cost of borrowing. Lin et al. (2011) sample firms from a number of foreign countries' to examine the relationship between the degree of separation of control and ownership and the cost of borrowing, as reflected in interest-rate spreads. We divide our sample into two groups to examine the influence of the degree of separation of control and ownership on the relationship between collateral and high-quality auditing. Our results indicate that in high control group, the substitution effects between collateral and high-quality auditing are only weakened when the degree of separation of control and ownership is high. However, we do not find these effects to be stronger in the low-control group, when the degree of separation of control and ownership is high. Our evidence offers insight into the incentives for and consequences of large shareholders' separation of control and ownership. Finally, following Armstrong et al. (2010) and Skinner (2011), we examine the interaction between various aspects of debt contracts to determine, specifically, whether they are substitutable or complementary. We seek to ascertain whether various mechanisms are used as alternatives or complements. Prior researchers have noticed the relationships between collateral and other contracting issues and characteristics and the quality of accounting (Zhang, 2008; Nikolaev, 2010; Chen et al., 2012; Black et al., 2004). The focus of our study is the use of an external monitoring mechanism, namely, external auditing. We examine the relationship between external auditing and the use of collateral, and then investigate the effects on this relationship of different levels of credit risk.

The rest of the paper is structured as follows. We develop our hypotheses in Section 2, and present the research design, sample selection and data in Section 3. We present the results of our main tests in Section 4 and results of our sensitivity tests in Section 5. Section 6 concludes the study.

2. Development of hypotheses

According to contract theory and agency theory, an enterprise is formed from the combination of various kinds of contracts. During the design and implementation process, proper monitoring mechanisms should be used to align stakeholders' interests (Jensen and Meckling, 1976). The focus of our study is the agency problem between lenders and borrowers, whose conflicts of interest mainly concern asset substitution (Jensen and Meckling, 1976), under-investment (Myers, 1977) and equity delusion (Smith and Warner, 1979), specifically the fear that borrowers will expropriate lenders. The aim of our study is to determine whether a lender will adjust the use of collateral when he or she knows the borrower's audit quality, and whether the degree of adjustment is always the same.

2.1. Collateral and audit quality

From the perspective of self-protection, agency costs can be decreased by using alignment mechanisms to solve the agency problem between lenders and borrower. Collateral and external auditing are two such mechanisms. The use of collateral is necessitated by information asymmetry between lenders and borrowers, and is a common component of bank loans (Yang and Qian, 2008). Bester (1985) and Chan and Kanatas (1985) find that in conditions of information asymmetry, collateral can reduce interest rates and may be regarded as a signal of better credit quality. Many researchers have focused on the role of external audit. Becker and Defond (1998) and Francis (1999) note that the clients of Big-four audit firms have lower discretional accruals than the clients of non-Big-4 firms. Qi et al. (2004) and Wu and Li (2006) test the Big-4 measure of audit quality and find that the Big-4 audit firms do provide a high audit quality. Teoh and Wong (1993) note that clients of the Big-4 have a higher earnings-response coefficient than clients of other audit firms. Khurana and Raman (2004) report that the use of a Big-4 firm can reduce the cost of both equity capital and debt (Pittman and

Fortin, 2004). These researchers argue that external auditing can improve the quality of borrowers' financial information and decrease information risks, helping lenders to make decisions.

In addition, lenders that pay serious attention to borrowers' financial information are found to make better decisions (Goncharov and Zimmerman, 2007), and thus alleviate credit risk. Chen et al. (2010) find that many debt contracts are available, based on different accounting measures. Rao and Hu (2005) document the roles of financial measures and accounting information in lenders' decision making, and show that lenders frequently consider borrowers' information. Grama et al. (2008) find that lenders are likely to give more severe debt contracts to borrowers involved in financial restatements. Lu et al. (2008) report that earnings management impairs the effectiveness of debt contracts.

In addition, Chen et al. (2012) show that the use of collateral incurs the costs of screening and monitoring the pledged assets, as well as disposal expenses; it also brings lenders' losses due to the sale of specialized assets. Manove and Padilla (1999) observe that lenders generally seek to give capital to high-quality borrowers, but when costs, benefits and the level of competition are taken into consideration, lenders' decisions are unlikely to be so prudential; even in an undeveloped bank-loans market, lenders regard the use of collateral as a substitute for ineffective monitoring (Manove et al., 2001). When designing debt contracts, do lenders use the optimal means to control credit risk? Does the tradeoff between costs and benefits influence lenders' decisions?

Finally, the relationship between debt contract issues and other mechanisms remains an empirical problem. Hu and Tang (2007) documents that higher-quality audit opinions and larger auditor offices reduce interest rates and increase the maturity of debt. Chen (2011) finds that auditors' reputation the number and proportion of borrowers' credit bank loans increases as the auditor's reputation increases. Black et al. (2004) use a bank-industry sample to prove that external regulation and debt covenants are substitutable, whereas, Nikolaev (2010) finds that conservatism and debt covenants are complementary. Chen et al. (2012) show that lenders generally regard collateral and conservatism as substitutable, but when the borrower has a low credit quality or a high proportion of intangible assets, the lender will reverse this assumption, regarding collateral and conservatism as complementary. As the studies above are not in complete accordance, we rely on our empirical analysis to identify the more accurate of the following two alternatives.

H1a. Collateral requirements are positively related to high-quality external auditing.

H1b. Collateral requirements are negatively related to high-quality external auditing.

2.2. Collateral, separation of control and ownership and audit quality

The first empirical studies of the ultimate controller and the agency problem between controlling owners and minority shareholders were conducted by La Ports et al. (1999) and Shleifer and Vishny (1997, 1999). According to La Porta et al. (1999) the agency problem that arises between large shareholders and minority shareholders has become more severe than that between shareholders and managers. Researchers examining the role of large stockholders tend to emphasize either alignment effects or entrenchment effects (Claessens et al., 2000). Kanga and Shivdasani (1995) note that large stockholders can alleviate the "free-rider" problem associated with minority shareholders, and large shareholders have an incentive to monitor managers (Kahn and Winton, 1998). Theses scholars conclude that the presence of large shareholders can improve corporate governance by preventing managers from acting in their self-interest. However, these studies are based on the ownership structure of U.S. firms, which are highly dispersed. Samples of firms from other countries show that ownership structures in these areas are not dispersed but highly concentrated, especially in developing countries (La Porta et al., 1999; Franks and Mayer, 1998; Cronqvist and Nilsson, 2003). Xiao (2007) notes that Chinese firms have a highly concentrated ownership structure, usually dominated by a single large stockholder. This large shareholder has the incentive to leverage control through stock pyramids or cross-shareholdings while minimizing his or her ownership, which results in a high level of separation of control and ownership (Luo and Tang, 2008; La Porta et al., 1999). This separation of control and ownership has received considerable attention from scholars. The empirical research pertaining to the incentives for and consequences of separating control and ownership can be divided into two groups. The researchers in the first group agree that a high level of separation of control and ownership can result in an alignment of interests by encouraging

the monitoring of managers. They show that under these conditions, a small amount of capital is required to supervise a large number of managers, due to diversification. This reduces investment risk (Pan and Yu, 2012). The researchers in the other group document that a large degree of separation of control and ownership can help large shareholders to expropriate from minority shareholders through tunneling activities, leading to agency or entrenchment effects (Johnson et al., 2000). Su and Zhu (2003) observe that large stockholders can cause severe agency problems for borrowers, as large shareholders may expropriate from minority shareholders by increasing their separation of control and ownership. This increases both credit risk and the likelihood of remaining in financial distress (Lin et al., 2011).

However, directly examining the relationship between the agency problem and the degree of separation of control and ownership without considering the control rights of the large shareholder may lead to unreliable results. Fan and Wong (2002) and Morck et al. (2005) document that the large shareholder can only engage in tunneling activities to gain private benefits and thereby reduce company value if he or she has considerable control rights. Majority control may even be required. Pan and Yu (2012) concur that substantial control rights are required for a large shareholder to engage in tunneling; also they show that the degree of entrenchment and alignment differs according to the level of control. Shleifer and Vishny (1997) find that when a large shareholder is capable of controlling the borrower, he or she is more likely to force a manager to engage in asset substitution and expropriate from the lender. However, the authors also show that this would result in a high credit risk and increase the likelihood of remaining in financial distress (Lin et al., 2011).We thus predict that in the high-control group, the entrenchment and agency effects will be stronger than the alignment effects when the degree of separation of control and ownership is high, resulting in higher credit risk. In contrast, we predict the alignment effects will be stronger than the entrenchment and agency effects in the low-control group when the degree of separation of control and ownership is high. We thus expect a high degree of separation of control and ownership to improve corporate governance, as it may encourage large shareholders to monitor managers and improve the efficiency of investment.

From the perspective of lenders' self-protection and considering the tradeoff between costs and benefits, a lender is more likely to regard external auditing and collateral as substitutes for a borrower with lower credit risk when a borrower chooses a high-quality auditor. In this way, the lender can minimize risk. Even when the borrower's credit risk is extremely high, the lender is able to regard external auditing and collateral as complementary. We thus test the following hypotheses empirically.

H2. When the large shareholder is able to control the borrower and the degree of separation of control and ownership is higher, the substitution effects between collateral and high-quality auditing are weaker.

H3. When the large shareholder is unable to control the borrower and the degree of separation of control and ownership is higher, the substitution effects between collateral and high-quality auditing are stronger.

2.3. Collateral, nature of controller, market development and audit quality

There are two distinct groups of Chinese firms: state-owned enterprises (SOEs) and non-state-owned enterprises (NSOEs). Since 1978, China has sought to convert SOEs from firms whose sole proprietor is the state to modern Western-style corporations (Cull and Xu, 2005). Although many decision rights have been delegated to the corporatized SOEs, the government retains the ultimate rights to make decisions about the disposal of assets and mergers and acquisitions undertaken by listed firms, as well as the right to appoint the CEOs. As SOEs lack the right to dispose of state assets, they are subsidized by the government when they face financial distress. Nevertheless, the CEOs of SOEs have multiple responsibilities (Chen et al., 2010). The promotion and compensation of CEOs of SOEs' are determined more by their success in fulfilling various political and social objectives than by their firms' operating and accounting performance (Fan et al., 2007). Li and Li (2004) find that SOEs face more divergent policy burdens than NSOEs, which lead to soft-budget constraints. The implicit insurance provided by the government and its control over state-owned banks are important sources of existing soft-budget constraints. Despite these constraints, SOEs have a lower credit risk. First, as the Chinese government has been engaged in the corporatization or partial privatization of these enterprises, it has an incentive to ensure that they remain financially sound. Second, the competition for listing in China is extremely intense;

SOEs must perform better than other firms to be chosen to list. A number of studies provide evidence that compared with NSOEs, SOEs have preferential access to capital; specifically, they have more opportunities to obtain capital and their capital costs are lower (Allen et al., 2005; Ayyagari et al., 2010; Guariglia et al., 2011).

Unlike the developed markets in Western countries, China's regional economic development is unbalanced; there are substantial differences between regions in terms of legal development and marketization (Yu and Pan, 2008; Fan and Wang, 2009). This makes China's institutional setting a natural forum in which to study the relationship between market development and the differences in substitution effects between SOEs and NSOEs (Wang et al., 2008). Jiang and Li (2006) note that when the government has little power over bank loans and financing activities are well developed, the differences between SOEs and NSOEs in terms of bank loans are reduced. According to Fang (2007), decision making regarding bank loans is more marketized and independent when the institutional environment is improved, government power over bank loans is decreased and soft-budget constraints are relaxed. Under such conditions, lenders are likely to give SOEs more severe debt contracts, alleviating the financial discrimination associated with the nature of ownership. Yu and Pan (2008a) find that NSOEs' political relationships may affect bank loans and that these effects are stronger when the levels of financing and legal development are low. SOEs' bank loans are negatively related to the levels of financing and legal development, which contradicts the findings of La Porta et al. (1998) in "Law and Finance." Wei and Shen (2009) find that when the degree of government intervention is high, SOEs are less able to obtain credit loans when lenders are well protected. We expect an increase in market development to decrease the supportive effects of government intervention in SOEs' bank loans.

When SOEs choose high-quality auditors, lender decrease their collateral requirements to reduce credit risk; the degree of adjustment is also larger for SOEs than NSOEs. With the development of the market environment, the degree of government intervention in lenders' decisions decreases, which increases the credit risk faced by SOEs. In a region with more developed markets, the gap in collateral requirements between SOEs and NSOEs is smaller than that in less developed regions. We thus test the following hypotheses empirically.

H4. The substitution effects between collateral and high-quality auditing are stronger in SOEs than NSOEs.

H5. When market-development index is higher, the enhancement effects of SOEs are weaker.

3. Research design

3.1. Measurement of main variables

3.1.1. Measurement of collateral
Collateral is the proportion of collateral loans, that is calculated as the ratio of total loans collateralized to total loans outstanding at the end of the year. We do not use a dummy variable for collateral. The information on bank loans is obtained from financial statements. In the main tests, we use the proportion of collateral loans to measure collateral; in the sensitivity tests, we use the proportion of collateral loans plus that of guarantor loans.[4]

3.1.2. Measurement of audit quality
Researchers have used a range of variables to measure audit quality, such as the size of the office (reputation) (DeAngelo, 1981). Clients of Big-4 audit firms have lower discretional accruals and higher earnings response coefficients than the clients of non-Big-4 firms (Becker and Defond, 1998; Francis, 1999; Teoh and Wong, 1993). Following Hu and Tang (2007) and Wu (2006) we use accounting-firm size as a dummy variable to measure audit quality. If the firm is in the Big-4 or Big-10, the dummy variable is 1; otherwise, it is 0. However, some researchers regard accounting-firm size as a poor proxy for audit quality, and it is

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[4] Bank loans can be divided into collateral loans, guarantor loans and credit loans, according to their level of restriction. The use of collateral involves two kinds of loans: pledged loans and mortgage loans. We use the proportion of collateral loans to measure the use of collateral. Some scholars use the proportion of collateral and guarantor loans to measure collateral (Chen and Xiao, 2012), and we have noticed that the information on bank loans disclosed in financial reports, sometimes are related to "collateral and guarantee loans." Therefore, we use the proportion of collateral loans to measure collateral in our main tests, and the proportion of collateral and guarantor loans in our sensitivity tests. Our predictions are generally well supported.

misleading to homogenize the audit quality of the Big-4, due to differences in the institutional environment (Liu and Zhou, 2007). We use discretional accruals to solve these problems. First, we divide the full sample into two groups according to audit quality and then compare the means of the two groups to determine whether the differences are significant.

3.2. Main test models

In H1$_a$ and H1$_b$, we predict that collateral and audit quality are negatively and positively related, respectively. We use the models developed by Rajan and Zingales (1995) and Chen et al. (2012) to test these hypotheses, as follows.[5]

Model 1:

$$\text{Collateral}_t = \alpha_0 + \alpha_1\text{Audit}_{t-1} + \alpha_2\text{Soe}_t + \alpha_3\text{Wedge}_t + \alpha_4\text{Lev}_t + \alpha_5\text{Size}_t + \alpha_6\text{Roa}_t + \alpha_7\text{Intcov}_t$$
$$+ \alpha_8\text{Growth}_t + \alpha_9\text{Current}_t + \alpha_{10}\text{Age}_t + \alpha_{11}\text{Guaran}_t + \alpha_{12}\text{Ltdebt}_t + \alpha_{13}\text{Goe}_t$$
$$+ \alpha_{14}\text{Intangible}_t + \alpha_{15}\text{Cfovol}_t + \alpha_{16}\text{Debtcov}_t + \alpha_{17}\text{Salescash}_t + \alpha_{i,j}\text{Year}_{i,j} + \alpha_{i,j}\text{Ind}_{i,j} + \varepsilon_{i,j}$$

We expect the sign of α_1 to be significantly negative or positive. In Model 1, we use Soe as a control variable because we expect SOEs to be less likely than NSOEs to provide collateral for their debt. We thus expect the sign of Soe to be negative. We also include leverage and the percentage of long-term debt in Model 1, because we expect these variables to be positively related to collateral. To address firm performance, operational risk and solvency, we add the following variables in Model 1: return on assets, natural logarithm of total assets, interest-coverage ratio, growth of assets and current ratio. We also use the number of years since the firm's establishment to control for the bank-firm relationship, because the results of previous literature indicate that the bank-firm relationship can solve the information-asymmetry problem and decrease the use of collateral. However, others believe that banks' information superiority enables them to ask for high interest, thereby exacerbating the agency problem. Therefore the relationship between collateral and age is expected to be either negative or positive. We predict that the sign of the market-development index, a proxy for market development, will be positive, because the higher the level of competition, the more likely the use of collateral. We use the percentage of intangible assets, the volatility of net operating cash flow, the debt coverage and the sales cash flow ratio to control for the ability to provide collateral and the operating cash flow. Finally, we use year and industry dummy variables to control for year and industry factors.

Model 2:

$$\text{Collateral}_t = \alpha_0 + \alpha_1\text{Audit}_{t-1} + \alpha_2\text{Wedge}_t + \alpha_3\text{Audit}_{t-1} * \text{Wedge}_t + \alpha_4\text{Soe}_t + \alpha_5\text{Lev}_t + \alpha_6\text{Size}_t + \alpha_7\text{Roa}_t$$
$$+ \alpha_8\text{Intcov}_t + \alpha_9\text{Growth}_t + \alpha_{10}\text{Current}_t + \alpha_{11}\text{Age}_t + \alpha_{12}\text{Guaran}_t + \alpha_{13}\text{Ltdebt}_t + \alpha_{14}\text{Goe}_t$$
$$+ \alpha_{15}\text{Intangible}_t + \alpha_{16}\text{Cfovol}_t + \alpha_{17}\text{Debtcov} + \alpha_{18}\text{Salescash}_t + \alpha_{i,j}\text{Year}_{i,j} + \alpha_{i,j}\text{Ind}_{i,j} + \varepsilon_{i,j}$$

We use Model 2 to examine H2 and H3. We predict that if the large shareholder has a high level of control, α_3 will be significantly positive; if the large shareholder has a low level of control, we expect α_3 to be significantly negative.

Model 3:

$$\text{Collateral}_t = \alpha_0 + \alpha_1\text{Audit}_{t-1} + \alpha_2\text{Soe}_t + \alpha_3\text{Wedge}_t + \alpha_4\text{Audit}_{t-1} * \text{Soe}_t + \alpha_5\text{Audit}_{t-1} * \text{Soe}_t * \text{Goe}_t$$
$$+ \alpha_6\text{Lev}_t + \alpha_7\text{Size}_t + \alpha_8\text{Roa}_t + \alpha_9\text{Intcov} + \alpha_{10}\text{Growth}_t + \alpha_{11}\text{Current}_t + \alpha_{12}\text{Age}_t$$
$$+ \alpha_{13}\text{Guaran}_t + \alpha_{14}\text{Ltdebt}_t + \alpha_{15}\text{Goe}_t + \alpha_{16}\text{Intangible}_t + \alpha_{17}\text{Cfovol}_t + \alpha_{18}\text{Debtcov}$$
$$+ \alpha_{19}\text{Salescash}_t + \alpha_{i,j}\text{Year}_{i,j} + \alpha_{i,j}\text{Ind}_{i,j} + \varepsilon_{i,j}$$

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[5] In accordance with the reviewers' suggestions, we use the debt-coverage ratio to proxy for cash flow, because lenders pay considerable attention to cash flow. We also use the percentage of intangible assets to control for the borrowers' ability to provide collateral. In addition, we adjust the framework of our main results in the following ways. First, we test the significance of H1. Second, we use a measure of auditor change, Heckman two-stage model and the PSM technique as robustness tests and to address endogeneity issues. Finally, we use Model 2 and Model 3 to test H2, H3, H4 and H5.

We use Model 3 to examine H4 and H5, in which we predict that α_4 will be significantly negative and α_5 significantly positive, respectively.

3.3. Sample selection and data

We use a sample of listed A-share Chinese firms from 2005 to 2011. Our sample selection process is as follows. First, we omit the ST, *ST and PT firms, as they are fail to provide the necessary information to examine the relationship between collateral and high audit quality. Next, we omit firms from the finance industry, because these do not fit our aims of examining bank loans. We then omit firms with listings later than 2006 and firms with fewer than three firm-year observations. In addition, we omit firms whose ultimate controlling shareholder cannot be identified. Finally, we eliminate observations that provide insufficient data to calculate audit quality or Z-scores, firms with zero bank loans, and firms for which we are unable to identify major loan sources or the number of collateral loans at the end of the year. After eliminating these observations, we have 4877 observations from 828 firms, of which SOEs comprise 3148 observations and NSOEs provide 1729.[6] We winsorize several of the control variables at the 1% level. Our data on collateral and guarantor loans, audit quality, ultimate controlling shareholders and other financial details are obtained from the Chinese Stock Market and Accounting Research (CSMAR) database (see Table 1).

4. Empirical results

4.1. Descriptive statistics for main variables

Table 2 provides the descriptive statistics for the main variables.

Table 2 reveals that the mean of proportion of collateral in the full sample is 0.420, which differs from Chen et al.'s (2012) results of 0.262 for a sample of firms from 2001 to 2006.The mean of proportion of collateral and guarantor loans together is 0.74, which is consistent with Chen and Xiao's (2012) findings. This result indicates that collateral and/or guarantor loans are widespread in debt contracts. Firms with a high audit quality comprise 30% of our sample; that is, appropriately one third of the firms sampled have chosen international Big-4 or domestic Big-10 auditors. SOEs comprise 64.5% of the sample. There are large differences between the maximum and minimum values for the other control variables, such as, interest coverage, market development, number of years since the firm was established and separation of control and ownership. This result indicates that these characteristics differ between firms, which are consistent with the literature.[7] Our descriptive statistics for the main variables are generally consistent with those presented by Chen et al. (2012).

Table 3 lists the descriptive statistics for firms divided according to audit quality.

Table 3 displays the differences in means between the groups and the results of *t*-tests. The mean discretionary accruals differ significantly between the groups, which suggest that our choice of criteria to build the high audit quality variable is appropriate for our sample. The proportion of collateral is significantly higher in the low audit quality group than in the high-quality group. This is preliminary proof of Hypothesis 1, in which we predict that collateral and audit quality are regarded as alternatives. We also find that with the exception of the current ratio, proportion of guarantor loans, leverage and separation of control and ownership, the mean of the variables are significantly higher in the high audit quality group, than in the low-quality group.

Table 4 lists descriptive statistics for the dummy variables for separation of control and owner-ship, large shareholders' control rights and market development.

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[6] The sample used in the draft paper comprised 4919 observations. Following the reviewers' recommendations, we have added several variables to our model, and thus have lost 42 observations (due to missing data) to give 4877 observations, of which 3148 pertain to SOEs and 1729 to Non-SOEs.

[7] These results are not winsorized, because we use dummy variables for market development and separation of ownership and control in the main tests. The reviewers also note the problems with the interest-coverage ratio and the measure of separation of ownership and control. In the descriptive statistics, we state that a continuous variable is used to represent the degree of separation of ownership and control, with a mean of 6.783. The mean degree of separation of ownership and control is thus 6.783%. The data are collected directly from the CSMAR database and our method is as described by La Porta (1997). The interest-coverage ratio is calculated as= EBIT/interest expenses.

Table 1
Definitions of variables.

Variables	Definitions
Collateral	Collater1: proportion of collateral loans in total outstanding loans at the end of the year
	Collater2: proportion of collateral and guarantor loans at the end of the year
Audit	Auditor dummy variable, equal to 1 if the auditor was an international Big-4 or domestic Big-10 firm in the previous year, and otherwise 0
	Discretional accruals in the previous year, calculated from the modified Jones model
Change	Change1: auditor-change dummy variable, equal to 1 if the client has switched from a non-international Big-4 or non-domestic Big-10 audit firm to an international Big-4 or domestic Big-10, and otherwise 0
	Change2: auditor-change dummy variable, equal to 1 if auditor has switched from an international Big-4 or domestic Big-10 audit firm to another auditor, and otherwise 0
Wedge	Dummy variable for separation of control and ownership. Mean, median and the 2/3 measure are used as criteria to classify the variable. In the main tests, we use the 2/3 measure as the criterion; in the sensitivity tests, we use mean and median as the criteria
Wedge1	Continuous variable of separation of control and ownership
Control	Dummy variable for large shareholders' level of control, with 25% and 30% as criteria. In the main tests, we use the 30% measure to distinguish between high and low control rights levels; in the sensitivity tests, we use 25% as the criterion
Current	Current ratio, calculated as current assets divided by current liabilities
Lev	Leverage, calculated as total assets divided by total liabilities
Intcov	Interest-coverage ratio, calculated as income before interest and tax expenses divided by interest expenses
Roa	Return on assets at the end of the year
Ltdebt	Percentage of long-term debt, calculated as the ratio of long-term debt to total loans outstanding at the end of the year
Guaran	Proportion of guarantor loans, calculated as the ratio of guarantor loans to total loans outstanding at the end of the year
Size	Natural logarithm of total assets at the end of the year
Soe	Nature of the controller, which equals 1 if the firm is an SOE, and otherwise 0
Age	Number of years since the firm was established.
Geo	Dummy variable for market development; mean, median and a 2/3 measure are used as criteria. In the main tests, we use the median as our criterion; in the sensitivity tests, we use the median and the 2/3 measure as criteria
Geo1	Continuous variable of market development.
Growth	Growth in total assets, calculated as the difference between ending total assets and beginning total assets, divided by beginning total assets
Intangible	Proportion of the intangible assets at the end of the year
Cfovol	Standard deviation of the net operating cash flow in the previous three years, a proxy for volatility of operating cash flow
Debtcov	Debt-coverage ratio, calculated as the total amount borrowed divided by the net operating cash flow, a proxy for operating cash flow
Salescash	Sales cash flow ratio, calculated as operating income divided by net operating cash flow, a proxy for operating cash flow

Table 2
Descriptive statistics.

Variables	Mean	Min.	Median	P75	Max.
Collateral	0.420	0	0.344	0.761	1
Auditor	0.297	0	0	1	1
Soe	0.645	0	1	1	1
Wedge1	6.801	0	0.514	13.59	44.48
Guaran	0.319	0	0.221	0.580	1
Ltdebt	0.321	0	0.249	0.550	1
Ltdebt	8.462	0.380	8.420	10.42	11.80
Geo1	0.129	−0.353	0.0898	0.219	1.086
Lev	0.560	0.189	0.559	0.668	1.399
Roa	0.0332	−0.181	0.0294	0.0574	0.211
Size	21.74	19.13	21.65	22.41	24.81
Current	1.204	0.191	1.099	1.470	3.727
Age	12.83	5	13	16	23
Intcov	8.524	−11.92	3.534	7.935	131.6
Cfovol	0.0410	0.00224	0.0304	0.0527	0.328
Intangible	0.0490	0	0.0306	0.0614	0.354
Debtcov	0.104	−0.499	0.0861	0.177	1.414
Salescash	0.0803	−1.596	0.0731	0.160	0.962

Table 3
Descriptive statistics by audit quality.

Variables	Auditor = 0		Auditor = 1		Diff. in mean	*t*-Test
	Mean	Median	Mean	Median		
DA	0.106	0.078	0.096	0.077	0.010	3.020[***]
Collateral	0.459	0.403	0.329	0.228	0.130	11.59[***]
Soe	0.621	1	0.704	1	−0.083	−5.586[***]
Wedge1	6.727	0.590	6.978	0.411	−0.251	−0.913
Geo	8.348	8.140	8.732	8.770	−0.384	−5.981[***]
Guaran	0.316	0.213	0.325	0.237	−0.009	−0.877
Ltdebt	0.303	0.226	0.364	0.319	−0.061	−6.463[***]
Growth	0.118	0.078	0.155	0.117	−0.037	−5.059[***]
Lev	0.559	0.555	0.563	0.566	−0.006	−0.766
Roa	0.031	0.027	0.040	0.035	−0.009	−5.322[***]
Size	21.57	21.52	22.17	22.03	−0.600	−17.76[***]
Current	1.202	1.093	1.209	1.115	−0.007	−0.367
Age	12.48	12	13.66	13	−1.180	−9.724[***]
Intcov	8.045	3.333	9.658	4.073	−1.613	−2.802[***]
Cfovol	0.043	0.031	0.038	0.029	0.005	4.179[***]
Intangible	0.049	0.030	0.048	0.032	0.001	0.780
Debtcov	0.108	0.090	0.094	0.076	0.014	2.447[**]
Salescash	0.084	0.077	0.071	0.062	0.013	1.752

We use various criteria to build our dummy variables. With regard to the degree of separation of control and ownership, the mean and 2/3 values do not differ significantly between the groups. Neither the mean nor the 2/3 values are significantly different for market development. When 25% is chosen as a criterion, high-control firms represent 73.7% of the sample, whereas the 30% criterion yields 60.2% of high-control firms. Therefore, we use 30% as the criterion in the main tests, and 25% in the sensitivity tests.

4.2. Correlation coefficients of main variables

Table 5 lists the correlation coefficients of the main variables.

The results displayed in Table 5 show that the correlation between collateral and audit quality is negative (−0.1638), which is consistent with our prediction. SOEs are less likely than NSOEs to pledge collateral (−0.2491), which makes them better able to obtain credit loans. Moreover, SOEs have longer debt maturity, which is reflected in the high proportion of long-term debt (0.0593). Our results support the conclusion that long-term debt is more difficult to monitor than short-term debt. We find the level of market development to be negatively related to collateral (−0.0995), which indicates that when lenders are better protected, borrowers are less likely to pledge collateral. Debt maturity is significantly longer in the high audit quality group than in the low-quality group (0.0922), which proves that external auditing may affect borrowers' debt maturity. Despite the high correlation between collateral and guarantor loans (0.5628), the other data are reasonable; there is no evidence of multicollinearity.

4.3. Main results

After controlling for year and industry factors, we use Model 1, 2 and 3 to examine H1, H2, H3, H4 and H5. First, we use Model 1 to test H1; next, we use auditor switching, the Heckman two-stage model and propensity-score matching (PSM) as robustness tests; finally, we use Model 2 and 3 to test H2 to H5.

4.3.1. H1 and endogeneity issues

Tables 6 and 7 list the results of testing H1 and the sensitivity tests. The first column displays the results for Model 1. We find the relationship between collateral and audit quality to be significantly negative at the 1% level (−0.0649, *t*-stat. = −8.18). Thus, H1$_b$ is supported, because collateral and high-quality auditing are

Table 4
Descriptive statistics for the dummy variables for separation of control and ownership, large shareholders' control rights and market development.

Variables	Grouping criteria	Mean	Median	Min.	Max.	Std.
Wedge[a]	Mean	0.381	0	0	1	0.486
	Median	0.500	1	0	1	0.500
	2/3	0.334	0	0	1	0.472
	Whether Exists	0.515	1	0	1	0.500
Control	25%	0.737	1	0	1	0.440
	30%	0.602	1	0	1	0.490
Geo	Mean	0.498	0	0	1	0.500
	Median	0.489	0	0	1	0.500
	2/3	0.332	0	0	1	0.471

[a] The reviewers recommended that we proxy for the degree of separation of ownership and control using a dummy variable indicating the existence of separation between ownership and control. We provide the descriptive statistics for this dummy variable in Table 4.

Table 5
Correlation coefficients of main variables.

	Collateral	Auditor	Soe	Geo1	Wedg1	Guaran	Ltdebt
Collateral	1						
Auditor	−0.1638[*]	1					
	(0.000)						
Soe	−0.2491[*]	0.0798[*]	1				
	(0.000)	(0.000)					
Geo1	−0.0995[*]	0.0854[*]	−0.0814[*]	1			
	(0.000)	(0.000)	(0.000)				
Wedge1	0.0134	0.0131	−0.3343[*]	0.00850	1		
	(0.351)	(0.361)	(0.000)	(0.553)			
Guaran	−0.5628[*]	0.0126	0.0111	0.0538[*]	0.0738[*]	1	
	(0.000)	(0.381)	(0.438)	(0.000)	(0.000)		
Ltdebt	0.0593[*]	0.0922[*]	0.0769[*]	−0.1070[*]	−0.00950	−0.0955[*]	1
	(0.000)	(0.000)	(0.000)	(0.000)	(0.506)	(0.000)	

regarded as substitutes by lenders. Apart from interest coverage and growth of assets, the control variables are all significant at the 1% level. In addition, we find that the number of years since establishment and the current ratio are positively related to collateral, which is not the expected result. SOEs are likely to pledge less collateral than NSOEs. High leverage, low return on assets, small size, a low level of market development and a high proportion of long-term debt all increase the likelihood of a firm using collateral. Interestingly, the degree of separation of control and ownership is not significant even at the 10% level, but this outcome is consistent with our prediction. Prior researchers note that the incentives to separate control and ownership are mixed. Such a separation may improve alignment and reduce risk by increasing the efficiency of monitoring (Pan and Yu, 2012), or cause agency and entrenchment effects through tunneling activities; the relationship between these two sets of effects cannot be simply negative or positive.

The self-selection problem is a type of endogeneity problem regularly encountered in studies of auditors, especially when the size of an audit firm is used to measure audit quality, as in our study. Borrowers are likely to have certain preferences when choosing auditors, which may result in biased samples, in turn affecting the accuracy and validity of the results. An auditor-switching sensitivity test of auditor change can partly solve the self-selection problem. Following previous literature, we also use the two-stage Heckman (1979) model to provide a fuller solution to the problem. The second column of Table 6 provides the results of the Heckman two-stage method. When the inverse Mills ratio is added to the equation, collateral and audit quality are again found to be significantly negatively related. In the first stage, we use a probit regression to test not only the control variables in Model 1, but other variables such as the ratio of receivables and inventory to total assets, and a dummy variable for audit opinion in the previous year. However, we report only the results of the sec-

Table 6
Results for H1.

	(1) H1	(2) Heckman		(3) Change
Auditor	−0.0694***	−0.0788***	Change1	−0.0219*
	(−8.18)	(−9.16)		(−1.86)
Soe	−0.119***	−0.129***	Change2	0.102***
	(−12.84)	(−11.79)		(3.14)
Wedge	0.00253	0.00605	Guaran	−0.692***
	(0.30)	(0.70)		(−60.41)
Lev	0.117***	0.149***	Ltdebt	0.112***
	(4.35)	(5.00)		(8.11)
Roa	−0.494***	−0.413***	Intangible	0.0969
	(−5.75)	(−3.71)		(1.62)
Size	−0.0755***	−0.0498***	Cfovol	−0.0327***
	(−18.33)	(−2.84)		(−3.00)
Growth	0.00485	−0.00806	Debtcov	−0.00599
	(0.26)	(−0.38)		(−0.49)
Current	0.0190**	0.0374***	Salescash	2.44e−05
	(2.39)	(4.64)		(0.24)
Age	0.00389***	0.00663***	Growth	0.00514
	(3.85)	(6.69)		(1.15)
Intcov	−0.000107	6.56e−05	Lev	0.00481**
	(−0.46)	(0.27)		(2.50)
Geo	−0.0517***	−0.0322***	Intcov	7.61e−06
	(−6.75)	(−3.23)		(0.17)
Guaran	−0.609***	−0.612***	Roa	0.0544**
	(−52.46)	(−51.82)		(2.37)
Ltdebt	0.101***	0.124***	Size	−0.0286***
	(6.98)	(8.80)		(−3.03)
Cfovol	−0.167	−0.0809	Current	−0.00153
	(−1.58)	(−0.70)		(−0.34)
Intangible	0.321***	0.352***		
	(5.10)	(4.98)		
Debtcov	−0.148***	−0.194***		
	(−4.96)	(−5.19)		
Salescash	0.0504**	0.0190		
	(2.36)	(0.89)		
Lamda		0.121		
		(1.49)		
Constant	2.172***	1.440***	Constant	−0.0157***
	(23.97)	(2.99)		(−5.12)
Industry	Control	Control		
Year	Control	Control		
Observations	4877	4853		4049
R-squared	0.501	0.478		0.487

Note: t-statistics are given in brackets.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

ond stage, which support our prediction that collateral is negatively related to audit quality (−0.0788, $t = −9.16$).

As documented in the main tests, substitution effects are found to exist between collateral and high-quality auditing. We use an auditor-switching test to further examine the relationship between collateral and high-quality auditing. The auditor's size (reputation) is used to build the auditor dummy. We predict that the proportion of collateral will increase if the borrower switches from an international Big-4 or domestic Big-10 to another auditor, and the proportion of collateral will decrease if the borrower switches from a non-international Big-4 and non-domestic Big-10 to an international big-4 or domestic big-10. We do not examine the

Table 7
Propensity-score matching.

Treatment method	Nearest-neighbor method		Radius-matching method		Divided-matching method		Kernel-matching method	
	Treat auditor = 1	Control auditor = 0	Treat auditor = 1	Control auditor = 0	Treat auditor = 1	Control auditor = 0	Treat auditor = 1	Control auditor = 0
ATT	−0.071		−0.113		−0.074		−0.080	
t-Statistic	−4.308***		−9.898***		−6.732***		−9.112***	
Frequency	200		200		50		200	

Notes: (1) ATT represents the difference in the use of collateral between the two groups, namely average treatment effects; (2) The treatment group and control group are the high audit quality group and the low audit quality group, respectively; (3) we report the ATT and *t*-statistics after matching.
* $p < 0.1$.
** $p < 0.05$.
*** $p < 0.01$.

difference between high-quality auditors and low-quality auditors, because according to our criteria, this kind of switch does not affect lenders' decisions. Our predictions are fully confirmed by the results of the regressions. There are 251 cases of auditor-switching in our sample, of which 28 firms switch from high-quality auditors to low quality auditors and 223 firms switch from low quality auditors to high-quality auditors.[8] The results shown in the third column support our predictions. The values of Change1 ($−0.0219$, $t = −1.86$) and Change2 (0.102, $t = 3.14$) indicate that when the firm moves from a low-quality auditor to a high-quality auditor, the use of collateral decreases; when the high-quality auditor is replaced by a low-quality auditor, the use of collateral increases.

The results of the propensity-score matching are listed in Table 7. There are two main stages. During the first stage, the observations are graded according to the control variables and their scores are then matched. During the second stage, we calculate the differences between the control group and the treatment group, namely the low audit quality group and the high audit quality group. We use four methods to calculate these differences. The results of the second stage are listed in Table 7, and support our prediction that high audit quality can reduce the use of collateral.

4.3.2. Results for H2 to H5

The first three columns of Table 8 provide the results of testing hypotheses 2 and 3. We first determine whether the large shareholder has a high or low level of control rights, then we divide the sample accordingly into two groups. We predict that in the high-control group, the high level of separation of control and ownership rights will weaken the substitution effects between collateral and high-quality auditing, as it will increase the opportunity for large shareholders to expropriate from minority shareholders, resulting in a higher credit risk. In the low-control group, however, a high level of separation of control and ownership may strengthen the substitution effects between collateral and high-quality auditing by helping large shareholders to monitor managers and reducing investment risk through diversification. This will reduce credit risk and increase the efficiency of investment. The results displayed in the second column of Table 8 show that in the high-control group, collateral and high-quality auditing are always significantly negatively related at the 1% level ($−0.103$, *t*-stat $= −6.97$), and that the auditor * wedge interaction is significantly positive at the 5% level (0.0439, *t*-stat $= 2.12$). This confirms Hypothesis 2, in which we predict that the substitution effects are weaker in the high-control group when the degree of separation of control and ownership is high. However, there is no evidence to support Hypothesis 3, which relates to the low-control group, as Auditor * wedge is not significantly negative ($−0.0251$, *t*-stat $= −0.94$). This result may be attributed to the non-significant differences between entrenchment effects and alignment effects in the low-control group. Moreover, we find Wedge to be significantly positive at the 5% level (0.0327, *t*-stat $= 2.06$).

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[8] Model 4 is designed to calculate the changes between the current year and the previous year. We do not use the data for 2004 as a benchmark; instead, we generate the lagged variables directly from the sample from 2005 to 2011. Consequently, our sample is reduced by 828 observations, from 4877 to 4049 observations.

The fourth column displays the results of Model 3, which was designed to test Hypotheses 4 and 5. We expect the substitution effects between collateral and high-quality auditing to be stronger when the borrower is an SOE rather than an NSOE, because SOEs have a lower credit risk, for several reasons. However, we also expect the enhancement effects of SOE to be weaker when the level of market development is high, because a more developed market is likely to reduce the government's intervention in bank loans. This will increase the credit risk faced by SOEs; thereby reducing the difference in credit risk between SOEs and NSOEs. The results of the regression fully confirm our prediction. As Auditor * Soe is significantly negative at the 1% level (-0.0951, t-stat $= -4.72$), the substitution effects are stronger in SOEs than in NSOEs, so Hypothesis 4 is supported. In addition, Auditor * Soe * Geo is significantly positive at the 5% level (0.0412, t-stat $= 2.24$) which confirms our prediction in Hypothesis 5 that the enhancement effects of SOEs are reduced when the level of market development is high.

5. Sensitivity tests

5.1. Using Z-score model to evaluate credit risk

Hypotheses 2, 3, 4 and 5 are developed based on the grounds that SOEs are likely to have a lower credit risk and that borrowers face a higher credit risk when large stockholders have substantial control rights and a high degree of separation of control and ownership; and the latter predictions does not apply to the low control rights group. In this section, we use Altman's (1968) Z-score model to validate our reasoning by examining the differences in Z-scores between the two groups, as a lower Z-score indicates a higher credit risk.

The Z-score model is as follows.

$$\text{Z-score} = 1.2(\text{current assets/total assets}) + 1.4(\text{equity-capital stock})/\text{total assets}$$
$$+ 3.3(\text{EBIT/total assets}) + 0.6(\text{stock-market capitalization/total liability})$$
$$+ 0.99(\text{sales revenue/total assets})$$

Z-score is used as the dependent variable, with the nature of the ultimate controller, the degree of separation of control and ownership, and several control variables on the right-hand side of the equation. The control variables comprise firm size, firm leverage, current ratio, return on assets, interest coverage, the number of years since the firm was established, a dummy variable for loss, and variables controlling for year and industry factors. We find that SOEs have higher Z-scores than NSOEs. The Z-score for the high control rights group is not significantly lower when the separation of control and ownership is greater, but the Z-score for the low control rights group is significantly higher when the separation of control and ownership is greater. The results are generally consistent with our predictions, but are not reported in this paper.

5.2. Alternative measures of collateral, large-shareholder control rights, degree of separation of control and ownership, and the level of market development

In our main tests, we use the proportion of collateral as the explained variable and a 30% measure, a 2/3 measure and the median as criteria to build variables for large-shareholder control rights, separation of control and ownership and market development. In this section, however, the proportion of collateral and guarantor loans is the explained variable. We use a 25% measure as the criterion to build a dummy variable for large-shareholder control rights; then the mean and median are used as criteria to build a dummy variable for separation of control and ownership, and the mean and 2/3 measure as the criteria for a market-development dummy variable. We use these alternative measures to regress Models 1, 2, and 3 and, reexamine all the five hypotheses. Our predictions are generally supported but the results are not reported in this paper.

5.3. Measurement of audit quality

In the main tests, we use the international Big-4 and the domestic Big-10 measures as a combined proxy for audit quality. We also use discretional accruals, calculated using the modified Jones model to verify the proxy.

Table 8
Results for H2 to H5.

	(1) H2,3 Full sample	(3) H2 High control	(6) H3 Low control	(4) H4,5 Full sample
Auditor	−0.0922***	−0.103***	−0.0365*	−0.0271*
	(−7.70)	(−6.97)	(−1.85)	(−1.84)
Soe	−0.129***	−0.148***	−0.0819***	−0.103***
	(−13.52)	(−11.16)	(−5.78)	(−9.62)
Wedge	0.0153	0.0147	0.0327**	0.0281***
	(1.49)	(1.11)	(2.06)	(3.20)
Auditor * Soe				−0.0951***
				(−4.72)
Auditor * Soe * Geo				0.0412**
				(2.24)
Auditor * Wedge	0.0258	0.0439**	−0.0251	
	(1.56)	(2.12)	(−0.94)	
Lev	0.172***	0.168***	0.133***	0.165***
	(6.40)	(4.13)	(3.69)	(6.11)
Roa	−0.514***	−0.695***	−0.256**	−0.535***
	(−5.91)	(−5.69)	(−2.11)	(−6.16)
Size	−0.0764***	−0.0779***	−0.0595***	−0.0758***
	(−18.40)	(−14.71)	(−8.65)	(−18.27)
Growth	0.00454	0.0123	−0.0194	0.00390
	(0.24)	(0.51)	(−0.66)	(0.21)
Current	0.0360***	0.0301***	0.0269**	0.0321***
	(4.61)	(2.84)	(2.39)	(4.07)
Age	0.00638***	0.00266*	0.00392***	0.00677***
	(6.52)	(1.92)	(2.64)	(6.92)
Intcov	0.000175	0.000140	−0.000516	0.000168
	(0.74)	(0.47)	(−1.35)	(0.72)
Geo	−0.0402***	−0.0628***	−0.0241**	−0.0503***
	(−5.22)	(−6.25)	(−2.05)	(−5.85)
Guaran	−0.617***	−0.544***	−0.725***	−0.621***
	(−52.76)	(−37.09)	(−38.72)	(−53.13)
Ltdebt	0.122***	0.114***	0.0796***	0.131***
	(8.73)	(6.34)	(3.60)	(9.13)
Cfovol	−0.00373	0.0421	−0.0820	−0.00605
	(−0.04)	(0.30)	(−0.52)	(−0.06)
Intangible	0.303***	0.397***	0.237**	0.265***
	(4.80)	(4.86)	(2.48)	(4.20)
Debtcov	−0.168***	−0.169***	−0.112**	−0.167***
	(−5.58)	(−4.34)	(−2.44)	(−5.54)
Salescash	0.0272	0.0635**	0.0235	0.0313
	(1.27)	(2.25)	(0.73)	(1.46)
Constant	2.151***	2.211***	1.870***	2.125***
	(23.78)	(19.29)	(12.46)	(23.42)
Industry	Control	Control	Control	Control
Year	Control	Control	Control	Control
Observations	4877	2935	1942	4877
R-squared	0.484	0.469	0.514	0.489

Although the international Big-4 firms occupy less than 5% of our sample, we use only international Big-4 firms as a proxy for audit quality to test all of the hypotheses. Our predictions are generally supported.

6. Conclusion

In this study, we attempt to ascertain from the perspective of lenders whether external auditing contributes to borrowers' bank loans by reducing collateral requirements, as suggested in the literature. We also aim to

determine whether the relationship between collateral and high-quality auditing is affected by the nature of the ultimate controller and the borrowers' ownership structure. Our results show that lenders regard collateral and high-quality auditing as alternative means of preventing credit risk. In China's institutional context, single shareholders are dominant, shareholders are highly concentrated and lenders are ineffectively protected. In this setting, the substitution effects between collateral and high-quality auditing are greater in SOEs than NSOEs, as SOEs have lower credit risk. We also notice that when the market development level is higher, the supportive effects of government's intervention in SOEs' bank loans are reduced, the credit risk faced by SOEs is stronger and the enhancement effects of substitution in SOEs are weaker. In addition, when the large shareholder has considerable control rights, the substitution effects between collateral and high-quality auditing are weakened if the borrower has a high level of separation of control and ownership. When the large shareholder can control the borrower and there is a high level of separation of control and ownership the entrenchment and agency effects are stronger than the alignment effects, so the borrower faces a higher credit risk. In contrast, a greater separation of control and ownership does not result in stronger alignment effects than entrenchment and agency effects in the group with fewer control rights. Our evidence shows that high-quality auditing and collateral are regarded as alternatives when lenders make self-protection decisions, but that degree of their substitutability is adjusted by lenders according to the borrower's level of credit risk. To further examine our predictions, we use alternative measures, an auditor-switching test and Altman's Z-score model as sensitivity tests. We also use Heckman's two-stage regression model to address self-selection problems associated with auditor choice, and propensity score matching to deal with endogeneity. Our predictions are generally well supported by the results of the main tests and the sensitivity tests. Finally, the limitations of our study should be acknowledged. First, although the international Big-4 and domestic Big-10 measures of audit quality generally support our predictions, and we conduct sensitivity tests to examine these measures further, it possible that our results contain measurement errors. Second, we control for debt maturity, then examine the relationship between collateral and external auditing, which may lead to the problem of endogeneity caused by interest rates. However, previous literature shows that interest rates in China are tightly regulated by the government, preventing lenders from using interest rates to distinguish between the high- and low-risk borrowers. Due to this limited functionality (Chen et al., 2012; Podpiera, 2006; Koivu, 2009), we do not use interest rates as a control variable in our models, nor do we conduct further tests to examine this problem.

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