Ultimate Ownership, Crash Risk, and the Split-Share Structure Reform in China

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ABSTRACT

This paper investigates the relationship between ultimate ownership and crash risk before and after the split-share structure reform in China, during which the previously non-tradable shares become freely tradable. We find that government-controlled firms, especially the local government-controlled ones, have significantly higher crash risks than privately controlled firms. After the reform, the crash risks of all firms have been reduced significantly, with privately controlled firms experiencing a larger reduction than the government-controlled firms. Further evidence demonstrates that government-controlled firms with stronger political incentives tend to have higher crash risks, and this positive association is more pronounced in local government-controlled firms. Various robustness and endogeneity tests confirm our main conclusions.

Keywords: Crash Risk, Government Control, Split-Share Structure Reform, Political Connections

JEL Classification Number: F23, F30, G15, G32, O32

1. Introduction

Existing literature shows that the central agency problem is the conflict between controlling shareholders and minority investors (La Porta et al., 1997, 1998, 1999, 2000; Johnson et al., 2000, Glaeser et al., 2001; Chang, 2003; Djankov et al., 2008). To facilitate the extraction of private control benefits, controlling shareholders have incentives to withhold unfavorable or negative information from outside investors (Peltzman, 1976; Watts and Zimmerman, 1986; Bushman and Piotroski, 2006; Hong et al, 2012; Piotroski et al., 2014). The managers, representing the controlling shareholders, intend to hide bad news to serve their own purposes (e.g. compensation) in such ways as smoothing earnings, undertaking sub-optimal investment, conducting related party transactions, and so on. Once the stockpiled negative information crosses a tipping point, it will be released all at once, leading to stock price crashes.[1] This paper investigates stock price crash risks innovatively from the perspective of ownership structure in a Chinese setting, thus shedding new lights on their important determinants.

In China, group and complex pyramidal ownership structure has been widely adopted to partially privatize state-owned enterprises (SOE) since early 1990s. By year 2001, more than 1,000 companies that have gone public are carve-outs or spin-offs from a previous SOE, with the original SOE as the substantial block-holder (Fan, Wong, and Zhang, 2005). The corporate structure of the group that the listed firm belongs to often consist of multiple layers and many firms in each layer. On average, the largest shareholder in Chinese listed companies holds 44.8% of the total shares and more than two-thirds of these firms have a government or government-related entity as their dominant shareholder (Bai, Liu, Lu, Song, and Zhang, 2004). As can be seen from the above analysis, agency conflicts between controlling shareholders and minority investors could be severe in China, given its highly concentrated ownership structures. More specifically, controlling shareholders have incentives to maintain private benefits of control, i.e., diverting corporate wealth to themselves

[1] A large body of literature suggests that the interest conflict between inside managers and outside investors is an important driving force of stock price crash risks as firm managers have incentives to strategically withhold negative information due to concerns about compensation, career development, or simply reputation. See Jin and Myers (2006) for firm opaqueness, Hutton, Marcus, and Tehranian (2009) for earnings management, Kim, Li, and Zhang (2011a) for corporate tax avoidance, Kim, Li, and Zhang (2011b) for CFO option sensitivity, Hamm, Li, and Ng (2012) for the frequency of management earnings guidance, Kim and Zhang (2013) for the conservatism in financial reporting, and Kim, Yeung, and Zhou (2013) for internal control weaknesses.

rather than sharing it with the other investors. For example, to tunnel from their listed companies, controlling shareholders in China typically conduct outright theft, related party transactions (Jian and Wong, 2010), and inter-corporate loans (Jiang, Lee, and Yue, 2010). When listed companies are financially distressed, they may choose to prop up the earnings of a firm through favorable asset-related transfers so as to meet key performance targets stipulated by market regulators (Jian and Wong, 2010). Prevalent tunneling and propping by controlling shareholders among the Chinese listed companies resulted in rampant earnings management (Liu and Lu, 2007; Chen et al, 2008), which has been documented as one of the driving forces to stock price crash risk (Hutton, Marcus, and Tehranian, 2009; Jin and Myers, 2006). The literature also suggests that, to render financial statements less informative about underlying firm performance, firms with controlling state ownership tend to follow less transparent, less timely, and/or lower quality reporting and auditing practice (Bushman, Piotroski, and Smith, 2004; Bushman and Piotroski, 2006; Chaney et al., 2008; Guedhami et al, 2009; Wang, Wong and Xia, 2008; Lin and Liu, 2009).

As the largest transition economy in the world, China has seen a growing number of stock price crash events recently. For example, on June 1, an investigation by the China's Securities Regulatory Commission (CSRC) revealed that Xintai Electric (an electrical equipment manufacturer) provided fake financial data during its IPO application and falsified its financial accounts in regular reports. CSRC announced that the firm and its senior executives would be fined and the two personnel held responsible would be permanently banned from entering the stock market. Its share trade resumed on July 12 after a suspension in May and share price dropped from 14.55 yuan before the suspension to 2.5 yuan in mid-August, equivalent to an 83% drop in a month. Given the great importance of crash risk in portfolio management as well as in risk management contexts, recent theoretical and empirical research has focused on the underlying causes of firm-specific stock crashes.

This study investigates the relation between firm-level characteristics of ultimate controlling shareholders and stock price crashes in China. We categorize our sample firms into different groups according to their ultimate ownership. We first divide these firms into privately and government-controlled firms, with the former referring to firms that are ultimately owned by non-government entities, such as entrepreneurs, townships, villages, and foreign companies, and the latter being

further classified into central and local (e.g., province, city, and county) government-controlled firms. The central and local governments serve as the first and second layers of agents to represent the nation. The empirical results show that, government-controlled firms, particularly local government-controlled firms, exhibit higher levels of crash risk than privately controlled firms, suggesting that the longer chain of agency representation in local government-controlled firms and the severe separation of control and cash flow rights provide managers with more collusion incentives. This is consistent with the finding of Chen et al (2008) that the collusion between government and listed firms in earnings management exists mainly in firms controlled by local governments.

We further examine how the association between ultimate ownership and crash risk is affected by the split-share structure reform (the reform). Initiated by the Chinese government in 2005, the reform repealed the restrictions on the transferability of controlling shareholders' shares. By removing a significant market friction, the reform represented an exogenous shock to firm governance systems leading to better incentive alignment between controlling shareholders and minority shareholders (e.g., Lin, 2009; Huang et al., 2013; Chen et al., 2012; Liao et al., 2014). We find that, after the reform, the crash risks of all firms with different types of controlling shareholders significantly reduced. Particularly, privately controlled firms have experienced a more pronounced crash risk reduction effect, suggesting that these firms benefit more from the reform. Our evidence is consistent with the findings of Lin (2009) that related-party transactions decline in both frequency and amount after the reform, indicating that the reform substantially improved corporate governance and relieved the conflicts of interests between insiders and outsiders.

We also investigate how the political connections (as a proxy for political incentives, namely, high political connections mean high incentives for political promotion and so on) of the management team of a firm affect the relationship between government ownership and crash risks. Political incentives may motivate firm managers to withhold negative information temporarily, which subsequently leads to stock price crash risks (Piotroski et al., 2014). Lee and Wang (2016) further show that, due to different incentives to appoint politicians as directors on the board, politically connected directors exacerbate (or reduce) stock price crash risk in listed state-controlled firms (or in listed privately controlled firms). To gauge the strength of the political connections of a firm,

we construct a political connection index (PCs) according to the political background of the senior management of the same firm. We find that government-controlled firms with stronger political incentives tend to have higher crash risks than privately controlled firms, and this effect is more pronounced in local government-controlled firms. This finding suggests that the effect of government ownership on crash risks may be partially explained by the strong political promotion incentives of the managers of government-controlled firms.

Endogeneity arises when both ultimate shareholding and crash risk are determined by unobservable factors. The purpose of this study is to introduce an interesting association between ultimate shareholding and crash risk while not to suggest a strong causality from crash risk to ultimate shareholding. In doing so, we try to ensure that endogeneity is not a severe problem of our main conclusions. The following are the ways we attempt to address this issue. First, firm fixed effects are included to control for unobservable sources of firm heterogeneity. This within firm test confirms that the existence of the association between ultimate shareholding and crash risk is not likely due to the differences across firms. Second, we take lagged values of ultimate ownership to predict the occurrence of crash risk. It is harder to argue that the future crash risk causes current ultimate shareholding. Third, we employ an event study with matching samples to further clarify the causality direction between ultimate ownership and crash risk. The results of this difference in difference test in essence confirm the validity of the impact of ultimate ownership on crash risk, not the opposite. In addition, in multivariate regressions, we control for changes in firm characteristics such as firm size (D_SIZE), return on assets (D_ROA), market-to-book ratio (D_MB), leverage ratio (D_LEV), prior three-year moving sum of the absolute value of discretionary accruals (D_ABACC), detrended stock trading volume (D_DTURN), average abnormal weekly returns (D_FSRET), and standard deviation of abnormal stock returns (D_SIGMA). Year and industry fixed effects are also included. The results remain valid. Four, in the main regressions, we try to include as many control variables as possible according to the existing literature. This ensures that endogeneity issue is fully considered in model design. Moreover, year and industry fixed effects are included to control for other factors unobservable in time series and industries. Our main conclusions remain valid with all the efforts in the above analysis. Nevertheless, we still acknowledge that

endogeneity is a difficult issue in this kind of study, while it is not serious enough to challenge our main results.

Our study contributes to the literature in several ways. First, our work advances the finance and economics literature on the importance of the fundamental agency problem between controlling shareholders and minority investors (Djankov et al., 2008; Johnson et al., 2000). Specifically, we focus on different kinds of ultimate controlling shareholders in Chinese listed firms and find that government-controlled firms, specifically local government-controlled firms, are associated with a higher stock price crash risk. Moreover, the positive effect of government ownership on stock price crashes is more pronounced in local government-controlled firms with higher political connections, consistent with the view of collusion incentives of local government controllers (e.g., Wang et al. 2008; Jiang et al. 2010).

Second, this study contributes to the growing literature on stock price crash risk. Most existing studies have examined how various accounting characteristics and determinants that are related to market structures and institutional infrastructures can affect stock price crashes.[2] However, only a few studies have examined the possible effect of ownership structure on stock price crashes. For example, Callen and Fang (2013) find that institutional investor stability is negatively associated with future stock price crash risk. Andreou, Antoniou, Horton, and Louca (2013) reveal that crashes are positively related to institutional ownership and the stock ownership of directors. We trace the ultimate controlling shareholders and examine their possible effect on crash risks, and thus our study sheds additional lights on this issue.

Third, our work complements previous research on the split-share structure reform. One thread of this literature focuses on the different aspects of the reform process. For example, Firth et al. (2010) and Li et al. (2011) find that the negotiated compensation of tradable shares to shareholders

[2]The former includes firm opaqueness (Jin and Myers, 2006), earnings management (Hutton, Marcus, and Tehranian, 2009), corporate tax avoidance (Kim, Li, and Zhang, 2011a), CFO option sensitivity (Kim, Li, and Zhang, 2011b), the frequency of management earnings guidance (Hamm, Li, and Ng, 2012), conservatism in financial reporting (Kim and Zhang, 2013), and internal control weaknesses (Kim, Yeung, and Zhou, 2013), while the latter includes trading volume and past returns (Chen, Hong, and Stein, 2001), analyst behavior (Chan, Jiang, Xu, and Yi, 2012), stock illiquidity (An, Gao, Li, and Zhu, 2015), mandatory adoption of IFRS (DeFond, Hung, Li, and Li, 2012), enforcement of insider trading laws (Hu, Kim, and Zhang, 2013), and political events (Piotroski, Wong, and Zhang, 2014).

is affected by the corporate ownership structure and the gains from risk sharing, respectively. The other thread examines the real effect of the reform. After the reform, firms tend to have less party-related transactions (Lin, 2009), lower cash holdings, higher market valuations of cash holdings (Chen et al., 2012), increased corporate risk-taking (Huang et al., 2013), and improved output, profit, and employment (Liao, Liu, and Wang, 2014). We extend the positive elements of the reform by showing that such a reform helps to reduce the crash risk of firms, especially those privately controlled firms. This finding is consistent with the view that the reform has significantly decreased the market friction, which leads to a better interest alignment between controlling shareholders and minority shareholders.

The rest of this paper is organized as follows. Section 2 discusses the institutional background and hypothesis development. Section 3 presents the data and variable descriptions. Section 4 provides empirical results. Section 5 analyzes the economic consequences of crash risk, namely, the implied cost of equity capital (ICOC). Section 6 concludes the paper.

2. Background and Hypothesis Development

2.1 The Unique Institutional Background of China

China provides an excellent environment for investigating how the conflicts of interest between controlling shareholders and minority investors can possibly affect stock price crashes. First, the Chinese firms have a unique ownership structure: almost all Chinese listed firms have a dominant shareholder. More than two-thirds of these firms have a government or a government-related entity as their dominant shareholder. Unlike the down-to-up development of Western security markets, such as those in Amsterdam, London, and New York, the Chinese security market evolves from up to down, pushed by the top government. In the early 1990s, to facilitate the financing of state-owned enterprises (SOEs) and to improve their governance quality and operation effciency, the Chinese government allowed these firms to sell a minority portion of their ownership to private investors. As a result, a significant proportion of the current Chinese listed firms are carve-outs or spin-offs from a previous SOE, with the original SOE as the substantial block-holder. Allen

et al. (2005) find that 80% of their 1,100 sample Chinese firms are former SOEs that occupy a significant market share. Moreover, Bai et al. (2004) find that the largest owner of Chinese listed firms holds 44.8% of the total shares on average, and that Chinese listed firms with parents hold 78.9% of the total shares. The senior management is usually appointed by the parent firm and is treated as government offcials (Chen et al., 2008; Huang et al., 2013) who have control rights on firm operation even without having cash flow rights.

Second, the Chinese stock market was a completely segmented market before the split-share structure reform in 2005. During this period, common stocks were classified into two categories, namely, tradable shares that were issued to the general public and non-tradable shares that were owned by all levels of government, state agencies, and other legal entities. The former can be freely traded in the market, whereas the latter can only be transferred through private negotiations. At the end of 2004, non-tradable shares accounted for 64% of all outstanding stocks, among which 74% were held by government-related entities.[3] Under the split-share system, the market performance of firms is almost irrelevant for the interests of controlling shareholders, who thus have little incentives to monitor. Realizing these market deficiencies, the Chinese government initiated the split-share structure reform in 2005 to facilitate the conversion of non-tradable shares to tradable shares. The non-tradable shareholders are required by the government to compensate for the tradable shareholders, and the compensation ratio is negotiated between the non-tradable and the tradable shareholders. By the end of 2007, the reform was completed by 1,238 firms, accounting for 94.3% of the total firms and 97% of the total market capitalization.

Third, China provides weak legal protection to minority investors. Government owners can pursue private gains and social or political goals, such as the maintenance of urban employment, direct control of important industries, and politically motivated job placement (Shleifer, 1998; Liu and Lu, 2007), because they can control the board and can adopt a corporate structure that facilitates government intervention (Fan et al., 2007a, 2007b). Therefore, "powerful, centralized, closed governments constrain financial development to maintain power and capture wealth, and politically connected interest groups may thwart financial development to maintain their economic

[3]Please refer to "China Capital Market Development Report" p.50, China Security Regulatory Commission (CSRC), 2008, China Financial Publishing House.

advantage by suppressing competition" (Bushman et al., 2004, page 222). A weak legal environment also results in the low transparency of firm operation and low quality of accounting disclosure (Allen, Qian, and Qian, 2005; Wei, Xie, and Zhang, 2005).

2.2 Hypothesis Development

2.2.1 Ultimate Controlling Shareholders and Crash Risk

Ownership structure is a fundamental issue of corporate governance. A well-dispersed ownership structure is mainly observed in the United States and Japan, whereas one or more controlling owners are often observed in European and Asian companies.[4] Therefore, the central agency problem has shifted from relieving the conflicts of interest between managers and shareholders to protecting the minority shareholders from being expropriated by controlling shareholders (Djankov et al., 2008; Johnson et al., 2000). The diversion of firm resources to corporate controllers, which is called "private benefits of control," has been empirically investigated in different contexts.[5] Shleifer and Vishny (1997) suggest that expropriation takes several forms that include excessive executive compensation, transfer pricing, self-serving financial transactions (e.g., directed equity issuance or personal loans to insiders), and outright theft of corporate assets.

As discussed in previous section, the Chinese firms have a highly concentrated ownership structure, usually with one major owner holding a significant percentage of the shares, which gives the controlling shareholders substantial discretionary power to use the resources of the firm for their private gains at the expense of the other shareholders. This finding is often observed among firms that are ultimately controlled by the government or government-related entities. Politicians and governments may have incentives to pursue social or political goals, such as infrastructure development and the resolution of fiscal and unemployment challenges, inconsistent with the interests of shareholders (Lin et al., 1996). Moreover, the managers of government-controlled firms are typ-

[4]See La Porta, Lopez-de-Silanes, and Shleifer (1999), Claessens, Djankov, and Lang (2000), Claessens, Djankov, Fan, and Lang (2002), Faccio and Lang (2002), Faccio, Lang,and Young (2001), and Johnson, Boone, Breach,and Friedman (2000).

[5]For example, the US savings and loans crisis (Akerlof and Romer, 1993), the Mexican and Asian financial crises (La Porta, Lopez-de-Silanes, and Zamarripa, 2003; Johnson Boone, Breach, and Friedman, 2000), the legal disputes over tunneling (Johnson, La Porta, Lopez-de-Silanes, and Shleifer, 2000), and the corporate governance during the transition from socialism (Glaeser, Johnson, and Shleifer, 2001).

ically appointed by the government, and they do not personally own shares in these firms (Fan et al., 2007a; Jian and Wong, 2010). The executive compensation is low and not sensitive to firm performance (Firth et al., 2006; Kato and Long, 2006). All of these factors further the separation of management utility and the maximization of firm profit, thus making expropriation widespread in China.

In particular, firms in China are controlled by the government at different levels. Different government owners can behave differently in the capital market because of the various allocations of power and responsibilities. According to the law, the ultimate owners of government-controlled firms are the people. Central government acts as the first-agent layer that represents the people, and local governments act as agents of the central government. Thus, various local governments serve as the lower-agent layer that represents the people. Higher-level governments protect their reputation more rigorously than lower-level governments. So it is likely for lower level governments to expropriate minority shareholders more severely (Xia and Fang, 2005). Local governments also have strong incentives to collide with local firms in earnings management to circumvent the central government's regulation (Chen et al, 2008) as they compete with each other for mobile capital in order to develop local economies. By contrast, the conflicts of interests between controlling and minority shareholders are less severe in privately controlled firms, as the controlling shareholders have both control and cash flow rights, thus are more concerned about the long-term performance of firms.

Given the severe agency problem and the resulting expropriation in government-controlled firms, corporate insiders may have strong motives to manipulate financial statements to obscure information about actual firm performance (e.g., Shleifer and Vishny, 1994; La Porta et al., 1998). The literature on financial reporting and auditing suggests that the availability of firm-specific information to outside investors is negatively related to the extent of state ownership. In comparison with other firms, Chaney et al. (2008) find that politically connected firms report lower-quality earnings. In country-level regressions, Bushman, Piotroski and Smith (2004) document that higher government share ownership undermines financial transparency including the intensity and timeliness of financial disclosures, analyst following, and media penetration. Bushman and Piotroski (2006) doc-

ument that firms in countries with more state involvement in the economy have less conservative earnings. The cross-country analysis of Guedhami et al (2009) provides robust evidence that state owners are less apt to choose a Big 4 auditor which is supposed to provide better assurance services to their clients (Francis, 2004). Particularly, Wang, Wong and Xia (2008) examine the auditor choice decisions in Chinese listed firms and find that state owned firms have a stronger tendency than non-state owned firms to hire low-quality auditors to facilitate collusion. Lin and Liu (2009) focus on IPO firms in China and show that firms with larger controlling shareholders are less likely to hire a high-quality auditor. Liu and Lu (2007) and Chen et al. (2008) provide evidence on earnings management due to the agency conflicts between controlling government shareholders and minority investors in China's public firms.

Moreover, corporate insiders may develop strong incentives to manipulate firms' information environment directly. Previous studies suggest that politicians and governments tend to suppress negative news about their activities (e.g., Peltzman, 1976; Watts and Zimmerman, 1986). More recently, Bushman and Piotroski (2006) find that, relative to firms in countries with less state involvement, firms speed recognition of good news and slow recognition of bad news in reported earnings in countries characterized by high state involvement in the economy. Piotroski, Wong, and Zhang (2014) document that local politicians and their affiliated firms temporarily restrict the flow of negative information about the companies in response to political incentives.

In sum, the Chinese firm share prices are influenced by the government and politicians given their important role in influencing firm-specific information environments. Stock price crashes are observed when the negative information has been accumulated beyond a certain level (Jin and Myers, 2006; Hutton et al., 2009; Kim et al., 2011a, 2011b). It is therefore argued that if the firm is owned by government, at either central level or local level, its information environment will be more likely opaque, including accounting information, thus it is associated with higher likelihood of the occurrence of crash risk. Local government-controlled firms have a longer chain of agency and have more acute agency problems, which can lead to more frequent and severe crashes.
On the basis of these arguments, we hypothesize the following:

H1: Ceteris paribus, government-controlled firms, especially local government-controlled firms, have a higher crash risk than privately controlled firms.

2.2.2 The Reform and Crash Risk

Property rights research identifies three essential aspects of complete corporate share ownership.[6] Specifically, corporate shareholders are entitled to control or voting rights, cash flow rights, and the rights to transfer shares and the associated control and cash flow rights to another party. Share transferability ensures future profit allocation through the capital market (Alchian, 1969), enhances the alignment of interest between controlling and minority shareholders, and leads to better control over managerial shirking and incompetence by promoting market discipline among managers through takeovers and proposals of effective incentive contracts to managers (Karpo and Rice, 1989). Before the split share structure reform, the trade of controlling shares was strictly prohibited for all publicly listed firms. The lack of share transfer rights makes the interests of controlling shareholders incongruent with share performance in the capital market as they were unable to benefit from capital gains. As a result, these shareholders only realize gains and obtain cash from cash distributions, possibly including cash that is obtained from related-party transactions and tunneling. Liu et al. (2010) argue that tunneling is the best choice (other than cash dividend) for controlling shareholders to realize their investment profits when their ownership is not tradable. To remove the trading restrictions on the shares of controlling shareholders, the Chinese government initiated the reform in 2005, allowing the non-tradable shares that were owned by controlling shareholders to be freely traded in the stock market after a one-or two-year lock-up period.

The reform provides a quasi-natural experiment, enabling us to better identify the effect of ultimate controlling shareholders on firm-specific crash risk. After the reform, controlling shareholders can directly benefit from the appreciation of share prices, thus they are more concerned about the performance of firms and their interest became better aligned with the interest of minority shareholders. Existing studies document that the reform removed significant market friction and reduced agency conflicts as controlling shareholders gain more incentives to take value-maximizing actions

[6]See Eggertsson (1990) for a survey on the literature.

for the firm as a whole, including the reduction or elimination of their expropriating behaviors (Lin, 2009; Li et al., 2011; Chen et al., 2012; Huang et al., 2013). For example, Lin (2009) finds that related party transactions decreased significantly when the discrepancy between control rights and cash-flow rights has been eliminated after the reform. Chen et al (2012) examine the effect of the reform on corporate cash holdings and find that the average cash holdings of Chinese-listed firms reduced significantly after the reform and the reduction in cash holdings is greater for firms with weaker governance and firms facing more financial constraints prior to the reform. Huang et al (2013) report that corporate risk-taking has increased significantly since the reform for both state-owned enterprises and family firms, suggesting that removing the restrictions on share transfer rights has enhanced controlling shareholders' incentives to undertake risky projects. Given the better interest alignment between controlling shareholders and minority shareholders and improved firm management in various aspects, we expect that the reform could possibly lead to lower stock price crash risk in publicly listed firms in China.

The effect of the reform on incentive alignment may differ across firms with various types of controlling shareholders. After the reform, the controlling shareholders of privately controlled firms both have control and cash flow rights and are expected to focus on maximizing returns. Their interests become aligned with those of minority shareholders. By contrast, the controlling shareholders of government-controlled firms are government agencies with an objective function of substantial non-price considerations, such as meeting certain political and social welfare objectives (e.g., Shleifer, 1998). Due to the divergence of control rights and cash flow rights in government-controlled firms, their controlling shareholders still do not benefit directly from share price increases even with the ability to transfer shares and capture the benefits of share price appreciation. Consistent with this argument, Huang et al (2013) find that the increase in corporate risk-taking after the reform is more pronounced for family firms than for state-owned firms and the controlling shareholders of family firms are more likely to sell their shares after the reform, whereas the controlling shareholders of government-controlled firms largely retain their holdings. The controlling shareholders in these firms play a political role of government agent rather than an economic agent of the firm's large shareholders. Therefore, the improvement of interest alignment in government-

controlled firms should be less pronounced than that in privately controlled firms. Given that local government-controlled firms have a long chain of agency problems, they should benefit less from the reform than central government-controlled firms.

On the basis of these arguments, we propose the following:

H2a: Ceteris paribus, the crash risk for firms with various types of controlling shareholders declines after the reform.

H2b: The reduction in crash risk is more pronounced for privately controlled firms than for government-controlled firms, particularly for local government-controlled firms.

3. Data and Variable Description

3.1 Sample Construction

Our primary data source is the China Stock Market and Accounting Research (CSMAR) database, from which we obtain information on the ultimate ownership, stock return, and financial status of firms. Our study covers the years 2003 to 2014. We choose 2003 as the starting year because the disclosure of ownership structure has been completed since then. Our sample begins with all publicly traded firms listed on the Shanghai and Shenzhen stock exchanges. Afterwards, we follow the convention and exclude the financial firms and firm-years with stock data of fewer than 26 weeks. We further exclude firms in which the ultimate shareholders cannot be identified.

Last, we eliminate firms that have missing observations during our study period to obtain a balanced panel data set. We impose this requirement because the majority of listed firms in China were government-controlled firms in early stage whereas large amount of privately controlled firms have been listed especially after year 2009. It is hard to compare government-controlled firms with privately controlled firms due to large variations in the economic and policy environments of China over the past decades, such as the RMB 4 trillion stimulus plan and the Financial Crisis of 2008. Hence, a balanced panel sample has been employed in order to maintain a consistent firm sample for comparison purposes both in time series and cross-section and to control for external environments. Eventually, we have 9,012 firm-year observations that are associated with 751 unique firms, in

which 1,948 observations (21.62%) are for central government-controlled firms, 4,530 observations (50.27%) are for local government-controlled firms, and 2,534 observations (28.11%) are for privately controlled firms.

3.2 Measures of Crash Risk

We use three measures of stock price crash risk, namely, $COLLAR$, $NCSKEW$, and $CRASH$. To construct these measures of firm-specific crash risk, we first estimate the abnormal weekly returns for each firm-year using the following expanded market model (Jin and Myers, 2006):

$$\begin{aligned} RET_{i,t} =& \alpha_i + \beta_{i,1} MKRET_{i,t-2} + \beta_{i,2} INDRET_{i,t-2} + \beta_{i,3} MKRET_{i,t-1} \\ &+ \beta_{i,4} INDRET_{i,t-1} + \beta_{i,5} MKRET_{i,t} + \beta_{i,6} INDRET_{i,t} \\ &+ \beta_{i,7} MKRET_{i,t+1} + \beta_{i,8} INDRET_{i,t+1} + \beta_{i,9} MKRET_{i,t+2} \\ &+ \beta_{i,10} INDRET_{i,t+2} + e_{i,t}, \end{aligned} \tag{1}$$

where $RET_{i,t}$ is the stock return for firm i in week t, $MKRET_{i,t}$ is the average return of the value-weighted Shanghai and Shenzhen composite indices excluding firm i in week t, and $INDRET_{i,t}$ is the value-weighted industry return excluding firm i in week t. Two lead and two lag terms are included to correct for the non-synchronicity for both the market and industry returns (Scholes and Williams, 1977; French et al., 1987). The abnormal weekly return is defined as the natural logarithm of one plus the residual term from the estimation of Equations (1) (e.g., the part that is not explained by the market and industry returns).

Following Jin and Myers (2006), $COLLAR$ accounts for both the frequency and the severity of crashes. On the basis of the abnormal weekly returns, we create an option portfolio with a long put option and a short call option. The strike prices are set to the mean minus 3.09 standard deviations for the former and to the mean plus 3.09 standard deviations for the latter. Under a lognormal distribution, the initial investment for the above strategy is zero. $COLLAR$ is then computed as the actual profits or losses from this strategy as a percentage of the stock price, with high values indicating more frequency and/or more severity of crashes.

Following Chen et al. (2001) and Kim et al. (2011a，2011b), negative skewness of the abnormal

weekly returns ($NCSKEW$) is also used to measure crash risk. The larger $NCSKEW$ is, the more likely for the crash to happen. Specifically, for firm i in year t, $NCSKEW$ is defined as follows.

$$NCSKEW_{i,t} = -\left[n(n-1)^{3/2}\sum w_{i,\tau}^3\right] \Big/ \left[(n-1)(n-2)(\sum w_{i,\tau}^2)^{3/2}\right], \quad (2)$$

where n is the number of trading weeks, and $w_{i,\tau}$ is firm i's weekly abnormal returns in week τ of year t.

Our third measure, $CRASH$, measures the likelihood of a crash (Hutton et al., 2009; Kim et al., 2011a; 2011b). For any given firm-year, we identify the number of crash weeks when the abnormal weekly return is 3.09 standard deviations below the mean, which corresponds to the 0.1% tails of the normal distribution. Afterwards, $CRASH$ is considered an indicator variable that equals one for a firm-year if at least one crash week is observed during the fiscal year period, and zero otherwise.

3.3 Classification of Ultimate Controlling Shareholders

We classify our sample firms into different categories according to the ultimate ownership[7] and we denote each category using a dummy variable. We separate the firms into privately controlled firms (*Private*) and government-controlled firms (*Gov*), with the former referring to firms that are owned by non-government entities, such as entrepreneurs, townships, villages, and foreign companies, and the latter referring to firms that are owned by government entities. We further group the government-controlled firms into central government-controlled firms (*Gov_centr*) and local government-controlled firms (*Gov_local*). The former is owned by the central government (e.g., the Ministry of Finance and the Central Industrial Enterprises Administration Committee), and the latter is owned by local governments (e.g., the province, city or county governments and the Bureau of State Assets Management at the province, city, or county level).

[7]According to the "Administration of the Takeover of Listed Companies Procedures" by the CSRC, "a shareholder shall be considered to have actual control of a listed company: 1). if it is the largest shareholder in the listed company's register of shareholders, unless there is evidence to the contrary; 2). if it is able to exercise or control more voting rights in the listed company than the largest shareholder in the company's register of shareholders; 3). if the percentage of shares or voting rights in the listed company held or controlled by it reaches or exceeds 30%, unless there is evidence to the contrary; 4). if it is able to decide the election of more than half of the members of the board of director by means of exercising its voting rights; or 5). in other circumstances determined by the CSRC" (http://english.mofcom.gov.cn/article/policyrelease/announcement/200712/20071205274819.shtml).

3.4 Control Variables

Following the literature, we also consider a list of control variables that are documented to affect stock price crash risk. The variable $DTURN$ refers to the detrended stock trading volume, a proxy for investor heterogeneity or the difference of opinions among investors. Chen et al. (2001) document that firms with high stock turnovers are more likely to crash. The one-year lagged $NCSKEW$ captures the potential persistence of the third moment of stock returns. $FSRET$ and $SIGMA$ denote the average abnormal weekly returns and the standard deviation of abnormal stock returns over a fiscal year, respectively. Chen et al. (2001) argue that past returns and past return volatility are positively associated with future crashes. $ABACC$ denotes the previous three-year moving sum of the absolute value of discretionary accruals, which are estimated using the modified Jones model (Dechow, Sloan, and Sweeney, 1995). Opaque firms are more prone to future stock price crashes (Hutton et al., 2009). We also control for firm characteristics including firm size ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), and B/H-share (BH), an indicator variable for issuing both A- and B- or H-shares.

3.5 Descriptive Statistics

Table 1 reports the summary statistics of the crash risk measures, the political connection index (PCs), and the control variables used in later regression analyses. As shown in the table, the entire sample is classified based on the ultimate ownership of firms. A t-test is performed on the difference between privately controlled firms and various categories of government-controlled firms. Compared with privately controlled firms, government-controlled firms, especially local government-controlled firms, have higher levels of crash risk. This relationship holds for all of the three crash risk measures. For example, the differences in $COLLAR$ are 0.035, 0.030, and 0.037 for between government-controlled firms and privately controlled firms, between central government-controlled firms and privately controlled firms, and between local government-controlled firms and privately controlled firms, respectively, and all the differences are statistically significant at 1% level. Most of the control variables also exhibit a significant difference between privately controlled firms and their counterparts. For example, privately controlled firms have lower average abnormal returns

and higher return volatility than government-controlled firms. These firms also tend to be smaller, have higher market-to-book ratio, and have higher levels of discretionary accruals and lower levels of political connections.

[INSERT TABLE 1 HERE]

Table 2 presents the Pearson correlation coefficients among all these variables. In general, the three measures of crash risk are highly correlated with one another but they are not highly correlated with other firm characteristics. The correlation coefficient between any two of the crash risk measures ranges from 0.372 to 0.740. $COLLAR$ is positively and significantly correlated with market-to-book ratio (MB) and detrended stock trading volume ($DTURN$). $NCSKEW$ is negatively correlated with firm size ($SIZE$) and leverage ratio (LEV) and positively correlated with market-to-book ratio (MB) and detrended stock trading volume ($DTURN$). $CRASH$ is negatively correlated with firm size ($SIZE$), return on assets (ROA), and return volatility ($SIGMA$), and positively correlated with firm-specific returns ($FSRET$). In general, the correlations among the variables in our sample are moderately low, thus suggesting the absence of multicollinearity.

[INSERT TABLE 2 HERE]

4. Empirical Results

This section investigates how the ultimate ownership structure of a firm affects its stock price crash risk. We first estimate the effect of different types of controlling shareholders on the three crash risk measures using multivariate analysis. Then we perform a battery of sensitivity tests to check the robustness of our results. Finally, we examine the impact of the split-share structure reform on crash risk and how the association between ultimate ownership and crash risk is affected by the reform.

4.1 Main Regression Results

We use the following regression models to examine how the different types of controlling shareholders affect stock price crash risks.

$$CR_{i,t} = \beta_0 + \beta_1 Gov_{i,t} + \sum \beta_k \times ControlVars_{i,t-1} + \varepsilon_{i,t}, \quad (3)$$

$$CR_{i,t} = \gamma_0 + \gamma_1 Gov\_centr_{i,t} + \gamma_2 Gov\_local_{i,t} + \sum \gamma_k \times ControlVars_{i,t-1} + \varepsilon_{i,t}, \quad (4)$$

where CR denotes the crash risk measures, including $COLLAR$, $NCSKEW$, and $CRASH$. In Equation (3), *Gov* is the dummy variable that represents the government-controlled firms. In Equation (4), government-controlled firms are further classified into central government-controlled firms and local government-controlled firms. *Gov_centr* equals one if a firm is ultimately controlled by the central government, and zero otherwise. *Goc_local* equals one if a firm is ultimately controlled by various local governments, and zero otherwise. Several control variables are included, such as firm size ($SIZE$), return on assets (ROA), market-to-book ratio (MB), financial leverage (LEV), detrended stock trading volume ($DTURN$), negative skewness ($NCSKEW$), average abnormal weekly returns ($FSRET$), standard deviation of abnormal weekly returns ($SIGMA$), discretionary accruals ($ABACC$), and B/H-share (BH). Logit regression is used when crash risk is measured by $CRASH$; otherwise, ordinary least squares regression is used. Year and industry fixed effects are included.

We estimate Equations (3) and (4) for each crash risk measure. The results are presented in Table 3. Two interesting results are revealed. First, government-controlled firms have higher levels of crash risks than privately controlled firms. Models 1, 3, and 5 show that *Gov* has significantly positive coefficients of 0.024 (t-statistic=2.81), 0.024 (t-statistic=2.24), and 0.142 (t-statistic=1.68) for $COLLAR$, $NCSKEW$, and $CRASH$, respectively. This finding indicates that government-controlled firms are more likely to have stock price crashes and higher levels of crash risk than privately controlled firms, probably because the controlling shareholders of these firms tend to expropriate the minority investors.

Second, the higher crash risks that are associated with government-controlled firms are mainly

driven by local government-controlled firms. In models 2, 4, and 6, the loadings of *Gov_local* are all positive and significant at 1% or 5% levels, and those of *Gov_centr* are not statistically significant or marginally significant at 10%, although they are positive. In terms of economic magnitude, *Gov_local* has a coefficient of 0.026 in model 2 when $COLLAR$ is used as the crash risk measure, indicating that the crash risk of local government-controlled firms is greater than that of privately controlled firms by 0.078 (=0.026/0.334) standard deviation for our sample firms. When we use $CRASH$ as the measure of crash risk, holding all the other independent variables at their mean values, the marginal effect of *Gov_local* is 0.0109, implying that the crash risk in local government-controlled firms is 1.09% higher than that of privately controlled firms, equivalent to 15.58% (0.0109/0.0700) of the unconditional crash probability.

These findings indicate that local government-controlled firms, which are characterized by a longer chain of agency problem, may have a high expropriation risk, and corporate insiders may have a strong incentive to hide negative information from outside investors. Therefore, high crash risks will be incurred. These results support H1.

[INSERT TABLE 3 HERE]

4.2 The Channels (e.g., Firm-level Information Environments) via which Ownership Structure Influences Crash Risk

在本文的理论分析中，我们认为ultimate ownership by government may affect the information environment of individual firms, and thus the crash risk of stock prices. 为了进一步验证government ownership是否通过公司信息环境的渠道作用于crash risk，我们从三个方面检验了ultimate ownership对公司信息环境的影响, including earning smoothness, auditor choice, and stock price synchronicity。现有的研究表明，earnings smoothing can be used as a means to obfuscate a firm's real underlying performance, and particularly, to hide bad performance (Levitt, 1998 ; Leuz et al., 2003). Specifically, Chen, Kim and Yao (2017jcf) find that a higher degree of earnings smoothing is associated with greater crash risk.

审计师是市场中重要的信息中介，auditors are instrumental in the production of reliable, firm-specific information。以往的研究shows that auditor quality can positively influence the information

environment of client firms，firms with high-quality auditors are expected to provide more credible, firm-specific information than other firms (例如Teoh and Wong，1993；Becker et al.，1998；Gul et al.，2010)。

现有的大量文献将更高的stock price synchronicity与更差的公司信息环境联系在一起。Specifically, a limited supply of firm-specific information is expected to produce firm-level stock returns that are highly synchronized with general market movements (e.g., Roll, 1988; Morck, Yeung and Yu, 2000; Durnev et al., 2003), while the systematic suppression of bad news will produce a stock return distribution that is significantly left skewed and subject to a greater frequency of stock return crashes (Jin and Myers, 2006; Chen Hong and Stein, 2001). 例如Jin and Myers (2006)的跨国研究发现，国家层面的信息不透明与更高的公司stock price synchronicity和更高的stock price crash risk 相关。

First, 我们检验了ultimate ownership对Earnings smoothness的影响。Following Tucker and Zarowin (2006) and Chen, Kim and Yao (2017jcf) , we measure earning smoothing as the correlation between changes in pre-abnormal-accruals earnings (i.e., unobserved pre-managed earnings which is measured by reported earnings minus abnormal accruals) and changes in abnormal accruals. 为了估计abnormal accrual, 我们参照Tucker and Zarowin (2006)的做法，采用如下的修正的Jones model: (Kothari et al., 2005):

$$\frac{TAcc_{i,t}}{Asset_{i,t-1}} = \alpha_1 \left[\frac{1}{Asset_{i,t-1}}\right] + \alpha_2 \frac{\Delta Sales_{i,t}}{Asset_{i,t-1}} + \alpha_3 \frac{PPE_{i,t}}{Asset_{i,t-1}} + \alpha_4 ROA_{i,t} + \varepsilon_{i,t}, \tag{5}$$

其中$TAcc$ 表示total accruals; $Asset$表示total assets; $\Delta Sales$ is the change in sales relative to the previous year; PPE is property, plant, and equipment; ROA is return on assets.

Equation (5) is estimated for each one-digit CSRC industry and in each fiscal year. 我们用Equation (5)的estimated residual来作为abnormal accrual ($DA_{i,t}$)的代理变量，而pre-managed earnings ($PME_{i,t}$) 则等于reported earnings减去abnormal accrual. The measure of earning smoothing ($SMOOTH_{i,t}$) is calculated as the correlation between changes in pre-abnormal-accruals earnings ($\Delta PME_{i,t}$) and changes in abnormal accruals ($\Delta DA_{i,t}$) over a rolling window of 4 years, and then multiplied by -1. $SMOOTH$取值越高表示a higher level of earning smoothing.

Model 1 and 2 in table 4 present the regression results of earning smoothing on ultimate own-

ership. We introduce a set of control variables to isolate the effects of ultimate ownership variables on earning smoothing, including firm size ($SIZE$), market-to-book ratio ($MtoB$), financial leverage (LEV), and return on assets (ROA). To be consistent with the dependent variable, which is calculated over a rolling window of 4 years, all control variables are calculated as averages over the same four-year period. Year and industry fixed effects are included in all regressions. As shown in model 1 and 2, the coefficients of *Gov* and *Gov_local* are positive and highly significant, and that of *Gov_centr* is not statistically significant, although it is also positive. These results indicate that government-controlled firms, especially local government controlled ones, are more likely to smooth earnings than privately controlled firms.

Second, 我们从审计质量的视角来检验ultimate ownership 对公司信息环境的影响。参考Wang, Wong, and Xia (2008)，我们定义两个审计师选择的哑变量，第一个为是否国际四大($BIG4$), which takes the value of one if a firm is audited by one of the joint ventures of international Big 4 audit firms and domestic audit firms, and zero otherwise. 第二个哑变量为是否small local auditors ($SLAD$), 如果公司注册地所在省份与审计师事务所总部所在省份相同，且审计机构is not a Top-10 auditor based on assets audited，则$SLAD$取值为1，否则取值为0。Logit regression results are reported in model 3 to 6. 从表中可知，当以$BIG4$为因变量时，*Gov*的系数为负，但不显著（t=1.56）, *Gov_local*的系数在5%的水平上统计显著为负，*Gov_centr*的系数不显著，表明相比于privately controlled firms, 政府（特别是地方政府）实际控制的公司更倾向于to hire非国际四大的审计师进行财务审计。当以$SLAD$ 为因变量时，*Gov*的系数在10%的水平显著为正，*Gov_local*的系数在1%的水平上统计显著为正，*Gov_centr*的系数仍然不显著，表明compared with privately controlled firms, Chinese state-owned firms controlled by local governments are more likely to hire small auditors within the same region (small local auditors). 该结果与Wang, Wong, and Xia (2008)的发现是一致的，他们利用1993-2003年的数据，发现地方政府控制的国有企业更倾向于选择small local auditor.

Finally, 我们考察了ultimate ownership对stock price synchonicity ($SYNCH$) 的影响。为了计算个股股价与市场指数变化的同步性，参照Gul et al. (2010)，我们首先从Equation (1) 的估计中获取每家公司每一年的R^2，然后进行如下的对数转换：

$$SYNCH_{i,t} = \frac{R^2_{i,t}}{1 - R^2_{i,t}}, \tag{6}$$

在式（6）中，SYNCH的取值越大，表示个股股价与市场指数变化的同步性越高，公司信息环境越差，从而股价的信息含量越低。回归结果如表4中的model 7 and 8所示，*Gov*的系数在10%的水平上显著为正，*Gov_centr*的系数不显著，*Gov_local*的系数在5%的水平上显著为正。该结果表明相比于privately controlled firms, 政府实际控制，特别是地方政府实际控制的公司的信息透明度显著较低，股价中包含较少的公司特质信息，因而个股股价与市场指数的变化同步性显著更高。

上述三个方面的检验结果很好地回应了我们的主要研究结论，提供证据表明ultimate ownership by government affect the information environment of individual firms, and thus the crash risk of stock prices.

[INSERT TABLE 4 HERE]

4.3 Endogeneity

4.3.1 Firm-fixed Effect

We first attempt to address the potential endogeneity issues by using firm fixed effects model to control for unobserved sources of firm heterogeneity. As shown in Table 1, the privately controlled firms significantly differ from their government-controlled counterparts. The fixed effects model assist in controlling for time invariant unobserved heterogeneity and the endogeneity problems caused by firm heterogeneity. Following Kim and Zhang (2013), we use conditional fixed effects Logit model when the dependent variable is measured by $CRASH$, an indicator variable, and linear fixed effects model when the dependent variable is measured by other crash risk variables.

The regression results are presented in Panel A of Table 5. It has been shown that, *Gov_local* has positive coefficients in models 2, 4, and 6. In particular, it is statistically significant at 5% in model 4 and marginally significant at 10% in model 2. By contrast, *Gov_centr* is insignificant across models 2, 4, and 6. This within firm test confirms the existence of the association between ultimate ownership and crash risk is not likely driven by the differences across firms.

4.3.2 Lagged Ultimate Ownership

We use contemporaneous ownership variables in our primary regressions because ultimate controlling ownership has a long-term nature in China, which minimizes the concern about reverse

causality. However, previous studies suggest that it is the hoarding of bad news for an extended period that leads to crash risks. To make a stronger causality inference, we substitute contemporaneous ownership variables with one-year lagged variables. The results are reported in panel B of Table 5. On the one hand, *Gov_local* is significantly positive for $COLLAR$ and $NCSKEW$ and is marginally significant for $CRASH$. On the other hand, *Gov_centr* is insignificant or only marginally significant for the three crash risk measures. These findings confirm our previous argument that local government-controlled firms tend to have higher crash risks than privately controlled firms, but central government-controlled firms do not.

[INSERT TABLE 5 HERE]

4.3.3 Event Study (Difference in Difference)

We then employ an event study with matching samples to further clarify the causality direction in the relationship between ultimate ownership and crash risk. The sample is selected based on the following procedures: 1) Identify the ultimate ownership switches between government owners and private owners and require no ultimate ownership switches either in the prior year or in the year after. As a result, we get 148 cases of ultimate ownership changes ($Gov - Private$), among which 30 occur between central government and private owners ($Gov\_centr - Private$) and 118 occur between local government and private owners ($Gov\_local - Private$). 2) Identify matching firms. We match each of the event firm in the year before the ownership change with another firm that has the same ownership type, operates in the same industry, and is closest in total assets, while there is no change in ultimate ownership in the sample period.

Next, we compute the changes in crash risk surrounding the event year for both event firms and matching firms. The changes in crash risk are computed as $year_{(t+1)}$ - $year_{(t-1)}$ for switches from government to private and as $year_{(t-1)}$ - $year_{(t+1)}$ for switches from private to government. We further compute the differences in crash risk changes between event firms and matching firms. The results are reported in Table 6. For event firms, crash risk declines for the group of $Gov - Private$ and the decline is even greater for the group of $Gov\_local - Private$. In contrast, matching firms do not exhibit such a pattern in their crash risk measures. The t-test further suggests that the

differences in crash risk changes between event firms and matching firms are statistically significant for both groups of $Gov - Private$ and $Gov\_local - Private$.

[INSERT TABLE 6 HERE]

4.3.4 Multivariate Regressions

Furthermore, we perform multivariate regressions to control for possible changes in other firm characteristics due to the change in ultimate ownership. Specifically, we control for the changes in firm size (D_SIZE), return on assets (D_ROA), market-to-book ratio (D_MB), leverage ratio (D_LEV), prior three-year moving sum of the absolute value of discretionary accruals (D_ABACC), detrended stock trading volume (D_DTURN), average abnormal weekly returns (D_FSRET), and standard deviation of abnormal weekly returns (D_SIGMA). Year and industry fixed effects are also included. The estimation results are shown in Table 6. The three dummy variables $Gov - Private$, $Gov\_centr - Private$, and $Gov\_local - Private$ equal one for event firms that have experienced ultimate ownership change between government and private, between central government and private, and between local government and private, respectively, and zero for control firms. Consistent with the univariate results, the coefficient estimates of $Gov - Private$ and $Gov\_local - Private$ are significantly negative across all the models, suggesting that, compared with the matching sample, crash risk declined more for firms that switched from government to private, in particular for those that switched from local government to private.

[INSERT TABLE 7 HERE]

4.4 Other Robustness Checks

In this section, we conduct several other robustness checks, including alternative sample selection procedures, alternative computation methods for the crash risk measures, and alternative crash risk measures. The empirical results, which are not reported in this paper due to length concerns while available upon request, are qualitatively similar to those reported above. They provide reinforcing empirical evidence on the higher crash risk associated with local government-controlled firms.

4.4.1 Tradable Market Capitalization Weighted Market and Industry Indices

To compute for the crash risk measures, we estimate the abnormal weekly returns for each stock using the value-weighted market index and industry returns. The weight for each stock in the market index or its industry is based on the market value of its overall shares outstanding, including tradable and non-tradable shares. To eliminate possible bias that may result from the significant proportion of non-tradable shares, we only consider tradable shares as an alternative weight to compute the returns for market indices and industries. The regression results are consistent with the previous main findings.

4.4.2 Excluding Firms with Fewer than 50 Weeks of Trading Data

If a firm only has a few weeks of trading information, the market regression model of Equation (1) may yield biased estimates. To avoid the potential bias in computing crash risk measures, we exclude firms with fewer than 50 weeks of trading data and then repeat our main analysis. The regression results show that our main conclusions are robust to this alternative sample screening procedure.

4.4.3 Alternative Measures of Crash Risk

Following the literature, we consider two alternative crash risk measures, $COUNT$ and $DUVOL$. $COUNT$ is based on the number of abnormal weekly returns that exceed 3.09 standard deviations above and below the mean, with 3.09 chosen to generate a frequency of 0.1% in the lognormal distribution (Jin and Myers, 2006). We subtract the upside frequencies from the downside frequencies. A high value of $COUNT$ indicates a high frequency of crashes.

$DUVOL$ is a measure of return asymmetries which does not involve third moments, and hence is less likely to be excessively influenced by extreme returns (Chen et al., 2001). For each firm-year, we separate all the weeks with abnormal returns below the annual mean ("down" weeks) from those with returns above the annual mean ("up" weeks), and compute the standard deviation for each of these subsamples separately. We then take the natural logarithm of the ratio of the standard

deviation on the down weeks to the standard deviation on the up weeks.

$$DUVOL_{i,t} = log\left\{(n_u - 1)\sum_{down} w_{i,\tau}^2 \Big/ (n_d - 1)\sum_{up} w_{i,\tau}^2\right\}, \tag{7}$$

Where, n_d and n_u are the number of down and up weeks, respectively. The higher the value of $DUVOL$, the higher the crash risk.

The regression estimates are consistent with our main results. That is, *Gov_local* has significantly positive coefficients whereas *Gov_centr* is not significant.

4.5 The Impact of the Split-share Structure Reform

As discussed in Section 2.2.2, the split-share structure reform in 2005 relieves the conflicts of interest between controlling shareholders and minority investors, thus affecting the stock price crash risks. In this section, we empirically test how the relation between controlling ownership and crash risks varies in the reform.

Considering that the reform has been completed at different times for different firms (the majority of firms has done this between 2005 and 2007), we impose the following sample selection criteria to control for the potential influence of macroeconomic factors: 1) Exclude firms that have completed the reform after 2007 as those firms usually experienced some problems and thus failed to complete the reform on time; 2) Exclude the year during which a firm completed the reform and keep the same number of years before and after the reform for each firm. For example, if a firm completed the reform in 2007, then we keep years 2003-2006 and 2008-2011.[8] 3) Exclude firms with ultimate ownership change during the reform. Finally, we get 2,488 firm-year observations for 459 unique firms, including 114 private controlled firms, 83 central government-controlled firms, and 262 local government-controlled firms.

We create an indicator variable, $Reform$, to denote the firm-years that completed the reform. Specifically, $Reform$ equals one if a firm has completed the reform by the end of a particular year, and zero otherwise. We also construct interaction terms between $Reform$ and various ownership variables to capture the differential crash risk responses of various firm types to the reform. Table

[8] We obtain similar results if we keep all the sample years for each firm.

8 summarizes the analyses. As expected, the crash risks of our sample firms are lowered on average after the reform. As shown in models 1, 4, and 7, $Reform$ has a significantly negative coefficient for all three crash risk measures. For example, in model 1, the coefficient of $Reform$ is ‐0.094 (t-statistic =-12.61), which is significant at 1%. In terms of economic magnitude, the sample standard deviation of pre-reform $COLLAR$ is 0.341, which indicates that the reform reduces the crash risk by 0.276 (=0.094/0.341) standard deviation for our sample firms.

The effect of reform on crash risks differs across firms with various ownership structures. For example, in model 2, the coefficients for $Reform$ and $Reform{\times}Gov$ are ‐0.124 (t-statistic = ‐9.40) and 0.039 (t-statistic=2.66), respectively. Both coefficients are significant at 1%. The standard deviations of pre-reform $COLLAR$ for private- and government-controlled firms are 0.365 and 0.333, respectively, which indicates that the reform lowers the crash risks by 0.339 (= 0.124/0.365) standard deviation for privately controlled firms and by 0.255 (= (0.124 ‐ 0.039)/0.333) standard deviation for government-controlled firms. These results imply that the crash risks of privately controlled firms are lowered to a larger extent than those of government-controlled firms. Further analysis of models 3, 6, and 9 suggests that the reform does not have varying effects on the crash risks of privately and central government-controlled firms but demonstrates the varying effects between privately and local government-controlled firms. The coefficients for $Reform{\times}Gov\_centr$ are not statistically significant, whereas those for $Reform{\times}Gov\_local$ are significantly positive across all three models.

Overall, the results from Table 8 support H2a and H2b. The reform helps relieve the agency conflicts between controlling shareholders and minority investors, thus reducing stock price crash risks. The negative effect of the reform is more pronounced in privately controlled firms than in government-controlled firms.

[INSERT TABLE 8 HERE]

4.6 The Impact of Political Connections

We have presented robust evidence that government-controlled firms have higher crash risks than privately controlled firms. This positive association is mainly driven by local government-controlled firms rather than by central government-controlled firms. We then explore the driving force of the relationship between government ownership and crash risks. We specifically focus on the political incentives of the managers of a firm, which is proxied by the political connections of the management team members.

It has been documented that political connections have a controversial effect on connected firms. Political connections could boost firm performance through preferential treatment from the government. On the other hand, they could generate an adverse impact on connected firms, especially on firms' information environment (see Chaney et al., 2011; Tang et al., 2011; Piotroski, Wong, and Zhang, 2014).[9] For example, an international study of Chaney et al. (2011) suggests that because of the protection brought by political connections, firms with political ties are more likely to remain opaque and thus the information quality of connected firms is lower than that of their non-connected counterparts. Piotroski, Wong, and Zhang (2014) argue that political incentives may motivate firm managers to temporarily suppress negative information. They examine the stock price behavior of Chinese listed firms around two highly anticipated political events, namely, the meetings of the National Congress of the Chinese Communist Party and the promotions of high-level provincial politicians and find that politically affiliated firms are significantly less (more) likely to experience stock price crashes in advance of (after) the two political events.

The effect of political connections may vary along with the types of ultimate controlling shareholders (Wang, 2015; Lee and Wang, 2016). A connection with the state could possibly grant advantages to privately controlled firms over their non-connected counterparts, which reduces the possibility of extremely bad operating outcomes and alleviates stock price crash risk. Also, the management team of privately controlled firms might be under less political pressures and are less

[9]Particularly, the evidence from Indonesia, another Asian country with highly concentrated ownership, supports this view. Leuz and Oberholzer-Gee (2006) and Habib, Muhammadi, and Jiang (2017) find that politically connected firms are less likely to cross-list their securities and thus to adopt U.S. GAAP and are less likely to appoint reputable auditors.

motivated to hide negative information. Corporate insiders in privately controlled firms are placed under more intense scrutiny by outside investors and are more subject to market pressure for high financial transparency. By contrast, political connections in government-controlled firms enhance the control of the government as dominant owner and increase the propensity to camouflage the opportunistic activities of controlling shareholders such as tunneling and expropriation, resulting in bad-news accumulation and a higher crash probability (Bushman et al., 2004; Boubaker et al., 2014). Additionally, managers of government-controlled firms have strong incentives to seek political promotions and are more motivated to engage in financial misconduct. The opportunistic behavior of these managers is shaped by the intensity of outside monitoring. Typically, the central government-controlled firms are more exposed to the spotlight of social media, and their misconduct cost is substantially higher than that of local government-controlled firms. The political connections of these managers are expected to have a stronger effect on the crash risks in government-controlled firms, especially in local government-controlled firms, than in privately controlled firms. Indeed, Lee and Wang (2016) find that politically connected directors help reduce crash risk in listed privately controlled firms while exacerbate stock price crash risk in listed state-controlled firms. Wang (2015) shows that having politicians as independent directors helps privately controlled firms outperform their non-connected counterparts but it does not help to add value to state-controlled firms, especially firms controlled by the local government.

We assess the strength of the political connection of a firm using a political connection index (PCs), which is constructed based on the political background of the senior management team of a firm, including the board members, CEO, and CFO. We obtain the political background data of these managers from the Wind database, which provides information on the positions that the executives previously held in the government or in other organizations. On the basis of these data, we classify the political background of the executives into (1) non-government positions, such as representatives of the People's Congress, members of the Committee of the People's Political Consultative Conference, or other positions that have a relatively strong political influence, and (2) government positions at different levels. The administration system of China has a strict division at the administrative level, ranging from ordinary clerks to state-level officials. Therefore, we

score the political connection strength for each position category according to the administrative level. Specifically, for government positions, vice-ministerial level and higher positions are scored 7, departmental-level positions are scored 6, deputy departmental-level positions are scored 5, division-level positions are scored 4, deputy division-level positions are scored 3, section-level positions are scored 2, and deputy section-level and lower positions are scored 1. For non-government positions, national-level positions are scored 6, provincial-level positions are scored 4, and municipal-level and lower positions are scored 2. We aggregate the political background scores of all executives in a firm to build the PCs and to standardize this index between 0 and 1.[10] A high index indicates strong political connections. As shown in Table 1, government-controlled firms, on average, have stronger political connections than privately controlled firms, with local government-controlled firms having the strongest political connections.

Table 9 shows how the political connections of the management team of a firm affect the relationship between government ownership and crash risks. As shown in models 1, 3 and 5, the coefficients of interaction term $PCs \times Gov$ are consistently positive and statistically significant at least at 10% levels. Models 2, 4, and 6 further show that the coefficients of $PC \times Gov\_centr$ are positive across all three models and significant in only model 4, while those of $PC \times Gov\_local$ are all positive and significant at 5% levels. To relieve possible endogeneity problems, we further control for firm fixed effects and the unreported results are quite similar to those in Table 9. In sum, the evidence indicates that government-controlled firms with stronger political connections tend to have higher crash risks than privately controlled firms, and this effect is more pronounced in local government-controlled firms. These findings suggest that the effect of government ownership on crash risks may be partially explained by the strong political incentives of the managers of government-controlled firms.

[INSERT TABLE 9 HERE]

[10] Alternatively, we average the percentile ranking of a sample firm according to the score of its executives and then construct a standardized index. The untabulated results are qualitatively similar to the reported results.

5. Conclusions

This paper examines the impact of ultimate controlling ownership on the stock price crash risk in China. Our sample firms are classified into privately and government-controlled firms according to their ultimate controlling ownership. We find that the crash risks associated with the latter are significantly higher than those associated with the former. Particularly, firms that are controlled by lower levels of government (e.g., local government-controlled firms) exhibit higher crash risks than privately controlled firms, whereas no significant difference in crash risks is observed between central government-controlled firms and privately controlled firms. Further evidence on the split – share structure reform suggests that although the crash risks for all sample firms are reduced after the reform, government-controlled firms, especially local government-controlled firms, experience a much smaller reduction than privately controlled firms.

We also investigate how the political connections (as a proxy for political incentives, namely, high political connections mean high incentives for political promotion and so on) of the management team of a firm affect the relationship between government ownership and crash risks. We find that government-controlled firms with stronger political connections tend to have higher crash risks than privately controlled firms, and this effect is more pronounced in local government-controlled firms. These findings suggest that the effect of government ownership on crash risks may be partially explained by the strong political incentives of the managers of government-controlled firms.

Overall, the findings of this paper suggest that firms that are controlled by various local governments may face a more acute agency problem than privately controlled firms. This provides important policy implications for the ongoing restructuring of state ownership in China, which aims to improve the operating efficiency and market performance of state-owned companies.

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Appendix A: Variable Definitions

FORMAT:

Acronym: Description

VARIABLES:

COLLAR is the mean profit or loss from a strategy of buying an out-of-money put option on the abnormal weekly return and shorting a call option on the abnormal weekly return, times 1000. The strike price for the put is mean abnormal weekly return minus 3.09 standard deviations for its fiscal year. The strike price for the call is mean abnormal weekly return plus 3.09 standard deviations for its fiscal year. Under normal distribution, the put-call strategy has zero expected value.

NCSKEW is the negative skewness of abnormal weekly returns over the fiscal year.

CRASH is an indicator variable which equals one for a firm-year if at least one crash week is observed during the fiscal year, and zero otherwise. A crash week is defined as a week during which the abnormal weekly return is 3.09 standard deviations below the mean.

COUNT is the difference between the numbers of negative and positive abnormal returns that are 3.09 standard deviations below and above the mean abnormal return.

DUVOL is the natural log of the ratio of the standard deviations of down-week to up-week abnormal weekly returns.

Gov is an indicator variable that equals one if a firm is ultimately controlled by government entities, either central or local, and zero otherwise.

Gov_centr is an indicator variable which equals one if a firm is ultimately controlled by the central government (e.g., the Ministry of Finance and the Central Industrial Enterprises Administration Committee), and zero otherwise.

Gov_local is an indicator variable which equals one if a firm is ultimately controlled by local

governments (e.g., the province, city, or county governments and the Bureau of State Assets Management at the province, city, or county levels), and zero otherwise.

Private is an indicator variable that equals one if a firm is ultimately controlled by non-government entities such as entrepreneurs, townships, villages, and foreign companies, and zero otherwise.

PCs is the political connection index measuring the strength of the political connection of a firm. This index is constructed on the basis of the political background of the senior management team of a firm. We classify the political background of the executives into non-government positions and government positions. Afterwards, we score their political connection strength according to the administrative levels. We then aggregate the political background scores of all the executives in a firm to build the PC and standardize this index between 0 and 1.

DTURN is the detrended stock trading volume, which is calculated as the difference between the average monthly share turnover over the current fiscal year period and that of the previous fiscal year, where monthly share turnover is calculated as the monthly trading volume divided by the total number of shares outstanding during the month.

FSRET denotes the average abnormal weekly returns over a fiscal year, times 100.

SIGMA is the standard deviation of abnormal weekly returns over a fiscal year.

ABACC is the previous three-year moving sum of the absolute value of discretionary accruals, which are estimated from the modified Jones model (Dechow, Sloan, and Sweeney, 1995).

SIZE is the size of a firm, which is measured by the logarithm of market valuation.

ROA is return on assets, which is computed as net income over total assets.

MB is market-to-book ratio, which represents the ratio of market value of equity to book value of equity.

LEV is leverage ratio, which represents the ratio of the book value of total liabilities to the book value of total assets.

BH is an indicator variable which equals one one if a firm issues both A- and B- or H-shares at the same time, and zero otherwise.

Reform is an indicator variable which equals one for firm-years where the firm has completed the split-share structure reform, and zero otherwise.

Table 1

Descriptive statistics of privately and government-controlled firms

This table presents the summary statistics of crash risk measures and firm characteristics. The firms are classified on the basis of their ultimate ownership. *Private* and *Gov* equal one if a firm is ultimately controlled by non-government entities and government entities, respectively, and zero otherwise. *Gov_centr* and *Gov_local* equal one if a firm is ultimately controlled by the central and local governments, respectively, and zero otherwise. $COLLAR$, $NCSKEW$, and $CRASH$ are crash risk measures. Firm characteristics include, the logarithm of total assets ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), prior three-year moving sum of the absolute value of discretionary accruals ($ABACC$), B/H-shares (BH), and political connections (PCs_t). Stock trading variables include, detrended stock trading volume ($DTURN$), negative skewness of abnormal returns ($NCSKEW$), average abnormal returns ($FSRET$), and standard deviation of abnormal returns ($SIGMA$). The sample period is from 2003 to 2014. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Private=1			*Gov*=1				*Gov_centr*=1				*Gov_local*=1			
Vars	N	Mean	Median	N	Mean	Median	Difference	N	Mean	Median	Difference	N	Mean	Median	Difference
$COLLAR_t$	2,534	-0.086	0.000	6,478	-0.051	0.000	0.035***	1,984	-0.055	0.000	0.030***	4,530	-0.049	0.000	0.037***
$NCSKEW_t$	2,534	-0.287	-0.245	6,478	-0.240	-0.218	0.047***	1,984	-0.256	-0.239	0.031	4,530	-0.233	-0.210	0.054***
$CRASH_t$	2,534	0.061	0.000	6,478	0.074	0.000	0.013**	1,984	0.065	0.000	0.004	4,530	0.078	0.000	0.017***
$SIZE_{t-1}$	2,534	21.401	21.321	6,478	21.883	21.736	0.482***	1,984	22.009	21.826	0.608***	4,530	21.829	21.709	0.427***
ROA_t	2,534	0.041	0.042	6,478	0.040	0.039	0.001	1,984	0.040	0.040	-0.001	4,530	0.040	0.040	-0.001
MB_{t-1}	2,534	3.829	2.578	6,478	3.028	2.253	-0.801***	1,984	3.167	2.485	-0.663***	4,530	2.968	2.158	-0.861***
LEV_{t-1}	2,534	0.514	0.520	6,478	0.509	0.514	-0.005	1,984	0.500	0.512	-0.015**	4,530	0.513	0.515	-0.001
$DTURN_{t-1}$	2,534	0.011	0.009	6,478	0.007	0.004	-0.004	1,984	0.005	0.005	-0.006	4,530	0.008	0.004	0.003
$FSRET_{t-1}$	2,534	-0.096	-0.069	6,478	-0.082	-0.060	0.014***	1,984	-0.087	-0.065	0.009**	4,530	-0.080	-0.058	0.016***
$SIGMA_{t-1}$	2,534	0.040	0.038	6,478	0.038	0.035	-0.003***	1,984	0.039	0.036	-0.001**	4,530	0.037	0.034	-0.003***
$ABACC_{t-1}$	2,534	0.218	0.174	6,478	0.176	0.144	-0.042***	1,984	0.181	0.149	-0.037***	4,530	0.173	0.141	-0.045***
BH_t	2,534	0.073	0.000	6,478	0.121	0.000	0.048***	1,984	0.133	0.000	0.060***	4,530	0.116	0.000	0.042***
PCs_t	2,534	0.152	0.113	6,478	0.164	0.145	0.012***	1,984	0.155	0.129	0.004	4,530	0.167	0.145	0.015***

Table 2
Correlation coefficients

This table reports the correlation coefficients between the crash risk measures and the firm characteristics. *Private* and *Gov* equal one if a firm is ultimately controlled by non-government entities and government entities, respectively, and zero otherwise. *Gov_centr* and *Gov_local* equal one if a firm is ultimately controlled by the central and local governments, respectively, and zero otherwise. $COLLAR$, $NCSKEW$, and $CRASH$ are crash risk measures. Firm characteristics include, the logarithm of total assets ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), prior three-year moving sum of the absolute value of discretionary accruals ($ABACC$), B/H-shares (BH), and political connections (PCs_t). Stock trading variables include, detrended stock trading volume ($DTURN$), negative skewness of abnormal returns ($NCSKEW$), average abnormal returns ($FSRET$), and standard deviation of abnormal returns ($SIGMA$). The sample period is from 2003 to 2014. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

		A	B	C	D	E	F	G	H	I	J	K	L	M
$COLLAR_t$	A	1.000												
$NCSKEW_t$	B	0.740***	1.000											
$CRASH_t$	C	0.372***	0.469***	1.000										
$SIZE_{t-1}$	D	-0.006	-0.068***	-0.022**	1.000									
ROA_t	E	0.008	-0.006	-0.025**	0.154***	1.000								
MB_{t-1}	F	0.041***	0.070***	0.005	-0.292***	0.041***	1.000							
LEV_{t-1}	G	-0.016	-0.032***	-0.010	0.200***	-0.119***	0.093***	1.000						
$DTURN_{t-1}$	H	0.020*	0.058***	0.001	-0.055***	0.009	0.108***	-0.006	1.000					
$FSRET_{t-1}$	I	-0.013	-0.010	0.031***	0.082***	0.016	-0.288***	-0.098***	-0.222***	1				
$SIGMA_{t-1}$	K	0.004	-0.014	-0.056***	-0.097***	-0.007	0.341***	0.138***	0.297***	-0.833***	1			
$ABACC_{t-1}$	K	0.003	0.002	-0.005	-0.083***	-0.007	0.185***	0.160***	-0.021**	-0.074***	0.118***	1		
BH_t	L	0.007	-0.001	0.009	0.199***	0.026**	0.022**	0.006	-0.011	-0.010	0.004	-0.044***	1	
PCs_t	M	-0.001	-0.010	-0.001	0.201***	0.066***	0.029**	-0.007	-0.022**	0.027**	-0.032***	-0.018*	-0.030***	1

Table 3

Ultimate controlling shareholders and crash risk

This table shows the impact of different types of ultimate controlling shareholders on stock price crash risk. The dependent variables are the crash risk measures $COLLAR$, $NCSKEW$, and $CRASH$. Gov, Gov_centr, and Gov_local are indicators that equal one if a firm is ultimately controlled by government entities, the central government, and local governments, respectively, and zero otherwise. Firm characteristics include, the logarithm of total assets ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), prior three-year moving sum of the absolute value of discretionary accruals ($ABACC$), and B/H-shares (BH). Stock trading variables include, detrended stock trading volume ($DTURN$), negative skewness of abnormal returns ($NCSKEW$), average abnormal returns ($FSRET$), and standard deviation of abnormal returns ($SIGMA$). All regressions include unreported industry- and year-fixed effects. The t-Statistics reported in parentheses are adjusted for both firm and year clustered standard errors. The sample period covers the years 2003 to 2014. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	$COLLAR_t$		$NCSKEW_t$		$CRASH_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
Gov_t	0.024***		0.024**		0.142*	
	(2.81)		(2.24)		(1.68)	
Gov_centr_t		0.017*		0.009		0.022
		(1.84)		(0.52)		(0.15)
Gov_local_t		0.026***		0.030***		0.187**
		(2.88)		(2.89)		(2.44)
$SIZE_{t-1}$	0.017***	0.017***	0.019	0.020	-0.025	-0.019
	(3.52)	(3.59)	(1.54)	(1.59)	(-0.42)	(-0.32)
ROA_t	-0.020	-0.021	-0.125	-0.127	-1.251***	-1.252***
	(-0.29)	(-0.30)	(-0.81)	(-0.83)	(-8.32)	(-8.30)
MB_{t-1}	0.005***	0.005***	0.013***	0.013***	0.006	0.007
	(3.13)	(3.13)	(4.48)	(4.53)	(0.33)	(0.38)
LEV_{t-1}	-0.038*	-0.039*	-0.068	-0.071	0.010	-0.007
	(-1.76)	(-1.81)	(-1.48)	(-1.54)	(0.04)	(-0.03)
$DTURN_{t-1}$	-0.020	-0.021	-0.045	-0.046	-0.143	-0.150
	(-0.93)	(-0.94)	(-1.13)	(-1.15)	(-0.52)	(-0.54)
$NCSKEW_{t-1}$	0.013***	0.013***	0.042***	0.042***	0.120*	0.118*
	(2.71)	(2.70)	(3.59)	(3.60)	(1.74)	(1.75)
$FSRET_{t-1}$	0.032	0.034	0.057	0.061	-0.199	-0.173
	(0.79)	(0.84)	(0.55)	(0.59)	(-0.75)	(-0.62)
$SIGMA_{t-1}$	0.955	0.977	1.978	2.030	-3.357	-2.949
	(1.34)	(1.39)	(1.40)	(1.44)	(-0.56)	(-0.48)
$ABACC_{t-1}$	0.024	0.025	0.051	0.053	-0.043	-0.030
	(0.58)	(0.60)	(0.68)	(0.71)	(-0.10)	(-0.07)
BH_t	-0.009	-0.009	-0.022	-0.022	0.135	0.139
	(-0.70)	(-0.70)	(-0.79)	(-0.78)	(1.00)	(1.03)
Constant	-0.431***	-0.437***	-0.709**	-0.723**	-2.468**	-2.611**
	(-4.31)	(-4.40)	(-2.22)	(-2.27)	(-2.03)	(-2.16)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-/ Adjusted R^2	0.031	0.031	0.082	0.082	0.036	0.036
No. of Obs.	9,012	9,012	9,012	9,012	9,012	9,012

Table 4

Ultimate controlling shareholders and firm-level information environment

This table reports the impact of different types of ultimate controlling shareholders on firm-level information environment. The dependent variables are earning smoothing ($SMOOTH$), Big 4 auditors ($BIG4$), small local auditors ($SLAD$), and stock price synchronicity ($SYNCH$). Gov, Gov_centr, and Gov_local are indicators that equal one if a firm is ultimately controlled by government entities, the central government, and local governments, respectively, and zero otherwise. Firm characteristics include, the logarithm of total assets ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), and prior three-year moving sum of the absolute value of discretionary accruals ($ABACC$). Stock trading variables include, detrended stock trading volume ($DTURN$), negative skewness of abnormal returns ($NCSKEW$), average abnormal returns ($FSRET$), and standard deviation of abnormal returns ($SIGMA$). All regressions include unreported industry, year, and firm fixed effects. The t-Statistics reported in parentheses are adjusted for both firm and time clustered standard errors. The sample period covers the years 2003 to 2014. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	$SMOOTH_t$		$BIG4_t$		$SLAD_t$		$SYHCH_t$	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Gov_t	0.035***		-0.450		0.260*		0.042*	
	(2.62)		(-1.56)		(1.70)		(1.69)	
Gov_centr_t		0.021		0.040		-0.229		0.032
		(1.53)		(0.12)		(-1.15)		(0.91)
Gov_local_t		0.040**		-0.738**		0.443***		0.046*
		(2.59)		(-2.33)		(2.84)		(1.76)
$Mean\_SIZE_t$	0.019***	0.019***						
	(2.48)	(2.55)						
$Mean\_MB_t$	0.132***	0.134***						
	(2.73)	(2.75)						
$Mean\_LEV_t$	0.107***	0.105***						
	(2.88)	(2.78)						
$Mean\_ROA_t$	2.261***	2.255***						
	(5.05)	(5.04)						
$SIZE_{t-1}$			1.144***	1.105***	-0.084	-0.061	0.128***	0.128***
			(11.37)	(11.08)	(-1.43)	(-1.04)	(3.36)	(3.36)
MB_{t-1}			0.097**	0.089**	-0.029	-0.023	-0.052***	-0.052***
			(2.40)	(2.22)	(-1.63)	(-1.30)	(-8.19)	(-8.19)
LEV_{t-1}			-2.309***	-2.266***	-0.463	-0.569*	-0.141	-0.142
			(-3.46)	(-3.42)	(-1.51)	(-1.84)	(-1.48)	(-1.50)
ROA_t			0.203	0.694	0.264	0.253	0.201**	0.201**
			(0.11)	(0.56)	(0.86)	(0.88)	(3.33)	(3.33)
REC_{t-1}			-0.987	-1.462	-1.082*	-0.718		
			(-0.76)	(-1.07)	(-1.76)	(-1.17)		
$Inventory_{t-1}$			-2.358**	-2.426**	0.315	0.359		
			(2.18)	(2.21)	(0.81)	(0.93)		
$Kurtosis_t$							-0.049***	-0.049***
							(-4.82)	(-4.82)
$Skewness_t$							-0.047**	-0.047**
							(-2.34)	(-2.36)
VAR_INDRET_t							18.072***	18.077***
							(4.50)	(4.50)
Constant	0.314*	0.309*	-28.833***	-27.961***	1.772	1.270	-0.727	-0.731
	(1.68)	(1.67)	(-11.91)	(-11.43)	(1.39)	(0.99)	(-1.14)	(-1.15)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-/ Within R^2	0.100	0.100	0.271	0.286	0.074	0.084	0.313	0.313
No. of Obs.	8,069	8,069	8,757	8,757	8,939	8,939	9,012	9,012

Table 5

Ultimate controlling shareholders and crash risk: controlling for firm fixed effects

This table reports the impact of different types of ultimate controlling shareholders on stock price crash risk after controlling for firm fixed effects. The dependent variables are the crash risk measures $COLLAR$, $NCSKEW$, and $CRASH$. Gov, Gov_centr, and Gov_local are indicators that equal one if a firm is ultimately controlled by government entities, the central government, and local governments, respectively, and zero otherwise. Firm characteristics include, the logarithm of total assets ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), and prior three-year moving sum of the absolute value of discretionary accruals ($ABACC$). Stock trading variables include, detrended stock trading volume ($DTURN$), negative skewness of abnormal returns ($NCSKEW$), average abnormal returns ($FSRET$), and standard deviation of abnormal returns ($SIGMA$). All regressions include unreported industry, year, and firm fixed effects. The t-Statistics reported in parentheses are adjusted for both firm and time clustered standard errors. The sample period covers the years 2003 to 2014. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	$COLLAR_t$		$NCSKEW_t$		$CRASH_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
Gov_t	0.029		0.048		0.112	
	(1.52)		(1.42)		(0.50)	
Gov_centr_t		0.006		-0.034		-0.125
		(0.24)		(-0.73)		(-0.40)
Gov_local_t		0.036*		0.073**		0.189
		(1.80)		(2.09)		(0.81)
$SIZE_{t-1}$	0.019***	0.020***	0.034***	0.035***	0.114	0.118*
	(3.21)	(3.26)	(3.22)	(3.31)	(1.60)	(1.65)
ROA_t	-0.102	-0.101	-0.235*	-0.233*	-1.764**	-1.755**
	(-1.34)	(-1.33)	(-1.76)	(-1.74)	(-2.04)	(-2.03)
MB_{t-1}	0.004**	0.004**	0.010***	0.010***	0.037*	0.037*
	(2.27)	(2.29)	(3.41)	(3.45)	(1.93)	(1.96)
LEV_{t-1}	-0.046	-0.047	-0.137**	-0.140**	-0.574	-0.586
	(-1.45)	(-1.47)	(-2.42)	(-2.48)	(-1.46)	(-1.49)
$DTURN_{t-1}$	-0.026	-0.026	-0.047	-0.048	-0.102	-0.105
	(-1.43)	(-1.45)	(-1.46)	(-1.50)	(-0.43)	(-0.44)
$NCSKEW_{t-1}$	-0.024***	-0.024***	-0.059***	-0.059***	-0.244***	-0.249***
	(-3.76)	(-3.78)	(-5.31)	(-5.35)	(-3.34)	(-3.39)
$FSRET_{t-1}$	0.027	0.028	0.012	0.014	-0.763	-0.763
	(0.56)	(0.57)	(0.15)	(0.16)	(-1.63)	(-1.63)
$SIGMA_{t-1}$	1.051**	1.058**	1.605*	1.630*	-5.405	-5.386
	(2.10)	(2.11)	(1.81)	(1.84)	(-0.88)	(-0.88)
$ABACC_{t-1}$	0.076**	0.076**	0.176***	0.175***	0.168	0.168
	(2.13)	(2.12)	(2.78)	(2.77)	(0.37)	(0.37)
Constant	-0.402**	-0.406**	-0.845***	-0.860***		
	(-2.28)	(-2.30)	(-2.71)	(-2.76)		
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-/ Within R^2	0.036	0.036	0.093	0.094	0.080	0.081
No. of Obs.	9,012	9,012	9,012	9,012	9,012	9,012

Table 5 Panel B Lagged ownership
Robustness checks

This table presents various robustness tests on the impact ultimate ownership on crash risk. Panel A uses one-year lagged ownership variables; Panel B uses tradable market capitalization weighted market and industry indices to compute abnormal returns; Panel C excludes firms with less than 50 weeks trading information; Panel D uses alternative crash risk measures. The dependent variables are the crash risk measures $COLLAR$, $NCSKEW$, and $CRASH$. Gov, Gov_centr, and Gov_local are indicators that equal one if a firm is ultimately controlled by government entities, the central government, and local governments, respectively, and zero otherwise. Firm characteristics include, the logarithm of total assets ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), prior three-year moving sum of the absolute value of discretionary accruals ($ABACC$), and B/H-shares (BH). Stock trading variables include, detrended stock trading volume ($DTURN$), negative skewness of abnormal returns ($NCSKEW$), average abnormal returns ($FSRET$), and standard deviation of abnormal returns ($SIGMA$). All regressions include unreported industry- and year-fixed effects. The t-Statistics reported in parentheses are adjusted for both firm and time clustered standard errors. The sample period covers the years 2003 to 2014. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Lagged ownership

	$COLLAR_t$		$NCSKEW_t$		$CRASH_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
Gov_{t-1}	0.021***		0.024**		0.097	
	(3.44)		(2.35)		(1.23)	
Gov_centr_{t-1}		0.016*		0.017		0.019
		(1.90)		(1.01)		(0.13)
Gov_local_{t-1}		0.023***		0.026***		0.126*
		(3.40)		(2.79)		(1.75)
$SIZE_{t-1}$	0.017***	0.017***	0.019	0.020	-0.024	-0.020
	(3.61)	(3.70)	(1.54)	(1.56)	(-0.40)	(-0.33)
ROA_t	-0.026	-0.026	-0.137	-0.137	-1.302***	-1.304***
	(-0.38)	(-0.38)	(-0.87)	(-0.88)	(-7.39)	(-7.39)
MB_{t-1}	0.005***	0.005***	0.013***	0.013***	0.006	0.007
	(3.15)	(3.16)	(4.47)	(4.52)	(0.32)	(0.36)
LEV_{t-1}	-0.038*	-0.039*	-0.069	-0.070	0.008	-0.004
	(-1.76)	(-1.83)	(-1.50)	(-1.53)	(0.04)	(-0.02)
$DTURN_{t-1}$	-0.020	-0.021	-0.045	-0.045	-0.146	-0.149
	(-0.93)	(-0.94)	(-1.13)	(-1.14)	(-0.53)	(-0.54)
$NCSKEW_{t-1}$	0.013***	0.013***	0.042***	0.042***	0.117*	0.116*
	(2.71)	(2.71)	(3.59)	(3.58)	(1.72)	(1.71)
$FSRET_{t-1}$	0.033	0.034	0.058	0.059	-0.182	-0.166
	(0.82)	(0.85)	(0.56)	(0.57)	(-0.67)	(-0.59)
$SIGMA_{t-1}$	0.956	0.969	1.979	1.997	-3.226	-2.982
	(1.35)	(1.38)	(1.40)	(1.42)	(-0.54)	(-0.49)
$ABACC_{t-1}$	0.023	0.024	0.051	0.052	-0.046	-0.037
	(0.57)	(0.58)	(0.70)	(0.71)	(-0.11)	(-0.09)
BH_t	-0.008	-0.008	-0.021	-0.021	0.142	0.144
	(-0.65)	(-0.64)	(-0.76)	(-0.76)	(1.05)	(1.07)
Constant	-0.423***	-0.426***	-0.693**	-0.698**	-2.501**	-2.595**
	(-3.56)	(-3.63)	(-2.13)	(-2.14)	(-2.05)	(-2.14)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-/ Adjusted R^2	0.030	0.030	0.082	0.082	0.035	0.035
No. of Obs.	9,009	9,009	9,009	9,009	9,009	9,009

Table 5

The change of ownership control and crash risk: t-Test

This table shows the univariate results on the impact of ultimate ownership changes on crash risk. The event sample consists of firms that experienced ultimate ownership switches between government owners and private owners during out sample period. For each event firm, we find a matching firm in the year prior to the ownership switch, i.e., a firm with the same kind of ultimate ownership, operating in the same industry, and closest in firm size but with no change in ultimate ownership during our sample period. The control sample consists of all matching firms. D_COLLAR, D_NCSKEW, and D_CRASH denote the changes in crash risk surrounding the event year. They are computed as $year_{(t+1)}$ - $year_{(t-1)}$ for ownership switches from government to private and as $year_{(t-1)}$ - $year_{(t+1)}$ for switches from private to government. The differences in the changes of crash risk between the event sample and the control sample, the t-statistics associated with these differences, and the number of ownership changes are reported in the last 3 columns. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Average Crash Risk Change		Difference	t-Test of (1)-(2)	N
	Event Sample(1)	Control Sample(2)	(1)-(2)		
Panel A: D_COLLAR					
Gov-Private	-0.061	0.054	-0.114	-2.485**	148
Gov_centr-Private	-0.028	0.063	-0.091	-0.914	30
Gov_local-Private	-0.069	0.050	-0.119	-2.313**	118
Panel B: D_NCSKEW					
Gov-Private	-0.170	0.045	-0.215	-2.252**	148
Gov_centr-Private	0.064	0.104	-0.040	-0.195	30
Gov_local-Private	-0.230	0.031	-0.260	-2.411**	118
Panel C: D_CRASH					
Gov-Private	-0.061	0.034	-0.095	-2.419**	148
Gov_centr-Private	0.068	0.068	0.000	0.000	30
Gov_local-Private	-0.076	0.042	-0.118	-2.782***	118

Table 6

The change of ownership control and crash risk: regression results

This table reports the regression results for the effect of ultimate ownership changes on crash risk. The sample includes both event firms and matching firms. Event firms are those that experienced ultimate ownership switches between government owners and private owners during out sample period. For each event firm, we find a matching firm in the year prior to the ownership switch, i.e., a firm with the same kind of ultimate ownership, operating in the same industry, and closest in firm size but with no change in ultimate ownership during our sample period. The dependent variables are the changes in crash risk surrounding the event year, denoted as D_COLLAR, D_NCSKEW, and D_CRASH. They are computed as $year_{(t+1)} - year_{(t-1)}$ for ownership switches from government to private and as $year_{(t-1)} - year_{(t+1)}$ for switches from private to government. $Gov-Private$, $Gov\_centr-Private$, and $Gov\_local-Private$ are dummy variables that equal one for event firms that have experienced ultimate ownership change between government and private, between central government and private, and between local government and private, respectively, and zero for control firms that have no change in ultimate ownership. Control variables include changes in firm characteristics such as firm size (D_SIZE), return on assets (D_ROA), market-to-book ratio (D_MB), leverage ratio (LEV), prior three-year moving sum of the absolute value of discretionary accruals (D_ABACC), detrended stock trading volume (D_DTURN), average abnormal returns (D_FSRET), and standard deviation of abnormal returns (D_SIGMA). All regressions include unreported industry- and year-fixed effects. Huber-White robust t-Statistics are reported in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	D_COLLAR			D_NCSKEW			D_CRASH		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Gov-Private$	-0.122***			-0.228**			-0.089**		
	(-2.68)			(-2.31)			(-2.26)		
$Gov\_centr-Private$		-0.155			-0.127			-0.002	
		(-1.58)			(-0.72)			(-0.02)	
$Gov\_local-Private$			-0.128**			-0.265**			-0.115***
			(-2.54)			(-2.36)			(-2.68)
D_SIZE	0.031	-0.172	0.023	0.043	-0.173	0.034	-0.017	-0.126	-0.012
	(0.78)	(-1.02)	(0.51)	(0.49)	(-0.61)	(0.36)	(-0.71)	(-1.46)	(-0.54)
D_ROA	0.286	0.875	0.062	0.601	3.151***	0.028	0.144	1.189*	0.022
	(1.26)	(1.37)	(0.26)	(1.21)	(3.56)	(0.05)	(1.07)	(1.95)	(0.14)
D_MB	0.002	0.020*	0.001	-0.004	0.062***	-0.011	0.002	0.019*	0.002
	(0.32)	(2.01)	(0.08)	(-0.34)	(3.51)	(-0.73)	(0.48)	(1.81)	(0.37)
D_LEV	0.189	0.625	0.179	-0.231	1.437*	-0.253	0.040	0.933**	-0.027
	(1.36)	(1.33)	(1.08)	(-0.72)	(1.72)	(-0.71)	(0.35)	(2.13)	(-0.22)
D_DTURN	-0.144**	-0.185	-0.066	-0.222*	-0.034	-0.095	-0.017	0.503**	-0.045
	(-2.26)	(-0.76)	(-1.03)	(-1.67)	(-0.07)	(-0.66)	(-0.41)	(2.10)	(-0.99)
D_FSRET	0.101	-0.829	-0.097	-0.565	-4.143*	-0.756*	-0.196	-0.492	-0.096
	(0.61)	(-0.64)	(-0.46)	(-1.63)	(-1.97)	(-1.72)	(-1.42)	(-0.45)	(-0.66)
D_SIGMA	0.658	-4.218	-2.178	-1.823	-27.235**	-4.751	-2.866*	-11.838	-1.373
	(0.32)	(-0.50)	(-0.82)	(-0.43)	(-2.15)	(-0.88)	(-1.74)	(-1.45)	(-0.81)
D_ABACC	-0.139	-0.328	0.056	-0.259	-0.303	0.042	-0.108	-0.383	0.072
	(-0.66)	(-1.03)	(0.20)	(-0.54)	(-0.41)	(0.07)	(-0.66)	(-1.17)	(0.50)
Constant	-0.591**	0.207	-0.217	-1.243**	0.240	-0.927	-1.005***	-0.152	-0.850***
	(-2.31)	(0.53)	(-0.63)	(-2.20)	(0.29)	(-1.52)	(-5.52)	(-0.44)	(-5.47)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.024	0.162	0.042	0.001	0.267	0.001	0.044	0.131	0.055
No. of Obs.	296	60	236	296	60	236	296	60	236

Table 8

The split-share structure reform and crash risk

This table reports the impact of the split-share structure reform on stock price crash risk. The dependent variables are crash risk measures $COLLAR$, $NCSKEW$, and $CRASH$. The indicator variable, $Reform$, equals one for the years after a firm has completed the reform and zero otherwise. *Gov*, *Gov_centr*, and *Gov_local* are indicators that equal one if a firm is ultimately controlled by government entities, the central government, and local governments, respectively, and zero otherwise. Firm characteristics include, the logarithm of total assets ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), prior three-year moving sum of the absolute value of discretionary accruals ($ABACC$), and B/H-shares (BH). Stock trading variables include, detrended stock trading volume ($DTURN$), negative skewness of abnormal returns ($NCSKEW$), average abnormal returns ($FSRET$), and standard deviation of abnormal returns ($SIGMA$). All regressions include unreported industry- and year-fixed effects. The t-Statistics reported in parentheses are adjusted for both firm and time clustered standard errors. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	$COLLAR_t$			$NCSKEW_t$			$CRASH_t$		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
$Reform$	-0.094***	-0.124***	-0.128***	-0.232***	-0.269***	-0.261***	-1.225***	-1.507***	-1.515***
	(-12.61)	(-9.40)	(-8.15)	(-12.19)	(-8.52)	(-5.89)	(-21.88)	(-11.81)	(-9.55)
$Reform \times Gov_t$		0.039***			0.043			0.373**	
		(2.66)			(1.56)			(2.28)	
$Reform \times Gov\_centr_t$			0.012			-0.029			-0.086
			(0.55)			(-0.48)			(-0.24)
$Reform \times Gov\_local_t$			0.048***			0.068***			0.509***
			(2.75)			(3.13)			(3.68)
Gov_t		-0.009			-0.067**			0.111	
		(-1.48)			(-2.30)			(1.19)	
Gov_centr_t			-0.011			-0.042			0.190
			(-0.70)			(-0.71)			(1.30)
Gov_local_t			-0.008			-0.076***			0.083
			(-0.72)			(-3.44)			(0.71)
$SIZE_{t-1}$	0.019***	0.018**	0.019***	0.022	0.026	0.028	-0.104*	-0.127**	-0.119**
	(2.76)	(2.50)	(2.62)	(1.14)	(1.29)	(1.37)	(-1.81)	(-2.21)	(-2.07)
ROA_t	-0.335***	-0.333***	-0.337***	-0.650***	-0.654***	-0.666***	-2.703***	-2.686***	-2.742***
	(-4.01)	(-4.06)	(-4.16)	(-4.19)	(-4.19)	(-4.23)	(-4.66)	(-4.67)	(-4.79)
MB_{t-1}	0.057**	0.057**	0.059**	0.079**	0.078**	0.081**	0.313***	0.310***	0.329***
	(2.35)	(2.35)	(2.43)	(2.31)	(2.33)	(2.43)	(2.85)	(2.76)	(2.99)
LEV_{t-1}	-0.072*	-0.071*	-0.075*	-0.070	-0.085	-0.087	0.121	0.170	0.150
	(-1.79)	(-1.73)	(-1.76)	(-1.00)	(-1.15)	(-1.12)	(0.55)	(0.81)	(0.68)
$DTURN_{t-1}$	-0.029	-0.028	-0.031	-0.060	-0.060	-0.066	-0.454	-0.397	-0.460
	(-0.50)	(-0.47)	(-0.53)	(-0.64)	(-0.65)	(-0.73)	(-1.31)	(-1.12)	(-1.27)
$NCSKEW_{t-1}$	0.010	0.009	0.009	-0.007	-0.008	-0.008	0.183***	0.182***	0.182***
	(0.91)	(0.86)	(0.84)	(-0.27)	(-0.30)	(-0.31)	(2.58)	(2.69)	(2.64)
$FSRET_{t-1}$	-0.019	-0.022	-0.022	-0.220**	-0.216*	-0.218*	0.382	0.273	0.239
	(-0.38)	(-0.44)	(-0.44)	(-1.98)	(-1.92)	(-1.93)	(0.43)	(0.33)	(0.30)
$SIGMA_{t-1}$	-0.228	-0.216	-0.215	-2.331	-2.265	-2.305	-6.203	-6.756	-6.912
	(-0.27)	(-0.26)	(-0.26)	(-1.14)	(-1.10)	(-1.11)	(-0.46)	(-0.50)	(-0.51)
$ABACC_{t-1}$	0.008	0.009	0.019	0.068	0.057	0.067	0.234	0.278	0.338
	(0.27)	(0.34)	(0.73)	(1.11)	(1.02)	(1.17)	(0.71)	(0.85)	(0.93)
BH_t	-0.001	-0.003	-0.000	-0.047	-0.040	-0.039	0.355	0.318	0.322
	(-0.06)	(-0.14)	(-0.01)	(-1.56)	(-1.23)	(-1.19)	(0.88)	(0.80)	(0.79)
Constant	-0.445**	-0.418**	-0.437**	-0.591	-0.600	-0.631	0.126	0.542	0.526
	(-2.52)	(-2.28)	(-2.37)	(-1.16)	(-1.17)	(-1.24)	(0.09)	(0.36)	(0.34)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-/ Adjusted R^2	0.021	0.021	0.021	0.055	0.055	0.055	0.063	0.065	0.065
No. of Obs.	2,488	2,488	2,488	2,488	2,488	2,488	2,488	2,488	2,488

Table 9

The impact of political connections

This table shows the impact of political connections on the relationship between ultimate ownership and crash risk. The dependent variables are crash risk measures $COLLAR$, $NCSKEW$, and $CRASH$. PCs represents the political connection index. Gov, Gov_centr, and Gov_local are indicators that equal one if a firm is ultimately controlled by government entities, the central government, and local governments, respectively, and zero otherwise. Firm characteristics include, the logarithm of total assets ($SIZE$), return on assets (ROA), market-to-book ratio (MB), leverage ratio (LEV), prior three-year moving sum of the absolute value of discretionary accruals ($ABACC$), and B/H-shares (BH). Stock trading variables include, detrended stock trading volume ($DTURN$), negative skewness of abnormal returns ($NCSKEW$), average abnormal returns ($FSRET$), and standard deviation of abnormal returns ($SIGMA$). All regressions include unreported industry- and year-fixed effects. The t-Statistics reported in parentheses are adjusted for both firm and time clustered standard errors. The sample period covers the years 2003 to 2014. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	$COLLAR_t$		$NCSKEW_t$		$CRASH_t$	
	(1)	(2)	(3)	(4)	(5)	(6)
$PCs_t \times Gov_t$	0.153**		0.289**		1.799*	
	(1.99)		(2.21)		(1.92)	
$PCs_t \times Gov\_centr_t$		0.150		0.369**		1.542
		(1.54)		(2.35)		(1.25)
$PCs_t \times Gov\_local_t$		0.153**		0.251**		1.878**
		(2.13)		(2.01)		(2.02)
PCs_t	-0.102	-0.102	-0.149	-0.150	-1.361	-1.367
	(-1.58)	(-1.58)	(-1.15)	(-1.16)	(-1.57)	(-1.58)
Gov_t	0.000		-0.026		-0.118	
	(0.00)		(-1.16)		(-0.78)	
Gov_centr_t		-0.005		-0.055**		-0.194
		(-0.28)		(-2.11)		(-0.86)
Gov_local_t		0.002		-0.013		-0.088
		(0.14)		(-0.54)		(-0.58)
$SIZE_{t-1}$	0.017***	0.017***	0.019	0.020	-0.025	-0.019
	(3.54)	(3.63)	(1.57)	(1.63)	(-0.41)	(-0.31)
ROA_t	-0.016	-0.017	-0.075	-0.075	-1.214***	-1.223***
	(-0.23)	(-0.24)	(-0.54)	(-0.55)	(-7.85)	(-8.17)
MB_{t-1}	0.005***	0.005***	0.013***	0.013***	0.006	0.007
	(3.05)	(3.05)	(4.49)	(4.56)	(0.31)	(0.36)
LEV_{t-1}	-0.037*	-0.038*	-0.063	-0.066	0.024	0.009
	(-1.73)	(-1.77)	(-1.38)	(-1.45)	(0.11)	(0.04)
$DTURN_{t-1}$	-0.021	-0.021	-0.046	-0.047	-0.153	-0.159
	(-0.97)	(-0.98)	(-1.35)	(-1.36)	(-0.55)	(-0.57)
$NCSKEW_{t-1}$	0.013***	0.013***	0.032***	0.032***	0.118*	0.116*
	(2.74)	(2.72)	(2.74)	(2.76)	(1.69)	(1.69)
$FSRET_{t-1}$	0.035	0.036	0.078	0.082	-0.171	-0.146
	(0.83)	(0.88)	(0.68)	(0.71)	(-0.64)	(-0.53)
$SIGMA_{t-1}$	0.990	1.009	1.883	1.934	-2.963	-2.564
	(1.38)	(1.42)	(1.32)	(1.36)	(-0.49)	(-0.42)
$ABACC_{t-1}$	0.021	0.022	0.062	0.064	-0.071	-0.058
	(0.51)	(0.52)	(0.83)	(0.86)	(-0.17)	(-0.14)
BH_t	-0.008	-0.008	-0.019	-0.019	0.141	0.143
	(-0.62)	(-0.62)	(-0.66)	(-0.66)	(1.02)	(1.05)
Constant	-0.412***	-0.418***	-0.715**	-0.730**	-2.299*	-2.450**
	(-4.25)	(-4.34)	(-2.39)	(-2.44)	(-1.87)	(-2.00)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Pseudo-/ Adjusted R^2	0.031	0.031	0.075	0.075	0.038	0.038
No. of Obs.	9,012	9,012	9,012	9,012	9,012	9,012