Ultimate government control and stock price crash risk: Evidence from China

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ARTICLE INFO	ABSTRACT
	Using data of Chinese firms over 2004–2018, we find that firms controlled by government entities, particularly central government entities, are less prone to stock price crashes, as compared with privately controlled firms. The effect is robust to alternative estimation approaches and moderated by the Split-share Structure Reform and the anti-corruption campaign. The results attest to the incentive alignment view that controlling and minority shareholders align their interests and stock prices perform well. Further, we find that government-controlled firms exhibit less financial opacity, undertake less risky investments, and appoint myopic CEOs, through which stock price crash risk is diminished.

1. Introduction

Over the past three decades, emerging markets have been improving corporate governance with a strong focus on the role of ownership structure and leading research globally by focusing on deep issues of ownership structure, property rights and organizational forms (Ararat et al., 2021). Firms in emerging markets are mostly ultimately controlled by a single shareholder or an interest group, such as governments, families or financial institutions, who maintain their control rights by using pyramids and participating in management (Aminadav and Papaioannou, 2020; Carney and Child, 2013; Claessens et al., 2000; Faccio and Lang, 2002; Gul et al., 2010; La Porta et al., 1999).[1] Recently corporate ownership concentration has become significant in the U.S. and other advanced markets as well (Ararat et al., 2021). An important issue thus arises as to whether the concentrated ownership enhances firm value in a universal sense, which lacks systematic evidence yet (Holderness, 2017). In this study, we attempt to tackle this issue through the lens of how a particular type of controlling ownership affects firms' future risks, which depends on managerial incentives versus entrenched effects (Boubakri et al., 2018; Claessens et al., 2002).

We pay special attention to the type of government controlling ownership, as governments have become more sophisticated owners and the most powerful shareholders across much of the developing world.[2] Even in many industrialized economies, government bailouts during the recent global financial crisis and the rise of state ownership after the crisis intrigue discussions on the costs and

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benefits of government ownership (Beuselinck et al., 2017; Borisova et al., 2015; Boubakri et al., 2018).[3] In particular, the waves of privatization and nationalization raise on-going debates on the role of government ownership. Despite the ample evidence for the role of government ownership in corporate financing, investments and market value, less is known about how it affects stock price crash risk.[4] The objective of this paper is thus to address the debates from the effects of government ownership on stock price crash risk.

Stock price crash risk, namely, extremely negative returns, has been attributed to managerial bad news hoarding (Hutton et al., 2009; Jin and Myers, 2006). When the accumulated bad news is released to the market all at once, it results in stock price crashes. To wit, the conflicts between self-interested managers and outside investors are a fundamental driver of the crash risk. In this vein, a large body of literature has documented the determinants of crash risk from firm-level characteristics, such as financial reporting opacity and corporate social responsibility (Hutton et al., 2009; Kim et al., 2014), managerial incentives, such as equity incentives and tournament incentives (Kim et al., 2011a; Sun et al., 2019), CEO background characteristics, such as early-life disaster experience and CEO power (Al Mamun et al., 2020; Chen et al., 2021), and external environment, such as the corruption crackdown, corporate board reform, and social trust (Chen et al., 2018b; Hu et al., 2020a; Li et al., 2017). There is limited evidence for the effects of corporate ownership structure on crash risk, especially centering on the government controlling ownership. This paper thus sheds lights on the determinants of crash risk from ultimate government control.

A priori, it is unclear how ultimate government control might affect crash risk. Under the entrenchment view, controlling shareholders expropriate minority shareholders' interests through tunneling, paying high executive compensation, and outright theft (Bertrand et al., 2002; Jiang et al., 2010; Shleifer and Vishny, 1997). Thus, controlling shareholders have an incentive to conceal opportunistic behaviors and disclose less firm-specific information, leading to stock price crashes (Boubaker et al., 2014). Government controlling shareholders, like other types of controlling shareholders, may exacerbate agency problems between controlling and minority shareholders and affect managerial incentives, which undermine firms' information environment and stock returns (Boubaker et al., 2014; Gompers et al., 2010).[5] In particular, government controlling shareholders have an incentive to pursue socio-political objectives, such as the avoidance of mass layoffs, at the expense of minority shareholders' interests (Chen et al., 2017b; Hsu et al., 2020). Because politicians' incentives to monitor managers are poor (Vickers and Yarrow, 1991), corporate insiders in government-controlled firms may manipulate firm-specific information, such as hasten the recognition of good news and delay bad news (Bushman and Piotroski, 2006). Consistent with the entrenchment view, Liang et al. (2020) claim that government controlling ownership increases crash risk.

Under the incentive alignment view, controlling and minority shareholders align their interests and stock prices perform well, especially during financial crises (Mitton, 2002). Thus, controlling shareholders disclose more and better firm-specific information and reduce stock price crash risk when they own a large fraction of cash flow rights (Boubaker et al., 2014). Consistent with this view, Boubakri et al. (2018) provide strong and robust evidence for that government-owned firms exhibit higher market valuation than non-government-owned firms in nine East Asian countries. Beuselinck et al. (2017) show that European firms with government ownership experience a smaller reduction in stock price than firms without government ownership over the global financial crisis period. More recently, Hsu et al. (2020) argue that state-owned enterprises (SOEs) are able to efficiently resolve market failures and externalities, such as employment, price stability, infrastructure and environmental issues, and provide evidence for that SOEs engage more in environmental issues and social issues. Those studies suggest that governments are unique and different from other blockholders. How government ownership affects firm performance depends on institutional development, such as voids in product, labor and financial markets (Musacchino et al., 2015). Consequently, it becomes an empirical issue to assess the net effect of ultimate government control on crash risk.[6]

Further, government control shapes managerial decisions and behaviors, through which it may affect crash risk in uncertain directions. Firstly, government ownership affects managers' financial reporting behaviors. According to Guedhami et al. (2009), state ownership is inversely related to financial reporting quality and transparency, suggesting a positive relationship between government control and crash risk. On the contrary, Chinese SOEs are found to have lower levels of earnings management and financial frauds (Chen et al., 2006; Li et al., 2021), because managers of SOEs pursue political incentives and have less incentive to sustain high stock prices (Chen et al., 2018a). Second, government-controlled companies tend to undertake conservative investments (Fogel et al., 2008), suggesting that politicians and managers are risk-averse and companies are less risk-taking (Boubakri et al., 2013). Risk-averse managers of SOEs are less likely to engage in high-risk projects and thus reduce stock price crash risk (Chen et al., 2018a). Third, those risk-averse or conservative managers of SOEs are likely to pursue short-term results that serve their own interests, such as promotions within the political ranking system (Chen et al., 2018a). Thus, managers of SOEs tend to become myopic or have short decision horizons (Antia et al., 2010). Again, it is an empirical matter to test the channels through which government control affects stock price crash risk.

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[3] As a large body of literature documents the performance improvements after state-owned firms are privatized, it is puzzling to see the increasing rather than decreasing of the state ownership of corporate equity.

[4] See, for example, Beuselinck et al. (2017), Boubakri et al. (2018), Chen et al. (2011), Chen et al., 2017a, and Faccio et al. (2006) among many others, for the effects of government ownership on corporate decisions and valuation.

[5] A large body of literature has documented the poor performance and low economic inefficiency of government ownership, see, for example, Bortolotti and Faccio (2009), Chen et al., 2017b, Megginson and Netter (2001), and Shleifer (1998).

[6] Recently, Liang et al. (2020) emphasize the agency problem between controlling shareholders and minority shareholders, as well as the costs of government ownership, and hypothesize a positive association between government control and stock price crash risk a priori. They find supportive evidence using a balanced panel data set of 751 Chinese firms over 2003–2014.

This paper thus empirically tests how ultimate government ownership affects stock price crash risk using data of Chinese firms. We choose China as our experimental setting for the following reasons. First, government ownership is still pervasive and dominant among Chinese firms, particularly in industries such as natural resources, civil aviation, real estate and finance, although private firms have been growing in number and made a big contribution to China's economic growth (Chen et al., 2011; Gul et al., 2010). In our sample, state-owned enterprises account for 68% in 2003 and 29% in 2017, suggesting that government ownership remains influential. The reduction in government ownership is due to the Split-share Structure Reform initiated in 2005.[7] Second, during our sample period, the Chinese market experienced two important events, the Split-share Structure Reform in 2005 and the anti-corruption campaign in 2012, which represent exogenous shocks to corporate governance or political objectives and align the interests of government entities and those of minority shareholders (Chen et al., 2018b; Liao et al., 2014). The two reforms can be employed as quasi-natural experiments to distinguish between the entrenchment effect and the incentive alignment effect.

We construct three measures of stock price crash risk, which are the negative skewness of firm-specific weekly returns, the volatility ratio of negative and positive firm-specific weekly returns, and a crash dummy, following previous literature (Hutton et al., 2009; Kim et al., 2014). We adopt La Porta et al. (1999)'s approach to track down the ultimate government ownership and identify firms ultimately controlled by government entities, which are further categorized into central versus local (i.e., province, city and county) government entities.[8] Thus, we create three dummy variables to distinguish government-controlled, central and local government-controlled firms from privately controlled firms, which are ultimately controlled by entrepreneurs, foreign companies, communities and collectives. With the two sets of variables, we examine the impacts of ultimate government ownership on crash risk as well as possible impacting channels.

The main findings are twofold. First, government-controlled firms show lower future crash risk than privately controlled firms. The effect is more pronounced among central government-controlled firms. The findings are robust after controlling for the stock market disaster, macro-level variables, market hysteresis, firm fixed effects, and a variety of corporate governance variables. The endogeneity concerns are addressed by a principal score matched sample, an instrumental variable approach, and difference-in-difference analyses. Particularly, the effect of government control is moderated by the Split-share Structure Reform and the effect of central government control is moderated by the anti-corruption campaign, attesting to the incentive alignment view. Second, we find that government-controlled firms exhibit less financial opacity, undertake less risky investments, and appoint myopic CEOs, through which stock price crash risk is diminished. Overall, the results suggest that government-controlled firms hoard less bad news, resulting in lower stock price crash risk.

This paper contributes to the literature in several ways. First, this study adds to the literature on how ownership concentration affects firms' future risks. The ownership concentration varies across countries and across firms in each country and controlling shareholders are generally classified into governments, families, and financial institutions (Aminadav and Papaioannou, 2020). In a closely related paper, Boubaker et al. (2014) examine the effect of large controlling shareholders on crash risk but do not distinguish state controlling shareholders from other types of controlling shareholders. We focus on the state controlling ownership and maintain that state shareholders are unique and different from other blockholders. More importantly, we find that the excess control of government controlling shareholders do not contribute to higher stock price crash risk, which distinguishes our study from Boubaker et al. (2014).

Second, this study adds evidence to the debates on the benefits and costs of government ownership from the perspective of its reduction effect on stock price crash risk. As documented in prior literature, government ownership can be detrimental to firms' value and resource allocation efficiency, because it exacerbates agency problems and information asymmetry (Boycko et al., 1996; Chen et al., 2017b). Meanwhile, government ownership also brings benefits, such as facilitating access to debt financing, providing explicit and implicit guarantees to bank loans, and bailing out firms in times of distress (Borisova et al., 2015; Faccio et al., 2006). This paper addresses the debates by providing evidence for that government controlling ownership reduces stock price crash risk and that the reduction effect is more pronounced among central government-controlled firms and after the reforms that strengthen the corporate governance system.

Third, this paper contributes to the literature on the determinants of stock price crash risk. Prior literature document the determinants of crash risk including firm-level characteristics, managerial incentives, and external environment (see, for example, Chen et al., 2018a, 2018b; Hu et al., 2020b; Hutton et al., 2009; Kim et al., 2011a; Kim et al., 2014; Li et al., 2017; Sun et al., 2019). This paper provides evidence for how ultimate government control determines crash risk. More importantly, we find that government-controlled firms exhibit less financial opacity, undertake less risky investments, and appoint myopic CEOs, through which stock price crash risk is diminished. Our results suggest that government control is a more fundamental determinant of crash risk, at least among Chinese firms.

The rest of the paper is structured as follows. Section 2 reviews relevant literature and develops hypotheses. Section 3 describes data and variables, followed by empirical results presented in Section 4. Finally, Section 5 concludes.

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[7] The goal of the Split-share Structure Reform is to convert all non-tradable shares into tradable shares. The reform started in April 2005. By the end of 2007, 1254 firms, representing over 97% of the market capitalization in the Chinese A-share market, had completed the reform (Li et al., 2011).

[8] The central and local governments are respectively the first and second layers of agents of the nation.

2. Literature review and hypothesis development

In the agency theory framework, stock price crash risk is rooted in the conflicts of interests between managers and investors. In their model, Jin and Myers (2006) assume that firm-specific information is opaque, or incompletely transparent, and thus managers are able to capture firm's operating cash flows by hiding information from outside investors. The amount of bad news that managers can hide is limited, however. When that amount is encountered, managers give up and all bad news is released to the market at once, resulting in large negative returns, or stock price crashes. Hutton et al. (2009) extend the cross-country study into individual firms, develop a measure of opacity at the firm level, and provide supportive evidence for the positive relationship between opacity and crash risk of individual firms.

Building on the agency conflicts and managers' hoarding of bad news, a burgeoning literature has examined firm-specific determinants of stock price crash risk, especially centering on managerial incentives and monitoring mechanisms. Among many others, Kim et al. (2011a) provide empirical evidence for that CFO option incentives positively forecast stock price crash risk, suggesting that CFOs are influential in bad news hoarding decisions. Kim et al. (2011b) claim that corporate tax avoidance facilitates managerial rent extraction and bad news hoarding behaviors, leading to future stock price crashes. Al Mamun et al. (2020) find that firms with powerful CEOs, who are able to influence corporate decisions, incur higher crash risk. Xu et al. (2014) document a positive relationship between excess perks executives can enjoy and future stock price crash risk, suggesting that executives in state-owned enterprises are incentivized to withhold bad news. In contrast, monitoring mechanisms are deemed to mitigate crash risk. For example, Callen and Fang (2013) assert that institutional ownership by public pension funds is negatively associated with crash risk, because pension funds monitor management more actively. In addition, short selling is found to reduce crash risk, because it facilitates corporate transparency by constraining earnings management (Fang et al., 2016) and disciplining managerial bad news hoarding (Deng et al., 2020). Further, corporate board reforms (Hu et al., 2020b), regional social trust as informal institutions to investor protection (Li et al., 2017), crackdown on political corruption (Chen et al., 2018b), and company visits (Yang et al., 2020) are effective in restraining managerial bad news hoarding behavior and reducing crash risk.

The ownership concentration, as pervasively observed around the world (La Porta et al., 1999), adds another layer of agency costs between controlling shareholders and minority shareholders and creates an important issue particularly in emerging markets (Shleifer and Vishny, 1997). In principle, ownership concentration might have two opposing effects on stock returns, namely, the entrenchment effect versus the incentive alignment effect (Gul et al., 2010). Under the entrenchment effect, controlling shareholders expropriate minority shareholders' interests through tunneling, paying high executive compensation, and outright theft (Bertrand et al., 2002; Jiang et al., 2010; Shleifer and Vishny, 1997). Thus, controlling shareholders have an incentive to conceal opportunistic behaviors and disclose less firm-specific information, leading to stock price crashes (Boubaker et al., 2014). Under the incentive alignment effect, controlling and minority shareholders align their interests and stock prices perform well, especially during financial crises (Mitton, 2002). Thus, controlling shareholders disclose more and better firm-specific information and reduce crash risk when they own a large fraction of cash flow rights (Boubaker et al., 2014).

Corporate ownership in Chinese listed firms is mostly concentrated in the hands of central or local government or government-controlled institutions (Aminadav and Papaioannou, 2020; Gul et al., 2010; Hsu et al., 2020; Jiang et al., 2010). Ex ante, state control might affect stock price crash risk in two different ways. On the one hand, in line with the entrenchment effect, government controlling shareholders, like other types of controlling shareholders, exacerbate agency problems between controlling and minority shareholders and affect managerial incentives, which undermine firms' information environment and stock returns (Boubaker et al., 2014; Gompers et al., 2010). For example, government controlling shareholders have an incentive to pursue socio-political objectives, such as the avoidance of mass layoffs, at the expense of minority shareholders' interests (Chen et al., 2017b; Hsu et al., 2020), resulting in low productivity, poor performance and resource allocation inefficiency (Boycko et al., 1996; Chen et al., 2017b; Shleifer and Vishny, 1994). Controlling shareholders of Chinese SOEs also tunnel through intercorporate loans or related-party transactions (Jiang et al., 2010; Liao et al., 2014). Moreover, politicians' incentives to monitor managers are poor (Vickers and Yarrow, 1991). Managers in politically connected SOEs are likely to pursue private political benefits, such as a promotion to a senior government position, and firms' performance deteriorates (Hung et al., 2012). Consequently, corporate insiders in government-controlled firms may manipulate firm-specific information, such as hasten the recognition of good news and delay bad news (Bushman and Piotroski, 2006). In this vein, Liang et al. (2020) claim that government controlling ownership leads to high crash risk.

On the other hand, attesting to the incentive alignment effect, a strand of literature has documented the benefits of SOEs in emerging markets. Among others, Carney and Child (2013) find that state ownership has become increasingly important to domestic and foreign firms in East Asian countries. Boubakri et al. (2018) provide strong and robust evidence for that SOEs exhibit higher market valuation than private firms in nine East Asian countries. The valuation effect of government ownership, which exists before and during the financial crisis period, is attributed to the financing decisions of SOEs and the discount rate applied by investors to value cash flows. Beuselinck et al. (2017) document that European firms with government ownership experience a smaller reduction in stock price than firms without government ownership during the global financial crisis period, due to the low risk of expropriation by governments. Using a sample of Egyptian firms, Dang and So (2018) find that state ownership, as a political asset neutral to regime changes, reduces equity risk in turmoil and politically connected shareholders expropriate less in the turmoil period. More recently, Hsu et al. (2020) argue that SOEs are able to efficiently resolve market failures and externalities, such as employment, price stability, infrastructure and environmental issues, and provide evidence for that SOEs engage more in environmental issues and social issues. Those studies suggest that governments are unique and different from other blockholders. How government ownership affects firm performance depends on institutional development, such as voids in product, labor and financial markets (Musacchino et al., 2015). If governments expropriate less of firms' assets, which is the case especially during a crisis (Friedman et al., 2003), then government-

controlled firms are less likely to experience default and stock price crashes.

Even in developed economies, government intervention can support firms and markets by its coercive power under certain circumstances, such as financial crises. For example, the increase in government ownership could possibly enhance monitoring and improve corporate governance policies, especially in common law countries (Borisova et al., 2012). Although government ownership generally increases the cost of debt and distorts investments during non-crisis years, it reduces cost of debt during financial crises for firms that are more likely to be distressed, by offering implicit debt guarantees against default (Borisova et al., 2015). Relatedly, Faccio et al. (2006) find that politically connected firms are more likely to be bailed out than similar nonconnected peers when they confront economic distress, suggesting that governments influence the allocation of capital through financial assistance. In the bailouts, although governments may be the ultimate beneficiaries because they are able to extract rents from firms' stakeholders, still shareholders benefit because their firms can borrow at favorable terms. As financial distress risk increases future stock price crashes (Andreou et al., 2021), it suggests that extremely bad news is less likely to happen to government-controlled firms.

Overall, there is a trade-off between the costs (or entrenchment effect) and benefits (or incentive alignment effect) of government control. The trade-off probably depends on the country's legal and political environment and the state of the economy. As the two competing views lead to different empirical predictions, we propose the first set of hypotheses as follows:

H1a. Under the entrenchment view, ultimate government control is positively related to stock price crash risk.

H1b. Under the incentive alignment view, ultimate government control is negatively related to stock price crash risk.

To further distinguish the two effects, we consider two important and unique events in the Chinese stock market, namely, the Split-share Structure Reform in 2005 and the anti-corruption campaign in 2012. The two events exogenously affect corporate governance and government objectives and better align the interests of government entities with those of minority shareholders, attesting to the incentive alignment effect.

Historically, Chinese SOEs issued minority tradable shares to institutional and individual investors and majority non-tradable shares to the Chinese government (Liao et al., 2014). Tradable shares could be transacted, whereas state-owned non-tradable shares were prohibited from trading in the secondary market before 2005. Such a split-share structure causes divergent interests and incentive conflicts between controlling and minority shareholders (Firth et al., 2010). Particularly, non-tradable shareholders were unable to benefit from capital gains and thus had little incentive to improve firm value (Liao et al., 2014). To resolve those problems, the Chinese government initiated the Split-share Structure Reform in 2005 that converted non-tradable shares into tradable shares. The reform removed the legal and technical obstacles of transferring state-owned shares to public investors and thus aligned the interests of the government and minority shareholders (Lu et al., 2021). As shown in Liao et al. (2014), the output, profit, and employment of SOEs substantially increased after the reform, because government agents provide supportive activities to SOEs. Thus, we propose that the conflicts between government controlling shareholders and minority shareholders are ameliorated after the reform, leading to less bad news hoarding by government shareholders.

Moreover, the Chinese government controls a number of SOEs and faces high costs of monitoring managers. To resolve this problem, the government designates government officials as managers of SOEs, constrains them by the government's commands, and scrutinizes them tightly. As managers of Chinese SOEs are de facto government officials with political ranks, they are keen to seek political promotions by pleasing the sovereign, leading to rent seeking and political corruption (Chen et al., 2018a). Political corruption, defined as the use of power by government officials for private gains, increases managerial incentives and abilities to withhold bad news (Chen et al., 2018b). For example, SOE executives can mask their activities of consuming luxury goods and services or bribing government officials to pursue political promotions. Further, the managerial relationship with government officials generally prevent shareholders from accessing information, and such asymmetric information facilitates managerial bad news hoarding behavior (Hu et al., 2020a). To eliminate the political corruption, the Chinese government has gone through several stages of anti-corruption campaign, of which the most famous one is the anti-corruption campaign initiated in 2012, or more specifically the "Eight-Point Regulation". It provided clear regulations for all government officials and SOE executives, such as restricting spending on domestic and overseas travel, vehicle-related expenses, and entertainment-related expenses. By putting government officials under high scrutiny, the anti-corruption campaign is politically significant to affect the corporate information environment and managerial behaviors (Chen et al., 2018b; Hu et al., 2020a). We thus propose that the anti-corruption campaign alleviates the conflicts between SOE executives and shareholders, resulting in lower stock price crash risk.

Collectively, we employ the two reforms as quasi-natural experiments to address the causality between government ownership and stock price crash risk. The second set of hypotheses is stated as follows:

H2a. The Split-share Structure Reform negatively moderates the effect of ultimate government control on stock price crash risk.

H2b. The anti-corruption campaign negatively moderates the effect of ultimate government control on stock price crash risk.

Next, we explore the channels through which government control affects stock price crash risk. In China, the government appoints top executives in SOEs, many of whom have political connections with current or former government officials or bureaucrats (Chen et al., 2011). Those top executives in SOEs are often representatives of government controlling shareholders and pursuing political rather than economic performance. In other words, their decisions and behaviors are profoundly shaped by the government. Surrounding the managerial outcome of stock price crash risk, we pin down three types of managerial behaviors, namely, financial reporting behavior, risky investments, and CEO decision horizon.

First, state ownership affects managers' financial reporting behaviors. Managers generally have incentives to manipulate earnings and thus increase crash risk, which has been recognized as the informational mechanism (Hutton et al., 2009). State ownership may

undermine firms' financial reporting quality and transparency (Bushman et al., 2004; Guedhami et al., 2009). Chinese SOEs are found to have lower levels of earnings management and financial frauds (Chen et al., 2006; Li et al., 2021), however, mainly because managers of SOEs pursue political incentives and have less incentive to sustain high stock prices (Chen et al., 2018a). We thus propose managerial financial reporting behavior as a channel.

Second, the government might affect managers' risk attitudes and investment behaviors, which materially affect stock price crash risk (Chen et al., 2021). According to Khurana et al. (2018), managers' overinvestment is one real mechanism through which earnings smoothing influences crash risk. When managers' overinvestment is restrained, crash risk can be lowered (Balachandran et al., 2020). Firms' bad performance that managers intend to smooth might come from their failure in operating risky investments, such as innovation activities, which increase the information asymmetry between firms and outsiders (Jia, 2018; Wu and Lai, 2020). Government-controlled companies tend to undertake conservative investments (Fogel et al., 2008), suggesting that politicians and managers are risk-averse and those companies are less risk-taking (Boubakri et al., 2013). Those risk-averse managers are less likely to engage in high-risk projects and able to reduce stock price crash risk, due to career and wealth concerns (Chen et al., 2018a). We thus postulate that managers' risky investment behavior is another possible channel.

Third, the government might also affect managers' investment decision horizon. Managers generally invest less for the long run, probably because they are preoccupied with safety (Hirshleifer and Thakor, 1992). In other words, managers are myopic and have short decision horizons. Particularly, managers approaching retirement age or about to be replaced are likely to undertake myopic behaviors, because they are less concerned with cash flows and risks after the time horizon (Antia et al., 2010; Hambrick and Fukutomi, 1991). Managers of SOEs are more conservative and likely to pursue short-term results that serve their own interests, such as promotions within the political ranking system (Chen et al., 2018a). Thus, managers of SOEs are incentivized to reduce crash risk with their decision horizon.

Collectively, we propose three channels to unveil the effects of government control on stock price crash risk in the Chinese stock market and state the third hypothesis as follows:

H3. Ultimate government control affects stock price crash risk through the channels of managerial financial reporting behavior, risky investments, and decision horizon.

3. Data and variable measurement

3.1. Sample and data

To construct our sample, we begin with all Chinese companies listed in the Shanghai and Shenzhen Stock Exchanges. We obtain the data of stock returns, financial statements, ownership and controlling structure, corporate governance, financial analysts, patents, and CEO attributes from the China Stock Market and Accounting Research Database. As the data of controlling structure (i.e., government controlling interest) has been available since 2003, our estimation of stock price crash risk starts in 2004, which is also the beginning of our sample period. We impose the following screening procedures to construct the final sample: (1) exclude firms with less than 10 trading weeks in each year when estimating crash risk measures; (2) exclude financial firms; (3) exclude firms missing data of key variables; and (4) exclude firms with negative book equity. Our final sample consists of 27,274 firm-year observations over 2004–2018.[9]

3.2. Variables

Following previous literature, we compute three measures of stock price crash risk, the negative skewness, down-to-up volatility of firm-specific weekly returns, and a crash dummy. We distinguish government-controlled versus privately controlled firms by examining the identity of firms' ultimate controlling shareholders. In the regression analyses, we include control variables following Chen et al. (2001) and Kim et al. (2014). Definitions of those variables are provided in Appendix and their construction is detailed as follows.

3.2.1. Measurement of crash risk

We construct three measures of firm-specific stock price crash risk, following prior literature (Chen et al., 2001; Kim et al., 2014). To obtain those measures, we first run the following expanded market model regression for each firm and year:

$$R_{i,t} = \alpha_i + \beta_{1,i}R_{m,t-2} + \beta_{2,i}R_{m,t-1} + \beta_{3,i}R_{m,t} + \beta_{1,i}R_{m,t+1} + \beta_{1,i}R_{m,t+2} + \varepsilon_{i,t} \tag{1}$$

where $R_{i,t}$ is the return on stock i in week t and $R_{m,t}$ is the return on the value-weighted market index in week t. The lead and lag terms of the market index return are included to adjust the effect of nonsynchronous trading (Dimson, 1979). The firm-specific weekly return for firm i in week t is computed as $w_{i,t} = Ln(1 + \varepsilon_{i,t})$, where $\varepsilon_{i,t}$ is the residual return from Eq. (1).

We then compute three measures of firm-specific stock price crash risk based on $w_{i,t}$. The first measure, denoted as NCSKEW, is

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[9] Liang et al. (2020) construct a balanced panel data set and their sample consists of 9012 firm-year observations for 751 firms over the period of 2003–2014. Although a balanced data set might enable the authors to make comparisons over time and cross-sectionally, it also suffers survivorship bias because it excludes firms entering and exiting the panel over the sample period. Thus, our sample is more representative of the Chinese stock market and able to limit the effect of the survivorship bias.

Table 1

Sample distribution.

Year	Obs.	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)	GOV(t)	CENTRAL(t)	LOCAL(t)
2004	1129	0.024	0.008	0.199	0.365	0.035	0.330
2005	1179	−0.044	−0.078	0.174	0.468	0.060	0.408
2006	1246	−0.396	−0.325	0.033	0.463	0.063	0.400
2007	1238	−0.215	−0.233	0.044	0.437	0.064	0.373
2008	1295	−0.056	−0.081	0.100	0.430	0.065	0.365
2009	1401	−0.497	−0.426	0.019	0.423	0.071	0.353
2010	1470	−0.082	−0.115	0.182	0.311	0.054	0.257
2011	1565	−0.231	−0.200	0.102	0.317	0.057	0.260
2012	1916	−0.288	−0.225	0.129	0.274	0.049	0.225
2013	2182	−0.382	−0.283	0.091	0.271	0.049	0.222
2014	2363	−0.293	−0.216	0.080	0.255	0.044	0.210
2015	2347	−0.196	−0.230	0.093	0.264	0.047	0.217
2016	2454	−0.445	−0.354	0.076	0.262	0.047	0.215
2017	2643	−0.100	−0.078	0.142	0.250	0.045	0.205
2018	2846	−0.122	−0.141	0.166	0.233	0.041	0.192
Total	27,274	−0.230	−0.203	0.110	0.311	0.051	0.260

This table presents mean values of the three stock price crash risk measures and percentages of government-controlled firms by year. The sample period starts in 2004 for measures of crash risk and in 2003 for government controlling ownership, and ends in 2018.

calculated by taking the negative of the third moment of $w_{i,t}$ each year and normalizing it by its standard deviation raised to the third power. Specifically, for each firm i in year t, NCSKEW is calculated as:

$$\text{NCSKEW}_{i,t} = -\left[n(n-1)^{\frac{3}{2}} \sum w_{i,t}^3 \right] \Big/ \left[(n-1)(n-2)\left(\sum w_{i,t}^2 \right)^{\frac{3}{2}} \right] \tag{2}$$

where n is the number of weekly returns in year t. A higher value of NCSKEW indicates a higher crash risk.

The second measure is the down-to-up volatility, DUVOL, which is calculated as:

$$\text{DUVOL}_{i,t} = log\left\{ \left[(n_u - 1) \sum_{DOWN} w_{i,t}^2 \right] \Big/ \left[(n_d - 1) \sum_{UP} w_{i,t}^2 \right] \right\} \tag{3}$$

where n_u and n_d are respectively the number of up and down weeks in which the $w_{i,t}$ are above or below its mean in year t. Again, a higher value of DUVOL indicates a higher crash risk.

The third measure is a crash dummy, CRASH. It is equal to one if a firm experiences one or more firm-specific weekly returns falling at least 3.09 standard deviations below its mean value in a given year, and zero otherwise.

3.2.2. Measurement of ultimate government control

We distinguish government-controlled versus privately controlled firms by carefully examining the identity of the ultimate controlling shareholders. To indicate whether a firm is ultimately controlled by the government, we create a dummy variable, GOV, equal to one if firms are controlled by government entities and zero otherwise. We further classify government-controlled firms into central and local government-controlled ones by another two dummy variables. One is CENTRAL, equal to one if firms' controlling shareholders are identified as the Ministry of Finance or the Central Industrial Enterprises Administration Committee, and zero otherwise. Another one is LOCAL, equal to one if firms' controlling shareholders belong to local governments, such as the province, city or county governments, and the Bureau of State Assets Management of the province, city or county, and zero otherwise.

3.2.3. Other variables

In our regression analyses, we consider a rich set of control variables that have been found to impact future stock price crash risk. Those variables include the one-year lagged crash risk measures (NCSKEW(t) and DUVOL(t)), the average monthly share turnover in year t minus the average monthly turnover in year t-1 (DTURN(t)), the average firm-specific weekly returns in year t (RET(t)), the standard deviation of firm-specific weekly returns in year t (SIGMA(t)), the natural logarithm of total assets (SIZE(t)), the percentage of total liabilities over total assets (LEV(t)), the book-to-market equity ratio (BTM(t)), the return on total assets (ROA(t)), and the absolute value of abnormal accruals estimated by the modified Jones model as in Dechow et al., 1995 (ABACC(t)).

We also include a number of internal and external corporate governance variables that are found to impact crash risk in prior studies (Boubaker et al., 2014; Kim et al., 2011a, 2011b). Specifically, the excess control of controlling shareholders, denoted as EXCESS, is calculated as the difference between the voting and cash flow rights divided by voting rights. UCF defines the cash flow rights of the ultimate controlling shareholders. A dummy variable, DUAL, measures whether or not the CEO also serves as the board chair. The size of the independent board, IBOARD, is computed as the percentage of independent board members to the total board members. Additionally, three external corporate governance are financial analyst coverage (ANALYST), institutional ownership (IO (t)), and the Herfindahl-Hirschman index (HHI) based on firms' sales within one-digit CRSC industry code.

To test the three channels, we construct the measures of firms' financial opacity, risky investments, and CEO decision horizon.

Table 2

Summary statistics.

Variable	Obs.	Mean	Std. dev	Min	P25	Median	P75	Max
Crash risk variables								
NCSKEW(t + 1)	27,274	−0.23	0.7	−2.309	−0.612	−0.204	0.177	1.761
DUVOL(t + 1)	27,274	−0.203	0.489	−1.423	−0.526	−0.202	0.112	1.089
CRASH(t + 1)	27,274	0.11	0.313	0	0	0	0	1
Government controlling ownership								
GOV(t)	27,274	0.311	0.463	0	0	0	1	1
CENTRAL(t)	27,274	0.051	0.22	0	0	0	0	1
LOCAL(t)	27,274	0.26	0.439	0	0	0	1	1
Control variables								
SIGMA(t)	27,274	0.049	0.02	0.018	0.035	0.046	0.059	0.12
RET(t)	27,274	−0.139	0.121	−0.709	−0.172	−0.102	−0.06	−0.015
DTURN(t)	27,274	−0.079	0.438	−1.752	−0.263	−0.025	0.155	0.956
SIZE(t)	27,274	15.332	1.068	13.096	14.58	15.298	15.999	18.266
LEV(t)	27,274	0.461	0.207	0.054	0.302	0.466	0.62	0.911
MTB(t)	27,274	3.925	3.95	0.705	1.777	2.766	4.548	28.593
ROA(t)	27,274	0.044	0.063	−0.203	0.015	0.04	0.073	0.23
ABACC(t)	27,274	0.079	0.09	0.001	0.023	0.051	0.1	0.54
Corporate governance variables								
EXCESS	24,876	0.152	0.222	0	0	0	0.296	0.909
UCF	24,876	0.341	0.1669	0.034	0.208	0.324	0.461	0.747
DUAL	24,991	0.216	0.411	0	0	0	0	1
IBOARD	27,136	0.366	0.053	0.25	0.333	0.333	0.4	0.571
ANALYST	19,039	1.912	0.869	0.693	1.099	1.946	2.639	3.689
IO	22,287	0.052	0.05	0.001	0.014	0.037	0.075	0.235
HHI	27,274	0.06	0.111	0.006	0.008	0.009	0.061	0.987
Financial opacity								
OPAQ	23,859	0.252	0.229	0.028	0.115	0.188	0.307	1.483
ISYN	27,274	0.408	0.824	−1.289	−0.177	0.33	0.928	2.669
DISC	14,844	2.97	0.651	1	3	3	3	4
Risky investments								
R&D	13,217	0.042	0.041	0	0.016	0.034	0.05	0.247
PATENT	27,274	1.832	1.81	0	0	1.609	3.258	6.521
GLOBAL	26,862	0.505	0.5	0	0	1	1	1
CEO characteristics								
AGE	24,781	48.335	6.453	33	44	48	53	64
TENURE	24,544	3.164	2.802	0.083	1.167	2.333	4.417	12.667
DH	24,544	−0.77	7.021	−18.583	−5.417	−0.417	3.833	16.583

This table presents summary statistics for measures of crash risk, government controlling ownership, control variables, corporate governance variables, financial opacity, firms' risky investment, and CEO myopia. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018.

Specifically, we employ three measures for firms' financial opacity. The first one is defined as OPAQ and computed by the three-year moving sum of the absolute value of annual discretionary accruals. The second one is firms' idiosyncratic synchronicity (ISYN) or lack of market synchronicity using a logistic transformation of R^2 estimated from Eq. (1) as $ISYN = [Ln(1-R^2)/R^2]$, as in Hutton et al. (2009). The third measure is the rankings of financial disclosure quality (DISC) provided by the Shenzhen Stock Exchange. The ranking of A (D) corresponds to good (poor) financial disclosure quality. We consider three variables to measure firms' risky investments, which are R&D to sales ratio (R&D), the logarithm of number of patents filed (PATENT), and whether or not firms generate oversea sales (GLOBAL). Finally, to measure CEO decision horizon, we employ CEO's AGE, TENURE, and DH. As in Antia et al. (2010), DH is a combination of industry-adjusted CEO age and tenure, computed as $DH = [TENURE(industry,t) – TENURE(i,t)] + [AGE(industry, t) - AGE(i,t)]$, where TENURE(i,t) is the number of years the CEO has held the position, AGE(i,t) is the age of the CEO working for firm i in year t, and TENURE(industry, t) and AGE(industry, t) are the industry median of TENURE and AGE.

Table 3
Correlation coefficients.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1)NCSKEW(t + 1)	1													
(2)DUVOL(t + 1)	0.8854*	1												
(3)CRASH(t + 1)	0.5007*	0.3995*	1											
(4)GOV(t)	−0.0713*	−0.0740*	−0.0236*	1										
(5)CENTRAL(t)	−0.0355*	−0.0388*	−0.0155*	0.3441*	1									
(6)LOCAL(t)	−0.0575*	−0.0586*	−0.0171*	0.8828*	−0.1373*	1								
(7)SIGMA(t)	0.001	−0.0183*	−0.0428*	−0.1021*	−0.0251*	−0.0952*	1							
(8)RET(t)	0.0048	0.0228*	0.0342*	0.0887*	0.0209*	0.0831*	−0.9696*	1						
(9)DTURN(t)	−0.0126*	−0.0203*	−0.0196*	0.0898*	0.0253*	0.0821*	0.2888*	−0.2936*	1					
(10)SIZE(t)	0.0161*	0.0076	0.0236*	0.0257*	0.1268*	−0.0363*	0.0775*	−0.0987*	0.0314*	1				
(11)LEV(t)	−0.0470*	−0.0581*	−0.0142*	0.1720*	0.0902*	0.1364*	−0.0107*	0.0117*	0.1341*	−0.0179*	1			
(12)MTB(t)	0.0977*	0.0894*	0.0373*	−0.1268*	−0.0337*	−0.1169*	0.3959*	−0.3915*	0.0552*	0.0965*	0.0815*	1		
(13)ROA(t)	0.0302*	0.0339*	0.0109*	−0.0507*	−0.0229*	−0.0420*	−0.0477*	0.0427*	−0.0789*	0.3172*	−0.3629*	−0.0095	1	
(14)ABACC(t)	0.0125*	0.0064	0.0106*	−0.0541*	−0.0124*	−0.0509*	0.1099*	−0.0955*	−0.0378*	−0.0359*	0.0823*	0.1804*	0.0006	1

This table reports bivariate correlations between crash risk, government control, and control variables. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. * indicates that the correlation coefficients are significant above the 5% level.

Table 4
Mean and median difference tests.

Panel A: Mean and median differences between privately controlled and government-controlled firms								
	PRIVATE			GOV				
Variables	Obs.	Mean	Median	Obs.	Mean	Median	Mean Diff	Chi2 (Median Diff)
NCSKEW(t + 1)	18,785	−0.197	−0.173	8489	−0.304	−0.273	0.108***	117.541***
DUVOL(t + 1)	18,785	−0.179	−0.179	8489	−0.257	−0.252	0.078***	92.900***
CRASH(t + 1)	18,785	0.115	0	8489	0.099	0	0.016***	15.195***
SIGMA(t)	18,785	0.051	0.047	8489	0.046	0.043	0.004***	159.932***
RET(t)	18,785	−0.146	−0.107	8489	−0.123	−0.091	−0.023***	160.594***
DTURN(t)	18,785	−0.105	−0.043	8489	−0.02	0.001	−0.085***	154.683***
SIZE(t)	18,785	15.313	15.303	8489	15.372	15.285	−0.059***	1.236
LEV(t)	18,785	0.437	0.436	8489	0.514	0.527	−0.077***	584.729***
MTB(t)	18,785	4.262	3.065	8489	3.18	2.205	1.082***	815.058***
ROA(t)	18,785	0.046	0.043	8489	0.039	0.035	0.007***	142.568***
ABACC(t)	18,785	0.082	0.053	8489	0.072	0.046	0.011***	63.017***

Panel B: Mean and median differences between central and local government-controlled firms								
	CENTRAL			LOCAL				
Variables	Obs.	Mean	Median	Obs.	Mean	Median	Mean Diff	Chi2 (Median Diff)
NCSKEW(t + 1)	1385	−0.337	−0.295	7104	−0.298	−0.268	−0.040**	1.734
DUVOL(t + 1)	1385	−0.285	−0.276	7104	−0.251	−0.246	−0.034**	3.407*
CRASH(t + 1)	1385	0.089	0	7104	0.101	0	−0.012	1.868
SIGMA(t)	1385	0.047	0.044	7104	0.046	0.043	0.001*	3.892**
RET(t)	1385	−0.128	−0.094	7104	−0.122	−0.089	−0.006*	4.088**
DTURN(t)	1385	−0.031	−0.007	7104	−0.018	0.002	−0.013	2.787*
SIZE(t)	1385	15.917	15.79	7104	15.266	15.219	0.651***	118.859***
LEV(t)	1385	0.542	0.562	7104	0.509	0.52	0.033***	21.857***
MTB(t)	1385	3.35	2.327	7104	3.147	2.187	0.203**	4.618**
ROA(t)	1385	0.038	0.033	7104	0.039	0.035	−0.002	0.306
ABACC(t)	1385	0.074	0.046	7104	0.071	0.046	0.003	0.009

This table reports mean and median difference tests of crash risk measures and control variables. Panel A presents difference tests between privately controlled (PRIVATE) and government-controlled (GOV) firms. Panel B presents difference tests between central (CENTRAL) and local (LOCAL) government-controlled firms. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

4. Empirical results

4.1. Univariate analysis

Table 1 describes the sample distribution by year. The number of firms increases almost steadily during our sample period of 2004–2018, leading to 27,274 firm-year observations in total. NCSKEW and DUVOL are positive and peaking in 2004 and turning to negative in the remaining years, both reaching the lowest value in 2009. The number of government-controlled firms drops dramatically since 2008, mainly due to the decline in the number of local government-controlled firms. The percentages of government- and local government-controlled firms fall to their lowest value in 2017, which are respectively 23.3% and 19.2%.

Table 2 presents summary statistics for all variables used in our analyses. All continuous variables are winsorized at the 1st and 99th percentiles. NCSKEW and DUVOL are averaged to −0.23 and − 0.203 with substantial dispersion (standard deviations of 0.7 and 0.489), respectively. The CRASH dummy is 0.11 on average, indicating that about 11% of firm-year observations are defined as crashes. Government-controlled firms account for 31.1% of all firm-year observations, with 5.1% of central-government and 26% of local-government controlling ownership.

Table 3 provides bivariate correlation coefficients. The three crash risk measures are highly correlated and are negatively correlated with the three measures of government controlling ownership. Specifically, the correlations between NCSKEW and GOV, CENTRAL, and LOCAL are −0.071, −0.036, and − 0.058, respectively. The correlations between DUVOL and GOV, CENTRAL, and LOCAL are −0.074, −0.039, and − 0.059, respectively. The correlations between CRASH and GOV, CENTRAL, and LOCAL are −0.024, −0.0166, and − 0.017, respectively. Those correlations are significant above the 5% level. Furthermore, crash risk seems to be positively correlated with firm size, market-to-book ratio, ROA, and discretionary accruals and negatively associated with de-meaned turnover ratio and leverage ratio. Another noticeable pattern is that government-controlled firms tend to have lower firm-specific volatility, higher return, higher turnover ratio, higher leverage ratio, lower book-to-market ratio, lower ROA, and lower discretionary accruals among the pooled observations.

To compare those firm attributes between government-controlled and privately controlled firms, we present mean and median difference tests in Panel A of Table 4. It shows that government-controlled firms maintain significantly lower crash risk, firm-specific volatility, book-to-market ratio, ROA, and discretionary accruals, and larger turnover ratio, firm size, and leverage ratio. Panel B of Table 4 presents mean and median difference tests between central and local government-controlled firms. It shows that central

Table 5
Baseline regression results.

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
GOV(t)	−0.068***	−0.047***	−0.008*			
	[−6.840]	[−6.746]	[−1.798]			
CENTRAL(t)				−0.105***	−0.074***	−0.019**
				[−5.344]	[−5.185]	[−2.359]
LOCAL(t)				−0.061***	−0.042***	−0.005
				[−5.781]	[−5.713]	[−1.195]
NCSKEW(t)	0.049***			0.049***		
	[7.589]			[7.581]		
DUVOL(t)		0.040***			0.040***	
		[6.256]			[6.256]	
CRASH(t)			−0.000			−0.000
			[−0.025]			[−0.029]
SIGMA(t)	5.291***	3.629***	−0.822*	5.322***	3.651***	−0.813*
	[5.444]	[5.413]	[−1.807]	[5.475]	[5.440]	[−1.785]
RET(t)	0.629***	0.505***	−0.114	0.633***	0.507***	−0.113
	[4.064]	[4.720]	[−1.638]	[4.087]	[4.740]	[−1.622]
DTURN(t)	−0.024**	−0.010	−0.009	−0.025**	−0.011	−0.009
	[−1.987]	[−1.205]	[−1.146]	[−2.018]	[−1.237]	[−1.161]
SIZE(t)	0.034***	0.013***	0.003	0.036***	0.015***	0.003
	[5.836]	[3.299]	[1.025]	[6.078]	[3.560]	[1.221]
LEV(t)	−0.154***	−0.117***	−0.014	−0.153***	−0.117***	−0.014
	[−6.067]	[−6.594]	[−1.190]	[−6.057]	[−6.582]	[−1.184]
MTB(t)	0.015***	0.010***	0.003***	0.015***	0.010***	0.003***
	[11.404]	[10.259]	[4.661]	[11.401]	[10.255]	[4.663]
ROA(t)	0.012	0.055	0.010	0.003	0.049	0.007
	[0.149]	[0.975]	[0.275]	[0.040]	[0.866]	[0.201]
ABACC(t)	0.015	−0.005	0.047*	0.017	−0.004	0.047*
	[0.285]	[−0.143]	[1.899]	[0.315]	[−0.112]	[1.918]
Constant	−0.462***	−0.183***	0.021	−0.488***	−0.201***	0.013
	[−4.870]	[−2.729]	[0.451]	[−5.107]	[−2.974]	[0.273]
Obs.	27,274	27,274	24,269	27,274	27,274	24,269
Adj. R²	0.066	0.068	0.024	0.067	0.068	0.024
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

This table presents regression results of crash risk measures on government control and control variables. Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

government-controlled firms exhibit lower crash risk, higher volatility, lower stock return, bigger size, higher leverage ratio, and higher market-to-book ratio.

4.2. Baseline regression results

To examine the impact of government controlling interest on crash risk, we run the following regression models:

$$\text{Crash Risk}_{i,t+1} = \alpha + \beta_1 {}^*GOV_{i,t} + \sum \beta_j {}^*Controls_{i,t} + + Year\ FE + Industr\ FE + \varepsilon_{i,t+1} \qquad (4)$$

$$\text{Crash Risk}_{i,t+1} = \alpha + \gamma_1 {}^*CENTRAL_{i,t} + \gamma_2 {}^*LOCAL_{i,t} + \sum \gamma_j {}^*Controls_{i,t} + Year\ FE + Industr\ FE + \varepsilon_{i,t+1} \qquad (5)$$

where crash risk is proxied by NCSKEW, DUVOL, and CRASH, GOV distinguishes government from private controlling ownership, CENTRAL and LOCAL further differentiate central and local governments from private controlling shareholders. Independent and control variables are one-year lagged to crash risk measures for predictability purpose. Year and industry dummies are included in the regressions to control for the year invariant and industry-specific effects. Standard errors are clustered at the firm level.[10]

Table 5 reports the baseline regression results. Models of (1)–(3) show that GOV is significantly and negatively associated with one-year ahead NCSKEW, DUVOL, and CRASH and the coefficients are estimated as −0.068 (t = 6.840), −0.047 (t = 6.746), and − 0.008 (t = 1.798), respectively. The results suggest that government-controlled firms exhibit lower crash risk than privately controlled firms after controlling for firm characteristics. In models of (4)–(6), when GOV is replaced with CENTRAL and LOCAL, the coefficients remain negative. The coefficients on CENTRAL are estimated as −0.105 (t = 5.344), −0.074 (t = 5.185), and − 0.019 (t = 2.359),

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[10] To relieve the concern of multiple collinearity in the regression analysis, we estimate the variance inflation factor (VIF) for the two regression equations, which is 3.69 on average for Eq. (4) and 3.63 for Eq. (5).

which are bigger than those on LOCAL, estimated as −0.061 (t = 5.781), −0.042 (t = 5.713), and − 0.005 (t = 1.195). The negative coefficients indicate that firms controlled by central and local governments have lower crash risk than those controlled by private shareholders. Further, the more negative coefficients on CENTRAL indicate that firms controlled by central government are less prone to stock price crashes than those controlled by local government. The estimated coefficients on control variables are in such a direction that is consistent with previous studies.

In sum, the baseline regression results suggest that government-controlled firms tend to show lower future crash risk than privately controlled firms. Such a reduction effect is more pronounced in central government-controlled firms than in local government-controlled ones. The results suggest that government-controlled firms hoard less bad news, resulting in lower crash risk, supporting the incentive alignment effect of the ultimate government control.

4.3. Robustness tests[11]

4.3.1. Excluding the stock market disaster in 2015

China's stock market experienced a big crash in 2015.[12] To eliminate the impacts of the stock market disaster, we drop observations in 2015 and rerun the baseline regressions. The results are reported in Panel A of Table 6. In models of (1)–(3), the coefficients on GOV are −0.071 (t = 6.916), −0.049 (t = 6.838), and − 0.01 (t = 2.235), respectively. In models of (4)–(6), the coefficients on CENTRAL and LOCAL are also significantly negative. In effect, the results become stronger after we exclude the stock market disaster in 2015.

4.3.2. Controlling for firm fixed effects

To mitigate the impacts related to firm-specific but time invariant omitted variables, we change model specifications by controlling for firm fixed effects. The regression results are reported in Panel B of Table 6. In models of (1)–(3), the coefficients on GOV are −0.03 (t = 1.664), −0.028 (t = 2.171), and 0.001 (t = 0.164). In models of (4)–(6), the coefficients on CENTRAL and LOCAL are marginally negative. That is, the impacts of ultimate government control are weakened but remain after controlling for firm fixed effects.

4.3.3. Controlling for macro-level variables

To relieve the concern that the relationship might be affected by variables at the macro level, we add two macro-level variables into the baseline regression model.[13] The first variable is the total market value of all stocks as a percentage of GDP (MV/GDP), which measures stock market development. The second one is the annualized turnover ratio of all stock traded in the stock market (ATO), which is a measure of the stock market liquidity and computed as the value of domestic shares traded in the market divided by their market capitalization.

The results are reported in Panel C of Table 6. The coefficients on GOV, CENTRAL and LOCAL are not changed after controlling for the two macro-economic variables, as compared with those coefficients in the baseline regressions. The coefficients on the one-year lagged MV/GDP and ATO are both significant and negative, suggesting that stock market development and liquidity can reduce firm-specific stock price crash risk.

4.3.4. Controlling for the market hysteresis

Considering the cyclical volatility and hysteresis of the stock market, we add more lags of dependent variables into the regressions. That is, we additionally include two- and three-year lagged NCSKEW, DUVOL and CRASH in the regressions. The results are reported in Panel D of Table 6. The coefficients on GOV, CENTRAL and LOCAL remain negative and significant after controlling for more lags of dependent variables. The three lagged variables of NCSKEW and DUVOL are all significantly and positively associated with NCSKEW(t) and DUVOL (t)), while the three lagged variables of CRASH are insignificant.

4.3.5. Controlling for corporate governance

Corporate governance may impact future stock price crash and potentially relate to government controlling ownership as well. We thus control for internal and external corporate governance variables. The internal corporate governance variables include the excess voting rights of controlling shareholders (EXCESS), cash flow rights of ultimate controlling shareholders (UCF), whether CEO serves as the board chair (DUAL), and the proportion of independent board members to the total board members (IBOARD). The external corporate governance variables are the number of financial analysts covering the firm (ANALYST), institutional ownership (IO), and the Herfindahl-Hirschman index (HHI). We additionally include those corporate governance variables into the baseline regression model (4).

The regression results are reported in Table 7. Noticeably, the GOV survives in all models. In models (1)–(3), EXCESS and UCF are negatively associated with the future crash risk, while the coefficients on EXCESS are only marginally significant. The results suggest that higher cash flow rights of controlling shareholders mitigate the agency problem between shareholders and managers, which is consistent with Boubaker et al. (2014). In models (4)–(6), the DUAL variable is positively related to crash risk, suggesting that CEOs

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[11] We thank the anonymous referees for suggesting the tests of excluding the stock market disaster in 2015, controlling for firm fixed effects, controlling for macro-economic variables, and controlling for the market hysteresis.
[12] The market index plummeted over 30% from June 12 to July 8, wiping out more than 20 trillion Yuan. On June 26, over two thousand listed stocks hit the lower limit.
[13] We are not able to include GDP growth rate and CPI into the regressions because of collinearity.

Table 6
Robustness tests.

Panel A: Excluding the stock market disaster in 2015

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
GOV(t)	−0.071***	−0.049***	−0.010**			
	[−6.916]	[−6.838]	[−2.235]			
CENTRAL(t)				−0.115***	−0.079***	−0.021**
				[−5.689]	[−5.408]	[−2.463]
LOCAL(t)				−0.063***	−0.043***	−0.008
				[−5.777]	[−5.745]	[−1.628]
Controls	YES	YES	YES	YES	YES	YES
Obs.	24,927	24,927	21,925	24,927	24,927	21,925
Adj. R^2	0.071	0.074	0.027	0.072	0.074	0.027
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Panel B: Controlling for firm fixed effects

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
GOV(t)	−0.030*	−0.028**	0.001			
	[−1.664]	[−2.171]	[0.164]			
CENTRAL(t)				−0.036	−0.032	−0.029*
				[−1.094]	[−1.285]	[−1.858]
LOCAL(t)				−0.029	−0.027*	0.010
				[−1.413]	[−1.875]	[1.143]
Controls	YES	YES	YES	YES	YES	YES
Obs.	27,274	27,274	24,269	27,274	27,274	24,269
No. of firms	3005	3005	2775	3005	3005	2775
Adj. R^2	0.072	0.075	0.038	0.072	0.075	0.038
Firm FE	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Panel C: Controlling for macro-economic variables

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
GOV(t)	−0.068***	−0.047***	−0.008*			
	[−6.840]	[−6.746]	[−1.798]			
CENTRAL(t)				−0.105***	−0.074***	−0.019**
				[−5.344]	[−5.185]	[−2.359]
LOCAL(t)				−0.061***	−0.042***	−0.005
				[−5.781]	[−5.713]	[−1.195]
MV/GDP(t)	−0.109***	−0.083***	−0.054***	−0.110***	−0.084***	−0.054***
	[−4.211]	[−4.509]	[−4.692]	[−4.245]	[−4.542]	[−4.730]
ATO(t)	−0.072***	−0.044***	0.020**	−0.072***	−0.044***	0.020**
	[−4.092]	[−3.464]	[2.464]	[−4.085]	[−3.458]	[2.480]
Controls	YES	YES	YES	YES	YES	YES
Obs.	27,274	27,274	24,269	27,274	27,274	24,269
Adj. R^2	0.066	0.068	0.024	0.067	0.068	0.024
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Panel D: Controlling for more lagged crash risks

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
GOV(t)	−0.062***	−0.042***	−0.009*			
	[−5.834]	[−5.650]	[−1.920]			
CENTRAL(t)				−0.103***	−0.071***	−0.017**
				[−5.111]	[−4.761]	[−2.049]
LOCAL(t)				−0.054***	−0.036***	−0.007
				[−4.736]	[−4.598]	[−1.452]
NCSKEW(t)	0.050***			0.050***		
	[6.928]			[6.924]		
NCSKEW(t-1)	0.028***			0.028***		
	[3.744]			[3.733]		

Table 6 (*continued*)

Panel C: Controlling for macro-economic variables

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
NCSKEW(t-2)	0.017**			0.017**		
	[2.328]			[2.308]		
DUVOL(t)		0.043***			0.043***	
		[6.079]			[6.077]	
DUVOL(t-1)		0.034***			0.034***	
		[4.594]			[4.586]	
DUVOL(t-2)		0.019***			0.019***	
		[2.652]			[2.636]	
CRASH(t)			−0.006			−0.006
			[−0.796]			[−0.797]
CRASH(t-1)			−0.005			−0.005
			[−0.684]			[−0.688]
CRASH(t-2)			0.011			0.010
			[1.371]			[1.364]
Controls	YES	YES	YES	YES	YES	YES
Obs.	21,494	21,494	18,955	21,494	21,494	18,955
Adj. R^2	0.067	0.065	0.021	0.067	0.065	0.021
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

This table presents robustness tests. Panel A reports the regression results after eliminating observations in the stock market crash of 2015 from the sample. Panel B, C, and D report the regression results after controlling for firm fixed effects, macro-economic variables, and more lagged dependent variables, respectively. Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

taking dual roles tend to hoard more bad news. As shown in models (7)–(9), the independent board members do not impact crash risk. In the rest of the models, the three external variables are all positively correlated with future crash risk, suggesting that external monitoring does not reduce crash risk. Finally, when all corporate governance variables are added into the regressions, GOV is still significantly and negatively correlated with crash risk. Overall, the impact of governance controlling ownership on future crash risk is robust to controlling for corporate governance variables.

4.4. Endogeneity concerns

4.4.1. Results from a propensity-score matched sample

To relieve the endogeneity concern arising from the sample selection bias, we construct a propensity-score matched sample between government-controlled and privately controlled firms. The sample is matched in multiple dimensions, including industry, firm size, leverage ratio, ROA, ABACC, MTB, RET, SIGMA, and DTURN. We then conduct the mean and median difference tests and run baseline regressions using the matched sample.

The mean and median difference tests are reported in Panel A of Table 8. Notably, the three crash risk measures, along with LEV, MTB, and ABACC, exhibit significant differences in their means and medians between the two groups of firms. Variables such as SIGMA, RET, and DTURN show no remarkable differences in the mean and median values between government and privately controlled firms in the matched sample.

The regression results based on the matched sample are reported in Panel B of Table 8. For the three crash risk measures as dependent variables, the coefficients on GOV are estimated as −0.061 ($t = 5.457$), −0.045 ($t = 5.767$), and − 0.006 ($t = 1.307$), respectively. The coefficients on CENTRAL and LOCAL are also consistent with those in the baseline regressions. That is, the variables of ultimate government control still significantly and negatively predict future stock price crash risk, consistent with the baseline regressions. Thus, the results are not affected by the sample selection.

4.4.2. Instrumental variable regressions

We additionally employ the instrumental variable (IV) approach to address the endogeneity issue. An IV should be correlated with government controlling ownership but uncorrelated with the error term. Following this rule, we choose firm age as an IV, which is the number of years after the firm's incorporation. It meets the relevance criterion because SOEs are founded earlier than private firms in China. Under the country's planned economy, public ownership was the basic economic system. There were only two types of firms before 1978: SOEs and collectives, which were small firms operated by rural municipalities or urban communities (Liao et al., 2014). At the same time, firm age is found uncorrelated with stock price crash risk, although more experienced firms might be better at handling risks (Andreou et al., 2017). We conduct the 2SLS analysis with the IV: in the first stage, the GOV is regressed on the IV while controlling for all variables that are found to impact crash risks; in the second stage, crash risk measures are regressed on the predicted GOV along with other control variables.

The results are presented in Table 9. As the IV might suffer from the weak identification issue, we provide F tests in the first stage.

Table 7

Controlling for corporate governance.

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)	(7) NCSKEW(t + 1)	(8) DUVOL(t + 1)	(9) CRASH(t + 1)
GOV(t)	−0.075***	−0.052***	−0.010**	−0.065***	−0.046***	−0.007	−0.067***	−0.046***	−0.008*
	[−6.921]	[−6.718]	[−2.215]	[−6.115]	[−6.178]	[−1.501]	[−6.744]	[−6.607]	[−1.776]
EXCESS(t)	−0.027	−0.016	−0.026**						
	[−0.993]	[−0.874]	[−2.231]						
UCF(t)	−0.092**	−0.065***	−0.036**						
	[−2.547]	[−2.622]	[−2.160]						
DUAL(t)				0.044***	0.023***	0.012**			
				[3.746]	[2.928]	[2.158]			
IBOARD(t)							0.023	−0.008	0.037
							[0.261]	[−0.128]	[0.949]
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Obs.	24,876	24,876	22,412	24,991	24,991	22,873	27,136	27,136	24,148
Adj. R²	0.066	0.067	0.025	0.066	0.066	0.023	0.066	0.067	0.024
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

VARIABLES	(10) NCSKEW(t + 1)	(11) DUVOL(t + 1)	(12) CRASH(t + 1)	(13) NCSKEW(t + 1)	(14) DUVOL(t + 1)	(15) CRASH(t + 1)	(16) NCSKEW(t + 1)	(17) DUVOL(t + 1)	(18) CRASH(t + 1)
GOV(t)	−0.067***	−0.044***	−0.014***	−0.069***	−0.045***	−0.009*	−0.068***	−0.047***	−0.008*
	[−5.890]	[−5.427]	[−2.713]	[−6.631]	[−6.100]	[−1.868]	[−6.825]	[−6.733]	[−1.801]
ANALYST(t)	0.059***	0.042***	0.004						
	[7.582]	[7.879]	[1.147]						
IO(t)				1.344***	0.859***	0.192***			
				[13.592]	[12.136]	[4.163]			
HHI(t)							0.336***	0.274***	0.087**
							[4.147]	[4.573]	[2.118]
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Obs.	19,039	19,039	17,111	22,287	22,287	20,055	27,274	27,274	24,269
Adj. R²	0.076	0.075	0.026	0.081	0.078	0.026	0.067	0.069	0.024
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

VARIABLES	(19) NCSKEW(t + 1)	(20) DUVOL(t + 1)	(21) CRASH(t + 1)
GOV(t)	−0.086***	−0.053***	−0.020***
	[−6.396]	[−5.533]	[−3.312]
EXCESS(t)	−0.043	−0.025	−0.040**
	[−1.309]	[−1.095]	[−2.561]
UCF(t)	−0.014	−0.019	−0.039*
	[−0.308]	[−0.597]	[−1.725]
DUAL(t)	0.039***	0.019*	0.011
	[2.759]	[1.936]	[1.573]
IBOARD(t)	0.086	0.014	0.049
	[0.759]	[0.189]	[0.937]
ANALYST(t)	0.028***	0.023***	−0.004
	[3.192]	[3.850]	[−1.122]
IO(t)	1.272***	0.810***	0.198***
	[10.831]	[9.642]	[3.534]
HHI(t)	0.293**	0.272***	0.072
	[2.270]	[2.761]	[1.239]
Controls	YES	YES	YES
Obs.	15,108	15,108	13,853
Adj. R²	0.086	0.083	0.027
Year FE	YES	YES	YES
Industry FE	YES	YES	YES

This table presents regression results of crash risk measures on government control, control variables, and corporate governance variables. Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

Table 8

Results from a propensity score matched sample.

Panel A: Mean and median difference tests

| Variables | PRIVATE | | | GOV | | | | |
	Obs.	Mean	Median	Obs.	Mean	Median	Mean Diff	Chi2 (Median Diff)
NCSKEW(t + 1)	8489	−0.234	−0.205	8489	−0.304	−0.273	0.070***	36.019***
DUVOL(t + 1)	8489	−0.204	−0.205	8489	−0.257	−0.252	0.053***	28.042***
CRASH(t + 1)	8489	0.112	0	8489	0.099	0	0.014***	8.387***
SIGMA(t)	8489	0.047	0.043	8489	0.046	0.043	0	1.546
RET(t)	8489	−0.124	−0.092	8489	−0.123	−0.091	−0.002	1.702
DTURN(t)	8489	−0.013	−0.001	8489	−0.02	0.001	0.007	0.713
SIZE(t)	8489	15.326	15.298	8489	15.372	15.285	−0.046***	0.396
LEV(t)	8489	0.523	0.542	8489	0.514	0.527	0.009***	11.094***
MTB(t)	8489	3.298	2.537	8489	3.18	2.205	0.118***	118.844***
ROA(t)	8489	0.036	0.035	8489	0.039	0.035	−0.003**	0.289
ABACC(t)	8489	0.075	0.05	8489	0.072	0.046	0.003***	11.300***

Panel B: Regression results

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
GOV(t)	−0.061***	−0.045***	−0.006			
	[−5.457]	[−5.767]	[−1.307]			
CENTRAL(t)				−0.095***	−0.070***	−0.017**
				[−4.686]	[−4.816]	[−2.055]
LOCAL(t)				−0.055***	−0.040***	−0.004
				[−4.668]	[−4.928]	[−0.829]
Controls	YES	YES	YES	YES	YES	YES
Obs.	16,978	16,978	15,524	16,978	16,978	15,524
Adj. R^2	0.076	0.078	0.025	0.076	0.078	0.025
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

This table presents the results from a propensity score matched (PSM) sample. To construct the PSM sample, we match government-controlled and privately controlled firms by industry, firm size, leverage ratio, ROA, ABACC, MTB, RET, SIGMA, and DTURN. Panel A reports the mean and median difference tests of crash risk measures and control variables between privately controlled (PRIVATE) and government-controlled (GOV) firms. Panel B reports the regression results of crash risk measures on government control and control variables. Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

Table 9

Instrumental variable regressions.

| VARIABLES | First stage | Second stage | | |
	GOV	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)
Firm age	0.095***			
	[5.021]			
$\widehat{GOV}$(t)		−0.492***	−0.348***	0.016
		[−3.709]	[−3.766]	[0.241]
Controls	YES	YES	YES	YES
Obs.	24,781	24,781	24,781	22,076
Adj. R^2	0.136	0.067	0.068	0.026
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES
Weak IV tests:				
F statistic	178.330			
Cragg-Donald Wald F statistic	148.180			
Stock-Yogo Weak ID test at 10%	16.38			

This table presents instrumental variable regressions of crash risk measures on government control and control variables. The instrumental variable is firm age, the number of years after the firm's incorporation. Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

Specifically, the F statistic is 172.803 and the Cragg-Donald Wald F statistic is 143.551, which is much larger than the critical value at 10% suggested by Stock and Yogo (2005), both rejecting the null hypothesis that firm age is a weak instrument. The first-stage regression shows that firm age is strongly correlated with GOV and its coefficient is 0.095 (t = 5.021). In the second stage, predicted GOV is consistently and negatively associated with NCSKEW and DUVOL, coefficients respectively estimated as −0.492 (t =

Table 10

Difference-in-difference analyses.

Panel A: Surrounding the Split-share Structure Reform in 2005

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
D(SSR)	−0.206***	−0.211***	−0.128***	−0.205***	−0.211***	−0.128***
	[−5.103]	[−7.088]	[−6.196]	[−5.091]	[−7.082]	[−6.209]
GOV(t)	0.013	−0.005	0.012			
	[0.414]	[−0.236]	[0.490]			
GOV(t)*D(SSR)	−0.082**	−0.055*	−0.007			
	[−2.049]	[−1.892]	[−0.269]			
CENTRAL(t)				0.044	−0.001	0.005
				[0.690]	[−0.014]	[0.088]
CENTRAL(t)*D(SSR)				−0.160*	−0.097	−0.021
				[−1.905]	[−1.634]	[−0.387]
LOCAL(t)				0.009	−0.006	0.013
				[0.276]	[−0.252]	[0.512]
LOCAL(t)*D(SSR)				−0.070*	−0.049	−0.004
				[−1.705]	[−1.606]	[−0.167]
Controls	YES	YES	YES	YES	YES	YES
Obs.	3768	3768	2853	3768	3768	2853
Adj. R^2	0.066	0.078	0.052	0.066	0.078	0.052
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

Panel B: Surrounding the anti-corruption campaign in 2012

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)
D(ACC)	−0.004	−0.012	0.032*	−0.004	−0.012	0.032*
	[−0.093]	[−0.404]	[1.662]	[−0.090]	[−0.399]	[1.671]
GOV(t)	−0.053*	−0.036*	−0.017			
	[−1.730]	[−1.690]	[−1.229]			
GOV(t)*D(ACC)	0.002	0.002	0.001			
	[0.039]	[0.061]	[0.036]			
CENTRAL(t)				0.029	0.014	−0.026
				[0.586]	[0.368]	[−1.151]
CENTRAL(t)*D(ACC)				−0.152*	−0.103*	0.005
				[−1.847]	[−1.854]	[0.148]
LOCAL(t)				−0.071**	−0.047**	−0.015
				[−2.180]	[−2.085]	[−1.033]
LOCAL(t)*D(ACC)				0.035	0.024	−0.000
				[0.752]	[0.762]	[−0.004]
Controls	YES	YES	YES	YES	YES	YES
Obs.	4036	4036	4010	4036	4036	4010
Adj. R^2	0.077	0.066	0.001	0.077	0.067	0.001
Year FE	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES

This table presents the difference-in-difference analyses surrounding the Split-share Structure Reform in 2005 (in Panel A) and the anti-corruption campaign in 2012 (in Panel B) and using a PSM sample. D(SSR) is an indicator equal to zero for years of 2004 and 2005 and equal to one for years of 2006 and 2007. D(ACC) is an indicator equal to zero for years of 2011 and 2012 and equal to one for years of 2013 and 2014. In the PSM sample, government-controlled and privately controlled firms are matched by industry, firm size, leverage ratio, ROA, ABACC, MTB, RET, SIGMA, and DTURN. Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

3.709) and − 0.348 ($t = 3.766$). When CRASH is regressed on the predicted GOV, its coefficient is 0.016 ($t = 0.241$), which is indifferent from zero. Overall, the results remain after we apply the IV approach.

4.4.3. Difference-in-difference analyses

In this subsection, we examine how the impact of ultimate government control evolves surrounding two quasi-natural experiments, the Split-share Structure Reform initiated in 2005 and the anti-corruption campaign in 2012. The two events exogenously affect corporate governance and government objectives and better align the interests of government entities with those of minority shareholders, attesting to the incentive alignment effect.

The Split-Share Structure Reform was initiated in 2005, aiming to convert controlling shareholders' non-tradable shares into

tradable shares. The reform represents an exogenous shock to corporate governance, resulting in better interest alignment between controlling shareholders and minority shareholders (Li et al., 2011; Huang et al., 2013). We predict that the crash risk will be reduced after the reform. Moreover, government-controlled firms might lower their crash risk further due to more severe agency problems pertaining to those firms before the reform.

To operationalize our prediction, we use a sample consisting of two years before and after the reform, because we have only two years of observations before the reform. We also restrict firms to exist both before and after the reform. Further, we match government-controlled with privately controlled firms based on industry, firm size, leverage ratio, ROA, ABACC, MTB, RET, SIGMA, and DTURN. We then conduct the analysis with the balanced and propensity score matched (PSM) sample.[14] Specifically, we create a dummy variable, denoted as D(SSR), equal to zero for years of 2004 and 2005 and equal to one for years of 2006 and 2007. We modify regression models (4) and (5) by including D(SSR) and its interactive terms with GOV(t), CENTRAL(t), and LOCAL(t) into the regressions. The regression results are presented in Panel A of Table 10. As predicted, the coefficients on D(SSR) are all significantly negative through the six models. In models (1)–(3), the coefficients on GOV(t)* D(SSR) are −0.082 ($t = 2.049$), −0.055 ($t = 1.892$), and − 0.007 ($t = 0.269$), respectively. In models (4)–(6), the coefficients on CENTRAL(t) * D(SSR) and LOCAL(t) * D(SSR) are negative but only marginally significant. The results suggest that government-controlled firms reduce their crash risk to a bigger extent than privately controlled firms after the Split-share Structure Reform, lending support to H2a.

Another experiment that may also alleviate the conflict of interests between government controlling shareholders, minority shareholders, and top executives is the anti-corruption campaign in 2012. During the 18th National Congress in November 2012, the Chinese central government announced one of the most famous anti-corruption regulation, the "Eight-Point Regulation", which marks the beginning of the anti-corruption campaign and since then has exerted an influential impact on cracking down corruption and grabbed international news headlines (Lin et al., 2016; Cao et al., 2018; Chen et al., 2018b). The regulation requires government officials to adopt clean work methods and improve the relations with the public. For example, government officials are banned from consuming luxury goods. We predict that government-controlled firms might lower their crash risk after the campaign, because the campaign might reduce the agency costs between shareholders and managers of SOEs.

To investigate our prediction, we use a sample consisting of two years before and after the campaign, because we need to exclude the stock market crash in 2015 and thus have only two years of observations after the campaign. We also restrict firms to exist both before and after the campaign. Further, we match government-controlled with privately controlled firms based on industry, firm size, leverage ratio, ROA, ABACC, MTB, RET, SIGMA, and DTURN. We then conduct the analysis with the balanced PSM sample. Specifically, we create a dummy variable, D(ACC), maintaining a value of one for years of 2013 and 2014 and a value of zero for years of 2011 and 2012. We then add the three interactive terms, which are GOV(t)*D(ACC), CENTRAL(t)*D(ACC), and LOCAL(t)*D(ACC), into regression models of (4) and (5). The regression results are reported in Panel B of Table 10. The results show that CENTRAL(t)*D(ACC) is significant when the dependent variables are NCSKEW and DUVOL. Its coefficients are −0.152 ($t = 1.847$) and − 0.103 ($t = 1.854$), respectively. The coefficients on GOV(t)*D(ACC) and LOCAL(t)*D(ACC) are statistically insignificant. The results suggest that the effect of central government control is enhanced after the campaign, due to the stronger monitoring effect imposed by the central government.

4.5. Channel tests

In this section, we examine three channels, through which the ultimate government control negatively affects stock price crash risk. The first channel is financial opacity, defined as how much firm-specific information is not incorporated in stock prices. The second channel is firms' risky investments into innovation and globalization activities. The third channel is CEO myopia, referring to managerial opportunism in pursuing short-term investments with faster paybacks (Antia et al., 2010).

To verify the three channels, we apply the two-step regression approach, as in Chen et al. (2018b). Specifically, in the first step, we regress each of those variables related to the three channels on GOV and controls; in the second step, we regress crash risk measures on each of those channel-related variables predicted in the first step as well as control variables. If the channel exists, then we expect a negative relation in the first step between channel-related variables and GOV and a positive relation in the second step, or a positive relation in the first step and a negative relation in the second step.

4.5.1. Financial opacity

One of the most conventional explanations of crash risk lies in financial opacity, as firstly documented by Jin and Myers (2006). Under this explanation, firms with greater financial opacity are more likely to withhold negative news. Opacity is in relation to the level of firm-specific information reflected in stock returns. In their study, Hutton et al. (2009) propose one measure of opacity at the firm level, which is the prior three years' moving sum of the absolute value of discretionary accruals. In addition, they construct a measure of idiosyncratic synchronicity to measure firm-specific volatility. We adopt the two measures and additionally include a more straightforward measure of opacity in the Chinese stock market, which is the rankings of financial report quality issued by the Shenzhen Stock Exchange.

The two-step regression results are provided in Table 11. Panel A shows that the coefficients on GOV are all significant, revealing that government-controlled firms are associated with lower financial opacity, lower firm-specific volatility in stock returns, and higher

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[14] We thank the anonymous referee for suggestions on the empirical analyses of the two experiments.

Table 11
Channel test: financial opacity.

Panel A: Regressions of firms' financial opacity on GOV

VARIABLES	(1) OPAQ(t)	(2) ISYN(t)	(3) DISC(t)
GOV(t)	−0.013***	−0.093***	0.077***
	[−4.150]	[−8.300]	[3.973]
SIZE(t)	−0.008***	0.038***	0.137***
	[−3.880]	[5.462]	[11.333]
LEV(t)	0.032***	−0.108***	−0.153***
	[3.257]	[−3.981]	[−3.564]
MTB(t)	0.005***	0.043***	−0.023***
	[9.307]	[21.528]	[−9.782]
ROA(t)	0.169***	0.494***	2.745***
	[6.345]	[5.866]	[18.673]
ABACC(t)	1.463***	0.347***	−0.548***
	[68.944]	[7.135]	[−8.096]
Constant	0.165***	−0.316***	0.540***
	[5.375]	[−3.049]	[2.900]
Obs.	23,859	27,274	14,844
Adj. R^2	0.486	0.402	0.207
Year FE	YES	YES	YES
Industry FE	YES	YES	YES

Panel B: Regressions of crash risk on firms' financial opacity

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)	(7) NCSKEW(t + 1)	(8) DUVOL(t + 1)	(9) CRASH(t + 1)
$\widehat{OPAQ}$(t)	4.788***	3.382***	0.652**						
	[6.131]	[6.184]	[2.001]						
$\widehat{ISYN}$(t)				0.726***	0.507***	0.081*			
				[6.840]	[6.746]	[1.798]			
$\widehat{DISC}$(t)							−0.968***	−0.735***	−0.055
							[−4.673]	[−5.100]	[−0.665]
NCSKEW(t)	0.045***			0.049***			0.050***		
	[6.572]			[7.589]			[5.831]		
DUVOL(t)		0.040***			0.040***			0.037***	
		[5.913]			[6.256]			[4.199]	
CRASH(t)			−0.003			−0.000			0.002
			[−0.409]			[−0.025]			[0.216]
SIGMA(t)	5.433***	3.571***	−0.679	5.291***	3.629***	−0.822*	3.132**	2.814***	−2.050***
	[5.251]	[5.037]	[−1.451]	[5.444]	[5.413]	[−1.807]	[2.455]	[3.179]	[−3.232]
RET(t)	0.679***	0.521***	−0.098	0.629***	0.505***	−0.114	0.236	0.313**	−0.300***
	[4.164]	[4.647]	[−1.371]	[4.064]	[4.720]	[−1.638]	[1.193]	[2.261]	[−3.140]
DTURN(t)	−0.004	0.008	−0.010	−0.024**	−0.010	−0.009	−0.033**	−0.010	−0.005
	[−0.222]	[0.615]	[−1.224]	[−1.987]	[−1.205]	[−1.146]	[−2.175]	[−0.946]	[−0.534]
SIZE(t)	0.073***	0.041***	0.008**	0.006	−0.006	−0.000	0.183***	0.121***	0.015
	[8.080]	[6.369]	[2.076]	[0.896]	[−1.256]	[−0.117]	[6.112]	[5.757]	[1.261]
LEV(t)	−0.286***	−0.206***	−0.039**	−0.075***	−0.062***	−0.005	−0.267***	−0.206***	−0.023
	[−7.992]	[−8.354]	[−2.569]	[−2.629]	[−3.076]	[−0.377]	[−5.861]	[−6.627]	[−1.157]
MTB(t)	−0.010**	−0.008**	−0.001	−0.017***	−0.012***	−0.001	−0.010*	−0.009**	0.001
	[−2.268]	[−2.506]	[−0.416]	[−3.421]	[−3.497]	[−0.411]	[−1.857]	[−2.531]	[0.286]
ROA(t)	−0.823***	−0.544***	−0.109	−0.346***	−0.195***	−0.030	2.588***	2.033***	0.156
	[−5.241]	[−4.957]	[−1.617]	[−3.590]	[−2.871]	[−0.694]	[4.475]	[5.062]	[0.666]
ABACC(t)	−6.968***	−4.941***	−0.905*	−0.237***	−0.181***	0.018	−0.512***	−0.402***	0.028
	[−6.077]	[−6.156]	[−1.895]	[−3.604]	[−4.011]	[0.626]	[−3.673]	[−4.203]	[0.480]
Constant	−1.263***	−0.746***	0.005	−0.232**	−0.022	0.039	−0.103	0.168	0.114
	[−7.771]	[−6.447]	[0.076]	[−2.289]	[−0.314]	[0.690]	[−0.559]	[1.329]	[1.392]
Obs.	23,859	23,859	22,853	27,274	27,274	24,269	14,844	14,844	12,992
Adj. R^2	0.069	0.069	0.024	0.066	0.068	0.024	0.050	0.051	0.021
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

This table presents two-step regressions of financial opacity measures on government control and control variables (first-step regressions in Panel A) and crash risk measures on financial opacity measures and control variables (second-step regressions in Panel B). Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

rankings of financial disclosure quality than privately controlled firms. Panel B shows that the predicted OPAQ and ISYN are positively and significantly associated with the three crash risk measures, and that the predicted DISC is negatively associated with crash risk. The results suggest that lower financial opacity, lower firm-specific volatility, and higher rankings of financial disclosure quality predict lower crash risk. The channel of financial opacity is thus verified.

4.5.2. Corporate risky investments

Managers' risk attitudes materially affect the bad news hoarding, because the intentional information management exposes managers to substantial risks (Chen et al., 2021). Government-controlled companies tend to undertake conservative investments (Fogel et al., 2008), suggesting that politicians and SOE managers are risk-averse and those companies are less risk-taking (Boubakri et al., 2013). Those risk-averse managers are less likely to engage in high-risk projects and thus able to reduce stock price crash risk, due to career and wealth concerns (Chen et al., 2018a). Besides, firms' bad performance that managers intend to manage might come from their failure in operating risky investments, such as innovation activities, which makes the information environment more opaque (Jia, 2018; Wu and Lai, 2020).

To measure corporate risky investments, we employ three variables. The first one is firms' R&D expense to sales ratio (R&D), as innovation activities are long-term and risky. The second one is also related to innovation and measures the outcomes of innovation activities (PATENT), that is, the number of patents filed over a 3-year window. The third one is whether or not a firm expands its business into global markets (GLOBAL), as globalization strategy is deemed risky.

The results are reported in Table 12. In Panel A, it shows that R&D, PATENT, and GLOBAL are all significantly and negatively correlated with GOV, implying that government-controlled firms undertake less risky investments. Turning to Panel B, we find that the three variables of risky investments are all positively and significantly associated with the three crash risk measures. That is, corporate risky investments positively predict crash risk. Collectively, government-controlled firms undertake less risky investments, which reduce stock price crash risk, supporting the channel of corporate risky investments.

4.5.3. CEO myopia

Managerial opportunism causes managers to pursue short-term investments with faster paybacks and forgo long-term investments that do not generate profits in the short run (Antia et al., 2010). In other words, managers are myopic and having short decision horizons. Managers generally invest less for the long run, probably because they are preoccupied with safety (Hirshleifer and Thakor, 1992). For those risk-averse or conservative managers of SOEs, they are likely to pursue short-term results that serve their own interests, such as promotions within the political ranking system (Chen et al., 2018a). In particular, managers approaching retirement age or about to be replaced are likely to become myopic, because they are less concerned with cash flows and risks after the time horizon (Antia et al., 2010; Hambrick and Fukutomi, 1991).

We follow previous studies to measure CEO myopia. The first measure is CEO age (AGE). Old CEOs are approaching retirement and thus having short time horizons, whereas young CEOs have a long future career and are financially incentivized to hide adverse operating performance from shareholders (Andreou et al., 2017; Chen et al., 2018a). The second measure is CEO tenure (TENURE), namely, the number of years in a CEO position. The rationale is that CEOs in their early years of service have pressures to deliver performance and need early feedback on their talent (Ali and Zhang, 2015; Andreou et al., 2017). To defend their jobs, short-tenured CEOs have excessive incentives to focus on short-term performance (Ali and Zhang, 2015). In contrast, CEOs with long tenures are committed to the *status quo*, defined as a belief in the enduring correctness of current organizational strategies and profiles, which positively affects firm performance (Hambrick et al., 1993). Following Antia et al. (2010), we combine CEO age and tenure to construct the third measure, a measure of CEO decision horizon (DH), computed as [TENURE(industry,t) – TENURE(i,t)] + [AGE(industry, t) - AGE(i,t)]. DH can take either positive or negative values. A positive value means that the CEO's expected tenure is longer than the industry median, whereas a negative value means that CEO's expected tenure is shorter than the industry median. Finally, we construct a measure of CEO backgrounds (BACK), including CEO's educational, professional, overseas, and academic backgrounds, which might affect CEO's professional ability and myopia. To construct the measure of BACK, we sum up four dummy variables: dummy(degree) is equal to one if a CEO has a master or doctoral degree and zero otherwise; dummy(profession) is equal to one if a CEO has professional backgrounds and zero otherwise; dummy(oversea) is equal to one if a CEO has studied or worked abroad and zero otherwise; and dummy(academic) is equal to one if a CEO has academic research backgrounds and zero otherwise.

The results are reported in Table 13. Panel A shows that CEOs in government-controlled firms tend to be older and have shorter tenure, shorter decision horizon, and fewer backgrounds, suggesting that those CEOs have myopic attributes. As shown in Panel B, those myopic attributes are strongly associated with future crash risk. Specifically, in models of (1)–(3), the coefficients on estimated AGE are estimated to be -0.061 ($t = 6.643$), -0.043 ($t = 6.640$), and -0.007 ($t = 1.695$), respectively, suggesting that firms with older CEOs are less likely to experience stock price crashes. In models of (4)–(9), the coefficients on estimated TENURE and DH are all positive, implying that CEOs with shorter decision horizon are associated with lower crash risk. Finally, in models (10)–(12), the coefficients on estimated BACK are positive, suggesting that CEOs having fewer backgrounds are able to lower stock price crash risk. Overall, we provide evidence for CEO myopia working as a channel.

5. Conclusions

Using data of Chinese firms over the period of 2004–2018, we examine how ultimate government control affects stock price crash risk. We find that firms controlled by government entities are less prone to stock price crashes, as compared with privately controlled firms. The reduction effect is more pronounced among central government-controlled firms. The results are robust after controlling for

Table 12

Channel test: risky investments.

Panel A: Regressions of firms' risky investments on GOV

VARIABLES	(1) R&D (t)	(2) PATENT(t)	(3) GLOBAL(t)
GOV(t)	−0.006***	−0.164***	−0.051***
	[−4.199]	[−3.502]	[−3.215]
SIZE(t)	0.003***	0.613***	0.037***
	[3.381]	[20.151]	[4.428]
LEV(t)	−0.066***	0.665***	0.043
	[−16.383]	[6.318]	[1.160]
MTB(t)	0.002***	−0.066***	−0.012***
	[9.203]	[−14.699]	[−8.097]
ROA(t)	−0.101***	0.206	−0.155*
	[−8.136]	[0.733]	[−1.648]
ABACC(t)	−0.018***	−0.885***	−0.137***
	[−3.733]	[−7.141]	[−3.278]
Constant	0.006	−8.928***	−0.285**
	[0.505]	[−20.012]	[−2.038]
Obs.	13,217	27,274	26,862
Adj. R²	0.300	0.410	0.210
Year FE	YES	YES	YES
Industry FE	YES	YES	YES

Panel B: Regressions of crash risk on firms' risky investments

VARIABLES	(1) NCSKEW(t + 1)	(2) DUVOL(t + 1)	(3) CRASH(t + 1)	(4) NCSKEW(t + 1)	(5) DUVOL(t + 1)	(6) CRASH(t + 1)	(7) NCSKEW(t + 1)	(8) DUVOL(t + 1)	(9) CRASH(t + 1)
$\widehat{R\&D}$(t)	14.356***	9.822***	2.629**						
	[4.985]	[4.871]	[2.187]						
$\widehat{PATENT}$(t)				0.413***	0.288***	0.046*			
				[6.840]	[6.746]	[1.798]			
$\widehat{GLOBAL}$(t)							1.323***	0.927***	0.160*
							[6.774]	[6.702]	[1.925]
NCSKEW(t)	0.055***			0.049***			0.049***		
	[5.912]			[7.589]			[7.545]		
DUVOL(t)		0.043***			0.040***			0.040***	
		[4.545]			[6.256]			[6.251]	
CRASH(t)			−0.001			−0.000			−0.000
			[−0.074]			[−0.025]			[−0.054]
SIGMA(t)	4.512***	2.716***	−1.263**	5.291***	3.629***	−0.822*	5.286***	3.555***	−0.750
	[3.388]	[2.933]	[−1.976]	[5.444]	[5.413]	[−1.807]	[5.402]	[5.258]	[−1.639]
RET(t)	0.478**	0.353**	−0.174*	0.629***	0.505***	−0.114	0.633***	0.496***	−0.104
	[2.312]	[2.463]	[−1.801]	[4.064]	[4.720]	[−1.638]	[4.070]	[4.610]	[−1.483]
DTURN(t)	−0.026*	−0.010	−0.012	−0.024**	−0.010	−0.009	−0.024*	−0.009	−0.009
	[−1.681]	[−0.960]	[−1.139]	[−1.987]	[−1.205]	[−1.146]	[−1.938]	[−1.102]	[−1.220]
SIZE(t)	0.002	−0.015*	0.000	−0.219***	−0.163***	−0.026	−0.015*	−0.022***	−0.003
	[0.191]	[−1.939]	[0.084]	[−5.894]	[−6.239]	[−1.623]	[−1.690]	[−3.443]	[−0.811]
LEV(t)	0.765***	0.507***	0.152*	−0.428***	−0.308***	−0.044**	−0.215***	−0.158***	−0.019
	[3.835]	[3.613]	[1.810]	[−9.375]	[−9.677]	[−2.247]	[−8.201]	[−8.683]	[−1.583]
MTB(t)	−0.009	−0.007	−0.001	0.042***	0.029***	0.006***	0.030***	0.021***	0.005***
	[−1.549]	[−1.580]	[−0.459]	[10.258]	[9.945]	[3.249]	[11.893]	[11.419]	[4.113]
ROA(t)	1.517***	1.125***	0.194	−0.073	−0.004	0.001	0.236***	0.218***	0.032
	[4.802]	[5.081]	[1.446]	[−0.898]	[−0.071]	[0.015]	[2.710]	[3.536]	[0.806]
ABACC(t)	0.366***	0.263***	0.135***	0.380***	0.250***	0.088***	0.185***	0.115***	0.065**
	[3.548]	[3.721]	[2.844]	[5.206]	[4.904]	[2.630]	[3.177]	[2.865]	[2.415]
Constant	−1.150***	−0.592***	0.057	3.223***	2.389***	0.410*	−0.091	0.085	0.032
	[−7.375]	[−5.420]	[0.713]	[5.867]	[6.181]	[1.848]	[−0.817]	[1.094]	[0.677]
Obs.	13,217	13,217	11,858	27,274	27,274	24,269	26,862	26,862	23,930
Adj. R²	0.059	0.059	0.017	0.066	0.068	0.024	0.066	0.068	0.024
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

This table presents two-step regressions of risky investments measures on government control and control variables (first-step regressions in Panel A) and crash risk measures on risky investments measures and control variables (second-step regressions in Panel B). Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

Table 13

Channel test: CEO myopia.

Panel A: Regressions of CEO myopia on GOV

	(1)	(2)	(3)	(4)
VARIABLES	AGE(t)	TENURE(t)	DH(t)	BACK(t)
GOV(t)	1.135***	−0.168***	−0.977***	−0.113***
	[6.159]	[−2.820]	[−4.938]	[−5.449]
SIZE(t)	0.629***	0.062*	−0.671***	0.069***
	[6.182]	[1.796]	[−6.160]	[5.603]
LEV(t)	0.035	0.033	−0.228	−0.208***
	[0.077]	[0.212]	[−0.451]	[−3.973]
MTB(t)	−0.059***	−0.030***	0.089***	0.001
	[−2.850]	[−3.940]	[3.771]	[0.372]
ROA(t)	−0.214	0.707*	−0.644	0.052
	[−0.178]	[1.763]	[−0.489]	[0.383]
ABACC(t)	−2.197***	−1.304***	3.339***	−0.318***
	[−3.909]	[−7.242]	[5.476]	[−5.411]
Constant	36.170***	0.489	9.004***	−0.583***
	[21.887]	[0.939]	[5.106]	[−2.989]
Obs.	24,781	24,544	24,544	24,781
Adj. R^2	0.098	0.283	0.018	0.386
Year FE	YES	YES	YES	YES
Industry FE	YES	YES	YES	YES

Panel B: Regressions of crash risk on CEO myopia

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)
$\widehat{\text{AGE}}$(t)	−0.061***	−0.043***	−0.007*						
	[−6.643]	[−6.640]	[−1.695]						
$\widehat{\text{TENURE}}$(t)				0.408***	0.285***	0.043			
				[6.526]	[6.466]	[1.598]			
$\widehat{\text{DH}}$(t)							0.070***	0.049***	0.007
							[6.526]	[6.466]	[1.598]
$\widehat{\text{BACK}}$(t)									
NCSKEW(t)	0.049***			0.050***			0.050***		
	[7.232]			[7.375]			[7.375]		
DUVOL(t)		0.038***			0.039***			0.039***	
		[5.679]			[5.829]			[5.829]	
CRASH(t)			−0.001			−0.000			−0.000
			[−0.090]			[−0.035]			[−0.035]
SIGMA(t)	5.015***	3.395***	−0.797*	4.947***	3.397***	−0.806*	4.947***	3.397***	−0.806*
	[4.911]	[4.867]	[−1.659]	[4.820]	[4.852]	[−1.672]	[4.820]	[4.852]	[−1.672]
RET(t)	0.597***	0.473***	−0.101	0.585***	0.473***	−0.102	0.585***	0.473***	−0.102
	[3.691]	[4.264]	[−1.372]	[3.602]	[4.251]	[−1.381]	[3.602]	[4.251]	[−1.381]
DTURN(t)	−0.023*	−0.009	−0.005	−0.022*	−0.009	−0.005	−0.022*	−0.009	−0.005
	[−1.775]	[−0.996]	[−0.594]	[−1.724]	[−0.956]	[−0.632]	[−1.724]	[−0.956]	[−0.632]
SIZE(t)	0.072***	0.039***	0.007*	0.008	−0.005	−0.000	0.080***	0.045***	0.007*
	[8.368]	[6.479]	[1.685]	[1.076]	[−1.119]	[−0.053]	[8.320]	[6.590]	[1.718]
LEV(t)	−0.145***	−0.109***	−0.012	−0.166***	−0.123***	−0.016	−0.137***	−0.102***	−0.013
	[−5.437]	[−5.908]	[−0.955]	[−6.282]	[−6.684]	[−1.325]	[−5.080]	[−5.446]	[−1.053]
MTB(t)	0.011***	0.007***	0.002***	0.027***	0.018***	0.004***	0.009***	0.005***	0.002***
	[7.395]	[6.697]	[3.561]	[12.158]	[11.578]	[4.272]	[4.933]	[4.342]	[2.910]
ROA(t)	0.071	0.094	0.027	−0.201**	−0.095	−0.008	0.132	0.138**	0.027
	[0.843]	[1.582]	[0.686]	[−2.091]	[−1.402]	[−0.176]	[1.548]	[2.279]	[0.686]
ABACC(t)	−0.086	−0.081**	0.047*	0.581***	0.385***	0.122***	−0.185***	−0.150***	0.041
	[−1.419]	[−1.986]	[1.696]	[6.012]	[5.669]	[2.806]	[−2.704]	[−3.209]	[1.327]
Constant	1.769***	1.387***	0.346**	−0.647***	−0.314***	0.021	−1.080***	−0.615***	−0.015
	[5.026]	[5.658]	[2.069]	[−6.287]	[−4.287]	[0.435]	[−7.942]	[−6.312]	[−0.251]
Obs.	24,781	24,781	22,076	24,544	24,544	21,866	24,544	24,544	21,866
Adj. R^2	0.066	0.068	0.024	0.066	0.067	0.024	0.066	0.067	0.024
Year FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

Table 13 (*continued*)

Panel B: Regressions of crash risk on CEO myopia									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
VARIABLES	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)
Industry FE	YES	YES	YES	YES	YES	YES	YES	YES	YES

	(10)	(11)	(12)
VARIABLES	NCSKEW(t + 1)	DUVOL(t + 1)	CRASH(t + 1)
$\widehat{AGE}(t)$			
$\widehat{TENURE}(t)$			
$\widehat{DH}(t)$			
$\widehat{BACK}(t)$	0.606***	0.423***	0.064
	[6.526]	[6.466]	[1.598]
NCSKEW(t)	0.050***		
	[7.375]		
DUVOL(t)		0.039***	
		[5.829]	
CRASH(t)			0
			[−0.035]
SIGMA(t)	4.947***	3.397***	−0.806*
	[4.820]	[4.852]	[−1.672]
RET(t)	0.585***	0.473***	−0.102
	[3.602]	[4.251]	[−1.381]
DTURN(t)	−0.022*	−0.009	−0.005
	[−1.724]	[−0.956]	[−0.632]
SIZE(t)	−0.009	−0.017***	−0.002
	[−1.015]	[−2.849]	[−0.496]
LEV(t)	−0.027	−0.026	−0.002
	[−0.783]	[−1.055]	[−0.097]
MTB(t)	0.014***	0.009***	0.003***
	[10.291]	[9.416]	[4.520]
ROA(t)	0.056	0.084	0.019
	[0.650]	[1.395]	[0.485]
ABACC(t)	0.241***	0.148***	0.086***
	[3.875]	[3.448]	[2.971]
Constant	−0.094	0.073	0.138**
	[−0.816]	[0.907]	[2.445]
Obs.	24,544	24,544	21,866
Adj. R^2	0.066	0.067	0.024
Year FE	YES	YES	YES
Industry FE	YES	YES	YES

This table presents two-step regressions of CEO myopia measures on government control and control variables (first-step regressions in Panel A) and crash risk measures on CEO myopia measures and control variables (second-step regressions in Panel B). Year and industry dummies are included in each of those regressions. T-statistics are adjusted by firm-clustered standard errors and reported in brackets. Definitions of all those variables are provided in Appendix. The sample period is 2004–2018. ***, **, and * indicate the levels of significance at the 1%, 5%, and 10%, respectively.

the market disaster, macro-level variables, market hysteresis, firm-fixed effects, and a variety of corporate governance variables. We address the endogeneity issues by applying a principle score matching sample, an instrumental variable approach, and the difference-in-difference analyses. Particularly, we find that the effect of government control is moderated by the Split-share Structure Reform and the effect of central government control is moderated by the anti-corruption campaign. Our results attest to the incentive alignment view that controlling and minority shareholders align their interests and stock prices perform well. Finally, we test three impacting channels, which are financial opacity, firms' risky investments, and CEO myopia. We find that government-controlled firms exhibit less financial opacity, undertake less risky investments, and appoint myopic CEOs, through which stock price crash risk is diminished. Taken together, the results suggest that government-controlled firms hoard less bad news, resulting in lower crash risk.

Acknowledgement

Appendix A. Definitions of variables

Variable	Definition
NCSKEW	The negative skewness of firm-specific weekly returns over the fiscal year
DUVOL	The logarithm of the ratio of the standard deviations of down-week to up-week firm-specific weekly returns
CRASH	A dummy variable equal to one if a firm experiences one or more firm-specific weekly returns falling at least 3.09 standard deviations below its mean value in a given year, and zero otherwise
GOV	A dummy variable equal to one if firms' controlling shareholders are government entities
CENTRAL	A dummy variable equal to one if firms' controlling shareholders are central government, such as the Ministry of Finance and the Central Industrial Enterprises Administration Committee
LOCAL	A dummy variable equal to one if firms' controlling shareholders are local governments, such as the province, city or county governments, the Bureau of State Assets Management of the province, city, or county
DTURN	The average monthly share turnover in the current fiscal year minus the average monthly share turnover in the previous fiscal year
RET	The mean of firm-specific weekly returns
SIGMA	The standard deviation of firm-specific weekly returns
SIZE	The natural logarithm of total assets
LEV	Total liabilities divided by total assets
MTB	The market value of equity divided by the book value of equity
ROA	Income before extraordinary items divided by total assets
ABACC	The absolute value of discretionary accruals estimated from the modified Jones model
D(SSR)	An indicator variable equal to one for years after 2005, when the Split-Share Structure Reform was enacted, and zero otherwise
D(ACR)	An indicator variable equal to one for years after 2012, when the Anti-Corruption Reform of the Eight-Point Regulation was enacted, and zero otherwise
EXCESS	The excess control by the ultimate controlling shareholders, computed as the difference between the control and cash flow rights scaled by control rights
UCF	The cash flow rights of ultimate controlling shareholders
DUAL	An indicator variable equals one if the positions of CEO and the chairman of the board are held by the same person, and zero otherwise
IBOARD	The percentage of independent board members over total board members
ANALYST	The logarithm of financial analyst coverage
IO	The institutional ownership
HHI	The Herfindahl-Hirschman index measuring the product market competition
OPAQ	The prior three years' moving sum of the absolute value of discretionary accruals
ISYN	A measure of the firm-specific information arriving to the securities market, computed as $Ln[(1-R^2)/R^2]$, where R^2 is from Eq. (1)
DISC	The quality of financial disclosure, ranked from 1 (poor quality) to 4 (good quality) by Shenzhen Stock Exchange
R&D	The ratio of R&D expenses to sales
PATENT	The logarithm of the number of patents filed by firms
GLOBAL	An indicator variable equal to one if the firm generates non-zero foreign sales and zero otherwise
AGE	CEO age
TENURE	CEO tenure, the number of years of holding the CEO position
DH	CEO decision horizon, computed as DH = [TENURE(industry,t) – TENURE(i,t)] + [AGE(industry,t)-AGE(i,t)], where TENURE(i,t) is the number of years the CEO has held the position and AGE(i,t) is the age of the CEO working for firm i in year t. TENURE(industry,t) and AGE(industry,t) are the industry median of TENURE and AGE.
BACK	CEO background, computed as the summation of four dummy variables: dummy(degree) is equal to one if the CEO has a master or doctoral degree and zero otherwise; dummy(profession) is equal to one if the CEO has professional backgrounds and zero otherwise; dummy(oversea) is equal to one if the CEO has studied or worked abroad and zero otherwise; dummy(academic) is equal to one if the CEO has academic research backgrounds and zero otherwise.
MV/GDP	The total market value of all stocks traded in the market as a percentage of GDP
ATO	The annualized turnover ratio of all stocks traded in the market, computed as the value of domestic shares traded in the market divided by their market capitalization

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