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Multiple large shareholders, blockholder trading and stock price crash risk

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Abstract

We show that in a setting with a strong concern for controlling shareholder entrenchment, firms with multiple large shareholders (MLS) are more likely to experience stock price crashes. As a result, when anticipating future revelations of bad news concerning corporate misconduct on information disclosure, large shareholders can exploit their information advantage and initiate their sales ex ante as far as eight quarters ahead. The positive association between MLS and crashes is more pronounced in the presence of noncontrolling shareholders' sales. Also, the positive predictive power of MLS on crash risk is more potent in firms with weak internal or external governance.

KEYWORDS
blockholder trading, controlling shareholder entrenchment, multiple large shareholders, stock price crash risk

JEL CLASSIFICATION
G32, G34, G14

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1 | INTRODUCTION

A large body of literature has investigated the role of large shareholders on stock price crash risk in the US markets (e.g., An & Zhang, 2013; Callen & Fang, 2013). They suggest that agency conflicts between managers and outside investors are a fundamental source of managerial bad news hoarding and subsequent stock price crashes, whereas the presence of institutional investors, with their large stake holdings, can reduce crash risk due to their monitoring role.

However, ownership structures exhibit relatively little concentration in the US markets despite the significance of institutional investors. Elsewhere, ownership by multiple large shareholders (MLS) who demonstrate heterogeneous blockholder types (e.g., individual, family, and state) is common in the corporate landscape.[1] In addition to MLS structure, most firms are predominantly controlled by the single largest shareholder, who often establishes control over a firm despite little cash flow rights, resulting in a negative entrenchment effect (Claessens et al., 2002; Djankov et al., 2008; La Porta et al., 1999). Despite the interests of managers and large shareholders can be essentially aligned in this scenario, this type of ownership structure has enabled controlling shareholders to engage in a variety of self-serving transactions and extract private benefits of control. Therefore, it is unclear whether MLS is an effective governance structure, in a setting with a strong concern for controlling shareholder entrenchment. In this study, to shed light on the governance impact of MLS, we investigate the association between the presence of MLS and stock price crash risk, and whether blockholders trade on their information advantage.

The literature provides two essentially opposing views on the governance role of MLS, thus it is unclear how the structure of MLS impacts on stock price crash risk. On the one hand, extant literature demonstrates the importance of the monitoring role of MLS in alleviating agency conflicts between controlling shareholders and minority shareholders (e.g., Attig et al., 2008; Laeven & Levine, 2008; Maury & Pajuste, 2005). According to these studies, the controlling shareholder is motivated to expropriate wealth from minority shareholders, but competition for corporate control from other large shareholders may prevent the controlling shareholder from extracting private benefits. Consistent with this argument, empirical studies provide evidence on various benefits of MLS, such as reducing excess leverage and tunnelling, improving investment efficiency, enhancing firm value, and lowering the cost of equity (Attig et al., 2008; Boateng & Huang, 2017; Jiang et al., 2018; Laeven & Levine, 2008; Maury & Pajuste, 2005). Thus, MLS could curb bad news hoarding by playing a monitoring role on the controlling shareholder. This monitoring role echoes the strand of literature on shareholder activism.

On the other hand, it is reasonable to expect that MLS is not always effective in reducing bad news hoarding because they can vote with their feet by selling their shares and exiting the firms. Owing to the information advantage of blockholders, they can 'foresee' future bad news and trade intensively to exploit its future revelation. So the key question here is when will they have incentives to adopt the exit mechanism rather than activism? The prerequisite for the aforementioned competition mechanism to work is the power balance among large

[1]See Faccio and Lang (2002), Maury and Pajuste (2005), Leven and Levine (2008); Holderness (2009). For example, Laeven and Levine (2008) examine 1657 sample firms from 13 Western European countries and find that 34% of the firms have two or more large shareholders with at least 10% of voting rights. Edmans and Manso (2011) find that 70% of U.S. firms have multiple blockholders with 5% or more of a firm's equity.

shareholders, which requires their holdings are more equally distributed (Laeven & Levine, 2008; Maury & Pajuste, 2005). Otherwise, no other one has sufficient incentives or power to monitor effectively (Grossman & Hart, 1980). However, this prerequisite is not satisfied with the presence of controlling shareholder entrenchment. For example, in China, due to the entrenchment of the controlling blockholders (e.g., Gul et al., 2010; Jiang & Kim, 2015), the noncontrolling blockholders are less likely to be powerful enough to influence firm decisions. Thus, the conflicts between the controlling shareholder and the outside blockholders can trigger exit to a larger extent when managers or controllers are hoarding bad news. Therefore, we argue that without effective monitoring and sufficient discipline from other blockholders under MLS structure, controlling shareholders may find it less costly to withhold bad operating performance news when faced with adverse outcomes that will affect their private interests. Therefore, MLS may increase their likelihood of hoarding bad news by controlling shareholders.

In this study, we examine the association between the presence of MLS and stock price crash risk in China by testing above two views. It is widely acknowledged that ownership structures of Chinese listed firms are highly concentrated, and the entrenchment of controlling shareholders is dominant (e.g., Gul et al., 2010; Jiang & Kim, 2015). China's capital market offers us a great opportunity as the use of exit requires that the interests of outside blockholders should not be perfectly aligned with those of the managers or controllers, so that there will be incentives to adopt the exit mechanism rather than activism. In China, due to the entrenchment of the controlling blockholders (e.g., Gul et al., 2010; Jiang & Kim, 2015), the interests of the controlling and noncontrolling blockholders are far from perfectly aligned. Wu (2017) studies a large number of outside blockholder sales after the removal of trading restrictions in the post-split-share structure reform (SSSR) period. He finds strong and negative market reactions to these sales and provides evidence that the negative price impact is not due to the oversupply of stocks. Also, he finds that the sales are followed by significant firm underperformance. Thus, noncontrolling shareholders have incentives to sell on negative information and realize capital gains. Thus, the conflicts between the controlling shareholder and the outside blockholders can trigger exit to a larger extent when managers or controllers are hoarding bad news.

Using a sample of Chinese listed firms during 2000–2019, our results show that the presence of MLS is positively associated with future stock price crash risk after controlling for possible determinants of crash risk. Our results confirm that MLS is not effective in curbing bad news hoarding in a setting with a strong concern for controlling shareholder entrenchment. We are aware that our main tests could be plagued with endogeneity as there might be some unobserved firm characteristics that drive both an MLS structure and crash risk simultaneously. Using the staggered implementation of the SSSR in China, we employ a difference-in-differences (DID) research design to estimate whether the exogenous shock to ownership structure confirms the predictive power of MLS for stock price crash risk. Our baseline results continue to hold.

To provide further insight into the behaviour of MLS when facing the hoarding of bad news, we explore whether blockholders trade on future stock price crash risk ex ante. Blockholders' failure to police corporate misconduct does not necessarily suggest they will not exploit private information advantage to maximize their personal benefits. Edmans (2014, p. 30) argues that *Once the manager has taken a bad action, blockholders cannot change it and are concerned only with maximizing their trading profits*. Owing to the information advantage of blockholders, they can 'foresee' future bad news and trade intensively to exploit its future revelation. Specifically,

we examine blockholders' trading intensity around the China Securities Regulatory Commission (CSRC) enforcement announcements that are specific corporate events that signal regulatory enforcement regarding managerial misconduct over information disclosure. Our results show that firms subject to CSRC enforcement experience more violent blockholder sales in terms of both trading volume and trading frequency in an eight-quarter window before the CSRC enforcement, compared to their nearest-neighbour matching peers. This confirms that blockholders can trade on corporate misconduct ex ante.

To study blockholders' exit behaviour in the Chinese setting, we are aware that there is a broader diversity of blockholders in Chinese listed firms, including SOEs, companies, individuals/families and institutions, and these heterogeneous blocks coexist as blockholders in a single firm. The literature indicates that blockholders are a heterogeneous group, with systematic variation in objectives, holding periods, position sizes, number of positions taken, and types of firms selected for a position (Edmans & Holderness, 2017; Hadlock & Schwartz-Ziv, 2019). For example, family blockholders hold distinctive objectives that may diverge from shareholder (financial) value maximization. They are motivated to preserve and advance their nonfinancial private benefits of control. Institutional investors, as blockholders, unlike families, are driven primarily by financial returns and tend to be more diversified and more prone to taking risks than family blockholders (Chen et al., 2019). Thus, blockholder heterogeneity determines, as long as conflicts of interest exist, the possibility that they sell on private information relating to future stock crashes. Therefore, even under an MLS structure, different types of blockholders may respond to future stock price crash risk differently depending on their preferences and objectives.

We also empirically test above theoretical insights in terms of blockholder heterogeneity. First, we find that the positive impact of MLS on stock price crash risk is more pronounced in the presence of noncontrolling shareholders' sales than controlling shareholders' sales. Due to the entrenchment of the controlling blockholders in China, the noncontrolling blockholders are less likely to be powerful enough to influence firm decisions, thereby having incentives to sell on negative information and realize capital gains. Despite we cannot rule out the possibility that controlling shareholders can also engage in informed trading before adverse corporate events, they have relatively stronger incentives to prevent any information-driven sales to avoid stock-price declines (Wu, 2017). Second, we also examine whether blockholder heterogeneity on stock price crash risk. Our evidence suggests that under an MLS structure, the presence of private blockholders as the largest shareholder significantly increases future crash risk in comparison to state-owned enterprise (SOE) blockholders.

Our study makes several contributions to the literature. First, while a large body of previous research acknowledges the importance of MLS in alleviating agency conflicts between the controlling shareholders and minority shareholders (Attig et al., 2008; Beck et al., 2008; Ben-Nasr et al., 2015; Bennedsen & Wolfenzon, 2000; Maury & Pajuste, 2005), we post challenges to this strand of literature. We point out that in a setting with controlling shareholder entrenchment due to concentrated ownership, the weakening of the monitoring and disciplining role of other large shareholders increase firms' likelihood of hoarding bad news. Our findings share similar insights with the emerging studies on the dark side of MLS. For example, Cai et al. (2016) argue that the cost of MLS reveals when there are conflicting incentives among large shareholders. Fang et al. (2018) document that coordination friction among MLS reduces large shareholders' monitoring efficiency and exacerbates agency problems between shareholders and executives.

Second, rather than focusing on blockholders' corporate governance preferences behind the scenes, which are barely direct to identify (e.g., Edmans, 2009; McCahery et al., 2016), we analyze their actual trading behaviour when faced with the failure of corporate governance. We propose that blockholders can be perceived as informed traders when exploiting their information advantage. In particular, if a blockholder recognizes that a firm is following a nonvalue-maximizing strategy, this may motivate him/her to sell before the negative information is fully incorporated into the stock price. In a similar vein, Cheng et al. (2017) document that Noncontrolling large shareholders successfully time the market, as shown by their positive abnormal returns when selling their shares. Wu (2017) finds strong and negative market reactions to outside blockholders' sales after the removal of trading restrictions in the post-SSSR period.

Third, although extant empirical research explores the determinants of crash risk, few studies focus on how ownership structures beyond the US market can reshape the stock price crash risk.[2] In the United States, the dominant type of blockholder is institutional investors, and their shareholdings are relatively dispersed. Using the US sample, An and Zhang (2013) and Callen and Fang (2013) find that stock price crash risk is negatively related to the presence of dedicated institutional investors while positively associated with transient institutional investors. However, the implications from the US market are far less common, especially in markets where firms are largely controlled by other types of blockholders such as individuals, families or the state. These blockholders' incentives and ability to monitor might not be comparable to sophisticated institutional investors, and their coexistence can make the governance scene more complicated. Our study on the Chinese stock market offers new evidence to the stock price crash literature that the entrenchment of controlling shareholders can increase the likelihood of hoarding bad news.

The rest of the paper proceeds as follows. Section 2 describes the sample and variable measurements. Section 3 displays the descriptive statistics and univariate analysis. Section 4 presents the methods and empirical results. Section 5 concludes the paper.

2 | SAMPLE AND VARIABLE MEASUREMENTS

2.1 | Sample and data sources

We start with all public firms listed on the main board of Shanghai and Shenzhen Stock Exchanges in the Chinese stock market from 2000 to 2019. We obtain the ownership structure, blockholders' trading records, and financial and accounting information from the CSMAR database. We exclude financial and utility companies and companies with fewer than 30 trading weeks as well as observations with missing values. After matching the data with financial and accounting control variables, we are left with a sample of 25,045 firm-year observations. To ensure that our results are not driven by outliers, all continuous variables are winsorized at the 1st and 99th percentiles.

[2]These determinants include financial reporting opacity (Hutton et al., 2009; Jin & Myers, 2006), corporate tax avoidance (Kim et al., 2011a), accounting conservatism (Kim & Zhang, 2016), corporate social responsibility (Kim et al., 2014), executive equity incentives (Kim et al., 2011b), excess management perks (Xu et al., 2014), the informal hierarchy among directors (Jebran et al., 2019), institutional investors (An & Zhang, 2013), auditor (Callen & Fang, 2017), analysts (Xu et al., 2013), and short sellers (Callen & Fang, 2015).

2.2 | Variable measurements

2.2.1 | Measuring MLS

The CSRC mandates that all public firms in the Chinese stock market disclose details (e.g., shareholding percentages and identities) of the 10 largest shareholders or any substantial shareholder that holds 5% or more of the shares. It provides us with the opportunity to identify the presence of blockholders on a yearly basis.

Accordingly, we define a large shareholder or blockholder as an entity with 5% or more of the voting rights over the firm. According to the Notice of the CSRC (No. 9, 2017)—'the Implementation of the Several Provisions on the Shareholding Reduction by the Principal Shareholders, Directors, Supervisors, and Senior Executives of Listed Companies', the controlling shareholders and any shareholder with a 5% or higher holding are defined as large shareholders. Also, 5% has been taken as a threshold to define large shareholders by previous studies (e.g., Faccio & Lang, 2002; Hope et al., 2017).[3]

After identifying the large shareholders, we capture the presence of MLS with a dummy variable, denoted by *DumMLS*, that equals one if a listed firm has two or more large shareholders in a given year, and zero otherwise. Alternatively, we measure the presence of MLS using the number of large shareholders in a listed firm, denoted by *NumMLS*.

2.2.2 | Measuring firm-specific crash risk

We measure firm-specific crash risk with two proxies, *NCSKEW* and *DUVOL*, following the previous literature (e.g., Chen et al., 2018; Ji et al., 2021; Kim et al., 2011a, 2011b; Xu et al., 2021). Both proxies are constructed based on firm-specific weekly returns and highly correlated to forecasted stock crashes. To calculate *NCSKEW* and *DUVOL*, we first estimate firm-specific weekly returns for each firm-year, denoted by *W*. Specifically, *W* is calculated as the natural logarithm of one plus the residual return from the expanded market model regression:

$$r_{i,w} = \alpha_i + \beta_1 r_{m,w-2} + \beta_2 r_{m,w-1} + \beta_3 r_{m,w} + \beta_4 r_{m,w+1} + \beta_5 r_{m,w+2} + \epsilon_{i,w}, \quad (1)$$

where $r_{i,w}$ is the return on stock i in week w and $r_{m,w}$ is the value-weighted A-share market return in week w. Then, the firm-specific weekly return for firm i in week w, $W_{i,w}$, is measured by the natural logarithm of one plus the residual return in Equation (1), that is $W_{i,w} = \mathrm{Ln}(1 + \epsilon_{i,w})$.

The first measure of crash risk, *NCSKEW*, is based on skewness, capturing the asymmetry of the return distribution. *NCSKEW* for any given firm in any year is calculated by taking the negative of the third moment of firm-specific weekly returns for each year, and normalizing it by the standard deviation of firm-specific weekly returns raised to the third power. A higher value of *NCSKEW* indicates a greater crash risk. Specifically, we calculate *NCSKEW* for firm i in year t as

[3]We alternatively take 10% as a threshold to define large shareholders. The unreported results remain qualitatively the same.

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

where n is the number of available firm-specific weekly returns for firm i during year t. Scaling the raw third moment by the standard deviation cubed allows for comparisons across stocks with different variances (Greene, 2003). By putting a minus sign in front of the third moment, we are adopting the convention that an increase in *NCSKEW* corresponds to a stock being more 'crash prone', that is, having a more left-skewed distribution. An increase in *NCSKEW* shows a greater left skewness in the distribution of firm-specific excess returns, and suggests that the firm is more likely to crash.

The second measure of crash risk is the down-to-up volatility of the crash likelihood, *DUVOL*. For each firm i in year t, firm-specific weekly returns are divided into two clusters. We group '*Down*' ('*Up*') weeks, when the weekly returns are below (above) the average firm-specific weekly return across the year, and then calculate the standard deviation for each of the two groups separately. *DUVOL* is the natural logarithm of the ratio of the standard deviation for the '*Down*' weeks to the standard deviation for the '*Up*' weeks, calculated as

$$DUVOL_{i,t} = \log\left\{\left[(n_u - 1)\sum_{\text{Down}} W_{i,t}^2\right] \Big/ \left[(n_d - 1)\sum_{\text{Up}} W_{i,t}^2\right]\right\}. \quad (3)$$

As with *NCSKEW*, a higher value of *DUVOL* suggests a greater crash risk. As *DUVOL* is a measure of return asymmetries that does not involve third moments, it is less likely to be overly influenced by a handful of extreme days (Chen et al., 2001; Xu et al., 2014; Yuan et al., 2016).

2.2.3 | Control variables

Following previous literature (Chen et al., 2001; Hutton et al., 2009; Kim et al., 2011a, 2011b), we control for other variables that help to explain stock price crash risk in our model specifications. Stock turnover, *Dturn*, is defined as the average monthly stock turnover over the current year, minus the average monthly stock turnover over the previous year. Stock volatility, *Sigma*, is the standard deviation of weekly stocks returns over the year. Stock return, *Return*, is the average of weekly stock returns over the year. Firm size, *Assets*, is the natural logarithm of the book value of total assets. *MTB* is the market-to-book value of the listed company. *Leverage* is total debts divided by total assets. Return on assets, *ROA*, is income before extraordinary items divided by total assets.

More empirical studies suggest that good corporate governance principles (such as board independence and managerial incentives) have a positive impact on firm performance and stock price crash risk (Andreou et al., 2016; Xu et al., 2014). An alternative interpretation of our finding is that MLS are merely a manifestation of a severe agency problem and firms with poor corporate governance are more prone to crash. To address this concern, we explicitly control for firm corporate governance characteristics identified as effective in the literature (e.g., Klein, 1998; Weisbach, 1988; Yermack, 1996): board size (*LnBoardSize*), board independence (*BIndependence*), and CEO–chairman duality (*Duality*). *Duality*, is a dummy variable that equals one if the chairman also holds the CEO position in the firm and zero otherwise. Empirical studies in the Chinese context suggest that CEO/Chair duality may connect with

agency costs captured by crash risk, since CEO/chair duality is negatively linked with CEO turnover (Kato & Long, 2006) and firm performance (Bai et al., 2004). *BoardSize* is the natural logarithm of board size. *BIndependence* is the ratio of the number of independent directors to the total number of directors. *Committees* are the number of board committees (such as audit committee, compensation committee and nomination committee. *BoardHolding* is shareholdings by the board of directors, which could influence the morning function of the board (Hadlock et al., 1999). In this way, we cover comprehensive corporate governance controls.

Discretionary accruals, *DISACC*, is the value estimated from the modified Jones model (Dechow et al., 1995; Hutton et al., 2009). *Big4* is a dummy variable that equals one if the listed firm is audited by one of the international Big four accounting firms, and zero otherwise.

3 | DESCRIPTIVE STATISTICS AND UNIVARIATE TESTS

3.1 | Summary statistics

Panel A of Table 1 reports the distribution of the number of large shareholders in Chinese listed firms, by firm-year. Almost every Chinese listed firm has at least one large shareholder, and over 55% of companies have two or more large shareholders, although firms with four or more large shareholders are still rare, about 8%.

There is a broader diversity in types of blockholders in Chinese listed firms, and these heterogeneous blocks coexist in a single firm. To display the blockholder heterogeneity in China, we manually categorize the top ten shareholders based on their identities into three types: SOE, private, and institution. Panel B of Table 1 documents the heterogeneity of types of blockholders in Chinese listed firms. Under the MLS structure, firms in which an SOE, company, private or institution is dominant, as the largest shareholder, account for about 26%, 74% and 1%, respectively. Also, the blockholder heterogeneity exists regardless of the type of the dominant blockholder. For example, firms with MLS in which an SOE is dominant as the largest blockholder often have at least one other SOE block(s), private block(s) or institution block(s).

The summary statistics for the dependent variables, independent variables and control variables are reported in Table 2. The two measures of future crash risk, $NCSKEW_{t+1}$ and $DUVOL_{t+1}$, have means of −0.242 and −0.166, with standard deviations of 0.759 and 0.500, respectively. The wide range in values for both measures indicates that there are large variations in crash risk among the sample. Descriptive statistics for other control variables are comparable to those from prior studies (e.g., Chen et al., 2018; Xu et al., 2014; Yuan et al., 2016).

3.2 | Univariate analysis

We first conduct univariate analysis for the relationship between MLS and stock price crash risk. Table 3 presents the results of univariate tests of (1) whether the presence of MLS; and (2) how the number of large shareholders respectively impact on stock price crash risk, proxied by $NCSKEW_t$ or $DUVOL_t$. The averages of $NCSKEW_t$ are 0.2588 and −0.2291 (−0.1776 and −0.1574 for $DUVOL_t$) for firms without and with MLS, respectively. The *t*-test reports whether the differences between firms without and with MLS are different from zero (two-sided), and the results suggest that the likelihood of a future stock price crash is significantly higher in firms with MLS than in those without MLS, regardless of the crash measure used.

TABLE 1 Sample distribution.

This table reports the distribution of ownership structures in Chinese-listed firms. Panel A reports the distribution of the number of large shareholders in Chinese listed firms by firm-year. Any shareholder with 5% or more of the voting rights is defined as a large shareholder/blockholder. Panel B reports the heterogeneity of types of blockholders in Chinese listed firms with the MLS structure, by firm-year.

Panel A Distribution of number of large shareholders in Chinese listed firms (firm-years)		
Number of large shareholders	**Obs**	**Proportion (%)**
None	31	0.12
One large shareholder	10,798	43.11
Multiple large shareholders (MLS)	14,216	56.76
Of which two are large	8282	33.07
Of which three are large	3864	15.43
Of which four or more are large	2070	8.27
Total	25,045	100.00
Panel B Heterogeneity of blockholder types of in Chinese listed firms with MLS structure (firm-years)		
Types of blockholders	**Obs**	**Proportion (%)**
SOE block as the largest blockholder	6452	25.76
With at least one SOE block	1372	5.48
With at least one private block	2072	8.27
With at least one institutional block	224	0.89
Private block as the largest blockholder	18,472	73.76
With at least one SOE block	1052	4.20
With at least one private block	11,294	45.09
With at least one institutional block	347	1.39
Institution block as the largest blockholder	188	0.75
With at least one SOE block	30	0.12
With at least one private block	154	0.61
With at least one institutional block	42	0.17
Total	25,045	100.00

In addition to the presence of MLS, we also test whether the number of large shareholders affects the stock price crash risk. The results exhibit an upward trend: stock price crash risk increases significantly with the number of large shareholders. For example, the values of $NCSKEW_t$ are −0.5834 without large shareholders, −0.2578 with one large shareholder, −0.2391 with two large shareholders, −0.2209 with three large shareholders, −0.2022 with four large shareholders, and −0.2044 with four or more large shareholders, respectively. We also conduct a *t* test for the difference in stock price crash risk between these groups with various numbers of large shareholders, and firms with only one large shareholder, as the benchmark group. Table 3 also shows that the difference in *NCSKEWt* or *DUVOLt* between any group with

TABLE 2 Descriptive statistics.

This table reports the descriptive statistics for the variables used in the empirical analysis. Definitions of variables are presented in Appendix A.

	Obs	Mean	SD	p25	Median	P75
$NCSKEW_{t+1}$	25,045	−0.242	0.759	−0.638	−0.215	0.184
$DUVOL_{t+1}$	25,045	−0.166	0.500	−0.493	−0.171	0.153
$DumMLS_t$	25,045	0.568	0.495	0.000	1.000	1.000
$NumMLS_t$	25,045	1.921	1.055	1.000	2.000	2.000
DumSale (>50%)	25,045	0.033	0.179	0.000	0.000	0.000
DumSale (30%–50%)	25,045	0.073	0.260	0.000	0.000	0.000
DumSale (<30%)	25,045	0.329	0.470	0.000	0.000	1.000
$Dturn_t$	25,045	−0.056	2.116	−1.051	−0.056	0.863
$NCSKEW_t$	25,045	−0.274	0.730	−0.675	−0.241	0.160
$Sigma_t$	25,045	0.063	0.025	0.045	0.057	0.074
$Return_t$	25,045	0.003	0.012	−0.005	0.001	0.010
$Assets_t$	25,045	22.026	1.281	21.100	21.852	22.754
MTB_t	25,045	1.827	1.114	1.170	1.468	2.041
$Leverage_t$	25,045	0.467	0.193	0.323	0.475	0.614
ROA_t	25,045	0.039	0.048	0.014	0.034	0.061
$Duality_t$	25,045	0.159	0.365	0.000	0.000	0.000
$Committees_t$	25,045	3.313	1.461	3.000	4.000	4.000
$BoardSize_t$	25,045	2.188	0.210	2.079	2.197	2.197
$BIndependence_t$	25,045	0.342	0.097	0.333	0.333	0.375
BoardHolding	25,045	0.053	0.135	0.000	0.000	0.002
$DISACC_t$	25,045	0.014	0.126	−0.036	0.014	0.065
$Big4_t$	25,045	0.067	0.249	0.000	0.000	0.000

MLS and the benchmark group is significantly different from zero. This confirms that firms with a larger number of blockholders bear higher stock price crash risk.

4 | MAIN RESULTS

4.1 | Baseline regression results

To investigate the relationship between the presence of MLS and crash risk, we estimate the following model:

TABLE 3 Univariate analysis between MLS and stock price crash risk.

This table reports the univariate analysis of the relationship between multiple large shareholders and stock price crash risk. The *t*-test tests whether the difference in *NCSKEWt* or *DUVOLt* between any two groups is different from zero (two-sided). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	$NCSKEW_t$		$DUVOL_t$	
Whether MLS	**Mean**	**Diff. between (1) and (0)**	**Mean**	**Diff. between (1) and (0)**
No	−0.2588	-	−0.1776	-
Yes	−0.2291	***	−0.1574	***
Number of large shareholders (*N*)	**Mean**	**Diff. between (*N*) and (1)**	**Mean**	**Diff. between (*N*) and (1)**
0	−0.5834	***	−0.3967	**
1	−0.2578	-	−0.1770	-
2	−0.2391	**	−0.1649	**
3	−0.2209	***	−0.1517	***
4	−0.2022	***	−0.1326	***
4 or more	−0.2044	***	−0.1387	***

$$CrashRisk_{i,t+1} = \beta_0 + \beta_1 MLS_{i,t} + \sum_{p=1}^{m} \beta_p Controls_{i,t} + \sum Year_t + \sum Industry_t + \epsilon_{i,t}, \quad (4)$$

where the dependent variable, *CrashRisk*, is measured by *NCSKEW or DUVOL*.[4] The primary independent variables are proxied by *DumMLS* and *NumMLS*. We control for factors that affect crash risk such as stock turnover and volatility, internal and external corporate governance mechanisms following previous literature (Chen et al., 2001; Hutton et al., 2009; Kim et al., 2011a, 2011b). Variable definitions are provided in Appendix A. In the regressions, we also include industry effects to cater for idiosyncratic differences between industries that can make it easier/more difficult for managers to hide bad news (Finkelstein & Hambrick, 1989). We control for industry fixed effects based on the CSRC industry classification. Similarly, we include year-fixed effects to control for unobserved year characteristics omitted from the analysis. Standard errors are adjusted for clustering at both firm and year levels (Petersen, 2009).[5]

[4]We further construct *Crash_dummy* as alternative measure of crash risk following (Andreou et al., 2021), which equals one for a firm-year if the firm experiences one or more firm-specific weekly returns falling 3.09 standard deviations below the mean weekly firm-specific return for that fiscal year, 0 otherwise. Appendix B reports the regression results of MLS effects on *Crash*_dummy. We use the conditional fixed-effects logit model to do the estimations, and the marginal effects at means have been reported. Columns (1) and (2) show that our $DumMLS_t$ and *Num MLSt* are positively and significantly related to the *Crash_dummy*. These results are consistent with the results using *NCSKEW* and *DUVOL*.

[5]Since the ownership structures do not often change within firms, we control for firm heterogeneity by clustering standard errors at firm level. We also report the baseline regression results with year and firm fixed effects controlled in Appendix C. Our results are robust to alternative model specifications.

In Table 4, we report the baseline ordinary least squares (OLS) regression results of the impact of MLS on stock price crash risk. The dependent variable in columns (1) and (3) is $NCSKEW_{t+1}$ while that in Columns (2) and (4) is $DUVOL_{t+1}$. The independent variable in Columns (1) and (2) is $DumMLS_t$ while that in Columns (3) and (4) is $NumMLS_t$. With both dependent variables ($NCSKEW_{t+1}$ and $DUVOL_{t+1}$), the presence of MLS, proxied by $DumMLS_t$, is positively associated with future stock price crash risk (the coefficients are 0.038 and 0.024, respectively). This supports our conjecture that without effective monitoring and sufficient discipline under an MLS structure, managers may initially find it less costly to withhold news on bad operating performance from shareholders, making their likelihood of hoarding bad news higher. However, when unfavourable news accumulates to a critical threshold level at which it is too costly for managers to continue withholding, they will reveal the news to the market all at once, leading to a substantial revision of investors' expectations about the future prospects of the firm and, inevitably, to a stock price crash.

Consistently, the coefficients on $NumMLS_t$ are positive and significant in both model specifications. With MLS, the crash risk increases as the number of large shareholders, suggesting that the monitoring of the management is weakened when there are more blockholders, which increases the potential for managerial bad news hoarding.[6]

The coefficients on the control variables are generally consistent with the findings of prior studies. First, we find that past negative return skewness, past volatility, the past return, and the market-to-book ratio are all positively related to crash risk, consistent with the findings of Chen et al. (2001) and Kim et al. (2011a). Second, consistent with Hutton et al. (2009) and Kim et al. (2011a), we find negative coefficients for both *Leverage* and *ROA*. However, differently to Kim et al. (2011a), we find that the coefficient of *Dturn* is significantly negative, suggesting that differences of opinion among investors decrease future crash risk. In terms of control variables relating to corporate governance, we find that duality of CEO-chairman increases future crash risk while a larger board size can decrease it. The coefficient on *DISACC* is positive, suggesting that firms with more accrual manipulation, as proxied by a 3-year moving sum of absolute discretionary accruals, are more likely to crash in the future, in line with Kim et al. (2011a). Finally, the coefficient of *Big4* indicates that firms audited by a Big Four auditor are less prone to future crashes.

4.2 | Endogeneity: DID results

We are aware that our main tests could be plagued with the endogeneity problem as there might be some unobserved firm characteristics that drive the MLS structure and crash risk simultaneously. Using the staggered implementation of the SSSR in China, we employ a DID research design to estimate its policy shock on the MLS–crash relationship and thereby mitigate any endogeneity issues.

We start with introducing the basic institutional details related to the SSSR, particularly focusing on how the SSSR impacts on blockholders and the MLS structure. Before 2005, shares

[6]We further explore the nonlinear relationship between crash risk and the number of blockholders, which has been reported in Appendix D. We add the *NumMLS_SQ* into the baseline model where *NumMLS_SQ* denotes the square of the number of blockholders. The coefficients on *NumMLS* are positive and large in scale (0.049 and 0.034), while *NumMLS_SQ* is negative but very small (−0.003 and −0.002). It indicates that the relation between crash risk and the number of blockholder are concavely positive when the number of blockholders is small (smaller than 8).

TABLE 4 Baseline results.

This table reports the regression results for the impact of MLS on stock price crash risk. The dependent variable in Columns (1) and (3) is $NCSKEW_{t+1}$, and in Columns (2) and (4) is $DUVOL_{t+1}$. The independent variable in Columns (1) and (2) is $DumMLS_t$, and in Columns (3) and (4) is $NumMLS_t$. $DumMLS_t$ is a dummy variable that equals one if a listed firm has two or more large shareholders (over 5% voting rights) in a given year, and zero otherwise. $NumMLS_t$ denotes the number of large shareholders (over 5% voting rights) in a listed firm. Industry and year fixed effects are included. The standard errors reported in parentheses are based on standard errors clustered by both firm and year. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)	(3)	(4)
$DumMLS_t$	0.038**	0.024***		
	(0.015)	(0.009)		
$NumMLS_t$			0.016**	0.010**
			(0.007)	(0.004)
$Dturn_t$	0.003	0.004*	0.003	0.004*
	(0.004)	(0.002)	(0.004)	(0.002)
$NCSKEW_t$	0.036***	0.021***	0.036***	0.021***
	(0.008)	(0.005)	(0.008)	(0.005)
$Sigma_t$	−1.586**	−1.343***	−1.603**	−1.352***
	(0.661)	(0.389)	(0.667)	(0.394)
$Return_t$	7.088***	4.563**	7.091***	4.565**
	(2.653)	(1.851)	(2.654)	(1.852)
$Assets_t$	−0.004	−0.016	−0.005	−0.016
	(0.018)	(0.012)	(0.018)	(0.012)
MTB_t	0.037**	0.019*	0.037**	0.020*
	(0.016)	(0.010)	(0.016)	(0.010)
$Leverage_t$	0.027	0.020	0.030	0.022
	(0.047)	(0.033)	(0.047)	(0.033)
ROA_t	0.266	0.160	0.269	0.161
	(0.227)	(0.152)	(0.227)	(0.152)
$Duality_t$	0.018	0.011	0.019	0.012
	(0.012)	(0.009)	(0.012)	(0.008)
$Committees_t$	0.002	0.001	0.002	0.001
	(0.006)	(0.003)	(0.006)	(0.003)
$BoardSize_t$	−0.042	−0.022	−0.041	−0.022
	(0.030)	(0.017)	(0.030)	(0.018)

(Continues)

TABLE 4 (Continued)

	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)	(3)	(4)
$BIndependence_t$	−0.082	−0.011	−0.081	−0.010
	(0.118)	(0.081)	(0.119)	(0.081)
BoardHolding	0.213***	0.139***	0.206***	0.135***
	(0.037)	(0.025)	(0.037)	(0.026)
$DISACC_t$	0.032	0.011	0.032	0.010
	(0.040)	(0.029)	(0.040)	(0.029)
$Big4_t$	−0.027	−0.016	−0.025	−0.015
	(0.018)	(0.015)	(0.018)	(0.015)
Constant	−0.001	0.247	−0.008	0.243
	(0.398)	(0.282)	(0.400)	(0.283)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.095	0.105	0.095	0.105
No. of obs.	25,045	22,092	22,092	22,092

in the Chinese stock market were divided into two types: tradable and nontradable in secondary market (e.g., Li et al., 2011). Holders of nontradable shares were entitled to the same voting and cash-flow rights as other shareholders. However, sales of these shares were only allowed through negotiations between designated parties or auctions, not in the secondary market. Most nontradable shareholders were state-owned entities. Tradable shares were mainly held by domestic institutional investors and domestic individuals.

The Chinese government push Chinese listed firm to complete SSSR to make all share tradable as soon as possible in a designated time window, firms had some flexibility in choosing the timing of the reform. According to Li et al. (2011), the companies that had completed the reform by 2007 represented 97% of China's market capitalization. Specifically, the SSSR allowed blockholders with nontradable shares to trade their shares gradually if they negotiated a compensation plan with those shareholders holding tradable shares.[7] As a result of the removal of trading restrictions, some small shareholders were left holding 5% or more of the company's shares and thus joining the group of blockholders after the reform.

The ownership structure changes that took place within the lockup period of the reform tended to be exogenous because of the dilution effect of the compensation plan. Following previous literature (e.g., Chen et al., 2012; Jiang et al., 2018; Liu & Tian, 2012), we utilize this exogenous shock as a DID test. We argue that ownership structure changes within the lockup

[7]Li et al. (2011) document that the average compensation from holders with non-tradable shares was a 30% increase in the number of shares held by shareholders with tradable shares.

period are more likely to be caused by the exogenous compensation plan due to the SSSR than a market transaction by a large shareholder.

We first check whether the firms have gone through IPOs before 2003, to ensure they have experienced the SSSR. We require an ownership transition to have taken place within the lockup period of the reform, to address the exogeneity concern. Specifically, we deem firms with ownership structure changes (from a single large shareholder to MLS) before and after the reform as the treatment group, and firms with unchanged corporate ownership (from a single large shareholder to a single large shareholder or from MLS to MLS) before and after the reform as the control group. We also require firms in both control and treatment groups to have 2 years or more of observations around the reform. Eventually, we obtain 29 firms with 451 firm-year observations as the treatment group, and 733 firms with 9507 firm-year observations as the control group.

We estimate the following model:

$$Crash\ \ risk_{i,t+1} = \beta_0 + \beta_1 Post_{i,t} + \beta_2 Post \times Treatment_{i,t} + \sum_{p=1}^{m} \beta_p Controls_{i,t} + \sum Year_t + \sum Industry_t + \epsilon_{i,t}, \quad (5)$$

where $Post_{i,t}$ is a dummy variable that equals one for firm i in year t and afterwards, if firm i completed the SSSR in year t, and zero otherwise. $Treatment_{i,t}$ is an indicator variable that equals one for firm i if firm i switched from having a single large shareholder to MLS during the lockup period of the SSSR, and zero otherwise. The coefficient on the interaction term $Post \times Treatment_{i,t}$ captures the difference between the treatment and the control group. All other variables are defined as in the baseline model.

Table 5 presents the DID regression results for the impact of MLS on future stock price crash risk. The coefficient on the interaction term $Post \times Treatment_t$ captures the difference between the change in crash risk for firms with an ownership transition from a single large shareholder to MLS and the change for firms without such a transition. In Table 5, the coefficients on the interactions are both significantly positive in the two model specifications, indicating that crash risk increases when the corporate ownership structure changes exogenously from a single large shareholder to MLS exogenously. These DID results show support for the baseline results, after controlling for the endogeneity concern.

4.3 | Blockholder trading around managerial misconduct enforcement: Event study

We utilize a transaction-level data set of blockholders in CSMAR to examine the blockholder trading activities around managerial misconduct enforcements. The transaction information includes the identity of the blockholder who places the trade, the transaction date, the trading volume and the trading price.

As for the enforcement, the CSRC, as the regulatory body, enforces securities laws and regulations in China and carries out investigations to identify and prosecute corporate misconduct. The original announcements about CSRC enforcements are collected from *Securities Times*, *Shanghai Securities News*, annual reports, CSRC news releases, and stock exchange yearbooks. CSMAR keeps a record of these enforcement events and drops any

TABLE 5 Endogeneity: difference-in-differences test.

This table reports the Difference-in-Differences regression results for the impact of multiple large shareholders (MLS) on future stock price crash risk. $Post_t$ is a dummy variable that equals one for firm i in year t and afterwards if firm i completed the split-share structure reform in year t, and zero otherwise. $Treatment_t$ is an indicator variable that equals one for firm i if it switches from a single large shareholder to MLS during the lockup period of the split-share reform, and zero otherwise. The interaction term $Post{\times}Treatment_t$ captures the difference in the change in crash risk between firms with an ownership transition and firms without a transition. Industry and year-fixed effects are included. The standard errors reported in parentheses are based on standard errors clustered by both firm and year. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)
$Post_t$	0.311***	0.192***
	(0.003)	(0.002)
$Post{\times}Treatment_t$	0.033**	0.015**
	(0.003)	(0.000)
$Dturn_t$	0.000**	0.000*
	(0.000)	(0.000)
$NCSKEW_t$	0.031***	0.015**
	(0.000)	(0.000)
$Sigma_t$	−1.739**	−1.466**
	(0.079)	(0.045)
$Return_t$	4.467***	3.371***
	(0.028)	(0.044)
$Assets_t$	−0.010*	−0.020***
	(0.001)	(0.000)
MTB_t	0.047***	0.025***
	(0.000)	(0.000)
$Leverage_t$	0.086**	0.078**
	(0.005)	(0.004)
ROA_t	0.436***	0.218***
	(0.005)	(0.001)
$Duality_t$	−0.010**	−0.004
	(0.001)	(0.001)
$Committees_t$	0.004	0.004*
	(0.001)	(0.001)
$BoardSize_t$	−0.084**	−0.038**
	(0.002)	(0.001)

TABLE 5 (Continued)

	$NCSKEW_{t+1}$ (1)	$DUVOL_{t+1}$ (2)
$BIndependence_t$	−0.323**	−0.128*
	(0.025)	(0.017)
BoardHolding	0.415**	0.225
	(0.018)	(0.040)
$DISACC_t$	−0.091***	−0.046***
	(0.000)	(0.000)
$Big4_t$	0.022*	0.020***
	(0.003)	(0.000)
Constant	−0.761**	−0.508***
	(0.018)	(0.007)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Adjusted R^2	0.120	0.130
No. of obs.	9994	9994

duplicates from different sources. The announcement date of an event is the earliest date on which the market learns of an investigation and, in most cases, it also indicates the date on which the enforcement decision is made.

The subjects of enforcement include listed firms and persons in listed firms (including the management, board of directors, supervisors, and listing sponsors). The misconduct types at the firm level are composed of postponement/delay of disclosure, false statement, major failures in disclosing information associated with inflated profits, asset fabrication, fund provision violation, illegal guarantees, illegal 'lending' to related parties, and illegal share buyback. The misconduct types at the person level include major embezzlement of shareholders, stock price manipulation, and insider trading. Most of the misconduct enforcement cases are related to information disclosure, which is highly associated with managerial bad news hoarding and future stock price crash risk.[8] Thus, we use these enforcement events as proxies for a higher likelihood of future crashes. In our sample period from 2000 to 2016, there are 4375 records of CSRC enforcement events. We first exclude 1333 enforcements that are not related to information disclosure. Then, we only keep the first enforcement for a given firm in a given quarter, which leaves us 2270 enforcement events. We also exclude enforcement events that

[8]The CSRC enforcement data set has been explored in several studies (Chen et al., 2005; Conyon & He, 2016; Cumming et al., 2015; Ding et al., 2010; Firth et al., 2011). For example, Chen et al. (2005) find that enforcement events have a negative impact on stock prices, with most firms suffering wealth losses of around 1%–2% in the 5 days surrounding the event. Also, firms with fraud enforcement are associated with a larger probability of auditor turnover, board chair turnover, and CEO turnover (Chen et al., 2005; Ding et al., 2010; Firth et al., 2011).

took place before 2002 or after 2014, to allow us to construct a 4-year window around the event. Finally, we are left with 1591 enforcements.

Following previous literature (Parrino et al., 2003), corresponding to each of the 1591 firm cases, we also construct a control group of firms that are not subject to enforcement by applying the nearest-neighbour matching method. This matched control sample allows us to compare the sales and purchases of blockholders at firms with similar performance to the treatment firms, but which are not charged with severe managerial misconduct. Specifically, we choose the firm that is not subject to enforcement with the stock return and market capitalization closest in magnitude to those of the firm that is subject to enforcement, in the quarter of the enforcement announcement. This procedure results in a sample of 1336 matching firms.

Panel A in Table 6 reports average trading volumes, in terms of sales, purchases, and net sales by blockholders around enforcement events, for the enforcement group and a control group. Quarter 0 is defined as the quarter in which the enforcement event is announced. The average sales volume for the enforcement-group firms across the eight quarters before the enforcement event is −0.223% of shares outstanding, a magnitude significantly larger than that seen in the control firms (−0.175%). However, the average sales volumes for the enforcement-group firms in the event quarter and the quarter following the event (−0.143 and −0.15, respectively) are significantly lower than those for the control firms (−0.217 and −0.231, respectively). In contrast, the differences in the purchase volumes between these two groups are not significant. In addition to sales and purchases, we also capture the net sales activity of blockholders. The net sales (the sales volume minus the purchase volume as a percentage of shares outstanding) for the enforcement and control firms show similar patterns to the sales for these firms. It suggests that blockholders' sales initiate as far ahead as eight quarters before the enforcement announcement in firms that are subject to enforcement.

Panel B in Table 6 reports the average number of blockholders placing trades in the 4 years around enforcement events. Consistent with the sales volumes of blockholders, the average number of selling blockholders for the enforcement sample is greater than that for the control sample in the 2 years before the events. There is no significant difference in the average number of purchasing blockholders between the two samples. Overall, our results support the notion that blockholders will sell their shares in the face of managerial misconduct regarding information disclosure.

4.4 | The sales of controlling and noncontrolling blockholders

We categorize blockholder sales on the basis of the blockholder's control rights over the firm: *DumSale* (>50%) is a dummy variable that equals one when there is at least one large shareholder with more than 50% of voting rights who sells more than 1% in a given year, and zero otherwise. *DumSale* (30%–50%) is a dummy variable that equals one when there is at least one large shareholder with voting rights of between 30% and 50% selling more than 1%, and zero otherwise. *DumSale* (<30%) is a dummy variable that equals one when there is at least one large shareholder with less than 30% of voting rights who sells more than 1%, and zero otherwise.

We choose 50% as the threshold for identifying controlling shareholders since a shareholder owning a majority of a company's shares naturally has the legitimate right to exercise control. Then, 30% is chosen as an alternative threshold for controlling shareholders since the CSRC has issued 'Measures on the Takeover of Listed Companies', in which control is defined as meaning

TABLE 6 Blockholder exit around managerial misconduct enforcement.

This table reports the nearest-neighbour matching results for blockholder exit around managerial misconduct enforcement. Panel A reports the trading intensity of sales, purchases and net sales for the enforced and matched groups, measured by trading volume as a percentage of shares outstanding. Panel B reports the trading intensity of sales and purchases for the enforced and matched groups, measured by the number of large shareholders placing trades. The *t*-test tests whether the difference in trading intensity between any two groups is different from zero (two-sided). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	Quarters (inclusive)								
Level at $t = 0$	**−8 thru −1**	**−8 thru −5**	**−4 thru −1**	**−1**	**0**	**1**	**1 thru 4**	**5 thru 8**	**1 thru 8**
No. of firm-quarters	**9216/9216**	**4164/4164**	**5052/5052**	**1336/1336**	**1361/1361**	**1320/1320**	**5037/5037**	**4481/4481**	**9518/9518**
Panel A: Trading intensity measured by sale volume as the percentage of shares outstanding (%)									
Panel A1: Sales									
Enforced	−0.223	−0.228	−0.218	−0.244	−0.143	−0.155	−0.181	−0.188	−0.184
	(0.013)	(0.018)	(0.018)	(0.041)	(0.022)	(0.021)	(0.014)	(0.015)	(0.010)
Matched	−0.175	−0.156	−0.181	−0.202	−0.217	−0.231	−0.201	−0.204	−0.202
	(0.011)	(0.014)	(0.015)	(0.034)	(0.040)	(0.033)	(0.015)	(0.018)	(0.012)
t-statistic (Enforced = Matched)	−2.906***	−3.108***	−1.297*	−0.797	1.635**	1.948***	0.977	0.687	1.176
Panel A2: Purchases									
Enforced	0.040	0.038	0.043	0.040	0.038	0.069	0.070	0.054	0.063
	(0.006)	(0.010)	(0.007)	(0.016)	(0.011)	(0.019)	(0.009)	(0.007)	(0.006)
Matched	0.037	0.035	0.038	0.050	0.062	0.056	0.056	0.081	0.068
	(0.005)	(0.007)	(0.007)	(0.019)	(0.014)	(0.015)	(0.008)	(0.010)	(0.006)
t-statistic (Enforced = Matched)	0.472	0.247	0.423	−0.442	−1.277	0.532	1.134	−2.193**	−0.661
Panel A3: Net Sales (Sales minus Purchases)									
Enforced	−0.183	−0.191	−0.175	−0.203	−0.105	−0.085	−0.112	−0.134	−0.122
	(0.013)	(0.020)	(0.019)	(0.043)	(0.023)	(0.026)	(0.015)	(0.016)	(0.011)

(Continues)

TABLE 6 (Continued)

	Quarters (inclusive)								
Level at $t = 0$	**−8 thru −1**	**−8 thru −5**	**−4 thru −1**	**−1**	**0**	**1**	**1 thru 4**	**5 thru 8**	**1 thru 8**
No. of firm-quarters	**9216/9216**	**4164/4164**	**5052/5052**	**1336/1336**	**1361/1361**	**1320/1320**	**5037/5037**	**4481/4481**	**9518/9518**
Matched	−0.138	−0.121	−0.152	−0.151	−0.156	−0.175	−0.145	−0.122	−0.134
	(0.011)	(0.014)	(0.016)	(0.039)	(0.041)	(0.036)	(0.014)	(0.019)	(0.012)
t-statistic (Enforced = Matched)	−2.567***	−2.847***	−0.973	−0.916	1.079	2.007**	1.546*	−0.467	0.749
Panel B: Trading intensity measured by the number of large shareholders placing trades									
Panel B1: Sales									
Enforced	0.067	0.067	0.067	0.067	0.055	0.057	0.064	0.063	0.064
	(0.003)	(0.004)	(0.004)	(0.008)	(0.007)	(0.007)	(0.004)	(0.004)	(0.003)
Matched	0.057	0.053	0.062	0.069	0.059	0.075	0.066	0.061	0.064
	(0.003)	(0.004)	(0.004)	(0.008)	(0.008)	(0.008)	(0.005)	(0.004)	(0.003)
t-statistic (Enforced = Matched)	2.393***	2.554***	0.959	−0.137	−0.362	−1.62**	−0.319	0.387	0.026
Panel B2: Purchases									
Enforced	0.012	0.010	0.015	0.012	0.013	0.017	0.022	0.022	0.022
	(0.001)	(0.002)	(0.002)	(0.003)	(0.003)	(0.004)	(0.002)	(0.002)	(0.002)
Matched	0.011	0.011	0.012	0.012	0.021	0.020	0.018	0.026	0.022
	(0.001)	(0.002)	(0.002)	(0.003)	(0.005)	(0.005)	(0.002)	(0.003)	(0.002)
t-statistic (Enforced = Matched)	0.483	−0.612	1.049	0.000	−1.386*	−0.492	1.183	−1.275	0.000

that the owner has substantial rights to change the composition of the board, and consequently affect managerial decision making. Provision 84 Chapter 10 of CSRC states that an investor can be regarded as the controlling shareholder if they own more than 30% of the company's shares.

Table 7 presents the regression results for the impact of sales by controlling and noncontrolling blockholders on stock price crash risk in MLS firms, non-MLS firms and all firms, respectively. First of all, we only find the sales placed by blockholders with shareholdings of less than 30% to be positively related to future crash risk in the full sample, the results of which are reported in Columns (5) and (6). Then, in Columns (1) and (2), among firms with MLS, only the exits by blockholders with less than 30% of control rights, who are more likely to be noncontrolling shareholders, are positively associated with future crash risk. By contrast, among non-MLS firms in Columns (3) and (4), we do not find a significant relationship between blockholder sales and crash risk, regardless of their control rights. Thus, we conclude that the positive predictive power of MLS on stock price crash risk is more pronounced in the presence of noncontrolling shareholders' sales, because of their higher monitoring costs and insufficient control rights in relation to managerial decision-making.

4.5 | Blockholder heterogeneity and stock price crash risk

Even within MLS, different types of blockholders may exhibit different reactions to future stock price crash risks, based on their unique preferences and goals. For instance, family blockholders typically prioritize nonfinancial private benefits of control, seeking to safeguard and enhance these advantages, which may not always align with the maximization of shareholder value. In contrast, institutional investors/blockholders tend to be primarily motivated by financial returns. They often have a more diverse portfolio and are generally more willing to embrace risks compared to their family blockholder counterparts (Chen et al., 2019). This divergence in motivations and risk appetites highlights the heterogeneity of blockholders. Provided conflicts of interest exist, this variability can influence whether blockholders choose to sell based on private information pertaining to imminent stock crashes. Consequently, within an MLS framework, blockholders' responses to potential stock price crash risks can significantly vary, reflecting their individual preferences and objectives. In our analysis, we follow the recommendations of Edmans and Holderness (2017) and Hadlock and Schwartz-Ziv (2019) and consider issues related to blockholder heterogeneity and coexistence.

To capture blockholders's heterogeneity, we define *SOE Sale*, as a dummy variable that equals one when there are at least one SOE blockholders sells more than 1% shares outstanding in a given year, and zero otherwise. *Private Sale* is a dummy variable that equals one when there is at least one private blockholders sells more than 1%, and zero otherwise. *Institution Sale* is a dummy variable that equals one when there is at least one institution blockholders sells more than 1%, and zero otherwise.

Table 8 presents the regression results for the impact of blockholder heterogeneity on stock price crash risks. The table is segregated into different sections: Columns (1)–(2) represent MLS firms, Columns (3)–(4) detail non-MLS firms, and Columns (5)–(6) encompass all firms. We can see that the coefficients of the impact of blockholders are only significant in MLS firms and all firms, while these are insignificant in non-MLS firms. More importantly, the correlation between *Private Sale* and crash risk is positively significant. However, no such correlation exists with *SOE Sale* or *Institutional Sale*, indicating that these do not have a discernible impact on crash risk. Overall, these results suggest that the presence of private blockholders as the largest

TABLE 7 Exit of controlling and noncontrolling blockholders.

This table reports the regression results for the impact of sales by controlling and noncontrolling blockholders on stock price crash risk in MLS, non-MLS and all firms, respectively. The dependent variable in Columns (1) and (3) is $NCSKEW_{t+1}$. The dependent variable in Columns (2) and (4) is $DUVOL_{t+1}$. The independent variables are $DumSale_t$ (>50%), $DumSale_t$ (30%–50%), and $DumSale_t$ (<30%) in all columns. *DumSale* (>50%) is a dummy variable that equals one when there is at least one large shareholder who has more than 50% of the voting rights and sells more than 1% shares outstanding in a given year, and zero otherwise. *DumSale* (30%–50%) is a dummy variable that equals one when there is at least one large shareholder who has voting rights of between 30%-50% and sells more than 1%, and zero otherwise. *DumSale* (<30%) is a dummy variable that equals one when there is at least one large shareholder who has less than 30% of the voting rights and sells more than 1%, and zero otherwise. Industry and year-fixed effects are included. The standard errors reported in parentheses are based on standard errors clustered by both firm and year. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

	MLS firms		**Non-MLS firms**		**All firms**	
	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
DumSale (>50%)	−0.000	−0.011	0.043	0.036	0.031	0.024
	(0.043)	(0.037)	(0.038)	(0.023)	(0.033)	(0.021)
DumSale (30%–50%)	0.006	0.016	0.024	0.002	0.018	0.014
	(0.025)	(0.015)	(0.025)	(0.013)	(0.019)	(0.011)
DumSale (<30%)	0.060***	0.032***	0.034	0.017	0.050***	0.026***
	(0.011)	(0.006)	(0.021)	(0.012)	(0.009)	(0.006)
$Dturn_t$	−0.005	0.001	0.001	0.001	−0.002	0.001
	(0.003)	(0.003)	(0.006)	(0.004)	(0.004)	(0.002)
$NCSKEW_t$	0.026***	0.015***	0.029**	0.017**	0.029***	0.017***
	(0.009)	(0.005)	(0.012)	(0.007)	(0.008)	(0.005)
$Sigma_t$	−1.871**	−1.443***	−1.362**	−1.058***	−1.668***	−1.289***
	(0.794)	(0.489)	(0.534)	(0.322)	(0.584)	(0.338)

TABLE 7 (Continued)

	MLS firms		Non-MLS firms		All firms	
	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)	(3)	(4)	(5)	(6)
$Return_t$	7.845***	4.834***	7.074***	4.377**	7.623***	4.668***
	(2.513)	(1.745)	(2.538)	(1.779)	(2.306)	(1.614)
$Assets_t$	0.019	0.001	−0.005	−0.015	0.007	−0.007
	(0.016)	(0.010)	(0.018)	(0.014)	(0.015)	(0.011)
MTB_t	0.041**	0.025**	0.041**	0.022*	0.042***	0.024**
	(0.017)	(0.011)	(0.018)	(0.011)	(0.016)	(0.010)
$Leverage_t$	−0.003	0.016	0.094	0.076	0.050	0.051
	(0.051)	(0.039)	(0.067)	(0.049)	(0.049)	(0.034)
ROA_t	0.054	−0.033	0.498*	0.355*	0.241	0.130
	(0.212)	(0.152)	(0.258)	(0.190)	(0.204)	(0.143)
$Duality_t$	0.003	−0.002	−0.013	−0.019	−0.002	−0.008
	(0.018)	(0.011)	(0.021)	(0.017)	(0.015)	(0.010)
$Committees_t$	0.009	0.005	0.013	0.009	0.010	0.006*
	(0.008)	(0.004)	(0.009)	(0.006)	(0.006)	(0.004)
$BoardSize_t$	−0.010	0.008	−0.020	−0.005	−0.018	−0.001
	(0.045)	(0.026)	(0.045)	(0.028)	(0.030)	(0.017)
$BIndependence_t$	−0.020	0.005	−0.111	−0.008	−0.069	−0.010
	(0.182)	(0.116)	(0.181)	(0.114)	(0.114)	(0.072)

(Continues)

TABLE 7 (Continued)

	MLS firms		Non-MLS firms		All firms	
	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)	(3)	(4)	(5)	(6)
BoardHolding	0.081	0.043	0.130	0.059	0.093	0.038
	(0.062)	(0.049)	(0.093)	(0.072)	(0.060)	(0.048)
$DISACC_t$	0.077*	0.031	−0.059	−0.056	0.028	−0.000
	(0.044)	(0.028)	(0.101)	(0.071)	(0.040)	(0.030)
$Big4_t$	−0.061***	−0.027	0.020	0.007	−0.020	−0.007
	(0.023)	(0.017)	(0.032)	(0.020)	(0.019)	(0.015)
Constant	−0.526	−0.165	−0.053	0.166	−0.293	0.002
	(0.390)	(0.250)	(0.409)	(0.312)	(0.358)	(0.252)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.078	0.084	0.086	0.090	0.081	0.085
No. of obs.	14,216	14,216	10,829	10,829	25,045	25,045

TABLE 8 Blockholder heterogeneity and stock price crash risk.

This table reports the regression results for the impact of sales by heterogenous blockholders on stock price crash risk in MLS, non-MLS and all firms, respectively. The dependent variable in columns (1) and (3) is $NCSKEW_{t+1}$. The dependent variable in Columns (2) and (4) is $DUVOL_{t+1}$. The independent variables are *SOE Sale, Private Sale, and Institution Sale* in all columns. *SOE Sale* is a dummy variable that equals one when there is at least one SOE blockholders sells more than 1% shares outstanding in a given year, and zero otherwise. *Private Sale* is a dummy variable that equals one when there is at least one private blockholders sells more than 1%, and zero otherwise. *Institution Sale* is a dummy variable that equals one when there is at least one institution blockholders sells more than 1%, and zero otherwise. Industry and year-fixed effects are included. The standard errors reported in parentheses are based on standard errors clustered by both firm and year. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

	MLS firms		**Non-MLS firms**		**All firms**	
	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
SOE Sale	−0.003	0.005	0.035	0.016	0.015	0.011
	(0.018)	(0.010)	(0.021)	(0.013)	(0.012)	(0.008)
Private Sale	0.044**	0.028**	0.021	0.004	0.038**	0.020**
	(0.021)	(0.011)	(0.022)	(0.015)	(0.018)	(0.010)
Institution Sale	0.028	0.007	0.162	0.095	0.047	0.018
	(0.049)	(0.028)	(0.124)	(0.065)	(0.048)	(0.024)
$Dturn_t$	−0.009**	−0.004	−0.003	−0.003	−0.006**	−0.004
	(0.004)	(0.003)	(0.005)	(0.004)	(0.003)	(0.003)
$NCSKEW_t$	0.035***	0.024***	0.033***	0.022***	0.036***	0.024***
	(0.012)	(0.007)	(0.011)	(0.006)	(0.008)	(0.005)
$Sigma_t$	−2.159**	−1.855***	−0.977	−0.750	−1.673**	−1.421***
	(0.875)	(0.549)	(0.603)	(0.465)	(0.662)	(0.443)

(Continues)

TABLE 8 (Continued)

	MLS firms		Non-MLS firms		All firms	
	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)	(3)	(4)	(5)	(6)
$Return_t$	12.045***	8.133***	10.778***	7.421***	11.619***	7.861***
	(2.814)	(2.043)	(1.899)	(1.491)	(2.340)	(1.780)
$Assets_t$	0.041**	0.020	0.041**	0.021	0.040**	0.019
	(0.018)	(0.013)	(0.021)	(0.015)	(0.017)	(0.013)
MTB_t	0.047***	0.028**	0.051***	0.031**	0.049***	0.030***
	(0.017)	(0.011)	(0.019)	(0.014)	(0.017)	(0.011)
$Leverage_t$	−0.031	−0.021	0.049	0.049	0.011	0.016
	(0.058)	(0.048)	(0.063)	(0.045)	(0.051)	(0.039)
ROA_t	0.436*	0.336**	0.846***	0.628***	0.612***	0.462***
	(0.229)	(0.160)	(0.215)	(0.151)	(0.206)	(0.141)
$Duality_t$	0.021	0.011	0.020	0.005	0.023*	0.010
	(0.016)	(0.010)	(0.023)	(0.014)	(0.014)	(0.009)
$Committees_t$	0.003	−0.000	0.003	−0.000	0.003	−0.000
	(0.006)	(0.004)	(0.009)	(0.005)	(0.005)	(0.003)
$BoardSize_t$	−0.020	−0.012	−0.019	−0.007	−0.016	−0.009
	(0.044)	(0.025)	(0.044)	(0.031)	(0.031)	(0.020)
$BIndependence_t$	−0.088	−0.031	−0.078	0.027	−0.085	−0.008
	(0.189)	(0.122)	(0.183)	(0.134)	(0.115)	(0.076)

TABLE 8 (Continued)

	MLS firms		Non-MLS firms		All firms	
	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)	(3)	(4)	(5)	(6)
BoardHolding	0.176***	0.103***	0.307***	0.171***	0.232***	0.129***
	(0.045)	(0.034)	(0.077)	(0.064)	(0.039)	(0.030)
$DISACC_t$	0.081*	0.036	−0.053	−0.037	0.035	0.011
	(0.046)	(0.036)	(0.087)	(0.057)	(0.034)	(0.023)
$Big4_t$	−0.019	0.012	−0.003	0.000	−0.006	0.013
	(0.024)	(0.020)	(0.036)	(0.021)	(0.022)	(0.016)
Constant	−0.969**	−0.479	−1.014**	−0.598*	−0.977**	−0.514*
	(0.449)	(0.304)	(0.459)	(0.339)	(0.415)	(0.296)
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Adjusted R^2	0.078	0.088	0.088	0.096	0.083	0.091
No. of obs.	14,216	14,216	10,829	10,829	25,045	25,045

TABLE 9 Corporate external/internal governance, MLS and stock price crash risk.

This table reports the regression results for corporate external/internal governance, multiple large shareholders (MLS) and stock price crash risk. The dependent variable in Columns (1) and (3) is $NCSKEW_{t+1}$. The dependent variable in columns (2) and (4) is $DUVOL_{t+1}$. $Big4_t$ is an indicator equal to one when a firm is audited by one of the Big 4 accounting firms. The interaction $Big4{\times}DumMLS_t$ indicates how MLS interact with an external corporate governance mechanism in Columns (1) and (2). $DISACC_{t,}$ is discretionary accruals, as a proxy for the quality of internal governance. The interaction $DISACC{\times}DumMLS_t$ indicates how MLS interact with internal corporate governance mechanisms in columns (3) and (4). Industry and year-fixed effects are included. The standard errors reported in parentheses are based on standard errors clustered by both firm and year. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A.

	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)	(3)	(4)
$DumMLS_t$	0.042**	0.026***	0.036**	0.023**
	(0.001)	(0.000)	(0.001)	(0.001)
$Big4{\times}DumMLS_t$	−0.048**	−0.016*		
	(0.002)	(0.003)		
$Big4_t$	0.003	−0.006	−0.027**	−0.017***
	(0.002)	(0.002)	(0.001)	(0.000)
$DISACC{\times}DumMLS_t$			0.133**	0.068**
			(0.002)	(0.001)
$DISACC_t$	0.031**	0.013*	−0.055**	−0.038**
	(0.001)	(0.002)	(0.002)	(0.002)
$Dturn_t$	0.003	0.004*	0.003	0.005**
	(0.001)	(0.000)	(0.001)	(0.000)
$NCSKEW_t$	0.036**	0.021**	0.036**	0.030***
	(0.001)	(0.001)	(0.001)	(0.000)
$Sigma_t$	−1.586***	−1.317***	−1.580***	−1.344***
	(0.008)	(0.005)	(0.009)	(0.007)
$Return_t$	7.084***	4.542**	7.076***	3.572***
	(0.105)	(0.076)	(0.107)	(0.042)
$Assets_t$	−0.004	−0.015***	−0.004	−0.018***
	(0.001)	(0.000)	(0.001)	(0.000)
MTB_t	0.037**	0.020**	0.037**	0.019**
	(0.001)	(0.000)	(0.001)	(0.000)
$Leverage_t$	0.027	0.017	0.027	0.025*
	(0.010)	(0.004)	(0.010)	(0.004)

TABLE 9 (Continued)

	$NCSKEW_{t+1}$ (1)	$DUVOL_{t+1}$ (2)	$NCSKEW_{t+1}$ (3)	$DUVOL_{t+1}$ (4)
ROA_t	0.261**	0.159**	0.270**	0.180**
	(0.006)	(0.004)	(0.005)	(0.005)
$Duality_t$	0.018**	0.010*	0.018**	0.010*
	(0.001)	(0.001)	(0.001)	(0.001)
$Committees_t$	0.003	0.001	0.003	0.005
	(0.002)	(0.002)	(0.002)	(0.001)
$BoardSize_t$	−0.043	−0.022	−0.041	0.016
	(0.010)	(0.005)	(0.010)	(0.003)
$BIndependence_t$	−0.082	−0.010	−0.083	0.333**
	(0.032)	(0.012)	(0.032)	(0.007)
BoardHolding	0.211**	0.139***	0.212**	0.136**
	(0.004)	(0.002)	(0.004)	(0.002)
Constant	−0.013	0.230**	−0.005	0.322**
	(0.010)	(0.008)	(0.010)	(0.009)
Year fixed effects	Yes	Yes	Yes	Yes
Industry fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.095	0.105	0.095	0.100
No. of obs.	25,045	25,045	25,045	25,045

shareholder significantly increases future crash risk in comparison to state-owned enterprise (SOE) blockholders and Institutional blockholders.

4.6 | MLS, internal/external corporate governance, and stock price crash risk

While the literature on blockholders and corporate governance is rich, there is substantial scope for further research into how they interact with other governance mechanisms (Edmans, 2014). In this study, we examine how the presence of MLS interacts with internal and external corporate governance mechanisms.

We proxy for the quality of internal governance with discretionary accruals, denoted by *DISACC* (Dechow et al., 1995; Hutton et al., 2009) and we measure external governance by whether the firm is audited by one of the Big 4 audit firms, denoted by *Big4*. Table 9 presents the regression results for corporate external/internal governance, MLS and stock price crash risk. The coefficients on $Big4 \times DumMLS_t$ are negatively significant (−0.139 and −0.043). The coefficients on $DISACC \times DumMLS_t$ are positively significant (0.272 and 0.090). This suggests

that the positive association between MLS and crash risk is significantly more pronounced in firms with weak internal and external governance.

5 | CONCLUSION

Our study shows that firms with MLS are more likely to experience stock price crashes, including crashes caused by the revelation of negative news in the form of regulatory enforcement in relation to managerial misconduct. Further, our evidence suggests that, when anticipating the future revelation of bad news, blockholders can exploit their information advantage and exit ex ante as far ahead as eight quarters. The positive association between MLS and stock price crash risk is more pronounced in the presence of the sales by noncontrolling blockholders than controlling blockholders. Our evidence also suggests that the positive predictive power of MLS for crash risk is more potent in firms with weak internal and external governance.

Our study offers new insights into the governance role of large shareholders, as well as their actions when facing a failure of corporate governance in a setting with concern for controlling shareholder entrenchment. Due to their high monitoring costs and insufficient control rights to discipline managerial decisions, their presence can increase the likelihood of managerial hoarding of bad news, and blockholders can even sell before the revelation of negative news. Our study has important practical and policy implications. We add to the understanding of insider trading literature by finding that blockholder trading occurs before a higher intensity of bad news is released, potentially foreshadowing future enforcement as much as 2 years beforehand. Our findings are timely in light of recent revisions proposed by the Shanghai Stock Exchange regarding stricter disclosure rules on changes to substantial shareholders' holdings.[9]

DATA AVAILABILITY STATEMENT

Data available on request from the authors. The data that support the findings of this study are available from the corresponding author upon reasonable request.

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[9]See http://www.sse.com.cn/disclosure/announcement/general/c/c_20180412_4499779.shtml

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APPENDIX A

See Table A1

TABLE A1 Variable definitions.

Variable	Definition
Dependent variables	
$NCSKEW_{t+1}$	The negative coefficient of skewness calculated by taking the negative of the third moment of firm-specific weekly returns for each year and normalizing it by the standard deviation of firm-specific weekly returns raised to the third power. See Equation (2) for details.
$DUVOL_{t+1}$	The down-to-up volatility measure of the crash likelihood. We group "*Down*" (or "*Up*") weeks when the weekly returns are below (or above) the annual average and calculate the standard deviation for each of these groups separately. *DUVOL* is the natural logarithm of the ratio of the standard deviation in the "*Down*" weeks to the standard deviation in the '*Up*' weeks. See Equation (3) for details.
Main explanatory variables	
$DumMLS_t$	A dummy variable that equals one if a listed firm has two or more large shareholders (over 5% voting rights) in a given year, and zero otherwise.
$NumMLS_t$	The number of large shareholders (over 5% voting rights) in a listed firm.
$Post_t$	A dummy variable that equals one for firm i in year t and afterwards if firm i completed the split-share structure reform in year t, and zero otherwise.
$Treatment_t$	An indicator variable that equals one for firm i if firm i switches from a single large shareholder to MLS during the lockup period of the split-share reform, and zero otherwise
DumSale (>50%)	A dummy variable that equals one when there is at least one large shareholder who has more than 50% of the voting rights and sells more than 1% shares outstanding in a given year, and zero otherwise.
DumSale (30%–50%)	A dummy variable that equals one when there is at least one large shareholder who has voting rights between 30% and 50% and sells more than 1% shares outstanding, and zero otherwise.
DumSale (<30%)	A dummy variable that equals one when there is at least one large shareholder who has less than 30% of the voting rights and sells more than 1% shares outstanding, and zero otherwise.
SOE Sale	A dummy variable that equals one when there is at least one SOE blockholders sells more than 1% shares outstanding in a given year, and zero otherwise
Private Sale	A dummy variable that equals one when there is at least one private blockholders sells more than 1%, and zero otherwise.
Institution Sale	A dummy variable that equals one when there is at least one institution blockholders sells more than 1%, and zero otherwise

TABLE A1 (Continued)

Variable	Definition
Control variables	
$Dturn_t$	The average monthly stock turnover over the current year minus the average monthly stock turnover over the previous year. The monthly turnover is calculated as the monthly trading volume divided by the shares outstanding in the same month.
$Sigma_t$	The standard deviation of weekly stock returns over the year (i.e. stock volatility).
$Return_t$	The average of weekly stock returns over the year.
$Assets_t$	The natural logarithm of the book value of total assets.
MTB_t	The market-to-book value of the listed company.
$Leverage_t$	Total debts divided by total assets.
ROA_t	Income before extraordinary items divided by total assets.
$Duality_t$	A dummy variable that equals one if the chairman also holds the CEO position in the firm, and zero otherwise.
$Committees_t$	The number of committees.
$BoardSize_t$	The natural logarithm of board size.
$BIndependece_t$	The ratio of the number of independent directors to the total number of directors.
BoardHolding	The shareholdings by the board of directors
$DISACC_t$	The value of discretionary accruals, where discretionary accruals are estimated from the modified Jones model (Dechow et al., 1995; Hutton et al., 2009).
$Big4_t$	A dummy variable that equals one if the listed firm is audited by a Big Four accounting firm, and zero otherwise.

APPENDIX B

See Table B1

TABLE B1 Baseline results: using crash dummy as the dependent variable.

This table reports the regression results for the impact of MLS on stock price crash risk. The dependent variable in Columns (1) and (2) is *Crash Dummy*$_{t+1}$. *Crash Dummy*$_{t+1}$ equals one for a firm-year if the firm experiences one or more firm-specific weekly returns falling 3.09 standard deviations below the mean weekly firm-specific return for that fiscal year, 0 otherwise. The independent variable are *DumMLS*$_t$, and *NumMLS*$_t$. respectively. *DumMLS*$_t$ is a dummy variable that equals one if a listed firm has two or more large shareholders (over 5% voting rights) in a given year, and zero otherwise. *NumMLS*$_t$ denotes the number of large shareholders (over 5% voting rights) in a listed firm. Industry and year fixed effects are included. The standard errors reported in parentheses are based on standard errors clustered by both firm and year. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively. All variables are defined in Appendix A of the manuscript.

	***Crash_Dummy*$_{t+1}$**	***Crash_Dummy*$_{t+1}$**
	(1)	**(2)**
DumMLS$_t$	0.007**	
	(0.003)	
NumMLS$_t$		0.004**
		(0.002)
Dturn$_t$	−0.001	−0.001
	(0.001)	(0.001)
NCSKEW$_t$	0.001	0.001
	(0.003)	(0.003)
Sigma$_t$	−0.479***	−0.485***
	(0.141)	(0.141)
Return$_t$	0.133	0.133
	(0.323)	(0.323)
Assets$_t$	−0.005**	−0.005**
	(0.002)	(0.002)
MTB$_t$	0.010***	0.010***
	(0.002)	(0.002)
Leverage$_t$	0.008	0.009
	(0.013)	(0.013)
ROA$_t$	−0.165***	−0.164***
	(0.047)	(0.047)
Duality$_t$	−0.001	−0.001
	(0.005)	(0.005)

TABLE B1 (Continued)

	$Crash\_Dummy_{t+1}$ (1)	$Crash\_Dummy_{t+1}$ (2)
$Committees_t$	−0.001	−0.001
	(0.002)	(0.002)
$BoardSize_t$	−0.004	−0.005
	(0.010)	(0.011)
$BIndependence_t$	0.043	0.043
	(0.037)	(0.037)
BoardHolding	0.046***	0.042**
	(0.016)	(0.016)
$DISACC_t$	0.019	0.019
	(0.016)	(0.016)
$Big4_t$	−0.007	−0.007
	(0.008)	(0.008)
Constant	0.224***	0.221***
	(0.058)	(0.058)
Year fixed effects	Yes	Yes
Industry fixed effects	Yes	Yes
Adjusted R^2	0.024	0.024
No. of obs.	25,045	25,045

APPENDIX C

See Table C1

TABLE C1 Multiple large shareholders and stock price crash risk with firm fixed effects.

This table reports the regression results for the impact of multiple large shareholders on crash risk. The dependent variable in columns (1) and (3) is $NCSKEW_{t+1}$. The dependent variable in Columns (2) and (4) is $DUVOL_{t+1}$. The independent variable in Columns (1) and (2) is $DumMLS_t$. The independent variable in columns (3) and (4) is $NumMLS_t$. $DumMLS_t$ is a dummy variable that equals one if a listed firm has two or more large shareholders (over 5% voting rights) in a given year, and zero otherwise. $NumMLS_t$ denotes the number of large shareholders (over 5% voting rights) in a listed firm. Firm and year fixed effects are included. The standard errors reported in parentheses are based on standard errors clustered by firm. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A.

	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)	(3)	(4)
$DumMLS_t$	0.038***	0.024***		
	(0.010)	(0.006)		
$NumMLS_t$			0.016***	0.010***
			(0.005)	(0.003)
$Dturn_t$	0.003	0.004**	0.003	0.004**
	(0.003)	(0.002)	(0.003)	(0.002)
$NCSKEW_t$	0.036***	0.021***	0.036***	0.021***
	(0.007)	(0.005)	(0.007)	(0.005)
$Sigma_t$	−1.586***	−1.343***	−1.603***	−1.352***
	(0.342)	(0.222)	(0.343)	(0.222)
$Return_t$	7.088***	4.563***	7.091***	4.565***
	(0.744)	(0.496)	(0.744)	(0.496)
$Assets_t$	−0.004	−0.016***	−0.005	−0.016***
	(0.006)	(0.004)	(0.006)	(0.004)
MTB_t	0.037***	0.019***	0.037***	0.020***
	(0.006)	(0.004)	(0.006)	(0.004)
$Leverage_t$	0.027	0.020	0.030	0.022
	(0.033)	(0.022)	(0.033)	(0.022)
ROA_t	0.266**	0.160*	0.269**	0.161**
	(0.122)	(0.082)	(0.122)	(0.082)
$Duality_t$	0.018	0.011	0.019	0.012
	(0.014)	(0.009)	(0.014)	(0.009)

TABLE C1 (Continued)

	$NCSKEW_{t+1}$	$DUVOL_{t+1}$	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	**(2)**	**(3)**	**(4)**
$Committees_t$	0.002	0.001	0.002	0.001
	(0.005)	(0.003)	(0.005)	(0.003)
$BoardSize_t$	−0.042	−0.022	−0.041	−0.022
	(0.026)	(0.017)	(0.026)	(0.017)
$BIndependence_t$	−0.082	−0.011	−0.081	−0.010
	(0.100)	(0.063)	(0.100)	(0.063)
BoardHolding	0.213***	0.139***	0.206***	0.135***
	(0.041)	(0.027)	(0.041)	(0.027)
$DISACC_t$	0.032	0.011	0.032	0.010
	(0.037)	(0.026)	(0.037)	(0.026)
$Big4_t$	−0.027	−0.016	−0.025	−0.015
	(0.021)	(0.014)	(0.021)	(0.014)
Year fixed effects	Yes	Yes	Yes	Yes
Firm fixed effects	Yes	Yes	Yes	Yes
Adjusted R^2	0.099	0.100	0.098	0.100
No. of obs.	25,045	25,045	25,045	25,045

APPENDIX D

See Table D1

TABLE D1 Multiple large shareholders and stock price crash risk: nonlinear relation.

This table reports the regression results for testing whether there is nonlinear relationship between MLS and crash risk. The dependent variable in Columns (1) and (2) is $NCSKEW_{t+1}$ and $DUVOL_{t+1}$, respectively. The main independent variables are $NumMLS_t$ and $NumMLS\_Squared_t$. $NumMLS_t$ denotes the number of large shareholders (over 5% voting rights) in a listed firm. *$NumMLS\_Squared_t$ is the squared value of $NumMLS_t$*. The standard errors reported in parentheses are based on standard errors clustered by firm and year. *, **, and *** denote statistical significance at the 10%, 5%, and 1% level, respectively. All variables are defined in Appendix A.

	$NCSKEW_{t+1}$	$DUVOL_{t+1}$
	(1)	(2)
$NumMLS_t$	0.049***	0.034***
	(0.016)	(0.010)
$NumMLS\_Squared_t$	−0.003**	−0.002**
	(0.001)	(0.001)
$Dturn_t$	0.003	0.004*
	(0.004)	(0.002)
$NCSKEW_t$	0.036***	0.021***
	(0.008)	(0.005)
$Sigma_t$	−1.599**	−1.349***
	(0.667)	(0.393)
$Return_t$	7.095***	4.567**
	(2.650)	(1.849)
$Assets_t$	−0.004	−0.016
	(0.017)	(0.012)
MTB_t	0.037**	0.019*
	(0.016)	(0.010)
$Leverage_t$	0.028	0.020
	(0.047)	(0.033)
ROA_t	0.267	0.160
	(0.226)	(0.152)
$Duality_t$	0.018	0.011
	(0.013)	(0.009)
$Committees_t$	0.002	0.001
	(0.006)	(0.003)

TABLE D1 (Continued)

	$NCSKEW_{t+1}$ (1)	$DUVOL_{t+1}$ (2)
$BoardSize_t$	−0.043	−0.023
	(0.030)	(0.018)
$BIndependence_t$	−0.082	−0.011
	(0.119)	(0.081)
BoardHolding	0.207***	0.136***
	(0.037)	(0.026)
$DISACC_t$	0.031	0.010
	(0.040)	(0.029)
$Big4_t$	−0.027	−0.016
	(0.018)	(0.015)
Constant	−0.041	0.219
	(0.395)	(0.280)
Year fixed effects	Yes	Yes
Firm fixed effects	Yes	Yes
Adjusted R^2	0.095	0.105
No. of obs.	25,045	25,045