

Institutional Ownership, Media Sentiment and Stock Price Crash Risk in China

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Abstract

China's stock market is known for its immature and irrational characteristics because there are difficulties in efficiently allocating resources. In China, there is a notably high risk of a sudden and severe decrease in stock values, which has been noticed as a stock price crash risk. Unlike Western markets, individual investors dominate China's stock market, and these investors often exhibit irrational and emotional trading habits, which have further increased the stock price's volatility. To maintain stability in the market, the Chinese government has been actively encouraging institutional ownership. The strategy is essential for improving market stability, reducing price fluctuations, and lowering the risk of stock price crashes. However, correlational studies suggest that institutional ownership may increase the risk of stock price crashes. Primarily, the long-term accumulation and concealment of negative information frequently contribute to the likelihood of a crash in stock prices. Many scholars maintain that media monitoring mechanisms can reduce the risk of stock market collapse. Furthermore, researchers emphasize the importance of external monitoring and responding to the revelation of inaccurate information. Many studies focus on the pivotal role of media sentiment in overseeing management and addressing issues related to agency difficulties. This underscores the importance of this study in understanding the dynamics of external monitoring in China. This study examines data from China's list of companies from 2011 to 2021. It employs the information cascade theory to examine the impact of institutional ownership on China's stock market, as well as the moderate effect of board characteristics on the correlation between institutional ownership and the probability of stock price crashes. Additionally, it investigates the influence of media sentiment as a moderating factor.

Keywords: Stock Price Crash Risk, Institutional Ownership, media sentiment, Information Cascade Theory, Agency Theory

Introduction

Stock Price Crash Risk of China's Stock Market

Stock price crash risk in China is defined as the conditional probability of a stock crash, focusing on its sensitivity to China's stock market collapse and its potential valuation change (Pan et al., 2021). China's stock market is an emerging market with immature and irrational characteristics (Chen et al., 2020), and resource allocation influences economic development in the market (Xiao, 2006). According to Weigert (2016), and Zhang & Zhuang (2019), China's stock market has a high crash risk, ranking second in a global sample of securities markets. To alleviate the situation, the Chinese government launched the Shanghai and Shenzhen stock exchanges, which are aimed at standardizing the stock market and lowering the stock price crash risk. Since then, the market valuation and the number of listed securities on exchanges have significantly increased. According to Seddighi & Nian (2004), and Li et al. (2018), there has been a significant increase in market valuation. However, the stock price is not as complete as expected, and there have been violent fluctuations in the stock price several times (Li & Liu, 2024).

Institutional Ownership of Chinese Firms

China's stock market shares are primarily owned by institutional ownership and a significant number of individual investors, which is different from the European and American stock markets (Hu et al., 2022; Lee et al., 2010). According to China's government statistics, there is a higher proportion of individual investors than institutional ownership (CSRC, 2008), with individual investors contributing over 80% of stock transaction fees and stamp duty (SWHY, 2022). Wang et al (2006), claimed that individual investors generally lack financial knowledge, are mainly concerned with trading speculations, and have superstitions about the stock price (Mei et al., 2005). Therefore, China's individual investors' trading activities are frequently irrational and sensitive to outside influences like emotion (Hu et al., 2022). As a result, China's stock market remains unstable due to its ongoing development and individual investors' irrational investment behaviour.

As a reaction to this phenomenon, China's government is promoting institutional ownership to stabilize the stock market by enhancing governance, reducing information asymmetries, and assisting insured companies in coping with external and internal shocks (Lin & Fu, 2017). Firth et al. (2016) claimed that encouraging institutional ownership is crucial for market stabilization, price volatility reduction, and reducing companies' stock price crash risk in China. Recently, China's government has been implementing policies to boost the stock market and institutional ownership growth, including opening stock exchanges to social security funds, insurance firms, and QFIs. (Chan and Yu, 2003; Liu, 2021). Some researchers also argue that developing a supportive market system and approving sensible policies are the primary methods to address China's stock market volatility (Ban & Qi, 2003). Other researchers, on the other hand, suggest that focusing on institutional ownership's growth could partially ignore the creation of the market environment. Still, this approach may lose significance if the market environment changes, potentially affecting the stock market's healthy development (Chiyachantana et al., 2004).

Media Monitoring

The impact of media reports on company performance is clear, as they inherently focus on processing and spreading information. Previous research has mainly investigated the

different relationships between media news reports and stock prices, investor sentiment, and corporate governance. This study specifically focuses on the role of "external monitoring" in media reports on stock prices.

Jensen and Meckling (1976) were the first to classify corporate governance into internal and external governance. Building on this, Dyck and Zingales (2004), argue that media coverage has a substantial impact on corporate governance and the legal system as "external monitoring". The influence has the potential to reduce investors' lack of knowledge and increase managers' awareness of their interests. Zingales et al (2000), considering the rapid development of the media industry, claimed that media monitoring of company operations is an essential component of external monitoring because it creates a reputation by shaping the formation of public opinion.

Additionally, Miller (2006), examines the role of media monitoring as a "watchdog" that may efficiently identify and examine harmful information about companies, targeting a wide variety of users and situations that would otherwise be costly to identify and investigate. Tetlock (2007), found that a correlation exists between a negative media attitude and a subsequent crisis in the stock price; the public's opinion of a stock in the news can also impact the company's future expansion and possible profitability. Dyck et al (2008), proposed a hypothesis that corresponds to the findings of Dyck and Zingales (2004), which suggest that countries with more developed media spread and more transparent information tend to be more trustworthy and have more robust corporate governance. Kothari et al (2009), also suggested that positive reporting leads to more stable fluctuations in stock prices, while negative media attention tends to create more unpredictable and unstable conditions.

In conclusion, companies may conceal negative information about their organization. If this undiscovered and accumulated negative information becomes public, it will inevitably affect the company's performance and ultimately lead to a collapse in the stock price. This study examines the role of media monitoring in terms of agency costs; the influence of positive media news on the listed companies is not considered, and the negative media news about publicly listed companies is the proxy index of media monitoring.

Study Objectives

The study aims to examine whether media news sentiment influences the relationship between institutional ownership and stock price crash risk. The specific objectives of this study are to examine the relationship between institutional ownership and China's listed companies' stock price crash risk and to examine the moderating role of media monitoring on the relationship between institutional ownership and the stock price crash risk of China's listed companies.

Literature and Hypothesizes

Information Cascade Theory

The information cascade theory (Bikhchandani et al., 1992) primarily examines the decision-making process of individuals when faced with limited information. Recently, it has been used to analyze the actions of investors in financial markets to adapt their investment plans based on the actions of other market participants. Several research studies have indicated that the behaviour of institutional investors is not entirely logical, and the

phenomenon of herd behaviour is characterized by unquestioningly following prevailing trends (Zheng et al., 2015). Therefore, the information cascade theory is usually employed to examine abnormalities and patterns of investor behaviour in financial markets.

The information cascade theory elucidates the regular occurrence of collective behaviour and illogical fluctuations in the market, particularly when investors are inadequately informed (Avery & Zemsky, 1998). In such cases, they tend to conform to prevailing trends mindlessly, leading to market prices deviating from their fundamental standards (Tan et al., 2008).

According to the information cascade theory, institutional investors will first make decisions based on their unique information and then subsequently modify their choices based on observing the decisions of other institutional investors (Zhao et al., 2021). When a group of institutional investors, who altogether hold a significant portion of the market, all make the same decision, it might lead other investors to ignore their private information and instead choose to follow the group's decision, creating a cascading effect (Maug & Naik, 2011). The cascading effect becomes evident in the market through the "following the trend" behaviour of investors, who tend to follow the majority even if their initial decision is based on incorrect or insufficient information (Tiniç et al., 2020). Due to individuals' tendency to conform to others, the transmission of information can lead to distortion or exaggeration, causing a herd effect in the market, deviations in market behaviour, and significant volatility in stock prices (Liu et al., 2022). Wang & Liu (2023) identified that institutional ownership enhanced the risk of a stock price crash and determined that institutional ownership in primarily transfers the risk of a drop in stock prices by influencing investors' sentiment.

Institutional Ownership

Institutional ownership is owned by legal entities that typically use self-owned funds or social and public sources to invest in stocks, including mutual funds, social security funds, insurance companies, broker-dealers, and QFIIs (Lin & Fu, 2017). The characteristics of institutional ownership are an enormous amount of funds, excellent ability to access information, and more analytical skills than individual investors (Ban & Qi, 2003).

Generally, there are two different points of view on the role of institutional ownership in the stock market:

(1) Institutional ownership stabilized the market

One point of view claims that institutional ownership can help reduce market volatility by improving company management, reducing uncertainty, and ultimately enhancing market segmentation because they can use information as an essential resource.

Institutional ownership plays a significant role in maintaining market stability by avoiding herding effects and positive feedback trading situations (Lakonishok et al. 1991) because they can access information before individual investors, leading to inverse trading patterns and contributing to stock price stability (Hirshleifer et al. 1994). Wermers' (1999), study on American stock market mutual funds found that herding behaviour may be rational and contribute to market stability by accelerating stock information absorption. According to Cohen et al. (2002), when stock prices rise, institutional ownership responds to positive cash flow information by purchasing more shares and transferring shares to individual investors.

Additionally, institutional ownership stabilizes stock prices by steering clear of individual investors who frequently attend media events to buy and sell stocks (Barber et al., 2006). Bohl & Brzeszczyński (2006), and Callen & Fang (2013), also claimed that a higher ratio of institutional ownership can decrease the autocorrelation and return volatility of stock index returns.

(2) Institutional ownership increased the stock price volatility.

Other researchers believe that rather than stabilizing China's stock market, institutional ownership has increased volatility in stock prices. De Long et al (1990), developed a widely accepted theoretical model that suggests the presence of optimistic feedback traders in the stock market can impede rational investors from stabilizing stock prices, potentially increasing market volatility. Sias (1996) studied the relationship between stock price volatility and the percentage of institutional ownership's shareholding on the New York Stock Exchange, finding a positive correlation between the investors' shareholding ratio and stock price crash risk.

The researchers believe there is a positive correlation between the frequency of information acquisition and transmission and the risk of a stock price crash. Sias et al (2001), studied stock prices using information cascade theory and believed that institutional investors' trading activities could positively impact stock prices. Gabaix et al (2003), also suggested that large investors' trading could cause extreme Chinese market volatility. Chiyachantana et al (2004), discovered a relationship between market conditions and institutional ownership's influence on stock prices. Chang and Dong (2006), found that herding behaviour positively affects idiosyncratic stock price instability. Easley & O'Hara (1987), studied the process of information transfer in the stock market and found that institutional owners tend to engage in large trades because they have access to unique information resources, which leads to variations in stock prices. Madhavan et al. (1997) also found that information exchange between different investors is an essential factor in stock price volatility, primarily when information asymmetry exists in the stock market. Kyle (1985) also thought the information exchange would increase the volatility of the stock market. This study considers the information a primary resource for institutional ownership since they can access and analyze more information. Thus, trading behaviours among institutional ownerships contained more predictions of the stock market. The decrease in trading restrictions between institutional ownership may cause nonlinear effects of information exchanges and increase stock price volatility (Fang et al., 2023). As an emerging market, China's stock market has the characteristics of uncertainty and emotional fluctuation; these characteristics would cause stock price volatility more easily (Ding et al., 2020).

This study used the "information cascade theory" to examine the relationship between institutional ownership and the stock price crash, considering the significant information asymmetry in China's capital market. Due to the characteristics of China's stock market, this study follows the "institutional ownership increases stock price volatility" hypothesis. The relationship between investors in China's stock market and stock price crash risk is tested with the following hypothesis:

Hypothesis 1: There is a positive relationship between institutional ownership and the companies' stock price crash risk

Media Monitoring

De Long et al (1990), argued that emotional sentiment components play a significant role in affecting investors' sentiment, as observed through media reporting and investor sentiment. Investors' decisions are influenced by a variety of factors, including public opinion. Considering media reports and corporate governance perspectives, Dyck and Zingales (2004), have claimed that media sentiment has a significant impact on corporate governance. Miller (2006), also considers the role of media monitoring as a "watchdog" which could identify and investigate the negative information of companies more widely and less cost-effectively.

Media news is a source of public information that investors widely use, and sentiments are more easily spread, widely disseminated, and constantly reinforced and amplified during transmission (Tetlock, 2007).

Fang and Peress (2009), claimed that news sentiment had become a new variable for companies' stock price volatility, and it would influence the decisions of investors. Likewise, Deephouse et al. (2017) argued that media attention has a direct and unavoidable influence on company stakeholders' evaluation and decisions, as evidenced by its direct impact on companies' economic performance.

In China's stock market, the news media is considered an information moderator (Liang et al., 2020). Generally, an official representative or a relatively independent third party with significant influence is the subject of a media news release; individual stock media articles' sentiment can reflect firms' unique characteristics more accurately than market sentiment (Du et al., 2022).

It is considered that media articles' sentiment for individual stock can reflect firms' characteristics more accurately than market sentiment in China (Du et al., 2022). This study follows (Liang et al., 2020), who uses media sentiment for a company as a moderator and considers that hiding negative information could primarily cause stock price crashes (Jin et al., 2005). This study takes the amount of "negative news" as the proxy index for media monitoring and presents the hypothesis that media sentiment could negatively moderate the impact from institutional ownership to stock price crash risk.

Hypothesis 2: The media sentiment negatively moderates the relationship between institutional ownership and the companies' stock price crash risk;

Data and Research Methodology

Sample and Data Collection

This study uses secondary data and a sample of listed companies on the A-shares board in Shanghai and Shenzhen stock exchange markets from 2011 to 2021 to investigate the relationship between different investors' ownership in China's stock market and stock price crash risk, as well as the moderating effect of board independence. This study sourced the sample data about investors' ownership from the China Stock Market and Accounting Research Database (CSMAR). The sample does not consider ST and *ST-type companies, which is consistent with (Du et al., 2022). This study excluded corporations with missing information, resulting in an unbalanced panel of 21,866 samples.

Dependent Variable

This study's dependent variable is stock price crash risk. The dependent variable "negative coefficient of skewness" (NCSKEW) is replaced with "down-to-up volatility" (DUVOL) (Kim et al., 2011b). It represents the variation in a stock's rise and fall volatility. The stock return data is split into two sub-samples: up weeks and down weeks, depending on whether the weekly return rate aftermarket adjustment ($w_{i,t}$) of the stock is greater than the yearly average return. Then, calculate the standard deviation (R_u , R_d) of the stock return in the two sub-samples, respectively.

The calculation method is shown as follows module:

$$DUVOL_{i,t} = \ln\left\{\frac{(n_u - 1) \sum_{down} R_d^2}{(n_d - 1) \sum_{up} R_u^2}\right\}$$

Equation 1

n_u (n_d) represents the number of weeks in which the specific return of week ($w_{i,t}$) is greater (less) than the annual average return (w_i). The greater the *DUVOL*, the wider the left-bias yield range of return, which means the greater the probability of a stock price crash.

Independent Variables

Institutional ownership referred to in this study mainly includes securities investment funds, QFII (qualified foreign institutional investors), brokerages, insurance companies, social security funds, trusts, finance companies, and banks. This study labels the shareholding proportion of institutional ownership in the publicly listed company as *INS* (Hayat et al., 2018).

Moderator Variable

According to the previous study (Du et al., 2022; Tetlock, 2007), this study collects the data from the CSMAR database and examines the moderating variables as the media sentiment (*MS*). *MS* is a dummy variable that reflects the negative news sentiment about a company. This study tests the median function of each listed company's negative news. Then, mark the companies with more negative news than the median function as "1," which means this kind of company is under strong news sentiment; mark those with less negative news than the median as "0," which means this kind of company is under weak news sentiment.

Control Variables

Following previous studies, this study selects several control variables that affect stock price crash risk. According to Ding et al (2020), firm size (*FIRMSIZE*) is calculated as the natural logarithm of total assets. According to Davis & Donaldson (1997), CEO duality (*DUAL*) is a dummy variable that reflects the CEO duality based on the CSMAR database. According to Zuo and Bai (2024), *OCCUPY* reflects the proportion of funds occupied by major shareholders. Zhang et al (2024), considered that *TNS* means the total number of shareholders. According to Lai et al (2020), *BANK* is a dummy variable that reflects if a company has bank shareholding. *SOE* is a dummy variable; it reflects if a company's share is primarily held by the state (Ding et al., 2020). According to Kim et al (2014), and Rutkowska-Ziarko (2022), this study calculates the return on assets (*ROA*) by comparing the profit to the assets, which signifies the efficiency of capital utilization. In previous research (Huang et al., 2020), profitability was considered to have a negative relationship with stock price crash risk. One of them is the average daily turnover rate (*ADTR*), which is measured as the daily volume of a share divided by the number of shares outstanding; the other one is net profit (*NP*). According to An & Zhang (2013), and Rutkowska-Ziarko (2022), this study uses Annual Return on Individual Stocks (*ARIS*) to reflect

profitability. Gompers et al. (2003) claimed that the proportion of revenue from the top sources (TOP) is also a signature variable for a company's performance. According to Chaudhry and Sam (2014), financial loss (LOSS) is a dummy variable that reflects if a company had a financial loss in a certain period. According to Casavecchia and Tiwari (2024), the operating fee (OFEE) reflects the operating expenses, which are expressed as a percentage of assets under management during the year. Based on Bathia et al.'s (2020) research, DER means debt-to-equity ratio, and it has signature relationships between equity and debt flows; additionally, Cakici et al. (2017) considered the book-to-market ratio (BM) as positively related to stock price crash risk. This study calculates BM as a company's book value divided by its market value. Operating leverage (OL) is also a signature variable relative to stock price crash risk (Chang et al., 2024).

Empirical Methodology

The study first examines whether institutional ownership has an impact on stock price crash risk. The findings of the LM test and Hausman test in this study show that the Fixed Effects Model (FEM) produces better results than Ordinary Least Squares (OLS) and the Random Effects Model (REM). Stata 17.0 conducted the data analysis.

The study considers institutional ownership as an independent variable that is used to examine whether it impacts stock price crash risk. This study uses the panel regression analysis model to analyze the relationship between institutional ownership and stock price crash risk while controlling for several firm-specific and board-characteristic factors. The baseline regression model is presented in the equation as follows:

$$crash_{t+1} = \alpha + \beta_1 INS_t + \sum_{q=2}^m \beta_q (qth\ ControlVariable_t) + YR + \varepsilon$$

Equation 2

In the model, Crash is the stock price crash risk index (DUVOL) in the $t + 1$ period; INS_t is the shareholding index of institutional ownership in the t period; it is calculated as the proportion of institutional ownership's shareholding in total outstanding share capital; $ControlVariable_t$ is the control variable in the t period; YR is the annual dummy variable.

To test hypothesis **H2**, the interaction term $INS_t \times MS_t$ was added to the above model and shown in the following equation:

$$crash_{t+1} = \alpha + \beta_1 INS_t + \beta_2 INS_t \times MS_t + \beta_3 MS_t + \sum_{q=4}^m \beta_q (qth\ ControlVariable_t) + YR + Ind + \varepsilon$$

Equation 3

Result

Descriptive Statistics

Table 1(a) lists the descriptive statistics for all variables in this study for 22,000 observations collected from 2011 to 2021. The minimum value of the dependent variable DUVOL is negative, while its maximum value is positive. The mean value for leverage (DUVOL) is -0.266. In addition, the standard deviation is 0.492, which indicates that significant risks and uncertainties exist across listed firms in the market during the sample period. The average institutional ownership (INS) is 42.563, and the standard deviation is 25.634, suggesting that institutional ownership takes the primary percentage in the listed firms and has significant

volatility. In the sample firms, the maximum value for firm size (FIRMSIZE) is 54000, with the minimum being 5, and the mean value is 5649.

In the company's shareholding. The maximum total number of shareholders is 1700000, and the minimum number is 2338. The maximum value for the proportion of funds occupied by major shareholders (OCCUPY) is 0.562, and the mean value is 0.016, with the minimum being 0, which means no major shareholders occupied. The maximum value of the proportion of bank shareholding (BANK) is 1, which means there is bank shareholding in a company; the minimum value is 0, which means there is no bank shareholding. The value of state ownership (SOE) reflects the same; the maximum value of SOE ownership is 1, which means the state entirely owns the company, and the minimum value is 0, with a mean value of 0.226.

In the level of company gains, the maximum value of net profit (NP) is 3.510, and the minimum value is -18.498, which indicates a possible financial loss. The maximum value of return on asset (ROA) is 1.137, and the minimum value is -1.838, and the mean value is 0.060. The maximum return on average daily turnover rate (ADTR) is 22.891, and the minimum value is 0.012, with a mean value of 2.832. Another similar variable is the Annual Return on Individual Stocks (ARIS); its maximum value is 14.278, with a minimum value of -0.822 and a mean value of 0.143.

The maximum value of the proportion of revenue from the top sources (TOP5) is 99.230, which means there is a signature concentration in a company's business and reflects more potential risk. The minimum value of TOP5 is 6.908, and the mean value is 53.33. The maximum value of financial loss (LOSS) is 1, which reflects the occurrence of loss in a company, and the minimum value is 0, which means not.

At the level of the financial index, the maximum value of the debt-to-equity ratio (DER) is 416.300, and the minimum value is 0.007, which indicates a sample diversity. The maximum value of the book-to-market ratio (RM) is 1.559, the minimum value is 0.008, and the mean value is 0.606. The maximum operating leverage (OL) is 9607.304, and the minimum value is -342.769, with a mean value of 2.358.

Table 1(a)

Descriptive Statistics of the Continuous Variables

Variable	Obs	Mean	Std.dev.	Min	Max
DUVOL	22000	-0.266	0.492	-3.058	2.182
INS	22000	42.563	25.634	0.000	155.657
FIRMSIZE	22000	5649	18000	5	540000
DUAL	22000	0.315	0.464	0.000	1.000
OCCUPY	21000	0.016	0.029	0.000	0.562
TNS	21000	47000	69000	2338.000	1700000.000
BANK	21000	0.053	0.224	0.000	1.000
SOE	21000	0.266	0.442	0.000	1.000
NP	21000	0.067	0.334	-18.498	3.510
ROA	21000	0.060	0.080	-1.838	1.137
ADTR	22000	2.832	2.329	0.012	22.891
ARIS	21000	0.143	0.585	-0.822	14.278

TOP5	21000	53.33	14.972	6.908	99.230
LOSS	21000	0.096	0.295	0.000	1.000
OFEE	20000	0.171	0.162	-0.966	7.603
DER	21000	1.113	3.940	0.007	416.300
BM	20000	0.606	0.244	0.008	1.559
OL	19000	2.358	91.208	-342.769	9607.304

Table 1(b) shows that the proportion of media sentiment of 11,245 firms (51.43 per cent) is more significant than the median value. Meanwhile, 10,621 (48.57 per cent) firms report a smaller digital finance index than the median value.

Table 1(b)

Descriptive Statistics for Dummy Variable

MS	Freq.	Percent	Cum.
0	11,245	51.43	51.43
1	10,621	48.57	100
Total	21,866	100	

Correlation Analysis

Pearson's correlation was used to examine whether there were relationships between the sample variables in this study. Table 2 shows the Pearson correlation matrix for the sample variables. As shown in the table, institutional ownership has a positive impact on DUVOL, and this is consistent with the hypothesis. Further tests should be conducted to explore the relationship in detail.

In addition, the variables FIRMSIZE, OCCUPY, BM and OL are positively correlated with NSCKEW, indicating that an increase in those would increase the stock price risk. Furthermore, the variables DUAL, ROA, TOP5, LOSS, and OFEE are signature positive related to DUVOL, which means the impact of those variables is stronger.

On the contrary, NP and OL are negatively related to DUVOL. Additionally, TNS, BANK, SOE, ADTR, ARIS and DER are significantly negatively correlated with DUVOL, suggesting that an increase in those variables leads to a reduction in stock price crash risk within the company.

Table 2

Pearson Correlation Matrix

	DUVOL	INS	FIRMSIZE	DUAL	OCCUPY	TNS	BANK
DUVOL	1						
INS	0.009	1					
FIRMSIZE	0.01	0.215***	1				
DUAL	0.023***	-0.180***	-0.038***	1			
OCCUPY	0.006	-0.006	0.022***	-0.038***	1		
TNS	-0.057***	0.130***	0.528***	-0.105***	0.038***	1	
BANK	-0.033***	0.084***	0.096***	-0.063***	0.014**	0.110***	1
SOE	-0.061***	0.404***	0.158***	-0.270***	0.017**	0.243***	0.117***
NP	-0.009	0.066***	-0.005	0.008	-0.099***	-0.015**	0.008
ROA	0.018***	0.137***	0.022***	0.007	-0.144***	-0.034***	0.015**
ADTR	-0.099***	-0.282***	-0.143***	0.125***	-0.034***	-0.108***	-0.087***
ARIS	-0.137***	0.032***	-0.001	0.022***	-0.026***	-0.019***	-0.015**

TOP5	0.020***	0.457***	0.129***	0.016**	-0.085***	-0.112***	0
LOSS	0.017**	-0.094***	-0.028***	0.006	0.132***	0.024***	-0.033***
OFEE	0.028***	-0.132***	-0.086***	0.071***	0.036***	-0.112***	-0.041***
DER	-0.018**	0.045***	0.047***	-0.033***	0.128***	0.059***	0.025***
BM	0.011	0.111***	0.190***	-0.123***	0.061***	0.202***	0.113***
OL	0.008	0.004	-0.003	0.006	-0.004	-0.004	0.017**

	SOE	NP	ROA	ADTR	ARIS	TOP5	LOSS
SOE	1						
NP	0	1					
ROA	-0.040***	0.595***	1				
ADTR	-0.198***	-0.013*	-0.031***	1			
ARIS	-0.048***	0.070***	0.176***	0.242***	1		
TOP5	0.042***	0.111***	0.179***	-0.041***	-0.012*	1	
LOSS	0.009	-0.430***	-0.582***	0.017**	-0.077***	-0.139***	1
OFEE	-0.144***	-0.267***	-0.104***	0.051***	-0.003	-0.059***	0.134***
DER	0.075***	-0.104***	-0.141***	-0.036***	-0.020***	-0.013*	0.131***
BM	0.241***	-0.067***	-0.192***	-0.244***	-0.367***	0.099***	0.038***
OL	0.005	-0.003	-0.008	-0.003	-0.005	0.003	0.008

	OFEE	DER	BM	OL
OFEE	1			
DER	-0.034***	1		
BM	-0.258***	0.096***	1	
OL	-0.003	0.001	0.003	1

Notes: ***, **, and * indicate significance at 1%, 5% and 10%; DUVOL= Down-to-up volatility, calculated according to Equation 1; INS= The percentage of institutional shares in total outstanding shares; FIRMSIZE= Number of total employees; DUAL= CEO duality, mark "1" when company has this situation and otherwise "0"; OCCUPY= proportion of funds occupied by major shareholders; TNS= total number of shareholders; BANK= mark "1" if a company has bank shareholding, otherwise "0"; SOE= mark "1" if a company has state shareholding, otherwise "0"; ROA= return divide total asset; ADTR= daily volume of a share dividing the number of shares outstanding; NP= net profit of a company; ARIS= (ending price of a stock - beginning price + dividend) / beginning price; TOP5= proportion of revenue from the top5 sources; LOSS= mark "1" if a company has financial loss, otherwise "0"; OFEE= percentage of assets under management during the year; DER= total debt divide total equity; SDAWR= standard deviation of a stock's annual weekly return; BTM= Book-to-market ratio; OL= percentage change in EBIT divide percentage changes in sales.

Empirical Tests and Discussion of the Impact of Institutional Ownership on Stock Price Crash Risk

Three different methods are available for estimating panel data regression models. There are Ordinary Least Squares (OLS), the Random Effect Model (REM), and the Fixed Effect Model (FEM). This study uses FEM by considering the problems of controlling individual characteristics, reducing estimation bias, and endogeneity in the panel data.

The regression results in Model 5 reveal that institutional ownership (INS) has a positive impact on FEM at the 1% significance level, with a coefficient of 0.0032 after controlling for

industry, time and firm-level fixed effects. This result is consistent with the previous hypothesis H1. It suggests that the higher concentration of institutional ownership is associated with a higher DUVOL, which means the proportion of institutional ownership increases the stock price crash risk. This empirical finding supports previous research under information cascade theory (Zhao et al., 2021; Liu et al., 2022; Wang & Liu, 2023). Average daily turnover rate (ADTR) and Annual return on individual stocks (ARIS) show a negative and significant impact on DUVOL at a 1% significance level; this result has been verified under different models, and it suggests that the liquidity of a stock has a significant impact on the stock price crash risk negatively, which is consistent with the previous study by Huang et al. (2020).

In model 6, The index of the interaction term between institutional ownership and DUVOL is -0.0008 at a 5% significance level. This result suggests that the media sentiment negatively moderates the relationship between institutional ownership and the companies' stock price crash risk, implying that higher media monitoring decreases the positive impact of institutional ownership on a stock price crash risk, which confirms hypothesis H2.

Table 3

The effect of institutional ownership on financing constraints

	OLS Model 1	OLS Model 2	REM Model 3	REM Model 4	FEM Model 5	FEM Model 6
INS	0.0005*** (0.0002)	0.0002 (0.0002)	0.0006*** (0.0002)	0.0003 (0.0002)	0.0032*** (0.0005)	0.0037*** (0.0005)
MS		0.0055 (0.0140)		0.0077 (0.0142)		0.0538*** (0.0180)
INSxMS		0.0005* (0.0003)		0.0005 (0.0003)		-0.0008** (0.0004)
FIRMSIZE	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000*** (0.0000)	0.0000** (0.0000)	0.0000** (0.0000)
DUAL	0.0098 (0.0079)	0.0096 (0.0079)	0.0091 (0.0081)	0.009 (0.0081)	-0.0198 (0.0143)	-0.0192 (0.0143)
OCCUPY	0.197 (0.1256)	0.181 (0.1256)	0.198 (0.1276)	0.183 (0.1275)	0.293 (0.2236)	0.289 (0.2244)
TNS	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)	-0.0000*** (0.0000)
BANK	-0.0652*** -0.0155	-0.0712*** -0.0156	-0.0648*** -0.0157	-0.0708*** -0.0157	-0.0389* -0.0211	-0.0384* -0.021
SOE	-0.0757*** (0.0094)	-0.0770*** (0.0094)	-0.0777*** (0.0097)	-0.0789*** (0.0097)	-0.1219*** (0.0332)	-0.1222*** (0.0332)
NP	-0.0375** (0.0149)	-0.0368** (0.0149)	-0.0365** (0.0150)	-0.0359** (0.0149)	-0.021 (0.0230)	-0.0212 (0.0230)
ROA	0.3581*** (0.0642)	0.3375*** (0.0644)	0.3455*** (0.0650)	0.3268*** (0.0651)	0.166 (0.1021)	0.166 (0.1018)
ADTR	-0.0185*** (0.0017)	-0.0182*** (0.0017)	-0.0183*** (0.0017)	-0.0181*** (0.0017)	-0.0191*** (0.0025)	-0.0194*** (0.0025)
ARIS	-0.1130*** (0.0067)	-0.1139*** (0.0067)	-0.1137*** (0.0067)	-0.1145*** (0.0067)	-0.1451*** (0.0130)	-0.1455*** (0.0130)
TOP5	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0022*** (0.0007)	-0.0023*** (0.0007)

LOSS	0.0572*** (0.0149)	0.0549*** (0.0149)	0.0558*** (0.0149)	0.0537*** (0.0149)	0.0196 (0.0190)	0.0194 (0.0190)
OFEE	0.0457* (0.0243)	0.038 (0.0244)	0.0474* (0.0249)	0.0398 (0.0250)	0.0797** (0.0346)	0.0764** (0.0342)
DER	-0.0016* (0.0009)	-0.0017* (0.0009)	-0.0015* (0.0009)	-0.0016* (0.0009)	-0.0011* (0.0006)	-0.0011* (0.0006)
BM	-0.0636*** (0.0178)	-0.0652*** (0.0178)	-0.0615*** (0.0182)	-0.0629*** (0.0181)	-0.1002*** (0.0379)	-0.0983*** (0.0378)
OL	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0000 (0.0000)	0.0001*** (0.0000)	0.0001*** (0.0000)
Constant	-0.1649*** (0.0201)	-0.1594*** (0.0211)	-0.1660*** (0.0206)	-0.1616*** (0.0216)	-0.1162*** (0.0432)	-0.1380*** (0.0438)
Observations	18528	18528	18528	18528	18019	18019
R-squared	0.0410	0.0419			0.2610	0.2614
Firm FE	NO	NO			YES	YES
Year FE	NO	NO			YES	YES

Notes: ***, **, and * indicate significance at 1%, 5% and 10%; DUVOL= Down-to-up volatility, calculated according to Equation 1; INS= The percentage of institutional shares in total outstanding shares; FIRMSIZE= Number of total employees; DUAL= CEO duality, mark "1" when company has this situation and otherwise "0"; OCCUPY= proportion of funds occupied by major shareholders; TNS= total number of shareholders; BANK= mark "1" if a company has bank shareholding, otherwise "0"; SOE= mark "1" if a company has state shareholding, otherwise "0"; ROA= return divide total asset; ADTR= daily volume of a share dividing the number of shares outstanding; NP= net profit of a company; ARIS= (ending price of a stock - beginning price + dividend) / beginning price; TOP5= proportion of revenue from the top5 sources; LOSS= mark "1" if a company has financial loss, otherwise "0"; OFEE= percentage of assets under management during the year; DER= total debt divide total equity; SDAWR= standard deviation of a stock's annual weekly return; BTM= Book-to-market ratio; OL= percentage change in EBIT divide percentage changes in sales.

Robustness Test

This study substituted dependent variables to examine the robustness of the empirical analysis. Following prior studies (Hutton et al., 2009; Kim et al., 2011), this study uses NCSKEW (negative coefficient of skewness) as a proxy to measure stock price crash risk. NCSKEW is calculated by "taking the negative of the third moment of daily returns and dividing it by the standard deviation of daily returns raised to the third power." The greater the NCSKEW, the more negative skew there is, and the risk of a stock price crash increases. The calculation method is shown as follows:

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

Equation 4

In this case, n is the number of trading weeks for stock i in year t . The market-adjusted return rate $w_{i,t}$ for Stock i for the week t has been calculated as:

$$w_{i,t} = \ln(1 + \epsilon_{i,t})$$

Table 4 indicates that institutional ownership has a positive relationship with NCSKEW at a 1% significance level, which means the increase in the proportion of institutional ownership's shareholding will increase the stock price crash risk, thus contradicting hypothesis H1.

The index of MS is 0.0843 at 1% significance level, which suggests that the media sentiment could impact the stock price crash risk significantly. The interaction term between institutional ownership and NCSKEW is -0.0009 at a 10% significance level; the results indicate that the media monitoring of a company decreases the influence of institutional ownership on stock price crash risk, confirming hypothesis H2.

Table 4
Robustness Test

VARIABLES	FEM Model 1	FEM Model 2
INS	0.0048*** (0.0007)	0.0053*** (0.0008)
MS		0.0843*** (0.0292)
INSxMS		-0.0009* (0.0006)
FIRMSIZE	0.0000*** (0.0000)	0.0000*** (0.0000)
DUAL	-0.0388* (0.0224)	-0.0379* (0.0224)
OCCUPY	0.593 (0.3708)	0.582 (0.3731)
TNS	-0.0000*** (0.0000)	-0.0000*** (0.0000)
BANK	-0.0666** (0.0311)	-0.0653** (0.0311)
SOE	-0.1515*** (0.0518)	-0.1513*** (0.0517)
NP	-0.041 (0.0414)	-0.0406 (0.0414)
ROA	0.3682** (0.1586)	0.3648** (0.1581)
ADTR	-0.0276*** (0.0038)	-0.0283*** (0.0038)
ARIS	-0.2062*** (0.0176)	-0.2068*** (0.0175)
TOP5	-0.0038*** (0.0012)	-0.0039*** (0.0012)
LOSS	0.0487 (0.0307)	0.0477 (0.0306)
OFEE	0.1188* (0.0673)	0.1138* (0.0666)
DER	-0.0019** (0.0009)	-0.0019** (0.0009)
BM	-0.2351*** (0.0598)	-0.2293*** (0.0596)
OL	0.0001***	0.0001***

	(0.0000)	(0.0000)
cons	-0.0949	-0.1309*
	(0.0705)	(0.0712)
Observations	18019	18019
R-squared	0.2550	0.2555
Firm FE	YES	YES
Year FE	YES	YES

Notes: ***, **, and * indicate significance at 1%, 5% and 10%; DUVOL= Down-to-up volatility, calculated according to Equation 1; INS= The percentage of institutional shares in total outstanding shares; FIRMSIZE= Number of total employees; DUAL= CEO duality, mark "1" when company has this situation and otherwise "0"; OCCUPY= proportion of funds occupied by major shareholders; TNS= total number of shareholders; BANK= mark "1" if a company has bank shareholding, otherwise "0"; SOE= mark "1" if a company has state shareholding, otherwise "0"; ROA= return divide total asset; ADTR= daily volume of a share dividing the number of shares outstanding; NP= net profit of a company; ARIS= (ending price of a stock - beginning price + dividend) / beginning price; TOP5= proportion of revenue from the top5 sources; LOSS= mark "1" if a company has financial loss, otherwise "0"; OFEE= percentage of assets under management during the year; DER= total debt divide total equity; SDAWR= standard deviation of a stock's annual weekly return; BTM= Book-to-market ratio; OL= percentage change in EBIT divide percentage changes in sales.

Conclusion

Stock price crash risk is a critical problem for China's stock market pricing mechanism and influences "healthy development" (Wu et al., 2009). Within this context, media sentiment plays a critical, moderate role in institutional ownership's ownership and stock price crash risk (Du et al., 2022). This study investigates the influence of an investor's ownership structure on a company's stock price crash risk through the moderating effect of media sentiment. This study examines data on A-share listed companies in China from 2011 to 2021, presenting the following conclusions:

First, the study's test results suggest a positive relationship between institutional ownership and the risk of a stock price crash. According to the information cascade theory, institutional ownerships have more access to information than others (Kong et al., 2011), which would cause nonlinear effects of information exchanges, cause the herding effect, and lead to the crash of stock prices (Fang et al., 2023), especially in China's stock market (Ding et al., 2020).

Second, according to the agency theory, a higher level of media sentiment would decrease institutional ownership's positive impact on stock price crash risk. The media concern, which acts as external monitoring, may focus on shareholders' interests and the negative information about the company, and the management group would be under monitoring from the public more widely, resulting in a decrease in the volatility of the stock price and raising the risk of a crash in the stock price (Liang et al., 2020). This study used data from China's stock market and evaluated the negative impact of media sentiment.

This study adds three new insights to the previous studies. Firstly, this study contributes to the existing research on the mechanism of stock price crashes, drawing upon the agency

conflict theory. The study in this article demonstrates that media sentiment is a significant moderating factor in the risk of a stock price crash. In China's emerging market with insufficient investor protection, media monitoring has the function of reducing the possibility of a stock price crash and promoting capital market stability.

Secondly, to effectively address the endogeneity issue, this study uses media sentiment to distinguish between the various groups of listed companies in China. Thirdly, it creates a FEM estimation model to determine the impact of media sentiment on stock price crash risk. To capture the media sentiment, this study also identifies situations in which a company is under media monitoring at the data level. This study investigates the moderating impact of media sentiment on stock price crash risk, confirming and enhancing the findings of earlier studies from the viewpoint of stock price crash risk.

Finally, the study can provide new perspectives and fresh evidence for analyzing the policy impact of promoting the reform of China's listed companies' media monitoring function. Based on the findings, this study makes several suggestions for the Chinese government and companies. To reduce information asymmetry between investors, the China Securities Regulatory Commission should establish a sound information disclosure mechanism for China's stock market, thereby preventing stock price crash risk. The listed company should perfect corporate governance, enhance the transparency of information disclosure, and strengthen monitoring mechanisms for independent directors.

There are three theoretical contributions to this study. Firstly, the moderating of stock prices by media has not been mentioned widely in the previous studies. This study explored the function of the media in the financial market from the viewpoint of news sentiment. Secondly, previous studies have limited media attention analysis due to difficulties in quantifying features and using the frequency of media mentions as a proxy variable. Negative news is more likely to demonstrate media attention's significance on a company's stock price, reflecting media governance rather than just "icing on the cake." Thirdly, this study uses the CNRDS media report sentiment index to analyze the impact of media news on stock price volatility, focusing on negative sentiment.

For practical contribution, China's stock market has experienced rapid growth due to modern technology, new financial instruments, and the 14th Five-Year Plan. However, the risk of stock price crashes is becoming a concern, requiring further study. This study makes understanding stock crash risk crucial for economic stability because macroeconomic shifts, capital flows, and market sentiment influence the market's volatility,

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