

Corporate Social Responsibility and Stock Price Crash Risk

—Moderating Effect Analysis of Social Capital

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Abstract

This paper uses panel data from 9381 samples of listed companies in China's A-share market from 2013 to 2018 to regress. Based on the theoretical analysis, this article explores the relationship between China's corporate social responsibility and the stock market crash risk, adding variables to examine the moderating effects of corporate social capital. Through the empirical research, this paper finds the conclusion that there is a negative correlation between corporate social responsibility and the risk of stock price crash. At the same time, corporate social capital has the moderating effects in the relationship between corporate social responsibility and the stock price crash risk. According to the conclusions, this article puts forward the suggestion that enterprises should enhance their awareness of social responsibility and actively fulfill their social responsibilities, and management should also focus on accumulating social capital.

Keywords

Corporate Social Responsibility, Stock Price Crash Risk, Corporate Social Capital, Moderating Effects

1. Introduction

With the rapid development of the economy, enterprises are showing prosperity and development. However, in pursuit of maximizing shareholder wealth, companies also brought some social issues, such as product safety issues, and environmental issues. In the process of enterprise development, managers gradually realized that enterprise development should not only pursue the maximization of economic benefits, but also focus on social benefits. Corporate social respon-

sibility activities have gradually attracted public attention.

But in recent years, incidents of lack of corporate social responsibility have occurred from time to time and these incidents have seriously affected the stable, sustainable, and healthy development of the society. For example, there is a notorious incident called “Changchun Changsheng Incident”. In this incident, a corporate called “Changsheng” in Changchun Province produced unqualified vaccine and some babies died because of the vaccine. Also, from 2010 to 2018, a corporate called “Fushikang” got involved in public accusations because it was lacking in human-based management for employees. These incidents have affected the stable development of the society and economy. Because of a series of issues of lack of social responsibility, the government has also established necessary punishment and supervision mechanisms for corporate social responsibility accidents, aiming to govern corporate behavior. At the same time, various stakeholders also pay attention to corporate social responsibility, and people pay more attention to the implementation of corporate social responsibility. For creditors, investors and other corporate stakeholders, the performance of corporate social responsibility has also become one of the important factors they consider when making investment decisions.

A stock price crash refers to a situation in which a market index has fallen sharply or a sudden drop in the price of a company’s stock. The occurrence of a stock price crash not only greatly affects the interests of investors, but also adversely affects the stability of the capital market. The “Changchun Changheng Incident” caused the company’s stock price to plummet and affected the stability of China’s capital market. This shows that the lack of social responsibility will have an impact on the stock market crash. Therefore, this article establishes a connection between social responsibility and the stock price crash risk. This paper not only hopes to point out the relationship between the social responsibility and the stock price crash risk, but also aims to provide a theoretical basis for stabilizing corporate value.

Nowadays, academia has rich research on social responsibility and the risk of stock market crash. A milestone in the definition of social responsibility is that [Bowen \(1953\)](#) proposed that companies not only need to pursue the maximization of profit, but also assume social responsibility, that is, make decisions based on the values and goals of the entire society. [Brummer \(1991\)](#) defines the corporate social responsibility and believes that corporate responsibility mainly includes economic, ethical, legal and social responsibilities. Since the beginning of the 21st century, people’s definition of social responsibility has become more precise. The European Commission proposed the definition of corporate social responsibility in 2001, which refers to the integration of social and environmental care on a voluntary basis by companies, adding to the interaction between the company and its stakeholders. As to the stock price crash, it is explained at the company and market levels. The company level is based on the “Information Hiding Hypothesis” that the stock price crash is the result of the concentrated release of private information ([Chen, Hong, & Stein, 2001](#)). [Jin & Myers \(2006\)](#)

pointed out that corporate management tends to conceal the negative news for the sake of interests. When the negative news accumulates to a certain extent, it will be prone to the outbreak of negative information when it is affected by the external market, and the company's stock price will suffer from a crash. Ball (2009) believes that due to personal interests, litigation risks and other reasons, management selectively discloses negative information, which leads to information asymmetry between investors and investors. This leads to incorrect estimates of corporate stock prices. Continuous accumulation until the threshold is exceeded will lead to the concentrated release of negative news in the market, causing corporate stock prices to collapse. From the perspective of market level, a theory that explains stock price crash is "Stochastic Bubble Models Hypothesis". Blanchard & Watson (1982) proposed that the bursting of the market bubble will generate a large number of negative returns, and the stock price is affected by external events and investor psychology, which may cause the stock price crash. Abreu & Brunnermeier (2003) believe that the stock market bubble is caused by the heterogeneous beliefs of investors, and different arbitrageurs will choose the appropriate timing to exit. Heterogeneous beliefs make the exit timing asynchronous and do not lead to the burst of the bubble. External shocks lead a large number of arbitrageurs in the market to exit at the same time, and a stock price crash will occur. Another theoretical mechanism to explain the stock price crash is "Volatility Feedback Hypothesis". This hypothesis suggests that an increase in the volatility of the stock price would increase the risk premium of the stock, thereby triggering a stock price crash.

At present, there are a few studies that examine the relationship between corporate social responsibility and the stock price crash risk. The current research conclusions show that corporate social responsibility has two aspects to the stock price crash risk. On the one hand, corporate social responsibility can reduce the risk of stock price crashes. Harjoto & Jo (2011) found that companies with better social responsibility are more likely to have good corporate governance capabilities and reduce the risk of stock price crashes by reducing the accumulation of bad news. Song, Hu, & Li (2017), starting from the information effect and reputation insurance effect, found that corporate reputation insurance effect has a significant effect on reducing the risk of stock price crash. On the other hand, some scholars have researched from other perspectives and found that the corporate social responsibility will increase the stock price crash risk. Hemingway & Maclagan (2004) research believes that the important driving force for companies to fulfill their social responsibilities is to conceal the negative news and bad behaviors in enterprises. Quan & Xiao (2016) believe that China's social responsibility has an "Instrument Effect" on the risk of stock market crash, that is, disclosure of social responsibility is an important tool for companies to use for "self-interest" and social responsibility will increase the stock price crash risk. It can be seen that considering different effect mechanisms, the relationship between corporate social responsibility and stock price crash risk will have different conclusions. In general, there is no research that conducted from social cap-

ital. Therefore, based on the existing research, this article discusses the impact of social responsibility on the stock price crash risk, and selects the corporate social capital for further discussion.

2. Hypothesis Development

2.1. Hypothesis of the Relationship of Corporate Social Responsibility and Stock Price Crash Risk

According to the Information Asymmetry Theory, reducing information asymmetry helps reduce the risk of corporate stock price crash. Gelb & Strawser (2001) pointed out in their research that when companies actively take on social responsibilities and fulfill their obligations, they will more actively disclose corporate information. Cheng, Ioannou, & Serafeim (2014) believe that companies' proactive information disclosure can improve corporate information transparency. Enterprises actively assume social responsibilities, which has become an important symbol of improving corporate information transparency. Hutton & Marcus (2009) research suggests that the more opaque corporate information is the higher risk of a stock price crash. Because managers often consider their own interests, they tend to conceal negative news, and the accumulation of negative news often increases the risk of stock price crash. Therefore, when companies actively fulfill their social responsibilities, they will disclose more social responsibility information. The improvement of information transparency has alleviated the problem of information asymmetry and has a positive effect on reducing the risk of stock price crash.

Analyzing from the Signal Transmission Theory, the disclosure of corporate social responsibility information is conducive to enhancing the confidence of stakeholders, especially investors. Companies with good performance and good social responsibility tend to voluntarily disclose corporate information so that they can be disclosed to the outside world that the company operates well and this signal facilitates the company to obtain more funds from the outside world. Social responsibility can have a positive impact on corporate performance. Transmitting a good signal to the outside world will improve corporate performance. The improvement of corporate performance will also enable the company to have a stronger motivation for information disclosure. This enables investors to predict the value of the company, which helps reduce the stock price crash risk. In other words, under the influence of the signal transmission mechanism, corporate social responsibility information disclosure and corporate performance promote each other, which can increase the ability to resist capital market risks and reduce the risk of stock market crashes.

In addition, the performance of corporate social responsibility can promote a good relationship between the company and various stakeholders. Such a good relationship is important for corporate reputation component. Other scholars have pointed out that the performance of corporate social responsibility can form interactions between stakeholders and enterprises, and enhance corporate

reputation in the process of interaction (Carroll & Buchholtz, 2008). Therefore, an enterprise's social responsibility can have a good reputation effect and have a positive impact on the company's stock price. Specifically, investors make investigations when making investment decisions and the reputation of the company is one of the important aspects considered by investors. A good reputation often indicates that the company has a strong sense of responsibility and good management ability. Song et al. (2017) described this role as the "prestige insurance effect" of social responsibility. Reputation capital contributes to the trust of stakeholders in the company, that is, they believe that the company has a high risk response capability. Therefore, when the company faces internal and external shocks, investors believe the company has the ability to face with the shock, thereby reducing the stock price crash risk.

Based on the above three perspectives, this article makes the following hypothesis:

Hypothesis 1: There is a negative correlation between corporate social responsibility and the stock price crash risk, that is, fulfilling social responsibility can reduce the risk of corporate stock price crash.

2.2. Hypothesis of the Moderating Effect of Social Capital

Enterprises also have intangible social capital, that is, the relationships and connections between enterprises and the outside. The Great Transformation written by Polanyi, published in 1944, first introduced the concept of "Embedded Theory". He believed that the economy is a complex that exists in various social relations and social systems. The core of the theory is that economic activities are integrated into specific social networks, political frameworks, cultural traditions, and institutional foundations. Granovetter (1985) proposed on this basis that since people are in a specific relationship network, trust is formed in this relationship network, and their economic behavior is affected by social relationships based on the trust. Based on this, people's economic behavior will produce efficient social interaction. At the same time, he divides this embedding into two types: relational and structural. The former means that the actions of economic agents will be affected by the trust of actors formed in the social relationship network, while the latter believes that the social relationship network formed by economic agents will interact with other social networks forming a larger social network. Based on these two types of embedding, trust is created between economic agents, and this sense of trust enables transactions to proceed smoothly. "Embedded Theory" holds that an enterprise is embedded in a social relationship network, and a social relationship network is an information transmission network, which can transmit signals to all parties in the network. Therefore, when enterprises transmit social responsibility information, social capital has an impact on information transmission. Based on this, this article discusses the impact of corporate social responsibility on the relationship between corporate social responsibility and stock price crash risk.

On the one hand, as mentioned above, according to the Information Asymmetry Theory, the main reason for the dump of corporate stock price is the information asymmetry brought by the enterprise. Enterprises conceal or delay the disclosure of negative news, and when negative information accumulates to a certain extent or suffers a large external shock, it is released instantly, causing the stock price to face a huge shock and trigger a crash (Hutton & Marcus, 2009; Pan, Wu & Shi, 2010; Song et al. 2017). Bian & Qiu (2000) believed that the relationship between enterprises and other enterprises has the function of transmitting information and providing scarce resources. At the same time, the social relationships that an enterprise has, as a bridge for mutual communication between enterprises, is an important channel for establishing cooperative relationships and transmitting information. Tang, Hu, & Sun (2011) pointed out that the political relationship of an enterprise can be regarded as a contract between the enterprise and the government. This contract has a very important role for enterprises as an informal institutional arrangement. Some studies have put forward the idea of “government intervention” when examining the relationship between enterprises and the government, arguing that corporate social capital is one of the ways for the government to intervene in enterprises (Luo, Luo, & Wang, 2014). The performance of the government’s intervention in enterprises through this approach is mainly reflected in the supervision and guidance of enterprises’ implementation of relevant policies and regulations (Zhang & Fang, 2013). In other words, the company reduces the risk of stock price crash by reducing the degree of asymmetry of information by fulfilling social responsibility. At this time, if an enterprise has social capital, information transmission will be more timely and adequate. Therefore, in the case of social capital, the effect of social responsibility to reduce the risk of stock price crash is strengthened.

On the other hand, according to the Embedded Theory and Signal Transmission Theory, through fulfilling social responsibility, the company transmits to the outside world a signal that the company is doing well and has a high sense of social responsibility. Such signals are received by investors and other stakeholders and help to strengthen investor confidence. This will help reduce the risk of stock market crashes. If an enterprise has social capital and forms a social relationship network, when it discloses social responsibility information and actively fulfills its social responsibility, the social responsibility information embedded in the corporate social relationship network will be transmitted through the relationship network to those who are associated with it. In other words, when a company with social capital fulfills its social responsibility or discloses related information, such a signal can be more widely spread through a network of relationships. This positive signal will be more widely transmitted, strengthening the effect that social responsibility reduces the stock price crash risk. Compared with companies without social capital, the effect of social responsibility in reducing the stock price crash risk is more obvious. Therefore, when a company fulfills its social responsibility, whether it has social capital will have a certain moderating effect on reducing the stock price crash risk.

In summary, when the company has social capital, the effect of mitigating information asymmetry and signal transmission by fulfilling social responsibility is strengthened. Such strengthening will help to reduce the stock price crash risk. When an enterprise does not have social capital, its role in fulfilling its social responsibility to alleviate information asymmetries and thereby reduce the stock price crash risk will be limited. Therefore, this article believes that social capital has a certain moderating effect in the relationship between corporate social responsibility and stock price crash risk. Based on this, this article makes the following hypothesis:

Hypothesis 2: Corporate social capital has a moderating effect on the relationship between corporate social responsibility and the stock price crash risk. The enterprise with social capital will enhance the effect that social responsibility reduces the stock price crash risk.

3. Regression Design

3.1. Data

The empirical process uses the data of China's A-share listed companies from 2013 to 2018 for analysis. All continuous variables are winsorized at the 1% and 99% level to control for outliers. In addition, in this study, we excluded financial and insurance listed companies and ST, PT listed companies. Also this paper excluded listed companies with severely missing data. Finally, we obtained 9381 observations to form panel data, and used these 9381 data to conduct the empirical research.

All data used in this paper are obtained from the database Wind and CSMAR.

3.2. Variables

3.2.1. Stock Price Crash Risk

This paper learns from [Chen et al. \(2001\)](#) and [Song et al. \(2017\)](#) to use NCSKEW to measure the stock price crash risk. The measurement method is as follows:

First, this paper set the following model:

$$R_{i,t} = \beta_1 + \beta_2 R_{m,t-2} + \beta_3 R_{m,t-1} + \beta_4 R_{m,t} + \beta_5 R_{m,t+1} + \beta_6 R_{m,t+2} + \varepsilon_{i,t} \quad (1)$$

Among them, $R_{i,t}$ represents the weekly rate of return of individual stocks. $R_{m,t}$ represents the average weekly rate of return of the market. The random error term $\varepsilon_{i,t}$ in this model can represent the part of the rate of individual stocks that cannot be explained by fluctuations in market rate of return.

Then, we calculate the specific yield of stock i at t week by using the equation:

$$W_{i,t} = \ln(1 + \varepsilon_{i,t}) \quad (2)$$

Based on this, NCSKEW of stock i can be calculated by the following equation:

$$\text{NCSKEW}_{i,t} = - \left[n(n-1)^{3/2} \Sigma W_{i,t}^3 \right] / \left[(n-1)(n-2) (\Sigma W_{i,t}^2)^{3/2} \right] \quad (3)$$

Among them, n represents the trading week number of stock i in a year.

The value of NCSKEW is positively correlated with the stock price crash risk.

3.2.2. Corporate Social Responsibility

Hexun.com has been paying attention to corporate social responsibility since 2010, and releases social responsibility reports every year. The data is evaluated from five aspects including shareholder responsibility and employee responsibility. The evaluation target includes both companies that disclose social responsibility reports and companies that do not disclose social responsibility reports. The sample has been expanded. Therefore, this article uses the data of corporate social responsibility report released by Hexun to evaluate corporate social responsibility.

3.2.3. Corporate Social Capital

Measuring the corporate social capital (CSC) is complicated. In the current research, the commonly used method is to measure whether a company's executives have connections with other companies or government. Therefore, this paper draws on the common methods of existing research, and measures whether the company's executives have or have held relevant positions in the government and whether they hold other corporate positions as a measure of whether the company has social capital.

3.2.4. Controlling Variables

Based on a series of paper on the stock price crash risk (Chen et al., 2001; Xu, Jiang, Yi, & Xu, 2012; Quan, Wu, & Yin, 2015; Song et al., 2017), this paper selects the following variables as controlling variables in this article: the company's total size (SIZE), the asset-liability ratio (LEV), the return on equity (ROE), the average monthly excess turnover rate (DTURN), the average weekly unique rate of return of individual stocks (RET), market to book ratio (MB), fluctuation of the stock yield (SIGMA), the shareholding ratio of institutional investor (INSTI), the shareholding ratio of the biggest shareholder (FIR), and information opacity (OPAQUE). In addition, when academics are studying stock price crash risk, they believe that this year's stock price crash risk will also have a certain impact on the next year's. Finally, this article also controls annual and industry effects. The variables use in this paper can be listed in **Table 1**.

3.3. Models

The panel data used in this study has individual effects. At the same time, the Hausman test is performed on the panel data, which shows that we should use a fixed effect model for regression. Therefore, the models are set as follows:

Model 1:

$$\text{NCSKEW}_{i,t+1} = \alpha_1 + \alpha_2 \text{CSR}_{i,t} + \beta X_{i,t} + \alpha_m \Sigma \text{YEAR} + \alpha_n \Sigma \text{IND} + \varepsilon_{i,t}$$

Model 2:

$$\begin{aligned} \text{NCSKEW}_{i,t+1} = & \alpha_1 + \alpha_2 \text{CSR}_{i,t} + \alpha_3 \text{CSC} + \alpha_4 \text{CSR}_{i,t} * \text{CSC} + \beta X_{i,t} \\ & + \alpha_m \Sigma \text{YEAR} + \alpha_n \Sigma \text{IND} + \varepsilon_{i,t} \end{aligned}$$

Table 1. Variables of the article.

Types of variables	Names of variables	Explanation
Dependent variable	$NCSKEW_{i,t+1}$	The measurement of stock price crash risk
Explanatory variable	$CSR_{i,t}$	The scores of corporate social responsibility released by Hexun.com
	$CSR_{i,t} * CSC$	With social capital: $CSC = 1$; Without social capital: $CSC = 0$
	$NCSKEW_{i,t}$	Negative return skew coefficient for one lag
	$SIZE_{i,t}$	Natural logarithm of total assets
	$LEV_{i,t}$	Ratio of total debt to total assets
	$ROE_{i,t}$	Ratio of net profit to net assets
	$DTURN_{i,t}$	The difference between the average monthly turnover rate of stocks in year t and year t-1
Control variable	$RET_{i,t}$	Mean value of weekly specific yield of stocks in year t
	$MB_{i,t}$	Ratio of share price to book value per share
	$SIGMA_{i,t}$	Standard deviation of weekly specific yield of stocks in year t
	$INSTI_{i,t}$	Shareholding rate of institutional investor
	$FIR_{i,t}$	Shareholding rate of the largest shareholder
	$OPAQUE_{i,t}$	Mean value of manipulable accrual profit in the past three year
	$YEAR$	Annual dummy variable
IND	Industrial dummy variable	

The explanatory variables of the above two models are the stock price crash risk, which is expressed by the negative return skew coefficient (NCSKEW). Model 1 is used to verify Hypothesis 1 in this paper, and the explanatory variable is $CSR_{i,t}$. Model 2 is used to verify Hypothesis 2, and the explanatory variable is the interaction term $CSR_{i,t} * CSC$. $X_{i,t}$ in these two models represents a series of control variables that will affect the stock price crash risk, which have been presented in Section 3.2. β is the set of control variable coefficients; $\varepsilon_{i,t}$ represents the random disturbance. In addition, the sample selected in this article is from different years and industries. Therefore, these models also use YEAR and IND to control the annual effects and industry effects during the regression.

4. Empirical Framework and Results

4.1. Data Description and Univariate Analysis

This article first gives a summary of the statistics. The results of description are shown in **Table 2**. The results show that the sample size of this article is 9381, the mean of the NCSKEW is -0.3455 and the standard deviation is 0.6307 , indicating that there is a large difference in the stock price crash risks between listed

Table 2. Summary of statistics.

Variables	N	Mean	Std.dev.	Min.	Max.	Median
NCSKEW	9381	-0.3455	0.6307	-1.6109	0.8290	-0.3125
CSR	9381	25.12462	15.3873	2.2300	63.7500	22.2100
CSC	9381	0.2771	0.4476	0	1	0
SIZE	9381	22.2807	1.1269	20.0104	24.2902	22.1716
LEV	9381	0.4404	0.2017	0.1148	0.8298	0.4344
ROE	9381	0.0692	0.0694	-0.1067	0.2139	0.0660
DTURN	9381	0.1187	0.7202	-0.7189	1.7630	-0.0982
RET	9381	-0.0004	0.0069	-0.0113	0.0128	-0.0009
MB	9381	3.7948	2.4381	0.9937	10.2940	3.0768
SIGMA	9381	0.0507	0.0181	0.0242	0.0878	0.0476
INSTI	9381	41.4856	22.0999	1.5920	76.2738	42.8938
FIR	9381	34.7838	14.1965	13.9300	64.3500	32.9000
OPAQUE	9381	0.2625	0.2079	0.0439	0.9279	0.2009

companies. The average value of CSR is 25.1246 with a standard deviation of 15.3873, reflecting a large difference in social responsibility between different listed companies in China. At the same time, the median of CSR is 22.21, which is slightly lower than the mean, reflecting CSR has a positive distribution. The social responsibility of most listed companies has not reached the average level, and there is still much space for improvement. In terms of CSC, the median value of corporate social capital is 0 and the average value is 0.2771, indicating that more than half of listed companies still do not have social capital. In addition, this paper also presents the results of each control variable. The average LEV of the sample enterprises reaches 44.04%. The average ROE is 6.92%, and its standard deviation is 0.0694, indicating that there is a certain gap between the returns of listed companies.

In order to avoid the occurrence of multicollinearity among the explanatory variables, which affects the regression results of this paper, the correlation analysis is performed on the variables used in this paper. The results are shown in **Table 3**. From the results in the table, it can be found that the value of the correlation coefficient between the various variables in the model is small and there is no high correlation between the variables, indicating that the multicollinearity is not serious in the model.

4.2. Analysis of Regression Results

This paper uses Stata14.0 to perform regression and uses the regression results for further empirical analysis. At the same time, in order to maintain the robustness of the regression results, this article performs cluster processing on the

Table 3. Correlation coefficient matrix.

	NCSKEW	CSR	CSC	SIZE	LEV	ROE	DTURN	RET	MB	SIGMA	INSTI	FIR	OPAQUE
NCSKEW	1												
CSR	-0.0504***	1											
CSC	-0.0162*	0.0690***	1										
SIZE	-0.0190**	0.2775***	0.0553***	1									
LEV	-0.0449***	-0.0227***	0.0091	0.5070***	1								
ROE	0.0398***	0.4791***	0.0376***	0.1539***	-0.0911***	1							
DTURN	-0.1036***	-0.0055	0.0034	0.0377***	0.0901***	-0.0801***	1						
RET	-0.0918***	0.0403***	-0.0251***	-0.0660***	-0.0028	0.0710***	0.3531***	1					
MB	0.0226**	-0.1161***	-0.0696***	-0.5060***	-0.1001***	0.0649***	0.0980***	0.2580***	1				
SIGMA	0.0985***	-0.1483***	-0.0723***	-0.3028***	-0.0687***	-0.0966***	0.4993***	0.4597***	0.4307***	1			
INSTI	-0.0077	0.2040***	0.0046	0.4267***	0.2075***	0.1538***	0.0279***	0.0550***	-0.1288***	-0.1437***	1		
FIR	-0.0323***	0.1340***	0.0082	0.2391***	0.0959***	0.1368***	0.0188**	0.0097	-0.1090***	-0.0487***	0.4490***	1	
OPAQUE	-0.0313***	-0.0171**	-0.0089	-0.0104	0.1098***	0.0015	-0.0190**	-0.0049	0.0953***	0.0399***	-0.0366**	-0.0153	1

*** means significant at 1% level, ** means significant at 5% level, * means significant at 10% level.

data at the company level during the processing. **Table 4** reflects the regression results of Model 1 and 2.

First, this paper analyzes the result of Model 1. The result of F-test in Model 1 is that $\text{Prob} > F = 0.0000$, which is less than 0 at the 1% significance level. The coefficient of the explanatory variable CSR is -0.0023 and it is significant at the level of 1%, which means that when the score of CSR increase 1, the NCSKEW will decrease 0.0023. This result indicates that there is a significant negative correlation between social responsibility and stock price crash risk. Hypothesis 1 is verified.

Then, this paper also conducts an empirical analysis of the moderating effect of the social capital variable through Model 2. The result of F-test in Model 2 is that $\text{Prob} > F = 0.0000$. The estimated value of the interactive term CSR * CSC is -0.0029 , which is significant at the level of 5%, and the sign is negative. This result indicates that corporate social capital has a moderating effect between corporate social responsibility and the stock price crash risk. The existence of corporate social capital strengthens the role of corporate social responsibility in reducing the risk of stock price crashes.

In order to verify the moderating effect of corporate social capital, this article will perform a test of the moderating effect. The sample will be divided into two groups for regression based on whether the company has social capital.

Table 5 reflects the results of group regression based on whether the company has social capital. Column (1) shows the regression results of a sample of companies with social capital, and Column (2) shows the regression results of a sample of companies without social capital. Comparing the regression results of the two groups of samples, it can be found that the estimated coefficient of CSR with

Table 4. Regression results.

	Model 1	Model 2
CSR _t	-0.0023*** (-3.46)	-0.0015** (-1.99)
NCSKEW _t	-0.2156*** (-18.39)	-0.0029** (-2.49)
CSR _t * CSC		0.1056** (2.55)
CSC		-0.2162*** (-18.43)
SIZE _t	0.1093*** (3.29)	0.1081*** (3.28)
LEV _t	-0.2830** (-2.50)	-0.2891** (-2.56)
ROE _t	-0.0333 (-0.19)	-0.0425 (-0.25)
DTURN _t	0.0023 (0.16)	0.0020 (0.13)
RET _t	8.5933*** (5.92)	8.5155*** (5.86)
MB _t	0.0372*** (4.93)	0.0380*** (5.00)
SIGMA _t	0.2554 (0.34)	0.2420 (0.33)
INSTI _t	0.0030*** (3.59)	0.0030*** (3.54)
FIR _t	-0.0020 (-1.00)	-0.0020 (-1.01)
OPAQUE _t	0.0423 (0.99)	0.0407 (0.95)
Constant	-3.1001*** (-4.27)	-3.1039*** (-4.32)
YEAR	Control	Control
IND	Control	Control
Adjusted R ²	0.1413	0.1423
F	75.35	67.62
N	9381	9381

***, **, * indicate the significance levels of 1%, 5%, and 10% respectively under the two-tailed t-test. The standard errors of all coefficients in the regression results have been cluster processed at the company level

Table 5. Empirical test of moderating effect of social capital.

	NCSKEW _{t+1}	
	With social capital (1)	Without social capital (2)
CSR _t	-0.0037*** (-2.74)	-0.0014* (-1.75)

Continued

NCSKEW _t	-0.2432*** (-9.60)	-0.2298*** (-16.12)
SIZE _t	0.1724** (2.28)	0.0938** (2.41)
LEV _t	-0.5418** (-2.18)	-0.3059** (-2.26)
ROE _t	0.7531* (1.83)	-0.2198 (-1.10)
DTURN _t	0.0234 (0.72)	0.0021 (0.12)
RET _t	12.8118*** (4.30)	6.6533*** (3.78)
MB _t	0.0645*** (3.71)	0.0370*** (4.13)
SIGMA _t	3.2409* (2.10)	0.4015 (0.45)
INSTI _t	0.0011 (0.59)	0.0035*** (3.58)
FIR _t	-0.0072 (-1.43)	0.0001 (0.03)
OPAQUE _t	0.1345 (1.38)	0.0218 (0.43)
Constant	-4.1511** (-2.52)	-2.8820*** (-3.39)
YEAR	Control	Control
IND	Control	Control
Adjusted R ²	0.1783	0.1384
F	21.89	51.39
N	2,482	6,899

***, **, * indicate the significance levels of 1%, 5%, and 10% respectively under the two-tailed t-test. The standard errors of all coefficients in the regression results have been cluster processed at the company level.

social capital is -0.0037 , which is significant at the level of 1%, and has a significant negative correlation with the stock price crash risk. In the sample of companies without social capital, the estimated coefficient is -0.0014 . Compared with the two groups, the absolute value of the estimated coefficient of the sample group without social capital is significantly lower than the estimate of the sample group with social capital. Through the comparison of the regression results, this paper concludes that the social capital has a moderating effect on the relationship between corporate social responsibility and stock price crash risk, and that enterprises with social capital will enhance their social responsibility to reduce the risk of stock price crash. Hypothesis 2 is verified.

5. Robustness Analysis

In order to improve the robustness of this research, this paper uses DUVOL as the substitution variables to replace the NCSKEW to do the empirical test.

The calculation method of the DUVOL indicator is as follow:

$$\text{DUVOL}_{i,t} = \ln \left\{ \frac{\left[(n_{\text{up}} - 1) \sum_{\text{down}} (W_{i,t} - \overline{W}_{i,t})^2 \right]}{\left[(n_{\text{down}} - 1) \sum_{\text{down}} (W_{i,t} - \overline{W}_{i,t})^2 \right]} \right\} \quad (3)$$

Among them, n_{up} represents the number of week which week-specific yield ($W_{i,t}$) of stock i is greater than the week-specific average rate of return while n_{down} represents the number of week which week-specific yield ($W_{i,t}$) of stock i is less than the week-specific average rate of return.

There is a positive correlation between the value of DUVOL and the stock price crash risk.

The regression results are shown in **Table 6**. The variable CSR of Model 1 is still significant at the level of 1%, which has a negative correlation with the variable DUVOL, which is consistent with the conclusion of the original model. In the same way, the variable CSR * CSC of Model 2 has a negative correlation with DUVOL and its sign is consistent with the CSR, which proves that corporate social capital has a moderating effect between the relationship of corporate social responsibility and stock price crash risk. The empirical results of this paper are robust.

Another problem considered in this paper in the robustness test is the endogenous problem, which we will use the instrumental variable method to solve. According to the research by [Lin et al. \(2011\)](#), endogenous problems mainly occur at the enterprise level. The data in the “China Corporate Social Responsibility Report Blue Book” also shows that China’s corporate social responsibility has industry attributes and characteristics, so using industry social responsibility as an instrumental variable will be a feasible choice. This paper uses the methods of [Lin et al. \(2011\)](#) to take the average value of the company’s industry social responsibility (denoted as CSRI_{*t*}) as the instrumental variable, and uses the two-stage OLS method to regress.

The regression results are shown in **Table 7**. From the regression results, after the endogenous treatment, the variable CSRI of Model 1 is still significant at the significant level of 5%, which shows a negative correlation with the variable NCSKEW, which is consistent with conclusions of the original model. In the same way, the explanatory variables CSRI * CSC of Model 2 are negatively correlated with the explanatory variables at the significant level of 5% and their signs are consistent with the signs of CSRI, which proves that the research conclusions in this article remain robust after controlling for endogeneity.

6. Conclusion

6.1. Contributions and Innovation

The research contributions of this paper are reflected in the following aspects:

Table 6. The result of the robustness analysis.

	Model 1	Model 2
CSR _t	-0.0019*** (-3.49)	-0.0012** (-2.01)
CSR _t * CSC		-0.0023*** (-2.52)
CSC		0.0681** (2.05)
DUVOL _t	-0.2304*** (-19.38)	-0.2308*** (-19.43)
SIZE _t	0.0568** (2.12)	0.0565** (2.12)
LEV _t	-0.2251** (-2.49)	-0.2188** (-2.53)
ROE _t	-0.0586 (-0.42)	-0.0670 (-0.48)
DTURN _t	-0.0017 (-0.14)	-0.0017 (-0.14)
RET _t	6.6353*** (5.34)	6.5721*** (5.29)
MB _t	0.0262*** (4.01)	0.0268*** (4.09)
SIGMA _t	0.3601 (0.60)	0.3508 (0.59)
INSTI _t	0.0024*** (3.48)	0.0024*** (3.49)
FIR _t	-0.0005 (-0.31)	-0.0005 (-0.30)
OPAQUE _t	0.0215 (0.65)	0.0208 (0.63)
Constant	-1.8207*** (-3.13)	-1.8317*** (-3.17)
YEAR	Control	Control
IND	Control	Control
Adjusted R ²	0.1631	0.1639
F	87.04	77.95
N	9381	9381

***, **, * indicate the significance levels of 1%, 5%, and 10% respectively under the two-tailed t-test. The standard errors of all coefficients in the regression results have been cluster processed at the company level.

Table 7. The regression results of instrumental variables.

	Model 1	Model 2
CSRI _t	-0.0017** (-2.52)	-0.0008 (-1.10)
CSRI _t * CSC		-0.0029** (-2.47)

Continued

CSC		0.1089** (2.55)
NCSKEW _t	-0.2155*** (-18.38)	-0.2161*** (-18.42)
SIZE _t	0.1065*** (3.20)	0.1054*** (3.20)
LEV _t	-0.27644** (-2.44)	-0.2824** (-2.50)
ROE _t	-0.0763 (-0.44)	-0.0852 (-0.49)
DTURN _t	-0.0028 (-0.19)	-0.0024 (-0.16)
RET _t	8.7000*** (6.00)	8.6186*** (5.94)
MB _t	0.0372*** (4.93)	0.0380*** (5.04)
SIGMA _t	0.2696 (0.36)	0.2554 (0.34)
INSTI _t	0.0030*** (3.58)	0.0030*** (3.61)
FIR _t	-0.0020 (-1.01)	-0.0020 (-1.02)
OPAQUE _t	0.0422 (0.65)	0.0405 (0.94)
Constant	-3.0551*** (-4.21)	-3.0612*** (-4.26)
YEAR	Control	Control
IND	Control	Control
Adjusted R ²	0.1412	0.1423
F	1458.13	1471.20
N	9381	9381

***, **, * indicate the significance levels of 1%, 5%, and 10% respectively under the two-tailed t-test. The standard errors of all coefficients in the regression results have been cluster processed at the company level.

First, it has enriched relevant research in the field of social responsibility, making new attempts to test the moderating effect of the corporate social capital and exam the relationship between social responsibility and stock price crash risk. Second, through research, it is found that actively fulfilling social responsibilities and disclosing social responsibility information are also of great significance for reducing the risk of corporate stock price crash, which will help guide companies to pay more attention to social responsibility. Thirdly, from the perspective of the government, this article attempts to provide decision-making basis for government regulators. In consideration of maintaining the stability of the capital market, it is pointed out that the government should actively guide enterprises to

fulfill their social responsibilities.

The innovation of this article lies in the rare research on corporate responsibility and stock price crash risk. Compared with the existing research, this article makes a new attempt to discuss the relationship between social responsibility and the risk of stock price crash from the perspective of corporate social capital. This paper analyzes the impact of corporate social capital on the relationship between social responsibility and the risk of stock price crash, and provides empirical support for corporate social capital reserve.

6.2. Conclusions

This paper uses panel data from 9381 samples of companies listed on the main board of China's A-share market from 2013 to 2018 to conduct an empirical study. It explores the relationship between corporate social responsibility and stock price crash risk. It also adds corporate social capital as the moderating variable to exam the moderating effects on the above relationship. After the theoretical analysis and empirical analysis conducted in the previous article, this paper mainly draws the following research conclusions:

1) There is a negative correlation between corporate social responsibility and the stock price crash risk, which means social responsibility can reduce the possibility of corporate stock price crash.

2) Corporate social capital has a moderating effect on the relationship between the corporate social responsibility and stock price crash risk. When the company has social capital, the role of social responsibility in reducing the risk of stock market crashes will be strengthened. When the company does not have social capital, the role of social responsibility in reducing the risk of stock market crashes will be weakened.

In summary, the performance of corporate social responsibility is of great significance to the stability of stock prices, and social capital within the company will have a moderating effect in this relationship.

6.3. Suggestions

According to the above research conclusions, strengthening corporate social responsibility will be of great significance to the stability of corporate stock prices, which is also related to the stability of China's capital market. Therefore, the following suggestions are proposed for each market subject.

On the one hand, enterprises should strengthen their sense of social responsibility and actively fulfill their social responsibilities including shareholders, employees, consumers, the environment and the community. At present, with the continuous development of the economy and society, investors have put forward higher requirements for enterprises, and the goals of enterprises have also changed from maximizing the wealth of shareholders to maximizing the interests of the stakeholders. This requires companies to pay more attention to the fulfillment of social responsibility. From the empirical results, corporate social

responsibility will play an important role in the stability of the stock price, which is an important aspect of the stability of the capital market. Therefore, it is extremely necessary for enterprises to strengthen the disclosure of social responsibility information and actively fulfill their social responsibilities. Enterprise managers can take the following actions. First, improve the relevant rules and regulations of the enterprise to ensure that the operation of the enterprise is supervised and the information is more transparent. Second, coordinate the work of various departments, improve the transparency of the information of each department and improve the work of information disclosure. Third, improve the content of reports such as corporate social responsibility reports and audit reports.

On the other hand, enterprises should take the initiative to accumulate social capital. The empirical results in this article show that corporate social capital has a moderating effect on the negative correlation between social responsibility and stock price crash risk. Enterprise managers focus on the accumulation of social capital and expand social relationships, which will help strengthen social responsibility and reduce the effect of stock price crash risk. It plays an important role in stabilizing stock prices and building investor confidence. As a relational society in contemporary China, the accumulation of social relations will also affect the development of enterprises. Therefore, corporate managers should pay attention to establishing good relationships with the government, upstream and downstream enterprises and partners, make reasonable use of their social capital, and actively take social responsibility on the basis of this, and thus enhance corporate reputation.

Conflicts of Interest

The author declares no conflicts of interest regarding the publication of this paper.

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