



# Article Does Corporate Social Responsibility Impact on Corporate Risk-Taking? Evidence from Emerging Economy

Xiao Li<sup>1</sup>, Gang Liu<sup>2,\*</sup>, Qinghua Fu<sup>3,\*</sup>, Abdul Aziz Abdul Rahman<sup>4</sup>, Abdelrhman Meero<sup>4</sup>, and Muhammad Safdar Sial<sup>5</sup>

- <sup>1</sup> Systems and Industrial Engineering Technology Research Center, Zhongyuan University of Technology, Zhengzhou 451191, China; xiaoli78@aliyun.com
- <sup>2</sup> Hubei Enterprise Culture Research Center, Hubei University of Economics, Wuhan 430205, China
- <sup>3</sup> Department of Business Administration, Moutai Institute, Renhuai 564507, China
- <sup>4</sup> College of Business Administration, Kingdom University, Riffa 40434, Bahrain;
- a.abdulrahman@ku.edu.bh (A.A.A.R.); ar.meero@ku.edu.bh (A.M.)
   <sup>5</sup> Department of Management Sciences, COMSATS University Islamabad (CUI), Islamabad 44000, Pakistan; safdarsial@comsats.edu.pk
- \* Correspondence: lgxueshu@126.com (G.L.); 2016101050084@whu.edu.cn (Q.F.)

Abstract: This study analyzes the impact of corporate social responsibility (CSR) fulfillment on corporate risk-taking to assist stakeholders in identifying the "double-edged sword" role of CSR activities and provide empirical evidence for enterprises to properly carry out CSR activities. The results show that the self-interest instrumentalization of CSR activities intensifies agency conflict, and CSR fulfillment weakens risk-taking to a certain extent. When CSR fulfillment reaches a certain value, CSR activities can improve risk-taking. Then, CSR fulfillment and risk-taking show a U-shaped relationship. Further analysis shows that the impacts of CSR on debt financing and R&D input reflect the U-shaped effect pathways of CSR fulfillment on risk-taking. Finally, it is suggested that CSR activities should be avoided to become the "self-interest tool" of the management. The regulators guide enterprises to break through the inflection point of the U-shaped effect and consider more for the stakeholders' overall interests. Additionally, the regulators establish an effective compensation system to ensure that the enterprises with adequate CSR fulfillment obtain high-quality capital resources and promote the sustainable development of the capital market.

Keywords: CSR; risk-taking; U-shaped effect; debt financing; R&D input

# 1. Introduction

In recent years, with increasing economic uncertainty in the world [1], the issue of risk-taking has attracted extensive attention in the academic circle. Corporate risk-taking is the risk selection of managers in the decision-making process, reflecting managers' analysis and selection of uncertain investment projects and the tendency to invest large amounts of resources to grasp market opportunities and pursue high returns [2]. The enhancement of risk-taking is conducive to improving the capital allocation efficiency and corporate value [3,4], which is the driving force to promote the economic growth and enterprises' sustainable development [5]. However, the capital market is not perfect, and the adverse selection caused by information asymmetry will lead to agency problems, which reduce the level of risk-taking [6], thus damaging corporate value. If the level of risk-taking is too low, the agency problem is more obvious, and the overly conservative management mode brings fewer benefits to stakeholders.

Due to the importance of risk-taking, existing studies mostly focus on the impacts of corporate governance mechanisms and external environmental factors on risk-taking [5,6]. Additionally, some scholars have studied risk-taking from CSR fulfillment. For instance, Feng et al. [7] and Zhou et al. [8] supported the risk-reduction hypothesis, believing that



Citation: Li, X.; Liu, G.; Fu, Q.; Abdul Rahman, A.A.; Meero, A.; Sial, M.S. Does Corporate Social Responsibility Impact on Corporate Risk-Taking? Evidence from Emerging Economy. *Sustainability* **2022**, *14*, 531. https:// doi.org/10.3390/su14010531

Academic Editors: Helena Alves, M. Isabel Sánchez-Hernández, Luis I. Álvarez-González and Jose Luis Vazquez-Burguete

Received: 20 October 2021 Accepted: 17 December 2021 Published: 4 January 2022

**Publisher's Note:** MDPI stays neutral with regard to jurisdictional claims in published maps and institutional affiliations.



**Copyright:** © 2022 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (https:// creativecommons.org/licenses/by/ 4.0/). active CSR fulfillment is conducive to reducing risks. However, Wang et al. [9] believed that CSR fulfillment is positively correlated with risk-taking. The mandatory CSR information disclosure has formed the opposite hypotheses of "supervision effect" and "cover-up effect" [10]. From the "supervision effect", compulsory CSR information disclosure can improve risk-taking. According to the "cover-up effect", compulsory CSR disclosure cannot improve risk-taking. Obviously, existing studies have discussed the linear relationship between CSR and risk-taking more.

Social responsibility is an obligation that organizations should fulfill [11]. Bae et al. [12] believed that the central banks in developing countries need to consider promoting environmental finance and investment. However, in the absence of strict institutional constraints in emerging economies, enterprises' understanding of the degree of CSR fulfillment is greatly different from the expectations of policy makers, and the uncertainty of relevant institutions will also bring uncertain CSR fulfillment [13]. Corporate risk-taking is an important financial decision. Few studies have studied the non-linear impact of CSR fulfillment on risk-taking, which may be the gap of existing studies. To correctly understand the effect of CSR fulfillment, it is necessary to analyze the behavioral motivation of the management to engage in CSR fulfillment [14]. The types of CSR activities may vary in different settings [15]. If CSR fulfillment is characterized by an "instrumental attribute", CSR activities are likely not conducive to enhancing the capacity of risk-taking. On the contrary, if enterprises fulfill their social responsibilities based on the interests of stakeholders, CSR activities are likely to improve risk-taking. Then, at the present stage, how does CSR fulfillment affect risk-taking in emerging economies? In accordance with the realistic considerations, this study deeply analyzes the impact of CSR fulfillment on risk-taking. It is expected to assist stakeholders in identifying the "double-edged sword" role of CSR fulfillment and provide empirical evidence for the regulators to formulate policies, which also becomes the motivation of this study.

The possible contributions are as follows. First, existing studies mostly focus on the impacts of corporate governance mechanisms and the external environment on risk-taking [5,6]. In contrast, from the combination of agency perspective and stakeholder perspective, this study examines the impact of CSR fulfillment on risk-taking and enriches the literature on CSR fulfillment and risk-taking. Second, existing studies analyze the linear relationship between CSR fulfillment and risk-taking [8,16]. However, few studies have examined the nonlinear effect of CSR fulfillment on risk-taking. This study examines the U-shaped effect of CSR fulfillment on risk-taking, which helps understand the economic effect of CSR activities at this stage. Third, existing literature analyzed the effect of CSR fulfillment on risk-taking from the resource dependence perspective [9], Zhao et al. [17] and Wan-Hussin et al. [18] explained the effect of CSR fulfillment on risk-taking from the resource dependence perspective [9], Zhao et al. [17] and Wan-Hussin et al. [18] explained the effect of CSR fulfillment on risk-taking from the resource dependence perspective [9], Zhao et al. [17] and Wan-Hussin et al. [18] explained the effect of CSR fulfillment on risk-taking from emerging economies. This study explains the mechanism of CSR fulfillment affecting risk-taking from debt financing and R&D input to deepen the rational cognition of CSR fulfillment and risk-taking.

In accordance with Filatotchev et al. [19], completing studies on a solid grounding in contextualized management theories can provide novel opportunities to integrate different theoretical perspectives. Jamali et al. [20] translated the generalized logics relevant to the mainstream CSR understanding for applicability to developing countries. The Chinese government has shifted its development strategy from rapid growth to high-quality growth and sustainable development [21]. Obviously, China is in a typical emerging economy stage. This study is carried out according to the Chinese background. As China enters a new development stage, to achieve stable employment and improve people's livelihood, cultural prosperity, and sound ecology, while maintaining steady and healthy economic development, it is indispensable for enterprises to earnestly fulfill social responsibilities. The remaining parts are organized as follows. Section 2 provides a literature review, theoretical analysis, and research hypothesis. Section 3 presents the data source, variable definition and model setting. Section 4 discusses descriptive statistics and correlation.

Section 5 conducts model regression analysis. Section 6 discusses alleviating endogeneity. Section 7 carries out a Robustness test. Section 8 conducts further analysis. Section 9 draws conclusions and recommendations.

### 2. Literature Review, Theoretical Analysis and Research Hypothesis

## 2.1. CSR Fulfillment and Risk-Taking from an Agency Perspective

The agency theory holds that management may conflict with shareholders on risk appetite. When an enterprise is under pressure from legitimacy, the management seeks to maximize its own interests, while shareholders pursue the maximization of shareholder value [22]. For the Chinese capital market in economic transition, the manager market is far from perfect and mature, and the agency problem between managers and shareholders is serious [23]. Shareholders can spread risks through their ownership portfolio and improve risk-taking [3], while the management has a tendency to manipulate information disclosure by CSR activities [24]. In China, the supervision mechanism of information disclosure is not yet perfect, which makes it difficult to prevent management from manipulating information disclosure [25]. CSR information disclosure may have a "cover-up effect", which is used by the management as a means to gloss over negative news [26]. Low-quality CSR information disclosure cannot reduce information asymmetry, thus aggravating the principal-agent problem.

Corporate risk-taking is the price that enterprises are willing to pay in the business process to obtain higher returns. It reflects the comprehensive results formed by the decision makers' risk choices and preferences. Risk-taking is an important part of financial decisions, reflecting the compatibility between the management's decision and shareholders' interests [27]. Moderate risk-taking is conducive to achieving higher business performance, enhancing enterprises' competitiveness and operational advantages in their industries, as well as promoting social productivity and all-round economic development [28,29]. However, the risk aversion and the abandonment of investment projects with net present value greater than zero reflect higher agency costs [28,30]. According to agency theory, because of the separation of ownership and management, CSR activities may be an agency tool for management to avoid risk-taking. The way that managers' see the role of business in providing social welfare impacts their decisions to participate in CSR activities [31]. Professional managers may enhance their reputation by winning the praise of non-profit organizations and environmental activists through CSR activities based on a "self-serving" attitude [32,33]. When CSR fulfillment is more of a "self-interest tool" for the management than a "value tool" for shareholders [24], then CSR fulfillment will not be optimistic.

It is concluded that the existing literature has focused on CSR activities and risktaking from an agency perspective. However, few studies have studied the impact of CSR fulfillment on risk-taking from China being an emerging economy. At present, in the Chinese capital market, the CSR system is in the process of construction and standardization, enterprises are less aware of CSR activities, and CSR fulfillment is suspected of being a show. China is in a relatively early stage of CSR development, and Chinese companies' internal incentives to adopt CSR projects are low [34]. Although the enterprises issuing CSR reports is increasing year by year, most of them are involuntary under external pressure, and the majority of enterprises are still not active [24]. As a typical country in an emerging economy, the Chinese market is still in an underdeveloped stage, where various problems are constantly exposed and various elements are constantly improved. Improper CSR fulfillment is likely to lead to negative consequences. For instance, CSR fulfillment is regarded as a kind of "reputation insurance", which tends to cover the essence of higher litigation risk [35]. Some enterprises take CSR activities as a "fig leaf" to cover up their shortcomings in other aspects. Within these enterprises, the management takes CSR more as a tool for its own interests rather than for overall interests. When CSR is regarded as a "self-interest tool" rather than a "value tool", CSR fulfillment is often a mere formality [36]. Therefore, the self-interest instrumentalization of CSR fulfillment intensifies the agency

4 of 26

conflict between the management and shareholders, resulting in management having a serious tendency to avoid risks.

Based on the above analyses, the following research hypothesis is proposed.

## Hypothesis 1 H1. The self-interest instrumentalization of CSR fulfillment weakens risk-taking.

#### 2.2. CSR and Risk-Taking from Stakeholder and Agency Perspectives

The stakeholder theory emphasizes that reasonable decision-making on CSR is conducive to realizing the common development of the organization and society. CSR fulfillment is an important embodiment of stakeholder theory. The demands and pressure from stakeholders promote enterprises to fulfill social responsibilities [37]. For instance, foreign board members help companies to increase their accountability through improved CSR disclosure [38]. Based on the stakeholder theory, active CSR fulfillment sends a positive signal to external creditors, investors and regulators. Enterprises improve their public image by implementing positive environmental protection measures [39]. Climate investment can be an important mechanism to reduce environmental hazards and solve many social problems [12]. CSR fulfillment is conducive to improving corporate reputation. In the long run, it can enhance corporate visibility and competitiveness, thus increasing corporate performance and the ability to resist risks [40,41]. The input in CSR can be seen as a risk management strategy [42]. CSR fulfillment can be regarded as a "value tool", which responds to the stakeholders' value appeals, optimizes the social network, and forms the valuable intangible capital to win the stakeholders' long-term trust and enhance the ability of risk-taking.

Enterprises fulfill the bottom-line responsibilities of paying taxes to the government according to laws and operating in compliance with regulations [16], creating a good external market environment for risk-taking. Meanwhile, it is an important source for enterprises to realize sustainable value creation and obtain lasting competitive advantage by taking responsibilities for employees' salary, health, safety and career development [43], sending a positive signal to the labor market, attracting excellent talents to join the value creation process and enhancing the social network basis of risk-taking. CSR fulfillment for suppliers and customers is helpful to obtain raw materials' supply with competitive advantages, achieve stable operating income and thus enhance the material basis of risk-taking [16]. The timely debt repayment of and CSR information disclosure to financial institutions are conducive to obtaining more financing support to improve risk-taking [44,45]. Enterprises provide more employment opportunities for the community, actively carry out public welfare and charitable donations, which improve social reputation and create potential opportunities to enhance risk-taking [46]. Better CSR fulfillment is correlated with the lower deviation from optimal risk-taking [47]. CSR fulfillment is an important means to cultivate competitive advantage and create economic and social shared value.

However, in responding to social norms, abnormal behaviors and agency conflicts will occur due to information asymmetry between shareholders and managers [48]. The self-interested tendency will weaken risk-taking. Risk avoidance leads to a low efficiency of resource allocation [49], which is not conducive to achieving sustainable development and thus damages the stakeholders' legitimate rights and interests. Conversely, active risk-taking is an important motivation to enhance value and achieve sustainable development [50,51]. With global economic integration and increasing public awareness of product safety and ecological protection, CSR activities have become a pathway to maintain legitimacy and cope with challenges, as well as the key resources and core capabilities to realize differentiation strategies [52–54]. Under the stakeholders' strong appeals, enterprises actively carry out CSR activities to be recognized by the industry [55] and obtain strategic resources, including dynamic capability, reputation and brand value [56,57]. Active CSR activities are conducive to enhancing competitiveness and corporate vitality, thus enhancing risk-taking.

studies have examined the relationship between them from the combination of the perspectives of stakeholder and agency. A problematizing review enables researchers to rethink existing literature to generate better ways of learning specific phenomena [58]. From the combination of the agency perspective and the stakeholder perspective, it is speculated that CSR fulfillment and risk-taking present a U-shaped relationship. When the management takes CSR as a self-interested tool, CSR fulfillment is lower than a certain critical point; thus, risk-taking will be significantly weakened. On the contrary, when enterprises actively respond to the stakeholders' value demands, they earnestly fulfill social responsibilities beyond a certain point, and CSR fulfillment will significantly enhance risk-taking.

Based on the above analyses, the following research hypothesis is proposed.

#### **Hypothesis 2 H2.** CSR fulfillment has a U-shaped effect on corporate risk-taking.

#### 3. Data Source, Variable Definition, and Model Setting

## 3.1. Data Source

In 2012, the China Securities Regulatory Commission published the revised "Guidelines on Industry Classification of Listed Companies". For the convenience of industry classification, this study selects the listed companies publicly traded in Shanghai and Shenzhen stock markets from 2012 to 2019 as the sample. The data are from CSMAR Database and Wind Financial Terminal and were excluded according to the following standards: (1) Finance, insurance; (2) ST, \*ST class; (3) Observations with missing values. Finally, the financial data of 1423 companies are obtained as effective observations. Moreover, the continuous variables are winsorized by a two-way 1% quantile to avoid the adverse effects of abnormal observations.

## 3.2. Variable Definition

## 3.2.1. Explained Variable

Corporate risk-taking (CRT). The common indicators used to evaluate CRT include earnings volatility [51,59], volatility of stock returns [60], R&D expenditure and capital expenditure [47], and debt ratio [61]. The volatility of accounting returns can reflect the risk level of investment decisions of listed companies more accurately [62]. Therefore, in accordance with Boubakri et al. [51], Song et al. [61] and Zhou et al. [62], this study adopts the volatility of return on assets (ROA) to measure CRT. Specifically, CRT is measured by the standard deviation of ROA during each observation period.

First, ROA is adjusted by the industry-annual mean, and the annual return on assets without industry-annual heterogeneity (Adj\_ROA) is obtained, as shown in Equation (1). EARN stands for accounting income. This study adopts net income and profits before interest and tax, respectively, to measure EARN. ASSET represents the average total assets at the beginning and end of the period. The subscripts i, t and j represent the enterprise, year and industry, in turn; n represents the number of enterprises in industry j and year t, and k represents enterprise k in industry j.

$$Adj_ROA_{i,t} = \frac{EARN_{i,t}}{ASSET_{i,t}} - \frac{1}{n_{j,t}} \sum_{k=1}^{n_{j,t}} \frac{EARN_{k,t}}{ASSET_{k,t}}$$
(1)

Second, the observation period is set as 3 years (T = 3, period t to t + 2). The standard deviation of Adj\_ROA is calculated on a rolling basis, which is adopted as the measurement index of CRT, as shown in Equation (2). In the specific calculation, in accordance with EARN, representing Net income or Profits before interest and tax, CRT are expressed as CRTA and CRTB, in turn. The higher the value of CRTA or CRTB, the greater the volatility of return on assets, indicating the higher the level of risk-taking.

$$CRT_{i,t} = \sqrt{\frac{1}{T-1} \sum_{t=1}^{T} \left( Adj_ROA_{i,t} - \frac{1}{T} \sum_{t=1}^{T} Adj_ROA_{i,t} \right)^2}$$
(2)

## 3.2.2. Explanatory Variable

In 2010, Hexun.com (Hexun), Rankins (RKS) and other organizations released CSR scores for listed companies. Some studies adopt the score of disclosure quality on CSR reports released by RKS to evaluate CSR fulfillment [63,64]. As a matter of fact, this is an evaluation of the quality of information disclosure. Different from RKS's evaluation on the quality of CSR disclosure, with reference to Jia and Liu [65] and Feng et al. [7], this study adopts the CSR score published by Hexun to measure CSR fulfillment. HeXun's "CSR Assessment System for Listed Companies" includes the following dimensions: (1) Shareholder responsibility; (2) Employee responsibility; (3) Responsibility for the rights and interests of suppliers, customers and consumers; (4) Environmental responsibility; and (5) Social responsibility, with respective weights accounting for 30%, 15%, 15%, 20% and 20%. This evaluation system reflects CSR fulfillment in a more comprehensive and objective way and has been applied more and more widely in recent years [7,65].

#### 3.2.3. Control Variable

In accordance with Chen et al. [66], Dunbar et al. [67] and Wan-Hussin et al. [18], this study takes Asset-liability ratio, Total asset turnover, Sales growth rate, Net profit margin on sales, Company age, Ownership concentration, Board structure, Audit opinion, Enterprise scale, Executive compensation, Property attribute and Systematic risk as control variables to evaluate their possible impacts on risk-taking. Additionally, the annual effect and industry effect are controlled in the regression analyses. Table 1 shows the variable names and descriptions.

## 3.3. Model Setting

With reference to Chen et al. [66], Hasan et al. [68], Bae et al. [12] and Wan-Hussin et al. [18], the following panel regression models 1 and 2 are constructed to test hypotheses 1 and 2, respectively. In the control variables, LEV, TAT, GROWTH, NPM, AU-DIT and LnSALARY are taken as the first-order lags to alleviate endogeneity caused by reverse causality.

Model 1.

$$CRTA(CRTB)_{i,t} = \alpha_0 + \alpha_1 HXCSR_{i,t} + \alpha_2 LEV_{i,t-1} + \alpha_3 TAT_{i,t-1} + \alpha_4 GROWTH_{i,t-1} + \alpha_5 NPM_{i,t-1} + \alpha_6 AGE_{i,t} + \alpha_7 ShrZ_{i,t} + \alpha_8 BDS_{i,t} + \alpha_9 AUDIT_{i,t-1} + \alpha_{10} LnASSET_{i,t} + \alpha_{11} LnSALARY_{i,t-1} + \alpha_{12} STATE_{i,t} + \alpha_{13} BETA_{i,t} + \alpha_{14} \sum_{t} YEAR + \alpha_{15} \sum_{t} IND + \varepsilon_{i,t}$$

$$(3)$$

Model 2.

$$CRTA(CRTB)_{i,t} = \beta_0 + \beta_1 HXCSR_{i,t} + \beta_2 HXCSR_{i,t}^2 + \beta_3 LEV_{i,t-1} + \beta_4 TAT_{i,t-1} + \beta_5 GROWTH_{i,t-1} + \beta_6 NPM_{i,t-1} + \beta_7 AGE_{i,t} + \beta_8 ShrZ_{i,t} + \beta_9 BDS_{i,t} + \beta_{10} AUDIT_{i,t-1} + \beta_{11} LnASSET_{i,t} + \beta_{12} LnSALARY_{i,t-1} + \beta_{13} STATE_{i,t} + \beta_{14} BETA_{i,t} + \beta_{15} \sum_{t} YEAR + \beta_{16} \sum_{t} IND + \varepsilon_{i,t}$$

$$(4)$$

		-	
Nature	Symbol	Name	Calculation Method
Explained variable	CRTA	Corporate	The standard deviation of Adj_ROA based on Net income
	CRTB	risk-taking	The standard deviation of Adj_ROA based on Profit before interest and tax
Explanatory variable	HXCSR	CSR fulfillment	CSR score published by Hexun.com
	LEV	Asset-liability ratio	Total liabilities/total assets
	TAT	Total asset turnover	Current operating income/average total assets; the average total assets is the average of total assets at the beginning and end.
	GROWTH	Sales growth rate	(Current sales revenue—previous sales revenue)/previous sales revenue
	NPM	Net profit margin on sales	Net income/sales revenue
	AGE	Company age	The periods from the establishment of the company to the end of the observed year
	ShrZ	Ownership concentration	The shareholding ratio of the largest shareholder/that of the second largest shareholder
	BDS	Board structure	The proportion of independent directors on the board of directors
Control variable	AUDIT	Audit opinion	Dummy variable, 1 for the standard unreserved opinion; otherwise, 0.
	LnASSET	Enterprise scale	The natural logarithm of total assets at the beginning of the period
	LnSALARY	Executive compensation	The natural logarithm of the top three executive compensations
	STATE	Property attribute	Dummy variable, 1 for state-owned enterprises; otherwise, 0.
	BETA	Systematic risk	Based on Capital Asset Pricing Model, Beta coefficient is estimated from the data in the latest 2 years.
	YEAR	Year	Annual effect
	IND	Industry	Industry effect, based on the "Guidelines on Industry Classification of Listed Companies", a total of 16 industry dummy variables are set accordance to categories.
	ε		Composite error term

Table 1. Variable name and description.

#### 4. Descriptive Statistics and Correlation

## 4.1. Descriptive Statistics

Table 2 reports the descriptive statistics. For the explained variable, the standard deviation of CRTA (CRTB) is 3.665 (3.896), indicating that there is a larger difference in risk-taking. For the explanatory variable, the maximum (minimum) of HXCSR is 76.020 (-4.340), implying that there is a great difference in CSR fulfillment during the observation periods. On the whole, CSR fulfillment is not optimistic. Under the realistic background of economic transformation, some enterprises fulfill social responsibilities due to institutional pressure and legitimacy [69]. Such enterprises are only bystanders for CSR activities, while others have played a leading role, and their CSR fulfillment is much higher than the average. Therefore, it is of practical significance to explore the impact of CSR fulfillment on risk-taking.

Variable	Mean	Median	Maximum	Minimum	Deviation	Observations
CRTA	2.849	1.512	22.349	0.070	3.665	9957
CRTB	3.124	1.733	23.681	0.089	3.896	9957
HXCSR	25.561	22.350	76.020	-4.340	17.650	11,371
LEV	49.006	49.639	92.836	6.880	20.498	11,371
TAT	0.673	0.557	2.858	0.046	0.503	11,371
GROWTH	11.172	6.773	203.747	-59.407	34.254	11,371
NPM	6.843	5.369	74.509	-72.881	16.424	11,369
AGE	20.330	20.014	35.409	9.763	4.992	11,371
ShrZ	12.537	4.604	127.128	1.020	20.667	11,371
BDS	0.372	0.333	0.571	0.308	0.053	11,371
AUDIT	0.968	1.000	1.000	0.000	0.175	11,371
LnASSET	22.602	22.473	26.435	19.584	1.368	11,371
LnSALARY	5.221	5.195	7.267	3.469	0.725	11,371
STATE	0.556	1.000	1.000	0.000	0.497	11,371
BETA	1.060	1.085	2.252	-0.179	0.482	11,371

 Table 2. Descriptive statistics.

In the control variables, the median of GROWTH is 6.77%, lower than its mean of 11.17%, indicating that more enterprises' sales growth has not reached the average of the market, and their sales performance is worrying. The median (standard deviation) of LnASSET is 22.473 (1.368); the maxima (minima) of LEV and NPM are 92.84% (6.88%) and 74.51% (-72.88%); the mean (standard deviation) of TAT is 0.673 (0.503). There are significant differences in enterprises' size, debt repayment pressure, asset turnover and sales profit. The maximum (minimum) of AGE is 35.409 (9.763), in line with the status quo of the capital market. The mean of ShrZ is 12.537. On average, the largest shareholder has a higher shareholding ratio. The minimum of BDS is 0.308, which does not comply with the provision that "the board members of a listed company should have at least one-third of independent directors", issued by the China Securities Regulatory Commission. The mean (median) of BETA is 1.060 (1.085), implying that enterprises face a certain degree of non-dispersible systemic risk. Besides, the executive compensation shows a certain range of difference. The average proportion of state-owned enterprises is 55.61%. External auditors hold a positive attitude toward the legality and fairness of the vast majority of enterprises' financial reports, ensuring the reliability of the data used in this paper. In general, the variables have sufficient variability, and the sample has a good degree of differentiation, which provides a useful basis for regression.

### 4.2. Correlation

Table 3 reports the pairwise correlations. When HXCSR is negatively and significantly (p < 0.01) correlated with CRTA (-0.199) and CRTB (-0.184), suggesting that the management may regard CSR as a tool for self-interest, the "instrumental" rather than "value" characteristics of CSR fulfillment intensifies the agency problem, and weakens risk-taking. Hypothesis 1 is preliminarily verified. However, the U-shaped relationship between HXCSR and CRTA, CRTB needs to be verified by multiple regression.

In the control variables, TAT (-0.056), GROWTH (-0.048), NPM (-0.211), AUDIT (-0.286), LnASSET (-0.232), LnSALARY (-0.147) and STATE (-0.108) are negatively and significantly (p < 0.01) correlated with CRTA. LEV is negatively and significantly correlated with CRTA (-0.018, p < 0.10). AGE is positively and significantly correlated with CRTA (-0.019, p < 0.10). Meanwhile, LEV (-0.030), TAT (-0.052), GROWTH (-0.039), NPM (-0.182), AUDIT (-0.277), LnASSET (-0.233), LnSALARY (-0.137) and STATE (-0.115) are negatively and significantly (p < 0.01) correlated with CRTB. AGE is positively and significantly correlated with CRTB (0.026, p < 0.01). The correlations ensure the rationality of Models 1 and 2 above. In addition, the maximum correlation between the explanatory variable and control variables, and between the control variables is 0.472, existing between LnASSET and LnSALARY, less than the threshold of 0.800, indicating that there is no serious multicollinearity in models 1 and 2, which provides a reliable guarantee for regression.

 Table 3. Pairwise correlations.

Variable	CRTA	CRTB	HXCSR	LEV	TAT	GROWTH	NPM	AGE	ShrZ	BDS	AUDIT	LnASSET	LnSALARY	STATE	BETA
CRTA	1.000														
CRTB	0.987 ***	1.000													
HXCSR	-0.199 ***	-0.184 ***	1.000												
LEV	-0.018 *	-0.030 ***	-0.027 ***	1.000											
TAT	-0.056 ***	-0.052 ***	0.045 ***	0.067 ***	1.000										
GROWTH	-0.048 ***	-0.039 ***	0.076 ***	0.024 **	0.060 ***	1.000									
NPM	-0.211 ***	-0.182 ***	0.318 ***	-0.256 ***	-0.127 ***	0.148 ***	1.000								
AGE	0.019 *	0.026 ***	-0.081 ***	0.041 ***	-0.054 ***	0.026 ***	0.024 **	1.000							
ShrZ	-0.012	-0.010	0.017 *	0.071 ***	0.031 ***	-0.063 ***	-0.005	-0.093 ***	1.000						
BDS	0.015	0.013	0.004	0.025 ***	-0.023 **	0.005	-0.017 *	-0.026 ***	-0.005	1.000					
AUDIT	-0.286 ***	-0.277 ***	0.143 ***	-0.105 ***	0.039 ***	0.024 ***	0.172 ***	-0.065 ***	0.019 **	0.004	1.000				
LnASSET	-0.232 ***	-0.233 ***	0.274 ***	0.435 ***	0.007	0.038 ***	0.092 ***	0.052 ***	0.011	0.060 ***	0.112 ***	1.000			
LnSALARY	-0.147 ***	-0.137 ***	0.240 ***	0.067 ***	0.094 ***	0.059 ***	0.139 ***	0.217 ***	-0.119 ***	0.021 **	0.091 ***	0.472 ***	1.000		
STATE	-0.108 ***	-0.115 ***	0.064 ***	0.172 ***	0.054 ***	-0.108 ***	-0.026 ***	-0.056 ***	0.207 ***	-0.023 **	0.060 ***	0.230 ***	-0.069 ***	1.000	
BETA	-0.001	-0.003	0.041 ***	0.076 ***	-0.031 ***	-0.019 **	-0.018 *	-0.000	0.054 ***	-0.004	-0.003	0.054 ***	0.005	0.067 ***	1.000

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%.

#### 5. Model Regression Analysis

Since the other factors affecting the explained variables are not controlled, the descriptive statistics and correlations are only the preliminary analysis results. The data type used in this study is panel data. The regression for panel data mainly includes the mixed OLS method, fixed effects model and random effects model. The fixed effects regression alleviates the endogeneity caused by the missing variables that do not change with time and have a certain degree of information advantage. The fixed effects model is adopted for regression.

## 5.1. Analyses of Model 1's Regression Results

In Table 4, columns 1 and 2 report the regression results for model 1. The coefficients on HXCSR are negative and significant (-0.019, p < 0.01; -0.017, p < 0.01). From the agency perspective, CSR fulfillment reflects the self-interest of the management to a certain extent. Such self-interest means that the management regards CSR fulfillment more as a tool to seek its own interests rather than for shareholder value or corporate interests. The self-interest instrumentalization of CSR fulfillment intensifies the principal-agent conflict between the management and owners, leading to more serious risk avoidance of agents and then weakening the risk-taking capacity of enterprises.

Table 4. Regression results for models 1 and 2.

	Moo	lel 1	Model 2		
17 11.	(1)	(2)	(3)	(4)	
Variable	CRTA	CRTB	CRTA	CRTB	
	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	
Intercept	5.876 (7.607)	9.398 (7.763)	8.182 (7.185)	11.572 (7.391)	
HXCSR	-0.019 *** (0.003)	-0.017 *** (0.003)	-0.117 *** (0.010)	-0.110 *** (0.010)	
HXCSR <sup>2</sup>			0.001 *** (0.0001)	0.001 *** (0.0001)	
L.LEV	0.004 (0.007)	0.003 (0.008)	0.004 (0.007)	0.002 (0.007)	
L.TAT	-0.258(0.288)	-0.355(0.304)	-0.187(0.281)	-0.288(0.297)	
L.GROWTH	-0.003 * (0.002)	-0.002(0.002)	-0.002(0.001)	-0.002(0.002)	
L.NPM	-0.004(0.005)	-0.004(0.005)	-0.005(0.005)	-0.005(0.005)	
AGE	-0.533 * (0.280)	-0.528 * (0.285)	-0.564 ** (0.262)	-0.557 ** (0.269)	
ShrZ	0.006 * (0.003)	0.007 * (0.003)	0.005 (0.003)	0.006 * (0.003)	
BDS	1.386 (1.441)	1.203 (1.516)	1.062 (1.387)	0.897 (1.465)	
L.AUDIT	-1.426 *** (0.455)	-1.587 *** (0.486)	-1.293 *** (0.458)	-1.462 *** (0.489)	
LnASSET	0.436 ** (0.178)	0.293 (0.189)	0.420 ** (0.172)	0.277 (0.183)	
L.LnSALARY	-0.056(0.161)	-0.020 (0.169)	-0.034(0.158)	0.0002 (0.166)	
STATE	1.069 ** (0.523)	1.022 * (0.546)	0.931 * (0.495)	0.892 * (0.522)	
BETA	0.207 ** (0.103)	0.207 * (0.108)	0.229 ** (0.102)	0.227 ** (0.107)	
YEAR/IND	YES	YES	YES	YES	
# of obs.	8532	8532	8532	8532	
Within_R <sup>2</sup>	0.059	0.052	0.088	0.075	
F_Value	12.59 ***	10.97 ***	18.91 ***	15.86 ***	

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Robust standard errors in brackets are clustered at the corporate level.

In the control variables, the coefficients on ShrZ are positive and significant (0.006, p < 0.10; 0.007, p < 0.10). The largest shareholder has a higher shareholding ratio, and its individual interests tend to be consistent with corporate overall interests. The governance effect of major shareholders enhances enterprises' risk-taking capacity. And those on STATE are positive and significant and (1.069, p < 0.05; 1.022, p < 0.10). In column 1, the coefficient on LnASSET is positive and significant (0.436, p < 0.05). State-owned enterprises tend to be

larger in size. As shown in Table 3, STATE is positively and significantly correlated with LnASSET (0.230, p < 0.01). Compared with small-scale enterprises, large-scale enterprises have a better reputation, are able to cope with negative shocks and have a higher risk-taking capacity. The coefficients on BETA are positive and significant (0.207, p < 0.05; 0.207, p < 0.10). The system risk cannot be dispersed. Excessive non-dispersed risk is likely to aggravate corporate risk. However, those on AGE are negative and significant (-0.533, p < 0.10; -0.528, p < 0.10), suggesting that the longer an enterprise has been established, the less active it is to take risks when moving from maturity to the decline stage. Besides, those on L.AUDIT are negative and significant (-1.426, p < 0.01; -1.587, p < 0.01). In column 1, the coefficient on L.GROWTH is negative and significant (-0.003, p < 0.10). The good development trend and auditors' positive evaluation alleviate risk pressure. The coefficients on the remaining control variables are not statistically significant.

#### 5.2. Analyses of Model 2's Regression Results

In Table 4, columns 3 and 4 report the regression results for model 2. The coefficients on HXCSR are negative and significant (-0.117, p < 0.01; -0.110, p < 0.01), and those on HXCSR<sup>2</sup> are positive and significant (0.001, p < 0.01; 0.001, p < 0.01), indicating that a U-shaped relationship presents between CSR fulfillment and risk-taking. The effect of CSR fulfillment on risk-taking has an inflection point. Only when CSR fulfillment reaches a certain level can enterprises gain multiple stakeholders' continuous trust, accumulate intangible social network resources and thus improve their own risk-taking. Hypothesis 2 above can be verified.

With reference to Haans et al. [70], the existence of the U-shaped effect can be examined. First, the coefficients on HXCSR<sup>2</sup> are positive and significant (p < 0.01). Secondly, for CRTA and CRTB, respectively, the two ends of the curve slope within the variable range are negative and positive (-0.129 and 0.084, -0.121 and 0.080). Third, for CRTA and CRTB, the inflection points of the U-shaped curve are 44.214 and 43.956 between the minimum (-4.340) and maximum (76.020) of HXCSR. Additionally, the three steps verify the U-shaped effect of CSR fulfillment on risk-taking. Figures 1 and 2 show this U-shaped relationship. CSR fulfillment is a "double-edged sword". If the management takes seriously stakeholders' demands, CSR fulfillment can be a "brand resource", which helps to enhance risk-taking. On the contrary, if CSR fulfillment is used "instrumentally", it generates a negative effect on risk-taking.



Figure 1. HXCSR and CRTA.



Figure 2. HXCSR and CRTB.

In the control variables, the coefficients on AGE, ShrZ, L.AUDIT, LNASSET, STATE and BETA are statistically significant, and the conclusions on them are consistent with those from model 1. The coefficients on the remaining control variables are not statistically significant.

## 6. Robustness Test

## 6.1. Two Stage Least Square (2SLS) Method

Due to the complexity of risk-taking, it is difficult to involve all influencing factors in the model setting. The omission of variables is a common and important reason for endogeneity. In accounting research, the instrumental variable method can alleviate the endogeneity caused by missing variables [71]. An appropriate instrumental variable is highly correlated with the possible endogenous variable, and not with the explained variable. With reference to Cai et al. [39] and Bouslah et al. [72], the annual mean of CSR fulfillment within the same region (CSR\_Region) and that within the same industry (CSR\_ind) are adopted as the instrumental variables. For enterprises that are geographically close or within the same industry, the competitive, political and social environments are similar, and CSR decisions influence each other. Within the same region or the same industry, CSR\_Region and CSR\_ind are related to individual CSR fulfillment but are less affected by individual risk management decisions. Therefore, CSR\_Region and CSR\_ind are exogenous to a single enterprise and can be the instrumental variables for CSR fulfillment. Besides, CSR fulfillment is related to its first-order lag (L.HXCSR). L.HXCSR has already occurred and belongs to a pre-determined variable, which may be unrelated to the current disturbance term. L.HXCSR is exogenous and can be an instrumental variable for HXCSR [7]. Then, with reference to Bae et al. [12], the 2SLS method is adopted for regression.

As shown in Table 5, in the first-stage regression, for model 1, F\_statistic is statistically significant (136.67, p < 0.01), and the coefficients on CSR\_ind, CSR\_Region and L.HXCSR are statistically significant (p < 0.01). For model 2, F\_statistics are statistically significant (130.65, p < 0.01; 81.87, p < 0.01). In column 2, the coefficients on CSR\_ind, CSR\_Region<sup>2</sup> and L.HXCSR are statistically significant (p < 0.05, or p < 0.01); in column 3, those on CSR\_ind, CSR\_Region, CSR\_Region<sup>2</sup> and L.HXCSR are statistically significant (p < 0.05, or p < 0.01). In general, the results show that the selection of instrumental variables is appropriate.

	Model 1	Model 2			
Variable	(1)	(2)	(3)		
	HXCSR	HXCSR	HXCSR <sup>2</sup>		
	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)		
CSR_ind	0.848 *** (0.077)	1.111 *** (0.230)	36.035 * (18.429)		
CSR_ind <sup>2</sup>		-0.004(0.004)	0.439 (0.300)		
CSR_Region	0.510 *** (0.045)	0.142 (0.165)	-27.125 ** (12.605)		
CSR_Region <sup>2</sup>		0.006 ** (0.003)	1.069 *** (0.221)		
L.HXCSR	0.398 *** (0.011)	0.397 *** (0.011)	30.272 *** (0.955)		
# of obs.	8532	8532	8532		
Adj_R <sup>2</sup>	0.424	0.424	0.397		
F_Value	136.67 ***	130.65 ***	81.87 ***		

Table 5. Regression results on instrumental variables in the 1st stage.

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Robust standard errors in brackets are clustered at the corporate level.

Table 6 reports the second-stage results. Wald\_chi<sup>2</sup> are statistically significant (p < 0.01), implying that the models are robust on the whole. In model 1, the coefficients on HXCSR are negative and significant (-0.020, p < 0.01; -0.020, p < 0.01), suggesting that when CSR fulfillment is regarded as a "self-interest tool", it will weaken risk-taking. Hypothesis 1 can be verified again. In model 2, the coefficients on HXCSR are negative and significant (-0.215, p < 0.01; -0.216, p < 0.01); those on HXCSR<sup>2</sup> are positive and significant (0.003, p < 0.01; 0.003, p < 0.01), again, indicating that there is a U-shaped relationship between CSR fulfillment and risk-taking. When enterprises fulfill social responsibilities to the government, employees, suppliers, customers, financial institutions and communities and exceed a certain threshold, CSR fulfillment can have a promoting effect on risk-taking. Hypothesis 2 can be verified again.

For the control variables, in model 1, the conclusions on L.AUDIT and BETA are consistent with those from Table 4. However, the coefficients on AGE are positive and significant (0.023, p < 0.05; 0.028, p < 0.01), different from those from Table 4. A possible reason is that when enterprises are in the growth stage, they have a strong willingness to take risks. The coefficients on LnASSET are negative and significant (-0.410, p < 0.01;-0.459, p < 0.01), as are those on STATE (-0.622, p < 0.01; -0.685, p < 0.01), which are inconsistent with those from Table 4. Perhaps, compared with small-scale enterprises, some large-scale and state-owned enterprises are more inclined to avoid risks [61]. In state-owned enterprises, the excessive separation of residual claims and operational controls results in the lack of a property incentive mechanism for the strategic makers [73], which makes the operational decisions and behaviors tend to be short-term and weakens the enthusiasm of risk-taking. Besides, the coefficients on L.LEV are positive and significant (0.008, p < 0.01; (0.007, p < 0.05), as are those on BDS (1.513, p < 0.05; 1.619, p < 0.05). Creditors' governance and independent directors' supervision improve risk-taking. The coefficients on L.TAT are negative and significant (-0.229, p < 0.05; -0.219, p < 0.05), as are those on L.NPM (-0.015, p < 0.01; -0.013, p < 0.01). Good asset turnover and sales profit are beneficial to alleviate operational risk pressure. In model 2, the conclusions on AGE, L.AUDIT, LnASSET, STATE and BETA are consistent with those from model 1 in Table 6.

	Мос	lel 1	Model 2		
Variable	CRTA	CRTB	CRTA	CRTB	
	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	
Intercept	14.968 *** (1.027)	16.019 *** (1.101)	15.413 *** (1.031)	16.466 *** (1.109)	
HXCSR	-0.020 *** (0.005)	-0.020 *** (0.005)	-0.215 *** (0.060)	-0.216 *** (0.064)	
HXCSR <sup>2</sup>			0.003 *** (0.001)	0.003 *** (0.001)	
L.LEV	0.008 *** (0.003)	0.007 ** (0.003)	0.001 (0.003)	-0.001(0.004)	
L.TAT	-0.229 ** (0.093)	-0.219 ** (0.099)	-0.040 (0.110)	-0.030(0.117)	
L.GROWTH	-0.001 (0.001)	-0.001(0.002)	0.001 (0.002)	0.001 (0.002)	
L.NPM	-0.015 *** (0.004)	-0.013 *** (0.004)	-0.007(0.005)	-0.005(0.005)	
AGE	0.023 ** (0.009)	0.028 *** (0.010)	0.024 *** (0.009)	0.029 *** (0.010)	
ShrZ	0.002 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 (0.002)	
BDS	1.513 ** (0.721)	1.619 ** (0.772)	0.863 (0.732)	0.968 (0.788)	
L.AUDIT	-3.516 *** (0.417)	-3.785 *** (0.444)	-3.054 *** (0.434)	-3.323 *** (0.465)	
LnASSET	-0.410 *** (0.044)	-0.459 *** (0.047)	-0.347 *** (0.048)	-0.396 *** (0.051)	
L.LnSALARY	-0.068(0.075)	-0.028(0.081)	0.069 (0.084)	0.109 (0.091)	
STATE	-0.622 *** (0.082)	-0.685 *** (0.088)	-0.660 *** (0.081)	-0.723 *** (0.088)	
BETA	0.181 * (0.099)	0.174 (0.106)	0.181 * (0.097)	0.174 * (0.104)	
YEAR/IND	YES	YES	YES	YES	
# of obs.	8532	8532	8532	8532	
Adj_R <sup>2</sup>	0.148	0.139	0.186	0.167	
Wald_chi <sup>2</sup>	1029.42 ***	989.13 ***	1067.62 ***	1019.22 ***	

Table 6. The results of the 2SLS method in the 2nd stage.

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Robust standard errors in brackets are clustered at the corporate level.

## 6.2. Generalized Method of Moment (GMM)

If the disturbance term of regression has heteroscedasticity or autocorrelation, then the GMM method is more effective than the 2SLS method. Therefore, referring to Thuy et al. [74], this study conducts GMM regression to overcome the heteroscedasticity and autocorrelation existing in panel data. In the GMM regression, the same instrumental variables as the 2SLS method are adopted. The tests of overidentifying restriction show that Hansen's J- $\chi^2$  statistics are 1.669 (p = 0.434) and 1.741 (p = 0.419), 6.673 (p = 0.083) and 5.5725 (p = 0.134), respectively. Thus, all instrumental variables can be considered exogenous at 5% significance. Table 7 reports the results of GMM regression.

In models 1 and 2, Wald\_chi<sup>2</sup> are statistically significant (p < 0.01), implying that the models are robust on the whole. Additionally, the coefficients on HXCSR are negative and significant (-0.020, p < 0.01; -0.020, p < 0.01; -0.224, p < 0.01; -0.221, p < 0.01). In model 2, the coefficients on HXCSR<sup>2</sup> are positive and significant (0.003, p < 0.01; 0.003, p < 0.01). In general, the above results tend to be consistent with those from Table 6 above. Besides, in model 2, when the explained variable is CRTB, the coefficient on ShrZ is positive and significant (0.003, p < 0.10), tending to be consistent with that from Table 4 above. The conclusions on the remaining control variables are consistent with those from Table 6 above.

	Мос	del 1	Model 2		
Variable	CRTA	CRTB	CRTA	CRTB	
	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	
Intercept	14.879 *** (1.024)	15.936 *** (1.099)	15.433 *** (1.029)	16.479 *** (1.107)	
HXCSR	-0.020 *** (0.005)	-0.020 *** (0.005)	-0.224 *** (0.061)	-0.221 *** (0.064)	
HXCSR <sup>2</sup>			0.003 *** (0.001)	0.003 *** (0.001)	
L.LEV	0.008 *** (0.003)	0.007 ** (0.003)	0.001 (0.003)	-0.001(0.004)	
L.TAT	-0.241 *** (0.092)	-0.232 ** (0.098)	-0.043 (0.110)	-0.036 (0.117)	
L.GROWTH	-0.001 (0.001)	-0.001(0.002)	0.001 (0.002)	0.001 (0.002)	
L.NPM	-0.016 *** (0.004)	-0.014 *** (0.004)	-0.007(0.005)	-0.006(0.005)	
AGE	0.023 ** (0.009)	0.028 *** (0.010)	0.024 *** (0.009)	0.028 *** (0.010)	
ShrZ	0.002 (0.002)	0.003 (0.002)	0.003 (0.002)	0.003 * (0.002)	
BDS	1.578 ** (0.719)	1.664 ** (0.771)	0.825 (0.731)	0.918 (0.788)	
L.AUDIT	-3.524 *** (0.416)	-3.787 *** (0.444)	-3.011 *** (0.434)	-3.286 *** (0.465)	
L.LnASSET	-0.406 *** (0.044)	-0.455 *** (0.047)	-0.342 *** (0.047)	-0.392 *** (0.051)	
L.LnSALARY	-0.065(0.075)	-0.024(0.081)	0.071 (0.084)	0.111 (0.091)	
STATE	-0.619 *** (0.082)	-0.684 *** (0.088)	-0.656 *** (0.081)	-0.721 *** (0.088)	
BETA	0.175 * (0.099)	0.168 (0.106)	0.161 * (0.097)	0.153 (0.104)	
YEAR/IND	YES	YES	YES	YES	
# of obs.	8532	8532	8532	8532	
Adj_R <sup>2</sup>	0.148	0.139	0.184	0.166	
Wald_chi <sup>2</sup>	1034.01 ***	993.49 ***	1069.19 ***	1020.72 ***	

Table 7. GMM regression results.

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Robust standard errors in brackets are clustered at the corporate level.

#### 7. Robustness Test

#### 7.1. Analyses Based on the Propensity Score Matching (PSM) Sample

CSR fulfillment may be inherent in the environment and corporate's own characteristics. For enterprises with good CSR fulfillment, the characteristic variables may be significantly different from those with poor CSR fulfillment. If the characteristic variables' differences affect risk-taking, there may be interference factors between CSR fulfillment and risk-taking based on the full sample. Therefore, with reference to Abadie and Imbens [75] and Feng et al. [7], the PSM sample is adopted for regression. A dummy variable, DHXCSR, is set as the explained variable in Logit regression (model 3). When HXCSR is greater than its corresponding industry-annual median, this study believes that CSR fulfillment is better, and DHXCSR equals 1; otherwise, it is 0. Meanwile, LEV, TAT, GROWTH, NPM, AGE, ShrZ, IN\_DIRECTOR, AUDIT, LnASSET, LnSALARY, STATE, BETA, YEAR and IND are taken as covariables to screen out the treatment group and control group. Different from the matching of a single index, PSM reduces multiple features into a "propensity score" to promote the overall matching of multiple features. Then, based on the one-to-one principle of nearest neighbor matching, 4228 pairs of paired observations are obtained, which are the same or similar in terms of main characteristic variables, to reduce the influence of possible interference factors on the conclusions. Table 8 presents the results based on the PSM sample.

	Мос	lel 1	Model 2		
Variable	CRTA	CRTB	CRTA	CRTB	
	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	
Intercept	3.807 (6.960)	7.347 (7.191)	6.041 (6.458)	9.457 (6.754)	
HXCSR	-0.018 *** (0.003)	-0.016 *** (0.003)	-0.118 *** (0.010)	-0.111 *** (0.010)	
HXCSR <sup>2</sup>			0.001 *** (0.0001)	0.001 *** (0.0001)	
L.LEV	0.002 (0.007)	0.001 (0.008)	0.001 (0.007)	-0.001(0.008)	
L.TAT	-0.146(0.284)	-0.233 (0.300)	-0.084(0.276)	-0.175(0.292)	
L.GROWTH	-0.003(0.002)	-0.002(0.002)	-0.002(0.002)	-0.002(0.002)	
L.NPM	0.006 (0.005)	0.008 (0.005)	0.006 (0.005)	0.007 (0.005)	
AGE	-0.400(0.250)	-0.397 (0.260)	-0.427 * (0.228)	-0.422 * (0.241)	
ShrZ	0.006 ** (0.003)	0.007 ** (0.003)	0.006 * (0.003)	0.006 * (0.003)	
BDS	1.237 (1.455)	0.999 (1.516)	0.918 (1.400)	0.698 (1.465)	
L.AUDIT	-0.925 ** (0.436)	-1.050 ** (0.472)	-0.766 * (0.436)	-0.900 * (0.473)	
LnASSET	0.375 ** (0.175)	0.232 (0.185)	0.359 ** (0.169)	0.217 (0.179)	
L.LnSALARY	-0.067(0.162)	-0.033 (0.169)	-0.050(0.159)	-0.017 (0.167)	
STATE	0.834 * (0.482)	0.763 (0.496)	0.680 (0.452)	0.617 (0.469)	
BETA	0.247 ** (0.102)	0.255 ** (0.106)	0.266 *** (0.100)	0.273 *** (0.105)	
YEAR/IND	YES	YES	YES	YES	
# of obs.	8398	8398	8398	8398	
Within_R <sup>2</sup>	0.050	0.043	0.081	0.068	
F_Value	10.38 ***	8.87 ***	17.03 ***	14.05 ***	

Table 8. Regression results based on PSM sample.

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Robust standard errors in brackets are clustered at the corporate level.

Model 3.

 $DHXCSR_{i,t} = \lambda_0 + \lambda_1 LEV_{i,t-1} + \lambda_2 TAT_{i,t-1} + \lambda_3 GROWTH_{i,t-1} + \lambda_4 NPM_{i,t-1} + \lambda_5 AGE_{i,t} + \lambda_5 AGE_{i,t$ 

 $\lambda_{6} Shr Z_{i,t} + \lambda_{7} BDS_{i,t} + \lambda_{8} AUDIT_{i,t-1} + \lambda_{9} LnASSET_{i,t} + \lambda_{10} LnSALARY_{i,t-1} + \lambda_{11} STATE_{i,t} + \lambda_{12} BETA_{i,t} + \lambda_{13} \sum_{t} YEAR + \lambda_{14} \sum_{t} IND + \varepsilon_{i,t}$ (5)

In model 1, the coefficients on HXCSR are negative and significant (-0.018, p < 0.01; -0.016, p < 0.01), implying that if CSR fulfillment is used "instrumentally" by the management, the agency problem weakens risk-taking. In model 2, the coefficients on HXCSR are negative and significant (-0.118, p < 0.01; -0.111, p < 0.01); and those on HXCSR<sup>2</sup> are positive and significant (0.001, p < 0.01; 0.001, p < 0.01), indicating that CSR fulfillment takes a U-shaped effect on risk-taking. Only when CSR fulfillment reaches a specific inflection point can it have a promoting effect on risk-taking. For CRTA and CRTB, the inflection points are 43.983 and 43.686, respectively. Hypotheses 1 and 2 are verified again.

For the control variables, in model 1, the conclusions on ShrZ, L.AUDIT, LNASSET, STATE and BETA are consistent with those from Table 4. In model 2, the conclusions on AGE, ShrZ, L.AUDIT, LNASSET and BETA are consistent with those from Table 4 above.

#### 7.2. Re-Estimating Explained Variables

7.2.1. Measuring Risk-Taking in Range Form

In the preceding analyses, the standard deviation of Adj\_ROA is adopted to measure risk-taking. Rahman et al. [76] confirmed that companies at distress risk showed greater declines in ROA. Further, with reference to Faccio et al. [49], Song et al. [61] and He et al. [77], this study takes every three years (T = 3, period t to t + 2) as an observation period and

calculates the range of Adj\_ROA on a rolling basis, expressed as MCRT. Equation (6) shows the calculation method. In the calculation, in accordance with EARN, representing net income or profit before interest and tax, MCRT is expressed as MCRTA or MCRTB, respectively. The greater the value of MCRTA or MCRTB, the higher the level of risk-taking. Then, the explained variables in models 1 and 2 are replaced with MCRTA and MCRTB. Table 9 presents the regression results.

$$MCRT_{i,t} = Max(Adj_ROA_{i,t}) - Min(Adj_ROA_{i,t})$$
(6)

Table 9. Regression results based on MCRT.

Model 1		lel 1	Model 2			
Variable	MCRTA	MCRTB	MCRTA	MCRTB		
	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)		
Intercept	-7.654 (8.095)	-3.061 (8.432)	-4.506 (7.715)	-0.108 (8.107)		
HXCSR	-0.036 *** (0.005)	-0.034 *** (0.005)	-0.161 *** (0.016)	-0.151 *** (0.016)		
HXCSR <sup>2</sup>			0.002 *** (0.0002)	0.002 *** (0.0002)		
L.LEV	0.013 (0.011)	0.013 (0.011)	0.012 (0.010)	0.012 (0.011)		
L.TAT	-0.618 (0.382)	-0.809 ** (0.410)	-0.512 (0.373)	-0.710 * (0.402)		
L.GROWTH	-0.002(0.002)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)		
L.NPM	0.005 (0.007)	0.005 (0.007)	0.004 (0.007)	0.003 (0.008)		
AGE	-0.330(0.245)	-0.297 (0.255)	-0.366 (0.231)	-0.331 (0.242)		
ShrZ	0.010 ** (0.005)	0.011 ** (0.005)	0.009 * (0.005)	0.010 * (0.005)		
BDS	1.395 (2.189)	1.156 (2.323)	1.016 (2.140)	0.801 (2.278)		
L.AUDIT	-1.300 * (0.670)	-1.475 ** (0.705)	-1.128 * (0.668)	-1.314 * (0.705)		
LnASSET	0.832 *** (0.253)	0.603 ** (0.269)	0.798 *** (0.246)	0.571 ** (0.263)		
L.LnSALARY	-0.552 ** (0.213)	-0.531 ** (0.226)	-0.516 ** (0.211)	-0.496 ** (0.224)		
STATE	1.696 ** (0.731)	1.730 ** (0.772)	1.563 ** (0.704)	1.606 ** (0.748)		
BETA	0.067 (0.153)	0.055 (0.160)	0.071 (0.152)	0.058 (0.159)		
YEAR/IND	YES	YES	YES	YES		
# of obs.	9946	9946	9946	9946		
Within_R <sup>2</sup>	0.193	0.198	0.208	0.210		
F_Value	60.05 ***	62.39 ***	55.89 ***	58.53 ***		

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Robust standard errors in brackets are clustered at the corporate level.

In models 1 and 2, the coefficients on HXCSR are negative and significant (-0.036, p < 0.01; -0.034, p < 0.01; -0.161, p < 0.01; -0.151, p < 0.01). At the present stage, CSR fulfillment reflects the self-interest of the management to a certain extent. In model 2, the coefficients on HXCSR<sup>2</sup> are positive and significant (0.002, p < 0.01; 0.002, p < 0.01), again indicating the U-shaped effect of CSR fulfillment on risk-taking.

For the control variables, the conclusions on ShrZ, L.AUDIT, LnASSET and STATE are consistent with those from Table 4. Besides, the coefficients on L.LnSALARY are negative and significant (-0.552, p < 0.05; -0.531, p < 0.05; -0.516, p < 0.05; -0.496, p < 0.05), implying that the compensation incentive stimulates senior executives' work enthusiasm, then alleviates the pressure of operation risks.

#### 7.2.2. Measuring CRT with the Volatility of Stock Returns

Corporate risk is not only reflected in the fluctuation of accounting income but is also reflected in the field of the capital market. With reference to Song et al. [61], the volatility of individual stock returns (RETURN) is adopted to measure risk-taking. RETURN is adjusted by the industry-annual mean, and the individual stock returns without industry-annual heterogeneity are obtained, expressed as Adj\_RETURN, as shown in Equation (7). On a

rolling basis, the standard deviation of Adj\_RETURN is calculated and expressed as SCRT, as shown in Equation (8).

$$Adj_RETURN_{i,t} = RETURN_{i,t} - \frac{1}{n_{j,t}} \sum_{k=1}^{n_{j,t}} RETURN_{k,t}$$
(7)

$$SCRT_{i,t} = \sqrt{\frac{1}{T-1} \sum_{t=1}^{T} \left( Adj_RETURN_{i,t} - \frac{1}{T} \sum_{t=1}^{T} Adj_RETURN_{i,t} \right)^2}$$
(8)

In the calculation, the observation period is set as 3 years (T = 3, period *t* to t + 2), based on the RETURN with reinvested cash dividends (RETURNA), and that without reinvested cash dividends (RETURNB), SCRT is expressed as SCRTA3, and SCRTB3, in turn. Moreover, the observation period is adjusted to 5 years (T = 5, period *t* to t + 4), the standard deviation of Adj\_RETURN is calculated again, SCRT is expressed as SCRTA5, and SCRTB5, respectively.

Table 10 reports the results for model 2 when the explained variables are SCRTA3, SCRTB3, SCRTA5 and SCRTB5, in turn. From columns 1 to 4, the coefficients on HXCSR are negative and significant (-0.014, p < 0.05; -0.015, p < 0.05; -0.013, p < 0.01; -0.014, p < 0.01), and those on HXCSR<sup>2</sup> are positive and significant (0.002, p < 0.05; 0.002, p < 0.05; 0.002, p < 0.01). When risk-taking is measured with the volatility of stock returns, CSR fulfillment still presents a U-shaped effect on risk-taking.

Table 10. Regression results based on RETURN volatility.

	(1)	(2)	(3)	(4)
Variable	SCRTA3	SCRTB3	SCRTA5	SCRTB5
	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)
Intercept	0.009 (0.603)	0.036 (0.597)	0.060 (0.486)	0.076 (0.482)
HXCSR	-0.014 ** (0.006)	-0.015 ** (0.006)	-0.013 *** (0.005)	-0.014 *** (0.005)
HXCSR <sup>2</sup>	0.002 ** (0.001)	0.002 ** (0.001)	0.002 *** (0.001)	0.002 *** (0.001)
L.LEV	0.001 ** (0.001)	0.001 ** (0.001)	0.001 *** (0.000)	0.001 *** (0.000)
L.TAT	-0.054 ** (0.023)	-0.053 ** (0.023)	-0.045 ** (0.020)	-0.045 ** (0.020)
L.GROWTH	0.002 (0.011)	0.002 (0.011)	0.003 (0.008)	0.003 (0.008)
L.NPM	-0.005(0.023)	-0.006(0.023)	-0.013 (0.018)	-0.014(0.018)
AGE	0.042 * (0.022)	0.040 * (0.022)	0.027 (0.018)	0.026 (0.017)
ShrZ	0.001 * (0.000)	0.001 * (0.000)	0.001 ** (0.000)	0.001 ** (0.000)
BDS	-0.270 ** (0.106)	-0.269 ** (0.106)	-0.196 ** (0.092)	-0.195 ** (0.091)
L.AUDIT	0.014 (0.028)	0.014 (0.028)	0.012 (0.022)	0.012 (0.022)
LnASSET	-0.024 * (0.013)	-0.024 * (0.013)	-0.012(0.011)	-0.012(0.011)
L.LnSALARY	-0.017 (0.013)	-0.017 (0.013)	-0.015(0.011)	-0.015(0.011)
STATE	0.047 (0.040)	0.047 (0.040)	0.028 (0.030)	0.028 (0.030)
BETA	0.006 (0.009)	0.007 (0.009)	0.008 (0.007)	0.009 (0.007)
YEAR/IND	YES	YES	YES	YES
# of obs.	9916	9916	9916	9916
Within_R <sup>2</sup>	0.155	0.157	0.108	0.110
F_Value	26.13 ***	26.50 ***	17.09 ***	17.40 ***

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Robust standard errors in brackets are clustered at the corporate level.

In the control variables, the conclusions on L.LEV, L.TAT, AGE, ShrZ and LnASSET are consistent with those from Tables 4 and 6. Besides, the coefficients on BDS are negative and significant (-0.270, p < 0.05; -0.269, p < 0.05; -0.196, p < 0.05; -0.195, p < 0.05), which are different from those from Table 6. The results imply that it is necessary for

regulators to urge independent directors to exert a governance effect to enhance enterprises' risk-taking ability.

#### 8. Further Analysis

The level of risk-taking reflects the ability of enterprises to grasp financing opportunities [78]. Moreover, higher risk-taking is conducive for enterprises to grasp investment opportunities with higher returns [29,59] to achieve a long-term competitive advantage. The pathway of risk-taking mainly includes financing business and investment business. The impact of CSR fulfillment on risk-taking is mainly reflected in the effect of CSR fulfillment on financing activities, and that on investment activities [61]. Therefore, this study examines the impacts of CSR fulfillment on corporate financing and investment.

According to the preferential order financing theory, external debt financing has a clear repayment period, and debt financing is more risky than internal equity. It is speculated that the enterprises with higher debt financing have a stronger willingness to take risks [61]. In accordance with Hutton et al. [79], debt financing is evaluated in two ways, including the ratio of debt to equity market price (DER) and that of debt with interest to tangible assets (DITAR). Equations (9) and (10) list the calculation methods, respectively. In Equation (9), X represents the total liabilities at the end of the period; Y is the sum of the shares market value and total liabilities, short-term borrowings and non-current liabilities due within one year, respectively;  $A_1$ ,  $A_2$  and  $A_3$  represent the total assets, net intangible assets and net goodwill, in turn.

$$DER = \frac{X}{Y}$$
(9)

DITAR = 
$$\sum_{k=1}^{k=3} Tk / (A1 - A2 - A3)$$
 (10)

From the investment perspective, enterprises' long-term investments are more risky than short-term and routine projects. Enterprises with better CSR disclosures tend to receive optimistic investment recommendations [18]. Corporate R&D input is the most representative long-term investment, and R&D activities are characterized by high uncertainty, high failure probability, and high adjustment costs [80]. Enterprises with more R&D input face less mandatory disclosure, greater asymmetry of internal and external information, and thus greater risks. As an emerging economy, China is realizing high-quality growth and sustainable development [21], and it is necessary for enterprises to strengthen R&D investment [81]. The proportion of R&D input is a reflection of the level of risk-taking [60]. Therefore, it is speculated that the enterprises with more R&D input are more willing to take risks. In accordance with Harjoto and Laksmana [47], the percentage of R&D input in operating income is adopted to evaluate the intensity of R&D input and expressed as R&D. Further, models 4 and 5 are constructed to examine the effect pathways of CSR fulfillment on risk-taking. Table 11 reports the regression results for models 4 and 5.

	Mod	Model 4			
<b>X7</b> • 11	(1)	(2)	(3)		
Variable	DER	DITAR	R&D		
	Coef. (S.E.)	Coef. (S.E.)	Coef. (S.E.)		
Intercept	-137.615 *** (16.853)	-89.598 *** (31.035)	1.404 (3.511)		
HXCSR	-0.195 *** (0.024)	-0.310 *** (0.042)	-0.034 *** (0.006)		
HXCSR <sup>2</sup>	0.002 *** (0.0003)	0.003 *** (0.0004)	0.0004 *** (0.0001)		
L.LEV			-0.013 *** (0.004)		
L.TAT	0.625 (0.910)	-5.654 *** (1.826)	-0.418 *** (0.135)		
L.GROWTH	0.037 (0.385)	0.012 ** (0.006)	-0.007 *** (0.001)		
L.NPM	-0.095 *** (0.011)	-0.096 *** (0.020)	0.006 (0.004)		
AGE	-0.703(0.523)	-0.646(0.955)	-0.032(0.103)		
ShrZ	0.033 *** (0.010)	0.040 *** (0.011)	-0.001(0.002)		
BDS	-3.200 (3.937)	-4.669(6.817)	-0.711(0.778)		
L.AUDIT	-0.824 (1.188)	-3.205 (1.967)	-0.085(0.209)		
LnASSET	8.902 *** (0.536)	6.357 *** (1.142)	0.168 (0.107)		
L.LnSALARY	-0.963 ** (0.444)	-1.274 * (0.655)	0.169 ** (0.073)		
STATE	0.930 (1.351)	3.467 (2.401)	0.229 (0.216)		
BETA	-0.302(0.300)	0.329 (0.431)	0.094 (0.062)		
YEAR/IND	YES	YES	YES		
# of obs.	8024	9946	6906		
Within_R <sup>2</sup>	0.389	0.091	0.092		
F_Value	120.69 ***	5.67 ***	17.08 ***		

Table 11. Regression results for models 4 and 5.

Note: \*\*\* Significant at 1%; \*\* Significant at 5%; \* Significant at 10%. Robust standard errors in brackets are clustered at the corporate level.

Model 4.

$$DER(DITAR)_{i,t} = \delta_0 + \delta_1 HXCSR_{i,t} + \delta_2 HXCSR_{i,t}^2 + \delta_3 TAT_{i,t-1} + \delta_4 GROWTH_{i,t-1} + \delta_5 NPM_{i,t-1} + \delta_6 AGE_{i,t} + \delta_7 ShrZ_{i,t} + \delta_8 BDS_{i,t} + \delta_9 AUDIT_{i,t-1} + \delta_{10} LnASSET_{i,t} + \delta_{11} LnSALARY_{i,t-1} + \delta_{12} STATE_{i,t} + \delta_{13} BETA_{i,t} + \delta_{14} \sum_{t} YEAR + \delta_{15} \sum_{t} IND + \varepsilon_{i,t}$$

$$(11)$$

Model 5.

$$R\&D_{i,t} = \zeta_0 + \zeta_1 HXCSR_{i,t} + \zeta_2 HXCSR_{i,t}^2 + \zeta_3 LEV_{i,t-1} + \zeta_4 TAT_{i,t-1} + \zeta_5 GROWTH_{i,t-1} + \zeta_6 NPM_{i,t-1} + \zeta_7 AGE_{i,t} + \zeta_8 ShrZ_{i,t} + \zeta_9 BDS_{i,t} + \zeta_{10} AUDIT_{i,t-1} + \zeta_{11} LnASSET_{i,t} + \zeta_{12} LnSALARY_{i,t-1} + \zeta_{13} STATE_{i,t} + \zeta_{14} BETA_{i,t} + \zeta_{15} \sum_{t} YEAR + \zeta_{16} \sum_{t} IND + \varepsilon_{i,t}$$

$$(12)$$

In model 4, the coefficients on HXCSR are negative and significant (-0.195, p < 0.01; -0.310, p < 0.01); those on HXCSR<sup>2</sup> are positive and significant (0.002, p < 0.01; 0.003, p < 0.01), indicating that the impact of CSR fulfillment on debt financing presents a U-shaped effect. The inflection points are 45.711 and 47.406, respectively. Only when CSR fulfillment is adequate can creditors have a more comprehensive understanding, improve their sense of identity with enterprises and bring financing convenience and more abundant credit resources. Adequate CSR fulfillment plays a certain role in signaling good business [82], improving corporate reputation, alleviating financing constraints and enhancing

financing capacity [83]. In model 5, the coefficient on HXCSR is negative and significant (-0.034, p < 0.01); those on HXCSR<sup>2</sup> are positive and significant (0.0004, p < 0.01), implying that the impact of CSR fulfillment on R&D input presents a U-shaped effect. The inflection point is 42.658. Only exceeding this inflection point, CSR fulfillment enhances R&D input and improves risk-taking. Additionally, the above results indicate that the U-shaped effects of CSR fulfillment on debt financing and R&D input reflect the main action pathways of CSR fulfillment on risk-taking.

For the control variables, in model 4, the conclusions on L.TAT, L.NPM, ShrZ, LnASSET and L.LnSALARY are consistent with those from Tables 4, 6 and 9. Besides, in column 2, the coefficient on L.GROWTH is positive and significant (0.012, p < 0.05), different from that from Table 4. Perhaps enterprises with good sales growth need more debt capital to support rapid development. In model 5, the conclusions on L.TAT and L.GROWTH are consistent with those from Tables 4 and 6. Besides, the coefficient on L.LEV is negative and significant (-0.013, p < 0.01); that on L.LnSALARY is positive and significant (0.169, p < 0.05). The higher debt repayment pressure results in a reduced R&D input, while the compensation incentive enhances the enthusiasm of conducting R&D activities.

#### 9. Conclusions and Recommendations

# 9.1. Conclusions

Based on agency theory and stakeholder theory, this study elaborates the effect of CSR fulfillment on risk-taking to provide empirical evidence for regulators to guide enterprises to properly carry out CSR activities. The results show that CSR fulfillment reflects the self-interest of the management to a certain extent. The self-interest instrumentalization of CSR fulfillment intensifies the agency conflict between shareholders and management. Then, CSR fulfillment weakens the risk-taking ability. Only when CSR fulfillment reaches a certain value can enterprises gain multiple stakeholders' continuous trust and accumulate intangible social network resources, which are conducive to improving risk-taking. Therefore, there is a U-shaped relationship between CSR fulfillment on debt financing and R&D input reflect the U-shaped effect pathways of CSR fulfillment on risk-taking.

This study theoretically provides micro-level evidence to investigate the impact of CSR fulfillment on risk-taking and reveals the U-shaped effect and action pathways of CSR fulfillment on risk-taking. In practice, this study provides a decision-making basis for the regulatory authorities to formulate policies to alleviate agency problems and promote enterprises to carry out CSR activities, which has certain guiding significance for improving relevant regulatory policies. Moreover, this study enriches the understanding of the economic consequences of CSR fulfillment and provides an information reference to identify the real intention of CSR fulfillment and provides an information reference for improving CSR fulfillment and promoting the healthy development of the capital market.

#### 9.2. Managerial and Theoretical Implications

CSR fulfillment is an important corporate behavior. It is not only an external decoration to improve image and reputation but also has a U-shaped effect on risk-taking. In the current system construction, the "double-edged sword" role of CSR fulfillment should be fully recognized. If CSR fulfillment is used "instrumentally", it will bring negative consequences to risk-taking and not be conducive to enhancing corporate value. When enterprises take seriously the stakeholders' demands and attach importance to improving the bond relationship with investors, suppliers, consumers, communities and other stakeholders, CSR fulfillment can enhance risk-taking and become a "brand resource". Enterprises should have a comprehensive understanding and avoid CSR fulfillment becoming the "self-interest tool" of the management. More non-financial information, such as CSR activities, is disclosed to stakeholders, and the positive effect of CSR fulfillment on capital allocation should be brought into play. Efforts should be made to promote the integration of CSR and corporate strategy through the implementation of CSR strategy to give full play to the positive role of CSR activities for enterprises' survival and development and to promote the harmonious unity of social interests and corporate interests.

CSR regulations still need further improvement. As a kind of non-financial information, compulsory CSR information disclosure can have a "supervision effect" [84], form a more effective external supervision mechanism, reduce information asymmetry and moral hazard, and improve the capacity of risk-taking. The regulators formulate more effective regulations on CSR disclosure, promote CSR fulfillment to break through the inflection point of the U-shaped effect and encourage enterprises to consider more for the stakeholders' overall interests on the premise of reasonable resources allocation. In CSR reports, in addition to non-financial information, enterprises disclose important financial information, such as accounting and investment policies, to provide a reference for stakeholders to identify the true intention of CSR activities. Meanwhile, the regulatory authorities establish an effective CSR supervision system and compensation mechanism, dredge the transmission pathway of CSR activities' positive economic effect. The efficiency of public management is comprehensively improved to achieve the priority allocation of capital resources to the enterprises earnestly carrying out CSR activities and to ensure that the enterprises with better CSR fulfillment obtain more high-quality resources, thus effectively promoting the healthy development of the capital market.

#### 9.3. Limitations and Prospects

This study analyzes the impact of CSR fulfillment on risk-taking and further explains the effect pathways of CSR fulfillment on risk-taking. However, due to the limitation of space, this study does not further explain the economic effect of risk-taking on corporate value. Corporate value is the result of operating risks taken by owners to maximize profits. Risk-taking is an important pathway to enhance corporate value [85]. From the perspective of enhancing corporate value, based on the logic of "impact effect—impact path—economic consequences", future studies can systematically investigate the value effect of CSR activities on risk-taking in the context of emerging economies, further explore the possible coupling effect of CSR fulfillment and risk-taking on corporate value, and explore pathways to increase corporate value. Through future research, it is expected to promote the positive role of CSR activities in corporate growth and provide micro-level empirical countermeasures for effectively protecting the legitimate rights and interests of stakeholders.

**Author Contributions:** Conceptualization, X.L. and G.L.; methodology, Q.F. and M.S.S.; formal analysis, G.L.; investigation, A.A.A.R. and A.M.; data curation, Q.F.; writing—original draft preparation, X.L.; writing—review and editing, A.A.A.R., A.M. and M.S.S. All authors have read and agreed to the published version of the manuscript.

**Funding:** This work is supported in part by the National Social Science Fund of China (20BGL026), in part by the Major Project of Applied Research in Philosophy and Social Science of Henan Universities, China (2019-YYZD-20), in part by the General Projects of Humanities and Social Sciences at Universities of Henan (2022-ZDJH-0016, 2022-ZDJH-0019), and in part by the Key Research Institute of Humanities and Social Sciences at Universities of Henan, China.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data will be made available on request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

## References

- 1. Li, F.Y.; Yang, M.Z. Can Economic Policy Uncertainty Influence Corporate Investment? The Empirical Research by Using China Economic Policy Uncertainty Index. *J. Financ. Res.* 2015, *38*, 115–129.
- Dong, B.B.; Ge, B.S. Inverted U-Shape between Risk-taking and the Performance of New Venture and the Mediating Role of Opportunity Capability. *Nankai Bus. Rev.* 2014, 17, 56–65.
- Nguyen, P. Corporate Governance and Risk-Taking: Evidence from Japanese Firms. *Pac.-Basin Financ. J.* 2011, 19, 278–297. [CrossRef]
- Faccio, M.; Marchica, M.T.; Mura, R. CEO Gender, Corporate Risk-Taking, and the Efficiency of Capital Allocation. *J. Corp. Financ.* 2016, *39*, 193–209. [CrossRef]
- 5. Liu, X.X.; Liu, M.; Yang, L. Intimacy of Guanxi and the Level of Risk-Taking in Private Enterprises. *Sci. Res. Manag.* 2020, *41*, 268–278.
- Abad, D.; Cutillas-Gomariz, M.F.; Sanchez-Ballesta, J.P.; Yague, J. Real Earnings Management and Information Asymmetry in the Equity Market. *Eur. Account. Rev.* 2018, 27, 209–235. [CrossRef]
- Feng, L.Y.; Xiao, X.; Cheng, X.K. Effect of Corporate Social Responsibility on Firm Risk: Based on the Economic Conditions. Nankai Bus. Rev. 2016, 19, 141–154.
- 8. Zhou, F.Z.; Jin, Y.P.; He, Z.F. The Effect of Corporate Social Responsibility on Corporate Performance and Risk: Evidence from Chinese A-share Listed Companies. *J. Technol. Econ.* **2020**, *39*, 119–129.
- Wang, J.L.; Li, Y.T.; Wu, X. Corporate Social Responsibility and Risk-Taking Behavior: Based on Resource Dependence Theory. *Forecasting* 2019, 38, 45–51.
- 10. Xue, J. The Impact of Mandatory Corporate Social Responsibility Information Disclosure on Firm's Risk-Taking. *Rev. Investig. Stud.* **2021**, *40*, 105–122.
- 11. Ferrell, O.C.; Fraedrich, J.; Ferrell, L. *Business Ethics: Ethical Decision Making and Cases*; Nelson Education: Scarborough, ON, Canada, 2015.
- 12. Bae, S.M.; Masud, M.A.K.; Rashid, M.H.; Kim, J.D. Determinants of Climate Financing and the Moderating Effect of Politics: Evidence from Bangladesh. *Sustain. Account. Manag. Policy J.* **2021**, *13*. [CrossRef]
- 13. Marquis, C.; Zhang, J.J.; Zhou, Y.H. Regulatory Uncertainty and Corporate Responses to Environmental Protection in China. *Calif. Manag. Rev.* **2011**, *54*, 39–63. [CrossRef]
- 14. Ioannou, I.; Serafeim, G. The Impact of Corporate Social Responsibility on Investment Recommendations: Analysts' Perceptions and Shifting Institutional Logics. *Strateg. Manag. J.* 2015, *36*, 1053–1081. [CrossRef]
- 15. Aray, Y.; Dikova, D.; Garanina, T.; Veselova, A. The Hunt for International Legitimacy: Examining the Relationship between Internationalization, State Ownership, Location and CSR Reporting of Russian Firms. *Int. Bus. Rev.* 2021, *30*, 101858. [CrossRef]
- 16. Wang, X.; Yang, Z. Gender Diversity of Board of Directors, Corporate Social Responsibility and Risk-Taking. J. Grad. Sch. Chin. Acad. Soc. Sci. 2019, 40, 33–47.
- 17. Zhao, T.J.; Xiao, X.; Jiang, Y.X. Corporate Social Responsibility and Corporate Investment: A Study based on Corporate Life Cycle. *J. Beijing Inst. Technol. Soc. Sci. Ed.* **2019**, *21*, 107–115.
- 18. Wan-Hussin, W.N.; Qasem, A.; Aripin, N.; Ariffin, M.S.M. Corporate Responsibility Disclosure, Information Environment and Analysts' Recommendations: Evidence from Malaysia. *Sustainability* **2021**, *13*, 3568. [CrossRef]
- 19. Filatotchev, I.; Ireland, R.D.; Stahl, G.K. Contextualizing Management Research: An Open Systems Perspective. *J. Manag. Stud.* **2021**, *in press*. [CrossRef]
- 20. Jamali, D.; Karam, C.; Yin, J.; Soundararajan, V. CSR Logics in Developing Countries: Translation, Adaptation and Stalled Development. J. World Bus. 2017, 52, 343–359. [CrossRef]
- 21. Zhang, F.; Jung, J.-y. Changes in the Influence of Social Responsibility Activities on Corporate Value over 10 Years in China. *Sustainability* **2020**, *12*, 9506. [CrossRef]
- 22. Testa, F.; Boiral, O.; Iraldo, F. Internalization of Environmental Practices and Institutional Complexity: Can Stakeholders Pressures Encourage Greenwashing? *J. Bus. Ethics* 2018, 147, 287–307. [CrossRef]
- 23. Tian, L.H.; Ye, Y.; Cheung, W. Separating Control from Cash-flow Rights and the Long-term Returns of Public Listed Firms: Tunneling or Delegating. *J. World Econ.* **2016**, *39*, 49–72.
- Quan, X.F.; Wu, S.N.; Yin, H.Y. Corporate Social Responsibility and Stock Price Crash Risk: Self-interest Tool or Value Strategy? Econ. Res. J. 2015, 50, 49–64.
- 25. Li, D.Y.; Zheng, M.; Cao, C.C.; Chen, X.H.; Ren, S.G.; Huang, M. The Impact of Legitimacy Pressure and Corporate Profitability on Green Innovation: Evidence from China Top 100. *J. Clean. Prod.* **2017**, *141*, 41–49. [CrossRef]
- Tian, L.H.; Wang, K.D. The "Cover-up Effect" of Social Responsibility Information Disclosure and the Crash Risk of Listed Companies: A DID-PSM Analysis of China's Stock Market. *Manag. World* 2017, 33, 146–157.
- Habib, A.; Hasan, M.M. Firm Life Cycle, Corporate Risk-Taking and Investor Sentiment. *Account. Financ.* 2017, 57, 465–497. [CrossRef]
- 28. John, K.; Litov, L.; Yeung, B. Corporate Governance and Risk-Taking. J. Financ. 2008, 63, 1679–1728. [CrossRef]
- 29. Low, A. Managerial Risk-Taking Behavior and Equity-based Compensation. J. Financ. Econ. 2009, 92, 470–490. [CrossRef]
- Zhang, M.; Tong, L.J.; Xu, H.R. The Social Network and Corporate Risk-Taking: Based on the Empirical Evidence of Listed Companies in China. *Manag. World* 2015, *31*, 161–175.

- Saveanu, T.; Badulescu, D.; Saveanu, S.; Abrudan, M.-M.; Badulescu, A. The Role of Owner-Managers in Shaping CSR Activity of Romanian SMEs. *Sustainability* 2021, 13, 11546. [CrossRef]
- 32. Barnea, A.; Rubin, A. Corporate Social Responsibility as a Conflict between Shareholders. J. Bus. Ethics 2010, 97, 71–86. [CrossRef]
- Jo, H.; Na, H. Does CSR Reduce Firm Risk? Evidence from Controversial Industry Sectors. J. Bus. Ethics 2012, 110, 441–456. [CrossRef]
- 34. Li, S.; Cheng, W.; Li, J.; Shen, H. Corporate Social Responsibility Development and Climate Change: Regional Evidence of China. *Sustainability* **2021**, *13*, 11859. [CrossRef]
- 35. Fu, C.; Ji, L. Litigation Risk and Corporate Charitable Giving: An Explanation from the Perspective of Reputation Insurance. *Nankai Bus. Rev.* **2017**, *20*, 108–121.
- Yang, W.S.; Yang, S.L. An Empirical Study on the Relationship between Corporate Social Responsibility and Financial Performance under the Chinese Context: Based on the Contrastive Analysis of Large, Small and Medium-size Listed Companies. *Chin. J. Manag. Sci.* 2016, 24, 143–150.
- Yang, X.; Rivers, C. Antecedents of CSR Practices in MNCs' Subsidiaries: A Stakeholder and Institutional Perspective. J. Bus. Ethics 2009, 86, 155–169. [CrossRef]
- Garanina, T.; Aray, Y. Enhancing CSR Disclosure through Foreign Ownership, Foreign Board Members, and Cross-listing: Does It work in Russian Context? *Emerg. Mark. Rev.* 2021, 46, 100754. [CrossRef]
- 39. Cai, L.; Cui, J.; Jo, H. Corporate Environmental Responsibility and Firm Risk. J. Bus. Ethics 2016, 139, 563–594. [CrossRef]
- 40. Sun, W.B.; Cui, K.X. Linking Corporate Social Responsibility to Firm Default Risk. Eur. Manag. J. 2014, 32, 275–287. [CrossRef]
- Saeidi, S.P.; Sofian, S.; Saeidi, P.; Saeidi, S.P.; Saaeidi, S.A. How Does Corporate Social Responsibility Contribute to Firm Financial Performance? The Mediating Role of Competitive Advantage, Reputation, and Customer Satisfaction. *J. Bus. Res.* 2015, 68, 341–350. [CrossRef]
- 42. Porter, M.E.; Kramer, M.R. Strategy and Society: The Link between Competitive Advantage and Corporate Social Responsibility. *Harv. Bus. Rev.* 2006, *84*, 78–92.
- Liu, Y.; Zhou, Z.C. The Relationships between Employees' Perceived Corporate Social Responsibility, Affective Commitment and Organizational Citizenship Behavior: A Cross-level Analysis of Commitment-based Human Resource Management Practices. *Manag. Rev.* 2015, 27, 118–127.
- 44. Qian, M.; Xu, G.H.; Shen, Y.; Dou, X.C. Research of Dynamic Relationship between Voluntary Corporate Social Responsibility Disclosure of Private Companies and Financial Constraints. *Manag. Rev.* **2017**, *29*, 163–174.
- 45. Hu, W.; Du, J.; Zhang, W. Corporate Social Responsibility Information Disclosure and Innovation Sustainability: Evidence from China. *Sustainability* **2020**, *12*, 409. [CrossRef]
- 46. Zeng, J.G.; Zhang, Y.; Yang, X. Religious Belief and the Keynote of Individual Social Responsibility of Senior Executives: From the Perspective of Individual Donation Behavior of Senior Executives in Chinese Private Enterprises. *Manag. World* **2016**, *32*, 97–110.
- 47. Harjoto, M.; Laksmana, I. The Impact of Corporate Social Responsibility on Risk Taking and Firm Value. *J. Bus. Ethics* **2018**, 151, 353–373. [CrossRef]
- 48. Hussain, N.; Rigoni, U.; Orij, R.P. Corporate Governance and Sustainability Performance: Analysis of Triple Bottom Line Performance. J. Bus. Ethics 2018, 149, 411–432. [CrossRef]
- 49. Faccio, M.; Marchica, M.T.; Mura, R. Large Shareholder Diversification and Corporate Risk-taking. *Rev. Financ. Stud.* 2011, 24, 3601–3641. [CrossRef]
- 50. Li, W.G.; Yu, M.G. Nature of Ownership, Market Liberalization, and Corporate Risk-Taking. China Ind. Econ. 2012, 26, 115–127.
- 51. Boubakri, N.; Cosset, J.C.; Saffar, W. The Role of State and Foreign Owners in Corporate Risk-Taking: Evidence from Privatization. *J. Financ. Econ.* **2013**, *108*, 641–658. [CrossRef]
- 52. Cheng, B.T.; Ioannou, I.; Serafeim, G. Corporate Social Responsibility and Access to Finance. *Strateg. Manag. J.* 2014, 35, 1–23. [CrossRef]
- 53. Kim, Y.; Li, H.D.; Li, S.Q. Corporate Social Responsibility and Stock Price Crash Risk. J. Bank. Financ. 2014, 43, 1–13. [CrossRef]
- 54. Lin, K.J.; Tan, J.S.; Zhao, L.M.; Karim, K. In the Name of Charity: Political Connections and Strategic Corporate Social Responsibility in a Transition Economy. *J. Corp. Financ.* 2015, *32*, 327–346. [CrossRef]
- 55. Ozdora-Aksak, E.; Atakan-Duman, S. Gaining Legitimacy through CSR: An Analysis of Turkey's 30 Largest Corporations. *Bus. Ethics* **2016**, *25*, 238–257. [CrossRef]
- 56. Maxfield, S. Reconciling Corporate Citizenship and Competitive Strategy: Insights from Economic Theory. J. Bus. Ethics 2008, 80, 367–377. [CrossRef]
- 57. Cheng, C.; Chi, R.Y.; Zhang, W. A Research on the Mechanism for Implementation of Firms' SCSR Program. *Sci. Res. Manag.* 2019, 40, 139–150.
- Alvesson, M.; Sandberg, J. The Problematizing Review: A Counterpoint to Elsbach and Van Knippenberg's Argument for Integrative Reviews. J. Manag. Stud. 2020, 57, 1290–1304. [CrossRef]
- 59. Yu, M.G.; Li, W.G.; Pan, H.B. Managerial Overconfidence and Corporate Risk-Taking. J. Financ. Res. 2013, 36, 149–163.
- 60. Bargeron, L.L.; Lehn, K.M.; Zutter, C.J. Sarbanes-Oxley and Corporate Risk-Taking. J. Account. Econ. 2010, 49, 34–52. [CrossRef]
- 61. Song, J.B.; Wen, W.; Wang, D.H.; Shen, W. Managerial Power, Internal and External Monitoring and Corporate Risk-Taking. *Econ. Theory Bus. Manag.* **2018**, *38*, 96–112.

- 62. Zhou, Z.F.; Liu, J.H.; Zeng, H.X. Impact of Water Information Disclosure on Corporate Risk-Taking Level: Evidence from High Water-Risk Industry. J. Environ. Econ. 2020, 5, 54–74.
- 63. Mao, Z.H.; Jin, L. Corporate Governance, Corporate Social Responsibility and Accounting Information Relevance. *Mod. Econ. Sc.* **2016**, *38*, 112–121.
- 64. Quan, X.F.; Xu, X.M.; Xu, R. Management Opportunistic Behavior in the Compulsory Disclosure of Corporate Social Responsibility: Empirical Evidence Base on A Share Listed Companies. *J. Manag. Sci. China* **2018**, *21*, 95–110.
- 65. Jia, X.P.; Liu, Y. External Environment, Internal Resource, and Corporate Social Responsibility. Nankai Bus. Rev. 2014, 17, 13–18.
- 66. Chen, Y.C.; Hung, M.Y.; Wang, Y.X. The Effect of Mandatory CSR Disclosure on Firm Profitability and Social Externalities: Evidence from China. *J. Account. Econ.* **2018**, *65*, 169–190. [CrossRef]
- 67. Dunbar, C.; Li, F.; Shi, Y. CEO Risk-Taking Incentives and Corporate Social Responsibility. J. Corp. Financ. 2020, 64, 101714. [CrossRef]
- Hasan, I.; Kobeissi, N.; Liu, L.; Haizhi, W. Corporate Social Responsibility and Firm Financial Performance: The Mediating Role of Productivity. J. Bus. Ethics 2018, 149, 671–688. [CrossRef]
- 69. Jia, X.P.; Liu, Y.; Liao, Y.H. Stakeholders Pressure, Corporate Social Responsibility, and Firm Value. *Chin. J. Manag.* **2016**, *13*, 267–274.
- Haans, R.F.J.; Pieters, C.; He, Z.-L. Thinking about U: Theorizing and Testing U- and Inverted U-Shaped Relationships in Strategy Research. *Strateg. Manag. J.* 2016, 37, 1177–1195. [CrossRef]
- 71. Nikolaev, V.; Lent, L.V. The Endogeneity Bias in the Relation between Cost-of-Debt Capital and Corporate Disclosure Policy. *Eur. Account. Rev.* **2005**, *14*, 677–724. [CrossRef]
- 72. Bouslah, K.; Kryzanowski, L.; M'Zali, B. Social Performance and Firm Risk: Impact of the Financial Crisis. *J. Bus. Ethics* 2018, 149, 643–669. [CrossRef]
- 73. Li, B.; Guo, J.E.; Su, K. Do Firms with Female CEO Have Lower Corporate Risk-Taking? Based on the Analysis of CEO Gender. *Forecasting* **2017**, *36*, 21–27.
- 74. Thuy, C.T.M.; Khuong, N.V.; Canh, N.T.; Liem, N.T. Corporate Social Responsibility Disclosure and Financial Performance: The Mediating Role of Financial Statement Comparability. *Sustainability* **2021**, *13*, 10077. [CrossRef]
- 75. Abadie, A.; Imbens, G.W. Large Sample Properties of Matching Estimators for Average Treatment Effects. *Econometrica* 2006, 74, 235–267. [CrossRef]
- Rahman, M.; Sa, C.L.; Masud, M.A.K. Predicting Firms' Financial Distress: An Empirical Analysis Using the F-Score Model. J. Risk Financ. Manag. 2021, 14, 199. [CrossRef]
- 77. He, Y.; Yu, W.L.; Yang, M.Z. CEOs with Rich Career Experience, Corporate Risk-Taking and the Value of Enterprises. *China Ind. Econ.* **2019**, *33*, 155–173.
- 78. Su, K. Mercantile Culture, Risk Taking and Firm Value. J. Zhejiang Gongshang Univ. 2017, 26, 89–97.
- 79. Hutton, I.; Jiang, D.; Kumar, A. Corporate Policies of Republican Managers. J. Financ. Quant. Anal. 2014, 49, 1279–1310. [CrossRef]
- 80. Belloc, F. Corporate Governance and Innovation: A Survey. J. Econ. Surv. 2012, 26, 835–864. [CrossRef]
- 81. Li, X.; Liu, G. Can fund shareholding inhibit insufficient R&D input? Empirical evidence from Chinese listed companies. *PLoS ONE* **2021**, *16*, e0248674.
- 82. Su, W.C.; Peng, M.W.; Tan, W.Q.; Cheung, Y.L. The Signaling Effect of Corporate Social Responsibility in Emerging Economies. J. Bus. Ethics 2016, 134, 479–491. [CrossRef]
- Zhou, H.; Li, G.P.; Lin, W.F. Corporate Social Responsibility and Credit Spreads-An Empirical Study in Chinese Context. Ann. Econ. Financ. 2016, 17, 79–103.
- Liu, L.; Tian, G.G. Mandatory CSR Disclosure, Monitoring and Investment Efficiency: Evidence from China. *Account. Financ.* 2021, 61, 595–644. [CrossRef]
- Su, K.; Wan, R.; Song, V.Y. Pyramidal Structure, Risk-Taking and Firm Value: Evidence from Chinese Local SOEs. *Econ. Transit.* 2018, 26, 401–427. [CrossRef]