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Research on the influence of environmental social responsibility on corporate risk-taking

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Abstract. In recent years, environmental problems such as water pollution and air pollution have frequently occurred, and environmental pollution problems have become more and more serious. As the main body of environmental pollution, enterprises also undertake the obligation to improve the environment and fulfill their environmental social responsibilities. In order to test the impact of different types of enterprises fulfilling environmental social responsibility on the risk-taking level of enterprises, we select the financial data and environmental social responsibility data of listed companies in Shandong Province for 2010-2017. The study finds that listed companies fulfilling their social responsibility to the environment can help to improve the level of risk-taking; state-owned listed companies prefer lower levels of risk-taking because of their particularity; the property rights of state-owned listed companies will enhance the impact of environmental social responsibility performance on risk-taking.

1. Introduction

Since the reform and opening up, the Chinese economy has experienced rapid growth for nearly 40 years. In the past, the extensive economic growth mode has brought about a series of environmental problems while bringing rapid economic growth. In particular, the rapid development of high-energy, high-pollution industries such as steel, chemicals, and coal has brought great pressure on the environment. How to deal with the relationship between environment and economic development has become a problem that needs to be paid more attention to in current economic development.

From the perspective of enterprises, the one-sided pursuit of economic benefits is one of the important reasons for environmental pollution. Therefore, enterprises should actively assume social responsibility for the environment. At the same time, the fulfillment of social responsibilities by enterprises helps to obtain the support of production factors such as capital and talents given by various stakeholders, and ultimately affects the risk-taking of enterprises. From the perspective of environmental responsibility, the thesis explores the impact of enterprises with different property rights on the implementation of environmental social responsibility.

2. Literature review

2.1. Corporate Social Responsibility Research

Corporate social responsibility research flourished in the West and attracted widespread attention in the mid-20th century. In 1916, Clark took the lead in proposing social responsibility. Sheldon (1924) proposed the concept of social responsibility based on the perspective of entrepreneurs. Schwartz, Carroll (2003) argue that corporate social responsibility includes economic responsibility, legal liability and ethical responsibility. Deborah (2005) believes that corporate social responsibility is the



obligation of the company to its various stakeholders in its business activities. Jamali (2007) believes that corporate social responsibility includes mandatory liability and voluntary responsibility.

2.2. Corporate Risk-Taking Research

Through combing the relevant literature, scholars mainly focus on the research on the influencing factors and measurement indicators of risk-taking.

2.2.1. Influencing factors of Corporate Risk-Taking. Coles et al. (2006) argue that the manager's compensation incentive system will affect corporate risk-taking. John et al. (2008) believes that corporate risk-taking is affected by investor protection. Kohler (2010) believes that shareholder rights are positively related to the level of corporate risk-taking. Boubakri et al. (2011) argue that the nature of ownership of an enterprise has an impact on the level of risk-taking of the firm. Shi (2015) explored the relationship between management compensation incentives and corporate risk-taking based on dynamic endogeneity. Chen et al. (2018) studied the impact of corporate strategy on risk-taking.

2.2.2. Measurement of Risk-Taking Indicators. From the research of scholars at home and abroad, there are two main views on the measurement of risk-taking indicators. One view is that the volatility index of stock returns should be used to measure the corporate risk-taking. The main representative of this view is Coles et al., and domestic scholars such as Ji and Du (2017). Another point of view is that the profitability volatility indicator is used to measure the level of risk-taking of a company. This view is represented by John et al. (2008), and has had a wide-ranging impact. Domestic scholars Yu et al. (2013), Li et al. (2014) and others have adopted this view, and this study also uses this indicator.

2.2.3. Social Responsibility and Corporate Risk-Taking. There is less research literature on the relationship between corporate social responsibility and risk-taking. Feng et al. (2016) studied the impact of corporate social responsibility on corporate risk. Li et al. (2017) studied the impact of commercial banks' social responsibility on their risk-taking from the perspective of government regulation. Lu and Xu (2019) believe that corporate social responsibility can reduce the company's deviation from the optimal risk-taking level.

In summary, the research on foreign social responsibility and corporate risk-taking is relatively early, and the research is more in-depth and comprehensive. However, although China has accumulated certain research results in social responsibility and corporate risk-taking, it has less considered the impact of environmental social responsibility performance on corporate risk-taking. This paper cuts through environmental social responsibility and explores the risk-taking issues of companies of different ownership types.

3. Research design

3.1. Sample Selection and Data Source

This paper takes Shandong listed companies as the research object. The risk-taking indicator is calculated using data from Shandong listed companies in 2008-2017, and the remaining indicators are calculated using data from 2010-2017. Among them, the environmental social responsibility performance data is derived from Hexun. The rest of the data is mainly collected through the CSMAR database, the website of cninf and the official website of the companies. In order to avoid the influence of extreme values, we have tail-finished the continuous variables of RISK, ASS, SHR, REV, LAR, AGE, etc. at 1% and 99%.

3.2. Description of Variable

3.2.1. Explained variable. According to John (2008), Yu et al. (2013) and others, the RISK of the enterprise is measured by the volatility index of profit.

$$RISK_{it} = \left[\frac{1}{N-1} \sum_{n=1}^N \left(ADJ_ROA_{in} - \frac{1}{N} \sum_{n=1}^N ADJ_ROA_{in} \right)^2 \right]^{1/2} \quad |N = 3 \quad (1)$$

$$ADJ_ROA_{in} = \frac{EBITDA_{in}}{ASSETS_{in}} - \frac{1}{X_n} \sum_{k=1}^x \frac{EBITDA_{kn}}{ASSETS_{kn}} \quad (2)$$

Among them, $ASSETS_{in}$ is the company's final asset; $EBITDA_{in}$ is the company's profit before interest, taxes, depreciation and amortization; ADJ_ROA_{in} is the ROA adjusted by the industry average; $RISK_{it}$ is the standard deviation of ROA after adjusting the industry average value during the observation period.

3.2.2. Explanatory variables. This paper uses EVN_{it} as an explanatory variable of corporate environmental social responsibility to explain the impact of corporate environmental social responsibility performance on corporate risk-taking; and use STA_{it} to represent the nature of property rights of enterprises so as to explain the impact of different types of corporate environmental social responsibility performance on risk-taking. The interaction between the two explains the regulatory role of the nature of corporate property rights in the impact of environmental social responsibility performance on risk-taking.

3.2.3. Control variable. This paper selects the company listing age (AGE_{it}), corporate income growth rate (INC_{it}), liability on asset ratio (LAR_{it}), company size (ASS_{it}) and shareholding ratio (SHR_{it}) as control variables. In addition, the paper also gradually controls the impact of the year and industry.

Table 1. variable definition.

Variable name	Symbol	Variable definitions
Risk-taking	$RISK_{it}$	Profitability volatility
Environmental social responsibility	EVN_{it}	Company's performance of environmental social responsibility
Nature of property	STA_{it}	State-owned companies take the value 1, otherwise it is 0
Company listing age	AGE_{it}	Add 1 logarithm to the time of the company's listing year from the t-year
Income growth rate	INC_{it}	Annual growth rate of business income
Liability on asset ratio	LAR_{it}	The Liability on asset ratio of the company for the corresponding year
Company Size	ASS_{it}	Logarithm of total assets of the enterprise
Shareholding ratio	SHR_{it}	The shareholding ratio of the largest shareholder of the company in the corresponding year

Before the regression analysis of each variable, the variables were comprehensively understood by descriptive statistical analysis of the variable data. It is found that the average value of EVN_{it} is only 2.2774, and the maximum value is 30. This shows that the performance of environmental social responsibility of listed companies in Shandong Province is not very satisfactory, and the gap between the companies is large. Descriptive statistics of related variables are shown in Table 2.

Table 2. Descriptive statistics.

Variable	Obs	Mean	Std. Dev.	Min	Max
$RISK_{it}$	1062	0.0313	0.0405	0.0018	0.2541

EVN _{it}	1171	2.2774	5.9566	0	30
STA _{it}	1187	0.3766	0.4847	0	1
AGE _{it}	1180	2.0552	0.8297	0	3.1355
INC _{it}	1122	0.1869	0.4511	-0.5926	2.8858
LAR _{it}	1187	0.4298	0.2217	0.0434	0.9957
ASS _{it}	1187	21.9952	1.2349	18.9323	25.7043
SHR _{it}	1187	33.0768	14.6053	6.45	71.21

3.3. Model building

In order to test the impact of environmental social responsibility performance on corporate risk-taking, we construct the following research model:

$$RISK_{it} = \alpha_0 + \alpha_1 EVN_{it} + \alpha_2 X_{it} + \varepsilon \quad (3)$$

Among them, $RISK_{it}$ is the corporate risk-taking level; EVN_{it} is the performance of the corporate environmental social responsibility, with a value of 0 or 1; X_{it} is the control variable.

In order to test the intermediary role of the nature of property rights in the implementation of environmental social responsibility performance of companies, we construct the following research model:

$$RISK_{it} = \beta_0 + \beta_1 EVN_{it} + \beta_2 STA_{it} + \beta_3 EVN_{it} * STA_{it} + \beta_4 X_{it} + \varepsilon \quad (4)$$

Among them, STA_{it} is the property right of the corresponding annual company, and $EVN_{it} * STA_{it}$ is an interaction term between environmental social responsibility and property rights established to examine the intermediary role of property rights.

4. Empirical analysis

4.1. Correlation analysis

Table 3 lists the Pearson correlation coefficient matrices for the main variables. It can be seen from the table that STA_{it} , ASS_{it} and $RISK_{it}$ have a significant negative correlation, indicating that the state-owned companies and the larger companies prefer the lower risk-taking levels. LAR_{it} , AGE_{it} and REV_{it} have a significant positive correlation with $RISK_{it}$, indicating that the higher the asset-liability ratio, the longer the time to market, and the higher the income growth rate, the higher the level of risk-taking. In addition, the correlation coefficient between the variables is small, the maximum is 0.4295, indicating that there is no obvious multicollinearity between the variables.

Table 3. Pearson correlation coefficient.

Variable	$RISK_{it}$	EVN_{it}	STA_{it}	LAR_{it}	ASS_{it}	AGE_{it}	INC_{it}	SHR_{it}
$RISK_{it}$	1							
EVN_{it}	-0.0616**	1						
STA_{it}	-0.0778**	0.1100***	1					
LAR_{it}	0.0850***	0.0735**	0.2179***	1				
ASS_{it}	-0.2992***	0.3988***	0.3218***	0.3909***	1			
AGE_{it}	0.1116***	0.1254***	0.4295***	0.3925***	0.3267***	1		
INC_{it}	0.1144***	-0.0156	-0.0559*	0.0342	0.0176	-0.0291	1	
SHR_{it}	-0.0319	0.1515***	0.0702**	-0.0411	0.1523***	-0.1019***	0.0007	1

4.2. Regression analysis

4.2.1. Environmental Social Responsibility and Corporate Risk-Taking. Table 4 (1)-(3) lists the regression results of the implementation of corporate environmental social responsibility and corporate risk-taking. From the regression results, it can be seen that the corporate environmental social responsibility performance (EVN_{it}) has a positive correlation with the corporate risk-taking at the 1% confidence level, indicating that the better the company's social responsibility to the environment is, the more it helps to improve the level of risk-taking. The asset-liability ratio (LAR_{it}) is significantly positively correlated with corporate risk-taking at a 1% confidence level, indicating that companies are willing to raise capital for investment by financing creditors. The adequate investment capital is more conducive to ensuring the smooth progress of investment decisions, and thus improving the level of corporate risk-taking. The corporate revenue growth rate (INC_{it}) and risk-taking are positively correlated at a 5% confidence level, indicating that the higher the company's income growth rate, the stronger its profitability, and the more beneficial it is to improve the corporate risk-taking level. The company's shareholding ratio (SHR_{it}) is significantly positively correlated with corporate risk-taking at a 5% confidence level. This shows that the higher the shareholding ratio of the company's largest shareholder, the better it is to improve the risk-taking level of the company.

Table 4. Environmental Social Responsibility, Nature of Property Rights and Risk-Taking.

Variable	(1)	(2)	(3)	(4)	(5)	(6)
EVN _{it}	0.0005*** (3.4629)	0.0005*** (2.8743)	0.0005*** (2.8697)	0.0005** (2.0409)	0.0002 (1.4243)	0.0000 (0.1312)
STA _{it}						-0.0099*** (-3.3450)
EVN _{it} * STA _{it}						0.0010*** (3.5886)
LAR _{it}	0.0344*** (3.9307)	0.0338*** (3.7744)	0.0338*** (3.7683)	0.0089 (0.8484)	0.0418*** (3.5922)	0.0341*** (3.9361)
ASS _{it}	-0.0139*** (-9.2025)	-0.0138*** (-8.6666)	-0.0138*** (-8.5993)	-0.0079*** (-4.2238)	-0.0168*** (-8.1884)	-0.0134*** (-9.0507)
AGE _{it}	0.0098*** (4.2037)	0.0098*** (4.1917)	0.0086*** (3.4828)	0.0043 (1.5233)	0.0149*** (4.2112)	0.0125*** (4.6375)
INC _{it}	0.0103** (2.5202)	0.0097** (2.2881)	0.0096** (2.2463)	0.0171*** (2.6171)	0.0072 (1.5010)	0.0097** (2.3510)
SHR _{it}	0.0002** (2.1992)	0.0002** (2.1676)	0.0001* (1.8654)	0.0004*** (4.0296)	0.0000 (0.0281)	0.0002** (2.3489)
CONS	0.2935*** (9.7488)	0.2946*** (9.3418)	0.3012*** (9.4210)	0.1720*** (4.4103)	0.3515*** (8.3980)	0.2795*** (9.4877)
YEAR	NO	YES	YES	NO	NO	NO
IND	NO	NO	YES	NO	NO	NO

4.3. The nature of Property Rights and Corporate Risk-Taking

Tables 4(4)-(5) are the regression results of environmental social responsibility performance and risk-taking of state-owned companies and non-state-owned companies. From the regression results, it can be seen that the implementation of environmental social responsibility of state-owned companies can significantly improve the level of corporate risk-taking. The performance of environmental social responsibility of non-state-owned companies is positively related to their risk-taking, but the correlation is not significant.

4.4. Environmental Social Responsibility, Nature of Property Rights and Corporate Risk-Taking

The interactive term $EVN_{it} * STA_{it}$ has a significant positive correlation with $RISK_{it}$, indicating that the nature of property rights plays a positive role in regulating the relationship between environmental social responsibility and corporate risk-taking. That is to say, the implementation of social responsibility by state-owned companies is more conducive to improving their risk-taking level.

5. Conclusion and Recommendations

5.1. Conclusion

In order to examine the impact of corporate environmental social responsibility performance and property rights on corporate risk-taking, we select the data of listed companies in Shandong Province from 2008 to 2017 for inspection. The results of this paper show that: (1) the implementation of environmental social responsibility by companies can help to improve the level of corporate risk-taking; (2) the better the performance of state-owned companies' environmental social responsibility is, the better it is to improve their risk-taking level, while the impact of non-state-owned companies' environmental social responsibility performance on their risk-taking is not significant. (3) the nature of property rights can play a positive role in the relationship between environmental social responsibility and corporate risk-taking.

5.2. Recommendations

5.2.1. Listed Companies. The fulfillment of environmental social responsibility by the company is conducive to improving the level of corporate risk-taking. Therefore, listed companies should further fulfill their social responsibility to the environment and improve their risk-taking levels.

5.2.2. Industries. All industries should further develop the content and form of environmental social responsibility disclosure in accordance with their own characteristics, and standardize the disclosure form of environmental social responsibility information.

5.2.3. Regulatory Authorities. At present, China's environmental social responsibility information disclosure is not standardized. Relevant regulatory agencies should further develop and improve environmental social responsibility laws and regulations, and regulate the disclosure of environmental social responsibility of companies.

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