




The impact of corporate social responsibility on corporate value

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Abstract. Uncertainty is a typical characteristic faced by enterprises. Institutional theory holds that uncertainty can help enterprises improve the value of fulfilling their social responsibilities. This paper discusses the conditions of the application of real option logic to corporate social responsibility and distinguishes the endogenous uncertainty from the exogenous uncertainty. Using the annual sample of 4561 Chinese listed companies from 2011 to 2019, the empirical analysis shows that economic policy uncertainty applies to the impact of the value of call options predicted by the real option theory.

Keywords: Corporate social responsibility, Uncertainty, Real Option

1 Introduction

In recent years, various shocks of uncertainty have created an era of dramatic change, such as Sino-US trade friction and COVID-19. Uncertainty affects the economic environment in which enterprises operate and their behaviors. Our goal is to study the influence of CSR on corporate value under different types of uncertainty.

The empirical research results of the relationship between CSR and corporate value are mixed. Previous studies used a single traditional valuation technique, indicating that enterprises should not invest in social responsibility[1], but this method ignored the strategic value of CSR. Hart and Milstein (2003) called for the use of real option theory to evaluate such investments that create sustainable value[2]. Therefore, Husted (2005) analyzed CSR within the framework of real options. On this basis, Cassimon et al. (2016) considered the impact of opportunity cost of delaying investment decisions and pointed out the best time for CSR investment[3]. More and more CSR literature shows that the fulfillment of CSR can reach more stakeholders to obtain relevant opportunities and avoid certain risks [4].

To sum up, previous studies focused on the timing of CSR investment based on cost-benefit. However, there is little literature on the real impact of CSR uncertainty resolution in the real options framework. In this regard, we study whether uncertainty can predict the value of CSR in the way of real option logic, that is, it depends on whether uncertainty is exogenous. We believe that the value of social capital brought about by social responsibility is particularly important when companies face great economic policy uncertainty. Therefore, in an era when "the greatest certainty is uncertainty", it is

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particularly important to identify the types of sources of uncertainty and thus make decisions.

2 Theoretical analysis and research assumptions

2.1 CSR and corporate value

Fulfilling CSR can improve the reputation of enterprises[5], gain the favor of stakeholders and alleviate certain risks[6]. At the strategic level, an enterprise is a combination of businesses. Avoiding controversial businesses can help enterprises gain competitive advantages and improve their market performance[7]. Positive interaction with stakeholders can increase market opportunities, reduce transaction costs, improve customer satisfaction and employee productivity. Therefore, building a positive relationship with stakeholders can lead to sustained and stable revenue and profits. In addition, fulfilling social responsibilities can gain political legitimacy and help companies obtain government subsidies. In this regard, CSR can be regarded as a "call option", which can meet the expectations of stakeholders, ensure that enterprises obtain various continuous resources, obtain future competitive advantages, and increase the value of enterprises. Therefore, the hypothesis is put forward:

H1: CSR has a positive impact on enterprise value.

2.2 Real option theory and uncertainty

Uncertainty is the determining factor of value creation in options. The conditions for resolving uncertainty need to be more clear, so that current strategic decisions can be linked with uncertainty[8]. Uncertainty means 'not being able to predict something accurately'. Reviewing previous studies, it is found that the source of uncertainty is the key to the division of uncertainty level, that is, whether the uncertainty is endogenous or exogenous for an enterprise.

Endogenous uncertainty. R&D intensity reflects the degree to which an enterprise chooses to develop a new technology or product and is a strategic risk of its own operation. Research and development is uncertain because decision makers cannot fully foresee the link between R&D expenditure and the actual introduction of new products or processes, and do not know when actual or potential competitors will introduce innovative products that affect the value of R&D projects upon completion. Companies that invest heavily in research and development show greater dynamic efficiency, which is the core factor for enterprises to weigh risk.

Enterprises can reduce or even eliminate this uncertainty by learning and acquiring new knowledge and information. For example, when developing technical resources vigorously, training R&D personnel, modifying existing or adopting new technologies. In addition, resolving this uncertainty may translate into investment costs and the net present value of output. Research and development investment is a high-cost project, and the fulfillment of CSR requires a certain cost. Therefore, endogenous uncertainty cannot determine the value of a call option. Put forward the hypothesis:

H2: R&D uncertainty mitigated the positive impact of CSR on firm value.

Most exogenous uncertainties are beyond the control of enterprises and are not affected by their behaviors[9]. For example, the uncertainty of economic policies, the macro-environment that cannot be guessed or manipulated determines the fluctuations of the economy, and the complex system composed of the market and the government determines inflation, interest rates, taxes, etc. It is similar to the systemic risk composed of common factors of the whole economy in financial literature. This uncertainty cannot be resolved by the actions and management of a single enterprise. China is one of the emerging economies with rapid development of economic quality. It is difficult for a single enterprise's behavior to affect China's macroeconomic situation. The change of economic policy is the key factor affecting enterprise value.

Fulfilling social responsibility can meet the needs and expectations of shareholders and investors. Fulfilling commitments to employees creates an environment of trust and win-win cooperation. When the economy is murky, shareholders and investors invest where their values better align. Therefore, CSR enterprises can gain the support of shareholders or investors who share the same values and vision. At the same time, it shows that enterprises have the ability to undertake social responsibility and obtain investment to produce a positive cycle. Thus, exogenous uncertainty conforms to the logic of real options. Put forward the hypothesis:

H3: Economic policy uncertainty promotes the positive impact of CSR on corporate value.

3 Research and design

3.1 Sample selection and data sources

Corporate financial data and other information are sourced from the CSMAR database. CSR data is obtained from Rankins, and corporate financial data is obtained from CSMAR. The study sample included all A-share listed companies in Shanghai and Shenzhen from 2011 to 2019. Excluding the financial industry, it is limited to enterprises with no missing values for key variables. In order to eliminate the influence of extreme values on empirical results, all continuous variables except CSR scores were winsorised at the 1% level. The final sample included 816 firms with annual observations from 4,561 firms.

3.2 variable declaration

Definitions and measurements of relevant variables are shown in Table 1.

3.3 Research variables and empirical models

In this paper, the following models (1), (2) and (3) are constructed to verify hypothesis 1, hypothesis 2 and hypothesis 3 respectively.

$$Q_{i,t+1} = \beta_0 + \beta_1 \text{CSR}_{i,t} + \sum \beta_c \text{Controls}_{i,t} + \varepsilon_{i,t} \quad (1)$$

$$Q_{i,t+1} = \beta_0 + \beta_1 \text{CSR}_{i,t} + \beta_2 \text{RD}_{i,t} + \beta_3 \text{CSR}_{i,t} \times \text{RD}_{i,t} + \sum \beta_c \text{Controls}_{i,t} + \varepsilon_{i,t} \quad (2)$$

$$Q_{i,t+1} = \beta_0 + \beta_1 \text{CSR}_{i,t} + \beta_2 \text{EPU}_{i,t} + \beta_3 \text{CSR}_{i,t} \times \text{EPU}_{i,t} + \sum \beta_c \text{Controls}_{i,t} + \varepsilon_{i,t} \quad (3)$$

Table 1. Definitions of key variables

Variable symbols	Variable name	Variable definitions
$Q_{i,t+1}$	Corporate value	TobinQ: Market value / total assets
CSR	CSR	Rankins CSR ratings as a proxy for CSR
RD	R&D uncertainty	R&D intensity as a proxy for a firm's endogenous uncertainty, R&D investment/operating revenue
EPU	Economic policy uncertainty	The monthly economic policy uncertainty index constructed by Baker (2016) averaged to convert to an annual economic policy uncertainty index[10].
Age	Age of business	Natural logarithm of establishment time
Size	Size of business	Natural logarithm of total assets at the end of the year
ROA	Return on assets	Net profit/total assets
Lev	Gearing ratio	Total liabilities/total assets
IB	Percentage of independent directors	Number of Independent Directors / Number of Directors
Dual	Double-hatted Executive Compensation	Chairman and Chief Executive Officer both
Salary	Marketability Index	Logarithm of total remuneration of top three executives
Market	Nature of ownership	FAN Marketability Index
SOE	Annual variables	1 if the ultimate control is the state, 0 otherwise
Year	Industry variables	Annual dummy variables
Ind		Industry dummy variables, based on the 2012 SEC Industry Classification

4 Empirical Results and Analysis

4.1 Descriptive statistics

Table 2 shows the statistical values of the variables in the model except for the industry, region and year dummy variables. It shows that there is some variation in corporate values and a large variation between CSR scores in China. The VIF values for the regression models are all less than 2.5, which is much less than the accepted threshold of 10, and therefore there is no multicollinearity in this study.

4.2 Empirical results

The study uses panel data from 2011-2019 and uses the GLS model to address heteroskedasticity and autocorrelation. In terms of control variables, firm value was significantly correlated with firm age and executive compensation, indicating the importance of controlling for these variables when determining the value effect of CSR.

From the coefficient of 0.006 ($p < 0.01$) for model (1) CSR in Table 3, it is clear that CSR positively affects corporate value and hypothesis 1 is supported. From model (3), the coefficient of the interaction term between CSR and R&D uncertainty is -0.001 ($p < 0.05$), indicating that R&D uncertainty is not applicable to the real options framework, and hypothesis 2 is supported. From model (5), the coefficient of the interaction term between CSR and economic policy uncertainty is 0.035 ($p < 0.01$), indicating that economic policy uncertainty, as an exogenous uncertainty, applies to the real options framework and hypothesis 3 is supported.

Table 2. Descriptive Statistics

	N	Mean	Std	Min	Med	Max	VIF
Q_{t+1}	4732	1.751	1.05	0.79	1.4	8.74	
CSR	5841	40.245	12.223	13.33	37.75	89	1.38
Age	5841	17.902	5.406	3	18	35	1.08
Size	5841	23.200	1.449	20.09	23.07	27.47	2.41
Lev	5841	0.490	0.201	0.05	0.5	0.94	1.57
Salary	5818	14.697	0.72	12.94	14.63	17.15	1.48
IB	5840	0.146	0.028	0.08	0.14	0.25	1.06
Dual	5748	0.178	0.383	0	0	1	1.12
Market	5841	7.992	1.748	2.33	8.1	10.83	1.17
SOE	5717	0.616	0.486	0	1	1	1.34
HHI	5841	0.113	0.113	0.02	0.08	0.9	1.08
RD	4364	3.693	4.534	0	2.95	57.49	1.2
EPU	5841	11.640	2.377	8.49	11.21	16.66	1.12

Table 3. Analysis of regression results

	(1) Q_{t+1}		(2) Q_{t+1}		(3) Q_{t+1}		(4) Q_{t+1}		(5) Q_{t+1}	
CSR	0.006*	(4.64	0.005*	(2.85	0.004*	(2.30	0.005*	(2.86	0.005*	(4.01
	**)	**)	*)	**)	**)
RD			0.032*	(5.70	0.028*	(4.88	0.032*	(5.69		
			**)	**)	**)		
CSR×R D					-	(-				
					0.001*	3.29)				
					**					
EPU							0.021*	(2.83		(-
							**)		0.62)
CSR×E PU									-0.003	(3.15
									0.001*)
									**	
Age	-	(-	-	(-	-	(-	-	(-	-	(-
	0.009*	3.64)	0.011*	3.47)	0.011*	3.39)	0.011*	3.30)	0.010*	(-
	**		**		**		**		**	3.81)
Size	-	(-	-	(-	-	(-	-	(-	-	(-
	0.286*	20.1	0.303*	16.3	0.308*	16.6	0.303*	16.3	0.286*	20.1
	**	5)	**	9)	**	0)	**	8)	**	7)
Lev	-	(-	-	(-	-	(-	-	(-	-	(-
	0.716*	8.35)	0.620*	5.67)	0.602*	5.51)	0.614*	5.63)	0.712*	8.32)
	**		**		**		**		**	
Salary	0.053*	(2.30		(1.77	0.060*	(2.06		(1.80	0.054*	(2.37
	*)	0.052*)	*)	0.053*)	*)
IB	-	(-	-	(-	-	(-	-	(-	-	(-
	-0.114	0.25)	-0.134	0.23)	-0.047	0.08)	-0.152	0.26)	-0.098	0.21)
		(1.25		(0.34		(0.34		(0.30		(1.25
Dual	0.044)	0.015)	0.015)	0.013)	0.044)

Market	0.005	(0.64)	-0.003	(-0.27)	-0.002	(-0.25)	-0.002	(-0.17)	0.004	(0.49)
SOE	0.014	(0.43)	0.078*	(1.94)	0.075*	(1.86)	0.079*	(1.96)	0.017	(0.52)
HHI	1.257*	(3.77)	2.011*	(4.09)	2.046*	(4.17)	2.005*	(4.08)	1.275*	(3.83)
Cons	7.731*	(21.67)	8.121*	(16.81)	8.104*	(16.80)	7.834*	(15.89)	7.808*	(21.40)
N	4,561		3,301		3,301		3,301		4,561	

*** p<0.01, ** p<0.05, * p<0.1

4.3 Robustness tests

Based on the median value of uncertainty, the sample was divided into high and low subgroups for robustness testing. The results are shown in Table 4. In the high R&D uncertainty sample group, the CSR score coefficient was 0.005 (p<0.01) and in the low R&D uncertainty sample group, the CSR score coefficient was 0.006 (p<0.01). In the high and low sample grouping of economic policy uncertainty, the CSR coefficient was 0.009 (p<0.01) and the CSR coefficient was 0.002. Similar to the results of the previous test hypothesis.

Table 4. Robustness tests

	RD				EPU			
	(1) High	(2) Low	(3) High	(4) Low	(1) High	(2) Low	(3) High	(4) Low
CSR	0.005***	(2.99)	0.006***	(3.35)	0.009***	(6.25)	0.002	(0.81)
Age	-0.010***	(-2.97)	-0.012***	(-2.87)	0.005	(1.57)	-0.034***	(-7.35)
Size	-0.348***	(-9.54)	-0.312***	(-6.99)	-0.313***	(-9.77)	-0.354***	(-9.42)
Lev	-1.012***	(-28.82)	-0.882***	(-24.99)	-1.099***	(-31.68)	-0.781***	(-23.42)
Salary	0.179***	(5.81)	0.106***	(3.10)	0.128***	(4.76)	0.159***	(4.04)
IB	-0.887	(-1.44)	1.317*	(1.86)	-0.318	(-0.60)	0.534	(0.62)
Dual	0.076	(1.64)	0.103*	(1.67)	0.057	(1.30)	0.138**	(2.23)
Market	0.007	(0.63)	-0.025**	(-2.08)	0.008	(0.83)	-0.029**	(-2.06)
SOE	-0.061	(-1.53)	0.100**	(2.00)	0.002	(0.05)	-0.005	(-0.09)
HHI	-0.103	(-0.60)	0.691***	(4.36)	0.158	(1.21)	0.409*	(1.89)
Cons	7.805***	(18.49)	7.574***	(14.16)	7.222***	(18.69)	8.643***	(14.91)
N	2,862		1,699		2,666		1,895	

*** p<0.01, ** p<0.05, * p<0.1

5 Conclusion and Insights

This paper verifies the impact of CSR on corporate value from a sample of 4561 Chinese listed companies constructed from CSMAR and RKS databases, and further examines the impact of different types of uncertainty on CSR and corporate value. The study finds that: (1) Fulfilling social responsibility can acquire social capital related to stakeholders, and social responsibility has the value of a call option. (2) Higher uncertainty can increase the value of the option, and social capital acquired through social responsibility can, to a certain extent, reduce the impact of uncertainty on the firm, and

economic policy uncertainty significantly enhances the value from fulfilling social responsibility. (3) Endogenous uncertainty does not fit into this logic, and R&D uncertainty is negatively related to the value of CSR. Therefore, it is concluded that the real options logic applies to the value derived from social responsibility when firms face exogenous uncertainty; it does not apply when uncertainty is endogenous.

There is guidance for business managers and governments in their decision-making. Firstly, fulfilling CSR has a spillover effect. Carrying out CSR activities not only promotes the harmonious development of society, but also enhances the value of enterprises. Secondly, with the uncertainty of exogenous life, social responsibility is more likely to promote corporate value. In addition, R&D has a high-risk nature and it is not necessary to choose a high-risk strategy to improve corporate performance in the case of better social responsibility performance. Therefore, corporate managers, with limited rationality, enhance the maintenance of stakeholder relationships and rationalise the use of social capital to reduce the impact of exogenous solution uncertainty. Government agencies can guide companies to actively fulfil their social responsibility through policies. For example, for customers, enterprises need to provide higher quality products and ensure the authenticity of their products by undertaking CSR. For governments, companies enjoy preferential policies while actively responding to government calls to help set up political party material collections. For communities, companies should actively make social donations to provide, co-ordinate and distribute supplies to infected areas.

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