ISSN 2616-5902 Vol. 3, Issue 12: 48-53, DOI: 10.25236/AJBM.2021.031210

Charitable Giving, Marketability, and R&D Investment

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Abstract: *Using the data of high-tech listed companies in China from 2010 to 2017 as a sample, this paper explores the strategic influence path between corporate charitable giving and R&D investment, and introduces the degree of regional marketization to verify the moderating effect on the relationship between charitable giving and R&D investment. The results found that: (i) There is significant positive effect of charitable giving on R&D investment. (ii) There is a difference in the impact of marketization degree on the relationship between charitable giving and R&D investment, and low marketization degree plays an enhanced moderating role on the positive impact between charitable giving and R&D investment.The paper supports the strategic philanthropy theory and helps to understand corporate charitable giving and innovation behavior from the perspective of endogenous and exogenous corporate support.*

Keywords: *charitable giving, marketability, R&D investment, strategic philanthropy theory*

1. Introduction

Since the epidemic, Chinese enterprises have consciously assumed social obligations under the severe environment, and various types of material donations and charity donations have demonstrated their commitment and sense of responsibility.However, as profit-oriented subjects, the charitable motives of enterprises imply certain strategic intentions [1]. Strategic philanthropy theory reveals the trade-off motivation of enterprises to make donations, i.e., to create a win-win situation between economic and social interests [2]. By responding to the needs of external stakeholders and building good social network relationships through the act of charitable giving, companies can in turn obtain the strategic resources and capabilities needed for innovation.

Innovation is the power source to maintain and enhance the core competitiveness of enterprises [3]. Enterprise innovation is indispensable for sustainable development of enterprises. Especially for high-tech companies, R&D investment is an important strategic choice to build their professional capital.Existing studies have considered the influence of factors such as agency mechanism setting and resource redundancy on corporate R&D investment, but have not considered corporate innovation into the corporate strategy framework. Therefore,this paper explores the relationship between the promotion of charitable giving on R&D investment at the strategic level based on a strategic perspective,and expands the limits of research on the drivers of corporate innovation.With the goal of maximizing the common interests of stakeholders,the paper reveals the strategic motivation behind corporate philanthropic giving behavior,i.e.,the social capital built by philanthropic giving contributes to the strategic synergy with the professional assets built by R&D investment. In addition, we introduce the government-enterprise linkage effect and explore the moderating effect of regional differences in marketization on the relationship between charitable giving and R&D investment, making the findings more applicable and relevant to regions.

2. Theoretical analysis and research hypothesis

2.1. Charitable giving and R&D investment

Corporate philanthropic giving as part of corporate social responsibility has been embedded in the overall strategic framework by an increasing number of companies,while R&D investment has been the most important strategic choice for companies in high-tech industries[4].Wang Duanxu et al[5]explored

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the relationship between corporate giving and stakeholders from the perspective of instrumental behavior,arguing that when corporate charitable giving meets the expectations of most stakeholders,it will enhance the cooperation between stakeholders and companies.jansen et al[6]argued that corporate charitable giving helps to build bridges between companies,government and society to obtain a broader and deeper relationship networks.Such bridges and networks can give back to enterprises more innovative capabilities and resources,and promote innovative activities.Yan Ye and Kongyue Li[7]argue that the social capital generated by charitable giving can help reduce the risks associated with uncertainty in corporate innovation. In summary, it is argued that the social capital formed by charitable donations is beneficial to support and solidify the technical capital formed in the process of R&D innovation, proposing the hypothesis that:

H1: There is a positive correlation between charitable giving and R&D investment.

2.2. Charitable giving, Marketization degree and R&D investment

The strategic decisions of firms are influenced by the market environment. The degree of marketization of the region can be used to portray the degree of local government intervention in the firm[8]. The degree of economic intervention varies from region to region. The degree of economic intervention is relatively low in more market-oriented regions, while it is relatively high in less market-oriented regions. Corporate charitable giving behavior has certain government-enterprise bonding effects and is an important way to strengthen the relationship between companies and the government [9]. Enterprises in regions with a relatively low degree of marketization are constrained by resources and are more inclined to establish good government-enterprise ties to build bridges with the government and mitigate the uncertainty of the policy environment faced by enterprises, so as to obtain government funding preferences; whereas in regions with a relatively high degree of marketization, the market economy is developing rapidly and information transparency is improving, and enterprises rely more on internal self-generated resources for R&D investment and technology upgrading. The government-enterprise bond of corporate philanthropy the government-enterprise bonding effect of corporate charitable donations is weak. Therefore, the hypothesis is proposed.

H2: The degree of marketization has an inverse moderating effect on the relationship between charitable giving and R&D investment.

3. Research Design

3.1. Data source and sample selection

We select A-share non-financial private listed companies in Shanghai and Shenzhen markets from 2010-2017 as the research sample through Wind database and CSMAR database. Since there are industry differences in corporate R&D investment, we draw on the approach of Shen Yi [4] et al. and select Chinese high-tech industries with more frequent product replacement and higher intensity of R&D investment as representatives, limiting to the industries of pharmaceutical manufacturing, railroad, ship and aerospace manufacturing, and electronic communication manufacturing, excluding the sample data of those with missing available data and ST enterprises, and finally obtaining the relevant companies in the research years. The sample of companies with missing data and ST companies was excluded, and 375 annual observations were obtained for the years under study.

3.2. Definition of variables

1) *Explained variables*. For corporate R&D investment, the common practice of domestic and international studies is to measure the intensity of R&D investment using the ratio of R&D investment to operating revenue.This paper follows the previous research approach and selects R&D investment ratio to operating income as the measure of R&D investment.

2) *Explanatory variables.*The current literature mostly uses the amount of donations in the current year as a measure of charitable giving, but this approach makes it difficult to test the long-term effects of charitable giving on the one hand, and also tends to hide the undesirable motives behind episodic donations. Therefore, in order to distinguish the strategic giving behavior of enterprises, this paper refers to the research findings of Pei Hongmei [10] scholars, takes the data of corporate giving with consecutive giving years greater than or equal to 3 years as the object of analysis, and adopts the ratio of the amount of annual charitable giving to the operating income of enterprises to indicate the intensity of charitable

ISSN 2616-5902 Vol. 3, Issue 12: 48-53, DOI: 10.25236/AJBM.2021.031210

giving.

3) *Moderating variables.* About Marketization degree data, the paper adopts the data disclosed by Wang Xiaolu and Fan Gang in the China Marketization Index Report by Province (2018) as the measure of marketization degree in each region of China. The mean value of marketability degree data will be obtained, and two types of marketability degrees will be distinguished according to the mean value, with a value of 0 assigned below the mean value and a value of 1 assigned above the mean value, so as to study the moderating effect of marketability degree on the relationship between charitable giving and corporate investment in R&D.

4) *Control variables.* Referring to previous studies, we choose enterprise size, gearing ratio, enterprise profitability, and controlling shareholder's shareholding ratio as the control variables of the model, and considering that factors such as the industry in which the enterprise is located and the year under investigation may affect the R&D activities of the enterprise, this paper controls for the fixed effects of the above two aspects. The specific variables are defined and described in Table-1 below.

Table 1: Variable definition table

TYPE	NAME	CODE	DESCRIPTION
Explained variables	R&D Investment	RD	Enterprise R&D investment amount / turnover
Explanatory variables	Charitable Donation	DON	The total amount of social donations in the company's statistical year
Moderating variables	Marketability	MD	China Marketability Index by Province
Control variables	Enterprise size	SIZE	Natural log of total assets
	Leverage ratio	LEV	(Total liabilities/total assets) 100%
	Return on Assets	ROA	(Net income/average net assets) 100%
	Concentration Rate	CR10	Shareholding ratio of top ten shareholders
	Industry	industry	Industry dummy variable
	Year	year	Line dummy variable

3.3. Empirical Model

Based on the research hypotheses proposed in the previous section regarding the relationship between charitable giving, marketability and R&D investment, the following benchmark regression model is established in this paper, in which model equation (1) is established in order to verify the impact of CSR on corporate value.

$$RD = \alpha_0 + \alpha_1 DON + \alpha_2 SIZE + \alpha_3 LEV + \alpha_4 ROA + \alpha_5 CR10 + \sum industry + \sum year + \varepsilon \quad (1)$$

4. Empirical analysis

4.1. Descriptive analysis

Table 2: Descriptive statistics of variables

Variable	Mean	Standard deviation	Min.	Max.
DON	4.765	1.921	-1.609	14.51
RD	3.473	4.182	0.00620	51.55
MD	8.372	1.869	-0.300	11.11
SIZE	23.24	1.569	18.76	28.86
LEV	0.476	0.196	0.00800	1.163
ROA	0.0953	0.123	-1.577	0.711
CRIO	59.92	16.11	14.60	99.99

As can be seen from Table 2, the average corporate charitable giving is 4.765, with a maximum value of 14.51 and a minimum value of -1.609. The maximum value of R&D investment reaches 51.55, with a minimum value of 0.006 and a mean value of 3.473. Since there is no fixed industry or category of companies, industry competition and industry characteristics among companies have different needs for R&D innovation, and there are also volume gaps between company’s limits the amount of donations, thus explaining a certain degree of variation in the behavior of firms making charitable donations and investing in R&D. The maximum value of the moderating variable regional marketability is 11.11 and

ISSN 2616-5902 Vol. 3, Issue 12: 48-53, DOI: 10.25236/AJBM.2021.031210

the minimum value is -0.300, indicating that there are significant differences in marketability across regions, which can be used to further explore the moderating effect of different degrees of marketability. In terms of control variables, the selected enterprise asset size approximately follows a normal distribution, with a maximum value of 28.86 and a minimum value of 18.76; the mean value of enterprise asset-liability ratio is 0.476, and the mean value of enterprise asset return is 0.0953.

4.2. Correlation analysis

Table 3: Correlation analysis results of variables

	RD	DON	MD	CR10	SIZE	LEV	ROA
RD	1						
DON	-0.100***	1					
MD	0.067**	-0.053*	1				
CR10	-0.203***	0.200***	-0.00500	1			
SIZE	-0.291***	0.454***	0.074***	0.259***	1		
LEV	-0.322***	0.159***	0.00500	0.00900	0.581***	1	
ROA	0.0190	0.181***	0	0.082***	0.0280	-0.215***	1

Ps: *** p<0.01, ** p<0.05, * p<0.1

As shown by the results in Table-3, corporate charitable giving shows a significant positive relationship with corporate size, corporate financial leverage, corporate profitability and shareholder ownership, but a significant negative relationship with the degree of marketability. R&D investment has a significant negative relationship with enterprise size, financial leverage, profitability and shareholder ownership, while it has a significant positive relationship with marketability. Among them, there is a significant negative relationship between corporate charitable giving and corporate R&D investment. In addition, the person correlation coefficient table shows that the correlations between the variables are below 0.6, and the variance inflation factor test (VIF<5) also excludes the possibility of multicollinearity between the variables.

4.3. Regression analysis

The regression test of the grouping of charitable giving and R&D investment under different degrees of marketability was conducted. Since the moderating variable marketization degree is a categorical variable and the explanatory variable charitable giving is a continuous variable, group regression is used to test the moderating effect of marketization degree. The regressions were conducted according to the marketization degree (MD) of the firm's region, with MD=1 being the higher marketization degree group and MD=0 being the lower marketization degree group, and the regressions were conducted using the benchmark model. At the same time, the regression results are shown in Table 3 to verify the relationship between corporate philanthropic giving and corporate R&D investment in regions with different degrees of marketization.

Table 4: Regression results

Variable	RD(Baseline mode)		RD(Hysteresis Test)		RD(Low marketization)		RD(High marketization)	
	coefficients	T-value	coefficients	T-value	coefficients	T-value	coefficients	T-value
Don	0.513***	(4.24)	0.345**	(2.03)	0.596***	(3.04)	0.221*	(1.68)
SIZE	-0.018	(-0.10)	0.094	(0.35)	-0.021	(-0.06)	0.276	(1.33)
LEV	-9.599***	(-6.58)	-10.877***	(-5.44)	-12.091***	(-3.97)	-4.848***	(-3.25)
ROA	2.087	(0.84)	3.485	(0.97)	5.878	(1.37)	-0.182	(-0.07)
CR10	-0.030**	(-2.05)	-0.068***	(-3.14)	0.007	(0.29)	-0.030	(-1.58)
Constant	8.672**	(2.16)	11.645**	(2.00)	3.998	(0.50)	1.514	(0.33)
Year	Yes		Yes		Yes		Yes	
Industry	Yes		Yes		Yes		Yes	
R-squared	0.615		0.674		0.835		0.438	
r2_a	0.577		0.619		0.793		0.346	
F	16.21		12.33		19.60		4.738	

Ps: *** p<0.01, ** p<0.05, * p<0.1

In the benchmark model, the regression coefficient of R&D investment and charitable donation is 0.513, which is significant under 1% adjustment, indicating that the social capital formed by charitable

ISSN 2616-5902 Vol. 3, Issue 12: 48-53, DOI: 10.25236/AJBM.2021.031210

donation is conducive to supporting and stabilizing the technical capital formed in the process of R&D innovation, and the empirical results validate H1 and provide strong support for further testing H2. The regression results of the two groups show that in the low marketization group, the regression coefficient of R&D investment and charitable donation is 0.596, which passes the significance test; while in the high marketization group, the regression coefficient of R&D investment and charitable donation is 0.221, whose significant effect is less than that of the low marketization group, indicating that there is a difference in market regulation, which verifies H2. The lag test results show that charitable the lagged test results show that the positive effect of charitable donations on R&D investment remains significant.

4.4. Robustness test

To further verify the robustness of the findings, this paper refers to the study by Sihai Li [11] et al. The natural logarithm of total charitable giving and the ratio of charitable giving to total assets at the end of the period are used as proxy variables for charitable giving to re-test the hypotheses and finally obtain conclusions that are consistent with the main test. To overcome the possible endogeneity problem between charitable giving and R&D investment caused by sample selection bias and reverse causality, the empirical results were tested using the Heckman two-step method. Drawing on the method of Chuntao Li [12] and Yue Guo [13], the mean industry charitable giving was selected as the instrumental variable and the predicted charitable giving obtained in the first stage was substituted for the true charitable giving in the second stage regression. The specific empirical results show that charitable giving still significantly motivates firms' R&D innovation activities, which are limited to the text without elaboration.

5. Conclusions and Recommendations

With a strategic philanthropic perspective, corporate giving behavior as a means of external information transfer shows a certain sense of strategic intent. By bridging internal and external communication, corporate giving can reduce the uncertainty of corporate innovation to some extent, but its utility varies with the degree of regional marketization. Considering the government-enterprise bonding effect, it is argued that the positive effect of charitable giving on R&D investment is more significant in regions with low marketization; and vice versa in regions with high marketization. Therefore, this paper makes the following recommendations.

For regions with low marketization, charitable giving by firms will be more helpful to improve public perceptions and deepen the trust of government, banks and other financial supporters in the firms, so that more external investment can be obtained. For regions with a high degree of marketization, charitable giving by enterprises is more of a way to assume social responsibility and build up their image. The government should focus on building a good business environment, reducing business operating costs, and giving certain policy leanings to enterprises that play a demonstration role in donations.

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