Corporate Social Responsibility, Media Sentiment and Profit Quality: Evidence from the Chinese Listed Companies

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Abstract: Stakeholder theory points out those companies should not only pay attention to the interests of shareholders and create value for them, but also fulfill their responsibilities to all stakeholders to achieve healthy and sustainable development. Corporate social responsibility can reflect the extent to which companies fulfill responsibilities to stakeholders. Profit quality refers to the quality of the enterprise's profit, which can reveal the ability of corporate sustainable development. Based on stakeholder theory, this paper studies the effect of corporate social responsibility on profit quality. Since media sentiment can affect stakeholders' perception to corporate social responsibility, we explore its moderating role in the relationship between the two. Further, we select the Chinese listed companies as the research sample for empirical testing. We find that the corporate social responsibility of the overall Chinese listed companies has a significant positive impact on profit quality. Furthermore, media sentiment promotes the positive impact of corporate social responsibility on profit quality.
Keywords: Corporate social responsibility, Media sentiment, Profit quality

1. Introduction

With the increasingly serious situation of environmental pollution and the safety of food and pharmaceutical, corporate social responsibility (CSR) has been widely concerned by all walks of life. Can companies bring economic benefits to themselves while fulfilling CSR? The existing literature on the economic consequences of CSR mainly focuses on the impact on financial performance. The research conclusion mainly has the following two aspects: (1) CSR has a positive effect on financial performance. Using the meta-analysis method, Li and Wei (2014) found that although the research results on the relationship between CSR and financial performance are still controversial, most of the existing studies believe the significant positive correlation between the two. Wang, Dou, and Jia (2016) pointed out that CSR in the current period and lagging a period has a significant positive impact on financial performance. (2) CSR has no significant impact on financial performance. Using the time series fixed effect method, Nelling and Webb (2009) found that CSR has no effect on financial performance. Zhao and Murrell (2016) indicated that CSR has no significant positive effect on financial performance because the relationship between the two is complicated.

There is still no consistent conclusion on whether CSR can bring economic returns to the enterprise itself. The existing literature mainly focuses on the economic consequences of CSR on financial performance. However, financial performance only reflects the quantity of corporate profits, not the quality of corporate profits. Profit quality reflects the corporate capability of healthy and sustainable development. Profit quality is the analysis of the essence of earnings, which reveals the basic ability of enterprises to continuously obtain profits in a certain period from multiple perspectives, including five dimensions: the amount of profit, the structure of profit, the ability to obtain cash, the stability of profit and the sustainability of profit (Li, Wen, and Jiao, 2019). Therefore, this paper explores whether CSR has a significant positive impact on profit quality.

The literature on the economic consequences of CSR is mainly studied from the following aspects: (1)

Mitigating the impact of negative events. When the enterprise faces a negative event for the first time, CSR cannot completely offset the negative impact but can compensate partly (Kang, Germann, and Grewal, 2016; Shiu and Yang, 2017). (2) Reducing information asymmetry. CSR can increase corporate performance by reducing information asymmetry (Cui, Jo, and Na, 2018; Lopatta, Buchholz, and Kaspereit, 2015). (3) Improving investment efficiency. The higher the level of CSR, the more effective corporate investment (Benlemlih and Bitar, 2016; Shahzad, Rehman, Nawaz, and Nawab, 2018). (4) Reducing capital cost. Martínez-Ferrero, Banerjee, and García-Sánchez (2014) confirmed that CSR can reduce the cost of capital. (5) Reducing system risk. CSR can reduce corporate system risk and then increase corporate value (Albuquerque, Koskinen, and Zhang, 2018; Harjoto and Laksmana, 2018).

The rapid development of information technology in the new era has made the media be the main medium for information dissemination. The media not only has the basic function such as information transmission, but also has the external governance function such as social supervision, which is usually regarded as a "fourth party right" independent of administration, legislation and justice (Dyck, Volchkova, and Zingales, 2008). The external governance effect of the media on the enterprise means that the media can transmit the information to the market and stakeholders and then supervise, restrict, and guide corporate actions (Dyck, Volchkova, and Zingales, 2008). The media's attention to CSR can directly affect the contribution of stakeholders to the enterprise, and then affect the corporate economic benefits.

However, there is rather limited literature on the economic consequences of CSR from the perspective of media. Su, Peng, Tan, and Cheung (2016) found that the impact of CSR on financial performance is more significant in the high-information communication market compared with the low-information communication market. Wen and Zhou (2017) indicated that the media governance has a significant "inverted U-shaped" moderating role in the positive impact of carbon information disclosure on financial performance. Media sentiment is the result of sentiment analysis to media reports, which refers to the overall sentiment bias of media toward an enterprise's CSR report. Media sentiment can influence stakeholders' perceptions of CSR. Eberle, Berens, and Li (2013) found that the negative impact of negative media reports on corporate reputation is much greater than the positive impact of positive reviews. Therefore, it is of great significance to study whether media sentiment plays a promoting or inhibiting role in the impact of CSR on profit quality. Therefore, this paper explores the moderating role of media sentiment in the impact of CSR on profit quality.

This paper has some contributions compared with the existing literature. (1) Based on the sample of Chinese listed companies, we empirically analyze the impact of CSR on profit quality. This contributes to the study of the economic consequences of CSR and provides a theoretical basis for companies to take the initiative to fulfill CSR. (2) We discuss the moderating role of media sentiment in the impact of CSR on profit quality, which is limited in the existing literature. Although some literature studies the role of media coverage and media attention, little research has been done on media sentiment, especially on the impact of CSR on profit quality.

The remainder of this paper organizes as follows. Section 2 discusses the theoretical analysis and research assumptions. Section 3 describes the research design. Sections 4 presents the empirical results and Section 5 concludes the paper.

2. Theoretical analysis and research assumptions
2.1 CSR and profit quality

For the research on the economic consequences of CSR, the existing literature mainly focuses on the impact of CSR on financial performance. However, financial performance only indicates the amount of corporate profit but cannot reflect the true profitability of an enterprise. Profit quality shows the essence of corporate profitability, which reflect not only the amount of corporate profit in a certain period of time but

also the main source and component of the profit, the ability to obtain cash, the ability of sustainable growth and the magnitude of profit fluctuation (Li, Wen, and Jiao, 2019).

This paper analyzes the impact of CSR on profit quality based on the stakeholder theory. Companies and their stakeholders have concluded multilateral implicit contracts. The key to whether an enterprise can obtain high-quality profits is whether it meets the stakeholders' needs (Wen and Fang, 2008). CSR represents the return of capital invested by stakeholders (Wen and Fang, 2008). A high level of CSR thus can promote high-quality corporate profits. Stakeholder theory believes that stakeholders are related to the interests of the enterprise because they invest their own capital into the enterprise. As the return on capital investment of stakeholders, CSR reflects the degree to which companies meet the needs of stakeholders. CSR to different stakeholders can promote value creation and then improve the quality of corporate profits.

Shareholders and creditors invest monetary resources in companies. CSR to shareholders and creditors can enable companies to have stable funds for production and operation. CSR to shareholders and creditors is the basis for companies to achieve high-quality profits. Employees put their human capital into the enterprise. CSR to employees can improve the cohesion of corporate culture, reduce employee turnover rates, improve employee labor productivity and innovation, and thus promote the improvement of corporate profit quality (Flammer, 2015). The supplier is the main supply source of corporate means of production. The CSR to the supplier promotes them to supply goods quickly, provide high-quality and inexpensive raw materials and high-quality after-sales service, increase the willingness to establish a long-term and stable cooperative relationship with the enterprise, and even give credit support when the enterprise is temporarily in trouble (Ağan, Kuzey, Acar, and Açıkgöz, 2016). CSR to consumers can improve their cognition of the quality of corporate products, stimulate them to make quick payment, repeat purchase, intangible publicity and provide reasonable suggestions. This can reduce the corporate cost of sales and improve marketing capabilities and then the quality of corporate profits (Mishra and Modi, 2016). CSR to the community and government can enable companies to gain a good reputation, form a higher corporate image, have a higher credit rating, and enjoy more favorable tax policies. On the other hand, CSR to the community and the government makes the enterprise to form the brand equity by corporate image and then contributes to the corporate profit quality. CSR to the environment makes companies gain commercial and political legitimacy and then promotes the corporate profit quality (Wei, Shen, Zhou, and Li, 2017). Further, CSR to the environment can promote the enterprise to use resources effectively and increase investment of new energy, and then reduce the corporate cost of environmental governance, so as to improve the sustainable profitability of the enterprise.

Based on the above analysis, we assert the following hypothesis:

Hypothesis 1：CSR has a significant positive impact on profit quality.

2.2 CSR, media sentiment and profit quality

CSR can only generate economic benefits if it receives the attention of stakeholders (Hawn and Ioannou, 2016). The media is an important way for stakeholders to pay attention to the fulfillment of CSR. The media has an "information effect", which plays an important role in disseminating information. On the other hand, the media has a "supervision effect", which plays an external supervision role. Therefore, based on the theoretical analysis of these two aspects, this paper analyzes the mediating role of media sentiment in the process of CSR's influence on profit quality.

From the perspective of information effects, the media can effectively transmit information about CSR, and then increase stakeholders' attention to them, and ultimately enhance the impact of CSR on corporate profitability. Communication theory believes that the original information needs to reach the audience through the communicator in the communication channel, among which the communicator includes the producer, transferor and processor of the information (Xiong, Li, and Wei, 2011). The extent to which these individuals fulfill their responsibilities as gatekeepers will ultimately affect the extent to which the original information is disseminated (Xiong, Li, and Wei, 2011). As the "gatekeeper" of information dissemination,

the media directly affects the information spread of CSR to the outside world and then affects the degree of attention of stakeholders to CSR. The media has the ability to transmit rich information about CSR. Moreover, it can deliver positive and negative CSR information to stakeholders. More positive reports on CSR can enhance the perception of stakeholders on CSR, enhance the satisfaction of stakeholders, and enhance the role of CSR in promoting the profit quality.

From the perspective of supervision effect, the media has a certain external supervision function for CSR. More positive media coverage of CSR can reduce agency costs and information asymmetry and improve corporate legitimacy and corporate reputation, and then strengthen the role of CSR in promoting the profit quality. More positive media coverage of CSR can reduce corporate agency costs, which strengthens the harmonious development of stakeholders and improve the quality of profit. The more media report on corporate information, the lower the asymmetry of information will be (Bushee, Core, Guay, and Hamm, 2010). More positive media coverage of CSR strengthens the legitimacy of the company and promotes the stakeholders' behavior of capital support, and then improves corporate profit quality. More positive media coverage of CSR can affect the corporate image and improve corporate reputation, and then strengthen the output of economic benefits of CSR.

Based on the above analysis, we assert the following hypothesis:

Hypothesis 2：Media sentiment plays a positive moderating role in the impact of CSR on profit quality, that is, CSR has a greater effect on profit quality in companies with more positive media reports.

3. Research design

3.1 Sample selection and data source

Regarding Chinese listed companies from 2013 to 2018 as a research sample, this paper examines the impact of CSR on profit quality and the moderating effect of media sentiment in the relationship between the two. CSR data are from the website of Hexun, which is the third-party rating agency. Media sentiment data are obtained by performing sentiment analysis on the text crawling from Baidu News by Python software. The rest of the data are collected from the China Stock Market and Accounting Research (CSMAR) Database. Further, in order to ensure the accuracy of the research results, this paper excludes companies with missing data, ST (special treatment) and listed companies in the financial industry. We finally obtain the size of 4,299 observations involving 2133 companies. All data processing is performed by the analysis software of EXCEL, Stata, Python and KNIME.

3.2 Variables

3.2.1 Independent variable

The independent variable is CSR. Many studies use third-party rating agencies to measure CSR. Wang and Xu (2016) measured CSR by the CSR rating score of Hexun website. In addition, the CSR score of HeXun is based on the stakeholder theory, which is consistent with the definition of CSR in this paper. Therefore, based on previous research methods and the needs of this paper, HeXun rating score is selected to measure CSR.

3.2.2 Dependent variable

The dependent variable is profit quality. Li, Wen, and Jiao (2019) indicated that profit quality reflects the essence of corporate profitability, including five dimensions: profit amount, profit structure, ability to obtain cash, profit sustainability and profit stability. Profit amount refers to the accounting profit of corporate book calculated on the accrual basis. Profit structure refers to the proportion of profits generated by the main corporate business, reflecting the main source and composition of profit. The ability to obtain cash refers to the net cash flow corresponding to the profitability and reflects the ability of the enterprise to obtain cash during the process of making profits. Profit sustainability refers to the continuous growth of corporate profits and reveals the sustainable capability of the enterprise to make profits. Profit stability refers

to the amplitude of fluctuation of corporate profits. The smaller the amplitude of fluctuation, the more stable the corporate profit. Li, Wen, and Jiao (2019) built an indicator evaluation system of profit quality pyramid with 20 indicators in 5 dimensions, and established an evaluation model of profit quality using the DANP technology and double-layer penalty variable weight method.

This paper measures the profit quality drawing on the above methods. The formula for calculating the profit quality PQ is as follows:

$$PQ = \sum_{i=1}^{5} \frac{\omega_i x_i^{\beta}}{\sum_{j=1}^{t_i} x_i^{\beta-1}} \ ,$$

where $x_i = \sum_{j=1}^{t_i} \frac{\omega_{ij} x_{ij}^{\beta_i-1}}{\sum_{j=1}^{t_i} x_{ij}^{\beta_i-1}}$ 、 ω_i are the dimension value and constant weight of the i-th dimension, respectively. x_{ij} 、 ω_{ij} are the indicator value and constant weight of the j-th indicator corresponding to the i-th dimension, respectively. β 、 β_i are penalty coefficients.

3.2.3 Moderating variable

The moderating variable is media sentiment. Many existing studies frequently use the variable of media coverage. Media coverage only reveals the influence of the media from a quantitative perspective. However, the media sentiment contains the emotional attitude of the media. It is thus reasonable to use media sentiment variables to measure the role of media.

Baidu News is the largest Chinese news reporting platform in the world. Its news sources cover a wide range, including not only officially published newspapers, magazines and government official websites but also a portal website with a certain degree of influence. Therefore, it is better to obtain media sentiment data from Baidu News.

This paper obtains the number of positive and negative reports of the media on CSR from Baidu News. The specific operation is as follows: first, we crawl the texts of CSR reports of different companies in different years from the Baidu News platform by Python software. Second, we perform sentiment analysis on each report text by KNIME software to obtain the attitude of each text, that is, whether the text is positive or negative. Third, we count the number of positive reports and negative reports on CSR of different companies in different years. Finally, we calculate the media sentiment value with reference to the calculation formula of Cahan, Chen, Chen, and Nguyen (2015). The calculation formula of media sentiment is as follows:

Media Sentiment = (Number of positive media coverage - Number of positive media reports) / Total media coverage.

3.3.3 Control variables

Corporate operating leverage, financial leverage, equity structure, corporate size, ownership property, whether the region is developed, and the industry affects the profit quality (Wen, Li, and Jiao, 2018). This paper employs the following control variables: operating leverage (*FI*), financial leverage (*LEV*), controlling shareholding ratio (*Largest*), corporate size (*Size*), ownership property (Property), Regional attributes (*Region*), industry (*IND*i). Different ownership property companies have different goals. We assign a value of 1 when the sample enterprise belongs to a state-controlled enterprise, otherwise it is 0. Based on the median GDP per capita of each province, we distinguish whether the location of the enterprise belongs to a developed region. If the enterprise belongs to a developed region, the value is 1, otherwise, the value is 0. Different industries have different profitability. The samples in this paper involve the following industries: agriculture, forestry, animal husbandry, fishery, extractive industries, manufacturing, electricity and gas and water production and supply, construction, wholesale and retail, transportation, storage and postal, Accommodation and catering industry, information transmission, software and information technology

tertiary industry, real estate industry, leasing and business tertiary industry, scientific research and technology tertiary industry, water conservancy, environment and public facilities management industry, education, health and social work, Culture, sports and entertainment industry, comprehensive industries. We thus set industry dummy variables as control variables.

The specific definition of variables is shown in table 1.

Table 1: Variable definitions

Variable name	Symbol	Definition
Dependent variable		
Corporate social responsibility	*CSR*	The rating score of Henxun website
Independent variable		
Profit quality	*PQ*	Profit quality evaluation model
Moderating variable		
Media sentiment	*MS*	(Number of positive media coverage - Number of positive media reports) / Total media coverage.
Control variables		
Operating leverage	*FI*	Total fixed assets / total assets
Financial leverage	*LEV*	Total liabilities / total assets
Corporate size	*Size*	Ln（total assets）
controlling shareholding ratio	*Largest*	Number of shares of controlling shareholder / total number of shares
ownership property	*Property*	1 for state-controlled enterprise, otherwise 0
Regional attributes	*Region*	1 for enterprise in developed region, otherwise 0
Industry	*IND$_i$*	1 for enterprise in own industry, otherwise 0

3.3 Model specification

Based on the above theoretical analysis and research assumptions, this paper establishes the following model for empirical analysis:

$$PQ = \beta_0 + \beta_1 CSR + \beta_2 FI + \beta_3 LEV + \beta_4 Size + \beta_5 Largest$$
$$+ \beta_6 Property + \beta_7 Region + \sum \beta_i IND_i + \varepsilon \tag{1}$$

$$PQ = \beta_0 + \beta_1 CSR + \beta_2 CSR \times MS + \beta_3 MS + \beta_4 FI + \beta_5 LEV + \beta_6 Size + \beta_7 Largest$$
$$+ \beta_8 Property + \beta_9 Region + \sum \beta_i IND_i + \varepsilon \tag{2}$$

Model (1) examines the positive impact of CSR on profit quality. Model (2) is used to test the positive moderating effect of media sentiment in the impact of CSR on profit quality.

4. Empirical results

4.1 Descriptive statistics and correlation analysis

Table 2 shows the descriptive statistics of the variables in this paper. Among the sample companies, the mean and standard deviation of profit quality (*PQ*) are 0.174 and 5.3%, respectively. This indicates that the overall level of profit quality is low and there are relatively large differences in the profitability of Chinese listed companies. The mean of *CSR* is 25.593. This shows that the overall level of CSR is low and the implementation of CSR of Chinese listed companies needs to be strengthened. The mean and standard deviation of media sentiment (*MS*) are 0.116 and 0.521, respectively. This reveals that there is more positive coverage on the CSR of listed companies and the media sentiment of CSR varies greatly among different companies.

For the control variables, the mean of operating leverage (*FI*) and financial leverage (*LEV*) are 0.186 and 0.367, respectively. This shows that the operating leverage and financial leverage are not high and the operational risk of Chinese listed companies is not large. The mean of corporate size (*Size*) is 22.336, which indicates that the scale of Chinese listed companies is large. The mean of controlling shareholding ratio (*Largest*) is 40.063 showing that the controlling shareholding ratio of Chinese listed companies is basically

at a medium level. The mean of ownership property (*Property*) and regional attributes (*Region*) are 0.304 and 0.817. This reveals that most of the sample are non-state-owned companies and companies in developed regions.

Table 2: Descriptive statistical of variables

Variables	N	Mean	Std.Dev.	Median	Min	Max
PQ	4299	0.174	0.053	0.173	0.005	0.525
CSR	4299	25.593	11.343	23.840	-5.800	87.040
MS	4299	0.116	0.521	0.111	-1.000	1.000
FI	4299	0.186	0.133	0.162	0.000	0.780
LEV	4299	0.367	0.179	0.349	0.017	0.941
Size	4299	22.336	1.206	22.208	18.295	28.070
Largest	4299	40.063	15.546	38.990	0.780	89.990
Property	4299	0.304	0.460	0.000	0.000	1.000
Region	4299	0.817	0.386	1.000	0.000	1.000

Table 3 shows the correlation analysis of the variables in this paper. The correlation coefficient between *CSR* and profit quality (PQ) is 0.256, which is significant at the level of 1%. It is initially verified that CSR is significantly positively related to profit quality. Further, operating leverage (*FI*), financial leverage (*LEV*) and ownership property (*Property*) are significantly negatively related to profit quality. Media sentiment (MS) and controlling shareholding ratio (Largest) are significantly positively related to profit quality. Furthermore, the correlation coefficients between the variables in Table 3 are all less than 0.8, which shows that there is no collinearity among the variables.

Table 3: Correlation analysis of variables

Variables	PQ	CSR	MS	FI	LEV	Size	Largest	Property	Region
PQ	1.000								
CSR	0.210***	1.000							
MS	0.089***	-0.026*	1.000						
FI	-0.050***	-0.057***	-0.054***	1.000					
LEV	-0.180***	0.024	-0.025*	-0.169***	1.000				
Size	0.010	0.229***	-0.036**	-0.093***	0.562***	1.000			
Largest	0.144***	0.097***	0.030*	0.029*	-0.026*	0.033**	1.000		
Property	-0.128***	0.130***	-0.116***	0.106***	0.225***	0.325***	-0.030*	1.000	
Region	0.016	0.019	-0.013	-0.037**	0.017	0.010	0.031**	0.022	1.000

Note: *, ** and *** donate statistical significance at 10%, 5% and 1% level.

4.2 Multiple regression results

Table 4 shows the regression analysis results of benchmark and moderating effect.

Table 4: Multiple regression results

Variables	Model (1)		Model (2)	
	PQ	*PQ*	*PQ*	*PQ*
CSR	0.0004***	0.0004***	0.0004***	0.0004***
	(6.705)	(6.357)	(6.677)	(6.342)
CSR×MS				0.0003**
				(2.204)
MS			0.0010	-0.0058*
			(0.685)	(-1.699)
FI		-0.0634***		-0.0627***

		(-3.699)		(-3.661)
LEV		-0.0496***		-0.0492***
		(-3.812)		(-3.787)
Size		0.0235***		0.0239***
		(5.437)		(5.529)
Largest		0.0003		0.0003
		(1.525)		(1.531)
Property		-0.0149		-0.0161
		(-1.323)		(-1.420)
Region		0.0024		0.0025
		(1.298)		(1.308)
Constant	0.1399***	-0.3579***	0.1396***	-0.3668***
	(3.403)	(-3.474)	(3.395)	(-3.561)
Industry	Yes	Yes	Yes	Yes
Year	Yes	Yes	Yes	Yes
N	4299	4299	4299	4299
R^2	0.3278	0.3476	0.3279	0.3492
F	65.5188	51.9265	61.6771	47.8963

Note: t statistics in parentheses. *, ** and *** donate statistical significance at 10%, 5% and 1% level.

This paper carries out regression analysis on the model (1) to test the impact of CSR on profit quality. Table 4 shows the regression analysis results of the model (1). Before and after adding the control variable, the regression coefficients of *CSR* to profit quality (*PQ*) are all 0.0004, which are significant at the 1% level. This shows that CSR has a significant positive effect on profit quality and Hypothesis 1 is supported. The regression results of the model (1) imply that the implementation of CSR can increase the quality of corporate profits.

We carry out regression analysis on the model (2) to test the moderating role of media sentiment in the impact of CSR on profit quality. Table 4 shows the regression analysis results of the model (2). Before and after adding the control variable, the regression coefficients of *CSR* to profit quality (*PQ*) are all 0.0004, which are significant at the 1% level. The regression coefficients of the cross product of CSR and media sentiment (*CSR×MS*) to profit quality (*PQ*) is 0.0003, which is significant at the 5% level. This shows that media sentiment has a positive moderating effect on the positive impact of CSR on profit quality and Hypothesis 2 is supported. The regression results of the model (1) imply that more positive media coverage of CSR can promote the positive impact of CSR on profit quality.

5. Conclusions and implications

This paper theoretically analyzes the impact of CSR on profit quality and the moderating role of media sentiment in the relationship between the two. Further, we conduct an empirical test with the data of Chinese listed companies from 2016 to 2018. The results show that CSR has a significant positive effect on profit quality and media sentiment plays a positive moderating role in the relationship between the two.

The conclusions drawn in this paper have certain implications. Based on the theory of stakeholders, this paper analyzes the impact of CSR on profit quality. This provides an important theoretical basis for the study of the economic consequences of CSR and a practical basis for companies to actively implement CSR. Based on the theory of communication, this paper theoretically analyzes the moderating effect of media sentiment on the impact of CSR on profit quality from the aspects of information effect and supervision effect, which enriches the internal mechanism of the value creation of CSR.

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