

Article

Corporate Social Responsibility and Profitability: The Moderating Role of Firm Type in Chinese Appliance Listed Companies

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Abstract: Corporate social responsibility (CSR) is among the dominant multi-attribute methods of comprehensively representing the competitiveness of a company. A large number of studies have commonly found that profitability can positively affect CSR. However, positivity depends on firm type and the economy, and there is little research in this area. The objective of this paper is to study and verify whether the profitability of different types of companies has a comparable impact on CSR measures in Chinese appliance listed companies. A specific multi-attribute AHP (analytic hierarchy process) model was proposed to determine the CSR for the conditions of Chinese appliance listed companies. The interactive regression model serves to analyse the impact of a firm type. The specific multi-attribute AHP model was verified as a suitable tool for CSR evaluation of Chinese appliance listed companies. The regression results show that for family firms, the impact of profitability on CSR is significant, while for non-family firms, the impact was not confirmed. Thus, evidence that family firms fulfil better CSR than non-family firms in the investigated Chinese sector is offered. The findings provide proof that it is essential to distinguish firm types, and the generalised findings are simplified and not valid.

Keywords: CSR; profitability; firm type; moderating effect; AHP two-level multi-attribute model



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1. Introduction

As the competition among companies becomes increasingly fierce, corporate social responsibility (CSR), one of the main tools to fully reflect the competitiveness of a company [1–3], has attracted more and more practitioners, academics, and public attention. The unique topic covers the means by which CSR indicators can be measured, and various methods have been developed. The conceptions and methods applied must reflect the specificities of the market and economy [4–6].

The factors affecting corporate participation in CSR have been extensively studied in recent decades. The existing literature seems to have reached a consensus that the higher the profitability, the better the CSR [7,8]. Nevertheless, is the rule valid for all types of companies? China, in particular, is a unique emerging market where state-owned enterprises (SOEs) play a vital role in the entire economy and private companies account for a large proportion of it [9]. Hardly any literature examines this area. To investigate the impact of the profit levels on the CSR of different types of companies, we take the Chinese appliance listed companies in 2018 as a sample and explore the moderating effect of the firm type on the relationship between corporate profitability and CSR. The reason for choosing China's appliance industry as the research sample is that it is one of the few internationally competitive industries in China. Therefore, the CSR of Chinese appliance companies does not only affect their long-term and healthy development [10], but it also impacts their international image and competitiveness [11].

The objective of this paper is to study and verify whether the profitability of different types of companies has a comparable impact on CSR measures in Chinese appliance listed companies. The specific two-level multi-attribute AHP model is proposed to identify the CSR value [12] for the conditions of Chinese appliance listed companies. The regression model with interactions is applied to investigate the moderating role of the firm type in explaining the relationship between corporate profitability and CSR in Chinese appliance listed companies. Family- and non-family-type firms are considered.

The study is structured as follows. Section 2 reviews the existing literature on the relationship between the CSR measure and profitability as well as the moderating effect of firm type on this relationship, and hypotheses are proposed. In Section 3, input data are introduced; the two-level multi-attribute model, including criteria and subcriteria, is proposed and described; and the regression CSR models with and without interactive variables are formulated. Section 4 describes the verification and empirical results of the models, which are interpreted and discussed. In the last section, Section 5, we provide conclusions and a summary of our findings.

2. Literature Review

Academic research on CSR began to take form in the 1950s [13]. A lot of scholars and organisations strive to define the concept of CSR. Currently, while there is a multitude of definitions of CSR [14], it is difficult to find a commonly accepted one. This paper adopts the concept of CSR advocated by Elkington [15] based on the triple bottom line principle. He assumes that if an enterprise forms an economic and social system, then its development objectives should constitute a triple beam that is related to the profit and the people associated with the company and cares for the planet.

2.1. CSR and Profitability: Relationship

Slack resource theory claims that better financial performance potentially leads to the availability of slack (financial and other) resources, which provide the opportunity for companies to invest in social performance domains, such as community relations, employee benefits, philanthropic donation, or environmental protection. If slack resources are available, the allocation of these resources to the social domain produces better social performance—“that doing well enables doing good” [16]. Therefore, Waddock and Graves [17] argue that better financial performance is a greater predictor of better corporate social performance. Campbell [18] deems that firms’ slack resources are essential determinants of CSR engagement and proposes that “corporations will be less likely to act in socially responsible ways where they are currently experiencing relatively weak financial performance”. Hasan and Habib [19] hold the same opinion.

Much empirical evidence supports the positive relationship between CSR and financial performance. Based on the American companies, the results of a study by Hussain et al. [20] suggest that profitability significantly influences environmental and social sustainability performance. Giannarakis [21] took a sample consisting of 100 companies from the Fortune 500 list for 2011 and found that profitability is positively associated with the extent of CSR disclosure. The same results were obtained from the studied Chinese samples [22–24], hence the following hypothesis:

Hypothesis 1. *CSR level is positively influenced by profitability in Chinese appliance listed companies.*

2.2. CSR and Profitability: Moderating Role of Firm Type

2.2.1. CSR and Profitability: Moderating Role of a Family Firm

Researchers Gomez-Mejia et al. [25] developed a general “socioemotional wealth (SEW)” model. This model has become one of the most influential theories for studying family firms. A large number of studies on the relationship between CSR and family firms use the SEW model as the theoretical basis and argue that family firms tend to perform CSR for the preservation of their SEW [26–28]. However, to date, there is an inconclusive

picture of the relationship between CSR and family firms [28–31]. We find that this research ignores the factual content mentioned by Berrone et al. [32] when applying the SEW model. He declared that “although SEW preservation is the higher-order” reference point for the family principal, poor performance acts as an informational clue that alters the family owners’ “loss framing”. This means that when poor performance exposes the family firm to the possibility of SEW extinction, they would consider the issue of survival first and shift the reference point for formulating strategies from SEW to economic outcomes. In other words, the family firm adjusts the reference point of the related CSR strategy in accordance with the change in financial performance. Specifically, when their profitability is high, they are likely to invest more into CSR to preserve SEW; when their profitability is low, they tend to care about financial results and reduce CSR investment, hence the following hypothesis:

Hypothesis 2. *For family firms, the level of profitability has a significant and positive influence on the company’s participation in CSR in Chinese appliance listed companies.*

2.2.2. CSR and Profitability: Moderating Role of a Non-Family Firm

Sociopolitical theories, which are often applied in research of SOEs, argue that blockholders could urge companies to issue CSR reports, as outlined by Cao et al. [33], for the following reasons: political connections with government, the need to obtain a better social image, consideration for public visibility, or incentives to avoid negative consequences. According to institutional theory, SOEs bring CSR activities to practice by three types of external drivers, namely, coercive, normative, and mimetic drivers [34]. Hence, a high level of CSR can be anticipated in SOEs. However, CSR is also possible at a low level in such firms. These firms are usually separated from market mechanisms and have immature corporate governance structures [24,35], and lack managers’ incentives or project management skills [36]. These conditions can be expected to limit consciousness and considerations regarding stakeholder wishes and CSR-oriented expectations. Therefore, theoretically, it is unclear whether SOEs are inclined to fulfil CSR due to the special status of their block-holder, or whether they are reluctant to participate in CSR activities due to immature corporate governance structures and limited management skills. Profitability is not a crucial factor affecting their motivation to implement CSR. Thus, this study posits that for SOEs, the impact of profitability on CSR is insignificant.

For non-family private firms, they have neither a particular major shareholder like SOEs to urge them to fulfil CSR from the political perspective [33,34,37] nor do they possess the motivation of preserving SEW like family firms to encourage active participation in CSR [38,39]. Consequently, they only implement CSR according to the basic requirements of the regulations, which has nothing to do with their profits. Hence, this study assumes that for non-family private firms, the impact of profitability on their CSR implementation is negligible.

In summary, the following hypothesis is suggested:

Hypothesis 3. *For non-family firms, the level of profitability has little impact on the company’s participation in CSR in Chinese appliance listed companies.*

3. Data and Methods

3.1. Sample Selection

This study selected the Chinese appliance listed companies for the year 2018 as its research object. The list of companies was obtained from the Iwencai database [40]. After excluding the companies listed in 2018 and 2019 as well as insolvent companies, a sample of 59 listed companies remained. More precisely, it contained 26 companies listed on the Main Board, 25 companies listed on the Small and Medium Enterprise Board, and eight companies listed on the Growth Enterprise Market. All data were collected from the Iwencai database [40], annual financial reports [41,42] and CSR reports (if any) [41–43]. The code of companies and original input data are presented in Appendix A, Table A1.

3.2. Dependent Variable

A considerable amount of previous literature on China's CSR research selected the overall evaluation score published by Rankins CSR Ratings Agency (RKS) [44]. It is a reliable CSR rating agency that measures the performance and disclosure of CSR in China. However, there is a flaw in its rating results; namely, it cannot cover all of the listed companies. This flaw exists because RKS evaluates the CSR of listed companies based on the CSR reports issued by the companies, but not every listed company is able or willing to disclose its CSR report.

Given the fact that the necessary sample data of China's appliance companies cannot be obtained from RKS, we proposed and applied an original multi-attribute model in this study. The model is based on the two-level decomposition of the evaluation criteria and subcriteria. Weights of the criteria and subcriteria are calculated by the analytic hierarchy process (AHP), see, e.g., Saaty [45]. Criteria and subcriteria are of a quantitative and qualitative type. The score is calculated by the weighted average arithmetic method.

With the aid of the AHP, we established the evaluation criteria system according to the triple bottom line principle mentioned above. It consists of three common aspects: economy, environment and society. The economic aspect includes five criteria: shareholder, consumer, employee, supply chain, and government. The environment and society aspects have identical criteria. The particular hierarchy of the criteria and subcriteria, including the corresponding indicators, is shown in Table 1. The scales of the qualitative subcriteria, including meaning, are introduced in Table 2. The Saaty preferences of criteria and subcriteria are assigned according to the authors' judgement and experience with Chinese appliance companies in the current Chinese context. The final weights, including local weights and global weights, are shown in Table 3. All weights passed the consistency test.

Table 1. Criteria, subcriteria and corresponding indicators constructed for assessing corporate social responsibility (CSR).

Criteria	Symbol	Subcriteria	Corresponding Indicators
shareholder	A1	Preserving and increasing the value of equity	The growth rate in owner equity
	A2	Cash dividend returns	Cash dividend yield
	A3	Dividend payment	Dividend payout ratio
consumer	B1	Product quality	The proportion of export revenue
	B2	Product R&D spending	The proportion of R&D expenditure in revenue
	B3	Product R&D capabilities	R&D staff ratio
employee	C1	Salary level	Salary competitiveness (compared with local average salary)
	C2	Salary growth	Salary growth rate
	C3	Employee training	Qualitative indicator
supply chain	D1	Capital occupation of supplier	Accounts payable turnover ratio
	D2	Relationship with supplier	Qualitative indicator
	D3	Relationship with dealer	Qualitative indicator
government	E1	Tax ability	The proportion of taxes in revenue
	E2	Support for government policies	The proportion of government subsidies in net profit
	E3	Employment issues	Number of employees (NE)
environment	F1	Energy saving	Qualitative indicator
	F2	Emission reduction	Qualitative indicator
	F3	Recycling of discarded or old household appliances	Qualitative indicator
society	G1	Donation expenses	The proportion of donation expenses in net profit
	G2	Charity activity	Qualitative indicator
	G3	Public welfare	Qualitative indicator

Table 2. Description of scales of qualitative subcriteria.

Subcriteria	Bad	Common	Good	Better	Best
	1	2	3	4	5
C3	little relevant content	relevant content is just a few clichés	only involves a basic training plan without a quantitative description	involves advanced training plan but without quantitative description	the description of employee training is clear, both in quantitative and qualitative aspects
D2	little mention of their relation	just passively accepts the product	a cooperative relationship	evaluates suppliers before purchasing	helps in improving the development of suppliers to provide higher quality products
D3	only provides products to the dealer	just meets the basic needs of the dealers	only a cooperative relationship without other disclosure	establishes stable cooperative relations and jointly makes specific marketing plans	actively trains its dealers to make them better understand its products
F1	little mention of energy saving	only mentions the term “energy saving” without any practice	saves energy during the production process	involves production or research and development of energy-saving products	clear and quantitative energy-saving instructions
F2	little mention of emission reduction	just mentions emission reduction in a few words without any practice	describes qualitatively and routinely how to reduce emissions	describes qualitatively and in detail how to reduce emissions	clear and quantitative emission reduction instructions
F3	If there is relevant information about the recycling of discarded or old household appliances in annual or CSR reports, this indicator is assigned to 1; otherwise, it is 0.				
G2, G3	If the company participated in charity activities or public welfare, the corresponding indicator has a value of 1; otherwise, the value is of 0.				

Table 3. Summary of weights of criteria and subcriteria.

Criteria	Local Weight	Subcriteria	Local Weight	Global Weight
shareholder	0.1	Preserving and increasing the value of equity	0.54	0.054
		Cash dividend returns	0.16	0.016
		Dividend payment	0.30	0.03
consumer	0.24	Product quality	0.50	0.12
		Product R&D spending	0.25	0.06
		Product R&D capabilities	0.25	0.06
employee	0.16	Salary level	0.54	0.0864
		Salary growth	0.30	0.048
		Employee training	0.16	0.0256
supply chain	0.07	Capital occupation of supplier	0.20	0.014
		Relationship with supplier	0.40	0.028
		Relationship with dealer	0.40	0.028
government	0.04	Tax ability	0.54	0.0216
		Support for government policies	0.16	0.0064
		Employment issues	0.30	0.012
environment	0.35	Energy saving	0.65	0.2275
		Emission reduction	0.12	0.042
		Recycling of discarded or old household appliances	0.23	0.0805
society	0.03	Donation expenses	0.61	0.0183
		Charity activity	0.12	0.0036
		Public welfare	0.27	0.0081

Source: according to the authors' judgement.

The authors collected the majority of the original input data involved in this hierarchy evaluation multicriteria system from the annual report and CSR report (if any). [41–43] The remaining data used are from the Iwencai database [40]. The particular values of subcriteria are presented in the Appendix A, Table A1. The usual necessary assumption of the multi-attribute method is positivity and comparability of criteria. If some indicators contain negative values, we subtract the minimum value of the indicator from the original value. The comparability is reached by the normalisation procedure of the same indicator between different companies. Thus, the value of each indicator is normalised (standardised) by dividing the original indicator by the maximum value of the indicator sample. After the normalisation process, all indicator values are within the interval of [0;1]. This approach is consistent, frequently applied, and recommended, e.g., by Mulliner et al. [46].

The final scores of CSR calculated from global weights and normalised criteria for each company serve as the proxy for the CSR implementation status of the Chinese appliance listed companies. See Appendix A, Table A1 for all original data and concrete CSR score of each sample company.

3.3. Moderating Variable

This study takes the firm type as the moderator. We distinguish family firms and non-family firms due to their moderating role of profitability on CSR. Determination of a family firm or a non-family company type can be performed in various ways. We adopt the definition of the family firm defined by the MSCI GMI Ratings used by Madden et al. [30]. Namely, family ties play a vital role in both ownership and board membership. Family members may not have absolute control over shareholder votes (more than 50%); however, they usually own at least 20% of shares. Since many early studies generally include founder companies within the scope of family firms, this study also does so in the same way. We refer to the definition of a founder company as provided by MSCI. This means that the CEO or chairman of the company in a given year is the founder of the company. When the sample company meets the definition of a family or a founder firm, we set the moderating variable of the firm type as a reference group, in contrast to the non-family firm.

3.4. Empirical Regression Model Description

Since the data in this study only involve a cross-sectional dimension, a multiple linear regression model is proposed to test the hypotheses formulated in the previous section. Hence, this study develops the following regression specifications to test the association between corporate profitability and CSR (test of Hypothesis 1).

$$CSR = \beta_0 + \beta_1 \cdot ROEC + \beta_2 \cdot FS + \beta_3 \cdot LEV + \beta_4 \cdot EOC + \varepsilon \quad (1)$$

where β_0 is the intercept, symbols β_1 , β_2 , β_3 , β_4 , represent the regression coefficients, $ROEC$ is the return on equity centred, FS is the firm size, LEV is the financial leverage, EOC is the equity ownership concentration, and ε represents the error term.

In this study, we adopt ROE to denote corporate profitability, which is measured as the ratio of net profit to equity. In order to unify the expression with Equation (2), we also use $ROEC$ in Equation (1). Following the prior literature [47–49], we control for several firm-level factors that may affect CSR implementation. The firm size FS is the natural logarithm of total assets. The ratio of total debt to total assets is used as a proxy for financial leverage LEV . Equity ownership concentration EOC is measured by the shareholding ratio of the largest shareholder.

To test the hypotheses 2 and 3, we regress CSR on corporate profitability, firm type, their interactive term, and control variables. This allows us to examine the moderating effect of the firm type on the association between profitability and CSR.

$$CSR = \beta_0 + \beta_1 \cdot ROEC + \beta_2 \cdot FT + \beta_3 \cdot FT \cdot ROEC + \beta_4 \cdot FS + \beta_5 \cdot LEV + \beta_6 \cdot EOC + \varepsilon \quad (2)$$

where FT is the dummy moderating variable of the firm type, and $FT \cdot ROEC$ is the interaction variable.

The introduced centring procedure does not affect the regression results of the model; however, it eliminates the multicollinearity between independent variables [19,50]. Simultaneously, the dummy variable *FT* provides a value of 0 for the reference family firm and a value of 1 for the non-family firm.

4. Data Characterisation, Model Verification and Description of the Results

4.1. Descriptive Statistics and Model Verification

Table 4 provides the descriptive statistics for the variables used in the regression models. The CSR level varies from 0.183 to 0.716, with a mean of 0.475 and a standard deviation of 0.116. ROE ranges between -105.000% and 34.790% , with a mean of 1.462% and a standard deviation of 26.551% . ROEC fluctuates from -106.462% to 33.328% , with a mean of 0% and a standard deviation of 26.551% . Statistics show that in 2018, the average value of the firm type is 0.37, which indicates that 37% of firms in China's appliance industry are non-family firms. In other words, family firms account for 63% of China's appliance industry.

Table 4. Descriptive statistics.

Variable	Minimum	Maximum	Mean	Std. Dev.
CSR	0.183	0.716	0.475	0.116
ROE	-105.000%	34.790%	1.462%	26.551%
ROEC	-106.462%	33.328%	0.000	26.551%
FT	0	1	0.37	0.488
FS	19.743	26.298	22.428	1.447
LEV	0.147	0.861	0.472	0.186
EOC	0.078	0.812	0.368	0.169

Before interpretation of the results and testing of the hypotheses, this study verifies the classical linear regression assumptions for the cross-sectional data. Mainly, it provides tests for multicollinearity, normality of the residuals, and homoscedasticity.

Table 5 presents Pearson's correlation analysis results among all variables with their significance level. It is apparent from the correlation coefficient values that there is no multicollinearity among independent variables. The maximum coefficient of the Pearson correlations is 0.597.

Table 5. Correlation matrix.

		Variables						
CSR	ROEC	FT	FT·ROEC	FS	LEV	EOC		
1	0.322 *	0.287 *	0.125	0.486 **	0.237	-0.132	CSR	
	1	0.106	0.415 **	0.168	$-0.395 **$	0.407 **	ROEC	
		1	0.163	0.358 **	0.269 *	-0.137	FT	
			1	0.448 **	0.152	0.181	FT · ROEC	
				1	0.597 **	-0.098	FS	
					1	-0.2	LEV	
						1	EOC	

Note: The symbols ** and * indicate statistical significance at the levels of 0.01 and 0.05, respectively.

Figure 1 shows intuitive answers that the residuals of Equations (1) and (2) are of Gaussian (normal) distribution, respectively.

From Table 6, presenting estimated coefficients and testing parameters, we can see the results of the LM statistic of Equations (1) and (2), which are not significant at the 5% level. This result means that there are no heteroscedasticity concerns.

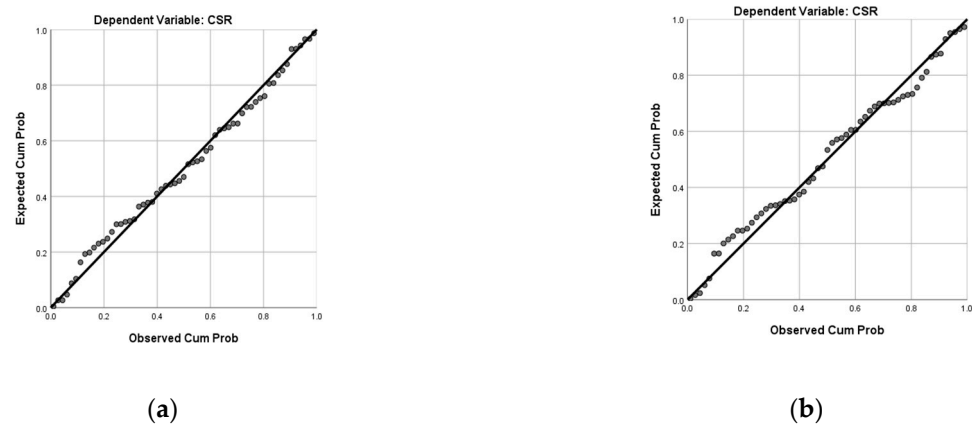


Figure 1. (a) Normal P–P plot of residuals for Equation (1); (b) normal P–P plot of residuals for Equation (2).

Table 6. Regression models results.

Variable	Equation (1)				Equation (2)			
	Coef.	S.E.	t	p	Coef.	S.E.	t	p
Constant	0.029	0.273	0.106	0.916	−0.113	0.281	−0.402	0.689
ROEC	0.002	0.001	3.025	0.004	0.002	0.001	3.385	0.001
FT					0.014	0.028	0.506	0.615
FT · ROEC					−0.003	0.001	−1.940	0.058
FS	0.020	0.013	1.480	0.145	0.025	0.014	1.867	0.068
LEV	0.141	0.110	1.279	0.206	0.153	0.110	1.390	0.170
EOC	−0.175	0.084	−2.078	0.042	−0.154	0.084	−1.823	0.074
	R ²		0.359		0.405			
	F-statistic		7.555 **		5.904 **			
	Change in R ² (ΔR^2)				0.046			
	F-statistic (ΔR^2)				3.762 ($p = 0.0578$)			
	White test (the LM statistic)		Obs · R ² _{ε²} = 3.304 $p = 0.1917$		Obs · R ² _{ε²} = 2.773 $p = 0.2499$			

Note: The symbol ** indicates statistical significance at the level of 0.01.

4.2. Regression Results

The regression results for the two analysed equations are shown in Table 6. The estimated coefficients should be compared. R-squared of Equation (1) is 0.359, which means that all the independent variables in Equation (1) together explain about 35.9% of the variance in the CSR level of the Chinese appliance listed companies. For Equation (2), the p -value of change in R-squared is 5.8%, which means that the moderator of the firm type plays an essential role in explaining the association between corporate profitability and CSR.

The results reported in Table 6 indicate that in Equations (1) and (2), both coefficients of corporate profitability are positive and significant ($p < 0.01$), which shows the importance of corporate profitability in explaining the variation in CSR. This conclusion supports Hypothesis 1. Profitable companies can afford the expenses linked to CSR, such as paying more dividends to the shareholders, investing more funds for research and development, and donating more to society. This result is consistent with the findings of Hussain et al. [20] and Giannarakis [21].

It is shown in Table 6 that the coefficient of interaction $FT \cdot ROEC$ is significant at the 5.8% level. This moderating effect of the firm type is visibly depicted in Figure 2. Combined with Table 7, we can see that the conditional effect is positive and statistically significant if the firm type is equal to 0. The red solid line indicates the family firm in Figure 2. It is

invalid and not significant when the firm type is equal to 1. The blue dotted line indicates the non-family firm in Figure 2.

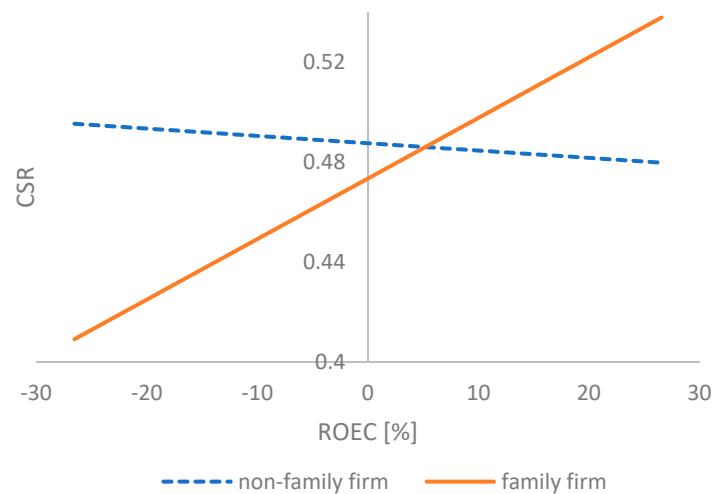


Figure 2. Graph of moderating effect of firm type on the relationship between CSR and profitability.

Table 7. Conditional effects of the focal predictor at values of the moderator.

FT	Effect	S.E.	t	p	LLCI	ULCI
0	0.0024	0.0007	3.3853	0.0014	0.001	0.0039
1	−0.0003	0.0014	−0.2152	0.8304	−0.003	0.0024

These results provide support for the conditional (moderating) effects proposed in Hypotheses 2 and 3. That is, for the family firm, the impact of profitability on the CSR is positive and significant. In contrast, for the non-family firm, this impact is not confirmed. The same evidence can be found in the last two columns of Table 7, which reports the results generated from 95% confidence intervals for the conditional effect on CSR using 5000 bootstrapping samples produced by the SPSS (PROCESS) procedure.

5. Conclusions

The findings of this study contribute to the research topic and literature in two ways. Firstly, the specific two-level multi-attribute AHP model was proposed and verified to identify CSR indicators regarding the conditions of Chinese appliance listed companies. The model should be applied when the CSR data of the analysed companies from ranking agencies are not at one's disposal. The applied model can include both quantitative and qualitative criteria.

Secondly, the study surveyed whether firm type moderates the association between corporate profitability and CSR in the specific and unique conditions of Chinese appliance listed companies. When we test the relationship between profit and the CSR of all sample companies as a whole, this relationship was significant and positive, which is in accordance with many existing studies. However, when the sample of companies was divided into family and non-family firms, profitability had different impacts on CSR for different types of companies, as we hypothesised. We can conclude that the divergence in characteristics of different types of companies results in the distinct motivation to fulfil the CSR.

The regression results show that although profitability is positively related to the CSR of all firms when the moderator of firm type is considered, this relationship changes a lot. Specifically, only the CSR of the family firms is significantly affected by profitability, while the phenomena of the non-family firms were not confirmed. Moreover, we have offered new proof for the statement that family firms are more prone to engage in CSR than non-family firms [30,51]. This was verified and is valid for the Chinese appliance sector

in the investigated year. Our findings promote a richer understanding of the relationship between profitability and CSR in the Chinese context, especially in the appliance sector.

These findings provide clear evidence to update the underlying view of previous studies, namely, that the impact of profitability on CSR is the same for all company types. The presented results can be very significant for decision makers and researchers, and they provide a new understanding of the impact of profitability on CSR. Recognising this crucial point, decision makers who intend to promote CSR can formulate targeted policies for different types of companies. It can also be used to create different business strategies for selected types of companies, which can better improve CSR during the process of business development and further enhance corporate competitiveness.

Future studies can extend the research in a number of ways. As a small amount of companies (15%) are evaluated with rating authority, evaluation ranking with AHP evaluation can be compared. Furthermore, after obtaining the data, more periods can be investigated with the aim of discovering dynamics. Analysis of other sectors in China with specificities can also provide more extensive evidence.

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

Appendix A

Table A1. Original data with symbols in Table 1 and CSR score of each sample company obtained via to the analytic hierarchy process (AHP) method.

Stock Code	Shareholder			Consumer			Employee			Supply Chain			Government			Environment			Society			CSR
	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	F1	F2	F3	G1	G2	G3	
000801	0.0277	0.0086	0.2304	0.1947	0.0664	0.2086	0.3890	0.1992	4	0.49	3	5	0.0237	0.0173	4	2	3	0	0.0000	0	1	0.4417
000810	0.2086	0.0000	0.0000	0.3077	0.0479	0.2120	0.6666	0.0073	4	0.52	3	4	0.0255	0.0029	5	2	3	0	0.0000	1	1	0.4456
002052	-0.3554	0.0000	0.0000	0.2641	0.0803	0.4641	1.3613	0.3460	3	0.82	4	4	0.0739	0.0094	2	4	3	0	0.0000	0	0	0.6246
002519	-0.3384	0.0000	0.0000	0.0815	0.0989	0.2670	0.3799	0.2021	3	0.73	2	4	0.0805	0.0400	3	3	3	0	0.0001	0	1	0.4763
002848	-0.0682	0.0000	0.0000	0.7877	0.069	0.1541	0.2881	0.2219	5	0.46	3	5	0.0297	0.0059	3	3	3	0	0.0002	0	1	0.5767
000016	0.1529	0.0294	0.5855	0.6343	0.0086	0.0774	0.0379	0.0650	4	2.25	3	3	0.0357	0.0006	6	4	5	1	0.0000	1	1	0.6302
002420	-0.6828	0.0000	0.0000	0.0616	0.0351	0.0717	0.1657	0.3763	2	0.7	1	4	0.0342	0.0069	4	1	3	0	0.0000	0	0	0.2457
002429	0.0507	0.0000	0.0000	0.3076	0.0302	0.1336	-0.0106	0.2138	4	1.19	5	4	0.0349	0.0049	5	4	2	0	0.0000	1	0	0.4889
600600	0.0738	0.0082	0.3001	0.4592	0.034	0.1227	0.6567	0.2051	5	1.04	1	4	0.0271	0.0060	6	5	4	1	0.0000	0	1	0.6751
600839	-0.0451	0.0045	0.3142	0.2044	0.0235	0.1076	0.2804	0.1857	5	0.77	4	4	0.0214	0.0009	7	4	5	1	0.0000	1	0	0.5715
603996	-0.0625	0.0000	0.0000	0.7946	0.0366	0.1766	0.5658	0.3792	3	1.17	3	2	0.0066	0.0018	3	2	3	0	0.0000	1	0	0.4996
002032	0.0923	0.2247	0.7277	0.2657	0.0226	0.1041	0.3589	-0.0087	4	1.09	1	4	0.0481	0.0062	6	1	5	1	0.0002	0	1	0.4495
002035	0.1826	0.1141	0.3811	0.0165	0.0367	0.0712	0.0528	0.0703	4	0.63	5	5	0.0547	0.0032	5	3	4	0	0.0004	0	1	0.4258
002242	0.0691	0.1714	0.8139	0.0350	0.0364	0.1951	2.2055	-0.0676	2	1.02	3	4	0.0543	0.0052	3	1	3	0	0.0009	0	1	0.4053
002403	0.0024	0.0228	0.3436	0.3432	0.0456	0.0852	0.2655	-0.0687	5	0.74	2	3	0.0560	0.0073	5	2	5	0	0.0004	0	1	0.4090
002473	0.0397	0.0000	0.0000	0.3353	0.0075	0.1270	0.1463	0.1675	3	1.12	2	4	0.1899	0.0007	1	4	3	0	0.0000	0	0	0.4600
002508	0.1661	0.1444	0.5152	0.0036	0.0395	0.1600	0.8911	0.0126	4	0.6	5	2	0.1126	0.0136	4	4	3	0	0.0001	1	1	0.5004
002543	0.0854	0.0775	0.5031	0.3349	0.0346	0.1022	0.3837	0.1491	4	0.89	4	3	0.0553	0.0095	5	4	3	0	0.0000	1	1	0.5256
002614	0.1276	0.0191	0.1271	0.7587	0.0337	0.1024	0.4319	0.2010	3	0.63	1	3	0.0597	0.0042	5	1	1	0	0.0001	0	1	0.4133
002677	0.0433	0.2296	0.7957	0.0000	0.0291	0.1087	0.1717	0.1267	3	1.08	5	3	0.1289	0.0006	3	5	3	1	0.0002	1	0	0.5881
002705	0.0472	0.0750	0.5580	0.8580	0.0326	0.1215	-0.1145	0.2020	5	0.75	3	4	0.0376	0.0038	6	2	5	0	0.0004	1	1	0.5417
002723	-0.1096	0.0000	0.0000	0.7406	0.0373	0.1446	0.4390	0.2949	4	0.89	4	3	0.0090	0.0034	3	4	1	0	0.0000	0	0	0.5643
002759	0.0183	0.0000	0.0000	0.0220	0.0367	0.1374	-0.1994	0.1752	3	0.71	1	3	0.0635	0.0040	2	1	3	0	0.0000	0	1	0.2667
300247	-0.3257	0.0000	0.0000	0.5758	0.0599	0.1061	0.1858	0.0710	4	1.25	1	2	0.0411	0.0127	3	1	3	0	0.0000	0	0	0.3649
300272	-0.3185	0.0280	0.1392	0.5400	0.0386	0.0963	0.2493	0.4137	5	1.94	1	4	0.0305	0.0060	3	5	5	0	0.0001	0	1	0.6010
603355	-0.1417	0.0272	0.2085	0.3318	0.0417	0.0826	0.2157	0.1720	5	0.85	3	4	0.0203	0.0068	5	4	2	0	0.0001	1	1	0.4895
603366	-0.1712	0.0000	0.0000	0.0454	0.0246	0.1038	0.4948	-0.1311	4	0.8	1	4	0.0728	0.0057	4	4	1	0	0.0004	0	1	0.3829
603579	0.0831	0.0607	0.3370	0.4156	0.0474	0.1369	0.2047	0.2915	4	1.13	2	3	0.0349	0.0044	3	1	3	0	0.0002	1	1	0.4051
603868	0.0802	0.2711	0.7733	0.0061	0.0133	0.0351	-0.4173	-0.0481	3	0.85	1	4	0.1370	0.0119	4	1	3	0	0.0000	0	0	0.2468
600983	0.0574	0.0098	0.1464	0.4740	0.0229	0.1298	0.3164	-0.2474	5	0.37	4	4	0.0319	0.0088	5	5	5	0	0.0000	0	0	0.5565
000404	0.0636	0.0035	0.1929	0.3472	0.0332	0.0909	0.3993	-0.0481	4	0.53	1	4	0.0084	0.0034	5	4	5	0	0.0000	0	1	0.4870
002011	-0.5225	0.0000	0.0000	0.1181	0.0371	0.0571	0.2179	0.0098	4	0.88	5	4	0.0436	0.0085	6	4	5	0	0.0000	0	0	0.4365

Table A1. Cont.

Stock Code	Shareholder			Consumer			Employee			Supply Chain			Government			Environment			Society			CSR
	A1	A2	A3	B1	B2	B3	C1	C2	C3	D1	D2	D3	E1	E2	E3	F1	F2	F3	G1	G2	G3	
002050	0.0978	0.0935	0.5735	0.4572	0.0403	0.1400	0.5673	0.0560	4	0.73	3	4	0.0417	0.0056	5	4	5	0	0.0000	0	0	0.5593
002290	0.0279	0.0000	0.0000	0.1390	0.0288	0.1461	-0.0789	0.0261	4	0.56	3	3	0.0397	0.0043	2	1	5	0	0.0005	0	1	0.3178
002418	-0.6192	0.0000	0.0000	0.0845	0.02	0.0466	-0.1178	0.0955	5	0.51	3	4	0.0501	0.0173	4	1	5	0	0.0016	1	1	0.2819
002676	0.0068	0.0000	0.0000	0.1344	0.0249	0.0896	-0.0753	-0.0235	4	1.16	3	5	0.0516	0.0042	4	4	3	0	0.0000	0	1	0.4294
002860	0.1155	0.0263	0.1834	0.0433	0.0478	0.1165	-0.1021	-0.0175	4	0.65	4	4	0.1066	0.0130	2	4	3	0	0.0000	1	0	0.4348
300160	-0.3403	0.0898	0.0000	0.2470	0.0314	0.0582	0.3642	0.3518	4	2.03	4	4	0.0503	0.0091	3	4	1	0	0.0007	1	0	0.4698
300217	0.0727	0.0123	0.1754	0.0807	0.0347	0.1040	-0.0907	0.2087	4	0.67	4	4	0.0595	0.0030	4	4	5	0	0.0000	0	0	0.4592
300342	-0.0183	0.0467	0.6554	0.0536	0.0735	0.2136	0.2430	0.1365	4	0.65	4	4	0.0753	0.0038	3	4	3	0	0.0008	0	1	0.5276
300403	-0.0967	0.0407	0.3705	0.6337	0.0715	0.1639	0.0684	0.0872	4	1.02	3	4	0.0547	0.0127	3	4	3	0	0.0002	0	1	0.5848
300475	0.0350	0.0056	0.2035	0.0000	0.0673	0.0798	0.1904	0.3643	3	0.32	2	4	0.1173	0.0254	2	4	1	0	0.0000	0	1	0.4419
600619	0.0565	0.0257	0.4180	0.2074	0.0393	0.1508	0.6280	0.0899	5	0.45	5	5	0.0274	0.0055	5	5	5	0	0.0000	1	1	0.5902
603519	-0.0137	0.1534	1.2133	0.2776	0.0315	0.1452	0.1152	0.1272	3	1.37	1	4	0.0160	0.0007	1	1	2	0	0.0000	0	0	0.3463
603578	0.0876	0.0379	0.3132	0.0066	0.0397	0.1419	-0.2113	0.1309	3	1.07	4	4	0.0718	0.0422	2	2	2	0	0.0007	1	1	0.3618
603677	0.1731	0.0437	0.4989	0.2563	0.0347	0.0997	-0.1199	0.1266	4	0.9	4	4	0.0262	0.0029	3	2	5	0	0.0004	1	0	0.4142
603726	0.0784	0.0892	0.6541	0.0423	0.0414	0.1565	-0.1357	0.1623	4	1.01	1	3	0.0639	0.0079	3	2	3	0	0.0003	0	0	0.3450
000333	0.1149	0.1032	0.4232	0.4252	0.0378	0.1074	1.4822	-0.0979	5	0.81	4	4	0.0529	0.0051	7	5	5	0	0.0001	1	0	0.6259
000651	0.3868	0.1890	0.4821	0.1124	0.0367	0.1330	0.1653	0.1201	5	0.72	5	5	0.0764	0.0034	7	5	5	1	0.0000	0	0	0.6538
300249	0.0413	0.0070	0.1748	0.0000	0.0525	0.2478	0.4025	0.0969	4	0.38	1	5	0.0394	0.0100	3	4	3	1	0.0000	0	0	0.5456
600854	-0.0017	0.0168	0.7634	0.0010	0.0006	0.0136	-0.1714	-0.1705	3	0.91	1	1	0.1304	0.0027	1	1	3	0	0.0000	0	0	0.1832
000521	-0.0042	0.0122	1.6213	0.2128	0.047	0.1552	0.2799	0.1620	4	0.55	2	4	0.0203	0.0055	6	4	5	0	0.0000	0	0	0.5305
000921	0.1132	0.0583	0.2998	0.2985	0.028	0.0398	0.0900	0.1420	5	0.73	5	4	0.0340	0.0096	6	4	5	1	0.0000	1	1	0.5977
002668	-0.3193	0.0000	0.0000	0.6678	0.0432	0.0731	-0.1408	-0.0709	3	0.54	3	2	0.0351	0.0021	6	1	3	0	0.0000	0	1	0.3493
600336	0.0329	0.0123	0.3430	0.1615	0.0199	0.0880	0.1704	0.0560	5	0.64	2	4	0.0439	0.0048	5	4	4	0	0.0000	0	0	0.4462
600690	0.1612	0.0467	0.3004	0.4202	0.0294	0.1709	0.2020	0.0651	5	0.68	5	5	0.0487	0.0049	7	5	5	0	0.0001	1	1	0.6754
000100	0.1243	0.0248	0.3864	0.4970	0.05	0.1663	0.3542	-0.0599	5	0.91	4	5	0.0441	0.0000	7	5	5	1	0.0001	1	1	0.7163
002426	-0.0956	0.0000	0.0000	0.1895	0.0213	0.2575	1.0986	0.1642	3	1.01	1	4	0.0241	0.0017	5	3	3	0	0.0000	1	0	0.4505
603331	0.0545	0.0448	0.4328	0.2674	0.0319	0.0952	-0.0073	0.0799	3	1.94	4	4	0.0577	0.0039	3	4	5	0	0.0003	1	0	0.4982

Note: Subcritener E3 is stated due to intervals of ordinal value: 1 for NE < 500, 2 for 500 < NE < 1000, 3 for 1000 < NE < 3000, 4 for 3000 < NE < 5000, 5 for 5000 < NE < 10000, 6 for 10000 < NE < 50000, 7 for NE > 50000.

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