DO INTERACTION AND EDUCATION MODERATE TOP MANAGEMENT TEAM AGE HETEROGENEITY AND CORPORATE SOCIAL RESPONSIBILITY?

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Using Chinese listed firms' data from 2008 to 2012, we explored, on the basis of upper echelons theory, whether and how top management team (TMT) age heterogeneity affects corporate social responsibility (CSR) and if TMT interaction and TMT education moderate this relationship. Results revealed an inverted U-shaped relationship between TMT age heterogeneity and CSR, in which TMT interaction played a moderating role; however, TMT education did not moderate the relationship. These results are helpful and significant for the understanding of CSR strategy, and for the improvement of human resource management.

Keywords: age heterogeneity, corporate social responsibility, top management team education, top management team interaction, upper echelons theory.

   Hambrick and Mason's (1984) upper echelons theory has triggered research on the impact of the demographic characteristics of a top management team (TMT)

on organizational outcomes (Hutzschenreuter & Horstkotte, 2013; Nadolska & Barkema, 2014). In this theory, TMT characteristics determine the cognitive basis, values, communication, and conflict within the team and, thus, affect the process of strategic choice and resulting performance outcomes. Although the impact of TMT heterogeneity on firm performance has also been a focus for researchers (for a review, see Homberg & Bui, 2013), the results are mixed. For example, researchers have found, on the basis of similarity–attraction theory (Byrne, 1971) and social identity theory (Ashforth & Mael, 1989), that TMT heterogeneity may hamper organizational strategic decisions and performance by destroying team cohesiveness and decreasing cooperation and communication (Certo, Lester, Dalton, & Dalton, 2006; Richard & Shelor, 2002). Findings of other studies conducted from an information and decision-making perspective, suggest that a heterogeneous TMT contributes to knowledge sharing and high-quality decision making among team members, thereby enhancing firm performance (Naranjo-Gil, Hartmann, & Maas, 2008; S. Nielsen, 2010).

Previous researchers have acknowledged the importance and impact of TMT heterogeneity on firms' financial performance (Andrevski, Richard, Shaw, & Ferrier, 2014; Cannella, Park, & Lee, 2008; B. B. Nielsen & Nielsen, 2013); in contrast, few researchers have examined the role of TMT heterogeneity in firms' social performance (Boulouta, 2013). However, findings show that the ignoring of social performance leads not only to serious environmental and social problems, but also to a negative effect on firms' financial performance (Brammer & Millington, 2008). Other researchers have suggested that the positive role of corporate social responsibility (CSR) may lead to firms attracting and retaining higher quality employees and the better marketing of their products and services, and to a contribution to firms' social legitimacy. Therefore, in this study we fully examined the effect of TMT heterogeneity on CSR.

In addition, many results have shown that the relationship of TMT heterogeneity and firm performance depends on external moderating factors, such as environmental uncertainty (Cannella et al., 2008) and industry and institutional environments (Yamak, Nielsen, & Escribá-Esteve, 2014). The moderating role of internal factors, such as TMT interaction and education, remains unclear. Finally, few researchers have examined TMT diversity and firm performance focusing on emerging economies. Therefore, an examination of Chinese firms will contribute to the decision making of other countries with emerging economies, and will provide valuable knowledge of the Chinese market.

In this study we investigated the influence of Chinese TMT age heterogeneity on CSR, and the moderating effect of TMT interaction and education on this relationship (see Figure 1). We focused on TMT age heterogeneity for three reasons: First, there are more notable variations in TMT age characteristics than there are in gender, race, career experience, or formal educational qualifications.

According to information about managers on the Chinese Stock Market and Accounting Research (CSMAR) database, the proportion of women in TMTs in Chinese firms is 15.5%, and the leading TMT educational qualifications are master's and bachelors' degrees (totaling 61.4%), whereas there is a more diversified distribution for TMT age. According to TMT age statistics in the database, the mean, standard deviation, maximum, and minimum are 48, 7.688, 24, and 84, respectively. Second, in China, great changes are taking place in TMT age distribution. The delaying of retirement is becoming a broader trend as the proportion of China's population in the older age group increases, thus increasing the number of older TMT managers. In contrast, according to China's current mechanism of selection and promotion, more relatively young managers are being appointed in TMTs. Third, we reasoned that focusing on the specific demographic characteristic of age would provide a more fine-grained analysis.

Unlike in previous studies, we focused on the social performance rather than the financial performance of emerging economies, and instead of external factors, we included two internal factors, TMT interaction and education, as moderators.
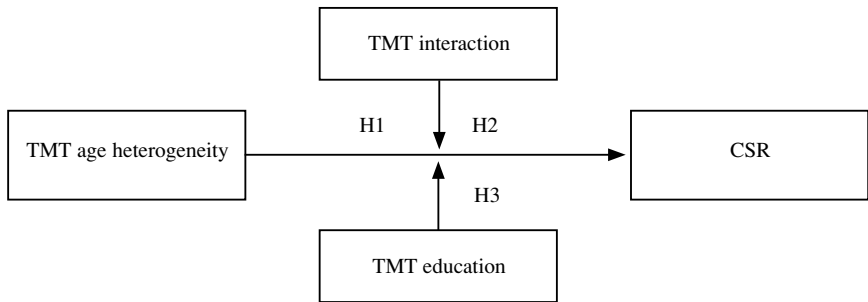
Figure 1. Conceptual model. TMT = top management team, CSR = corporate social responsibility.

Literature Review and Hypothesis Development

Top Management Team Age Heterogeneity and Corporate Social Responsibility

Heterogeneity refers to the degree to which there are differences in the demographic, cognitive, and functional background dimensions in a group composition (Z. Liao & Long, 2016). In social identity theory (Ashforth & Mael, 1989) and similarity–attraction theory (Byrne, 1971), the negative effects of heterogeneity are emphasized; members form associations within the organization on the basis of social classification, and this leads to in-organization favoritism and out-organization prejudice. This process ultimately affects the

organization's outcome and performance (Tajfel, 1982). For example, managers are likely to interact with other managers in the same age group, finding that they are easier to interact with and more likely to share their values and expectations, than are those in a different age group.

In contrast, out-organization members are perceived as less trustworthy, more dishonest, and less cooperative than in-organization members. According to this view, group members consciously or unconsciously classify themselves and others into social categories depending on age or other characteristics; they accord more positive emotions to people who are similar to them in age or other characteristics, and more negative emotions to those who differ in age or other characteristics. These effects lead to negative consequences, such as decreased within-group communication (Zenger & Lawrence, 1989), less cooperation and cohesion, and increased turnover and emotional conflict (Amason & Sapienza, 1997; Riordan & Shore, 1997), which eventually generate negative effects on firms' strategic decision making and performance.

It is noted in information/decision-making theory that, compared to a non-heterogeneous team, a heterogeneous team has more resources and information that provide richer and more diverse perspectives, thereby generating cognitive conflict within the team (Qian, Cao, & Takeuchi, 2013). This process contributes to team learning so that teams make high-quality and creative strategic decisions that enable them to solve problems effectively and, ultimately, enhance business performance (Simons, Pelled, & Smith, 1999).

In this study we took the point of view that a TMT's age heterogeneity may simultaneously generate positive and negative effects on CSR. In their upper echelons theory, Hambrick and Mason (1984) suggest that managers of different ages have different cognitive bases, values, and attitudes toward life. Thus, when there is a low level of age heterogeneity in a TMT, members have greater cohesion, better communication, and more consistent values, which help firms develop efficiently and implement CSR strategy. In contrast, according to stakeholder theory (Donaldson & Preston, 1995), the level of satisfaction that firms experience in meeting each stakeholder's demand reflects the level of their social responsibility performance. For this process to be carried out, a large quantity of information needs to be collected and organized. When the level of age heterogeneity is high, the TMT's broader access to information, more diverse perspectives, and stronger ability to handle various information are more conducive to the improvement of CSR performance.

In this study we suggested that although the above-mentioned aspects of age heterogeneity are not in conflict, their effects are very different in the different levels of TMT age heterogeneity. When the level of TMT age heterogeneity is low, there is greater cohesion and exchange of information and collaboration. However, as the TMT is limited by little diverse information and lower

cognitive conflict, it is difficult for the TMT to create a high-quality CSR strategy; therefore, the CSR performance is poor. With an increase in TMT age heterogeneity, however, the TMT's cohesion declines, cognitive conflict increases, and the TMTs ability to collect and process information strengthens. This is more conducive to the TMT developing and implementing a high-quality CSR strategy and improving the firm's CSR performance.

It is likely that there may be a turning point in this promotion tendency. For example, when age heterogeneity increases further, this heterogeneity is likely to provide excessively diversified information and opinions regarding CSR strategy, and is also likely to trigger enormous disagreement and difficulty in reconciling divergence and difference of opinions within the team. Thus, as TMT age heterogeneity increases it is more likely that emotional conflict will be generated, and team collaboration and cooperation destroyed, leading to poor decisions and low CSR performance. Thus, we proposed the following hypothesis:

Hypothesis 1: Top management team age heterogeneity will have an inverted U-shaped relationship with corporate social responsibility.

The Moderating Role of Top Management Team Interaction

TMT interaction will undoubtedly play a positive role in the above process. On the one hand, members' interaction is conducive to the exchange of information, brainstorming, and achieving consensus on CSR. In addition, communication among members regarding CSR objectives or decisions during TMT interaction promotes learning among members and the understanding of CSR objectives: TMT's decision-making ability is improved and, ultimately, the firm's CSR performance. On the other hand, effective team interaction helps members articulate and share their ideas and opinions in a timely manner. This process effectively reduces emotional conflict among members, creating a strong environment for the development of a socially responsible decision, increasing understanding and trust among members, inspiring openness and cooperation between the top managers (Chatman & Flynn, 2001), and increasing team cohesion; thus, CSR objectives can be internalized by top managers and externalized in their actions. Therefore, we proposed the following hypothesis:

Hypothesis 2: Top management team interaction will positively moderate the relationship between team age heterogeneity and corporate social responsibility.

The Moderating Role of Top Management Team Education

As highly educated managers usually have greater learning and cognitive abilities than those who are not as highly educated (Wiersema & Bantel, 1992), they also have greater adaptation and information integration abilities. Previous findings have shown that highly educated top managers have a positive influence on corporate strategic positioning (Kimberly & Evanisko, 1981), corporate

management, technological innovation, and diversification (Wiersema & Bantel, 1992). Therefore, our view is that the better educated managers are, the more likely they are to undertake CSR: First, the more highly educated managers are and the longer they have spent being educated, the more they are influenced by positive thinking (Campbell, 2007) and, therefore, the more likely they are to care about food safety, environmental protection, and other social problems (Huang, 2013). Second, the more highly educated managers are, the more they are able to remain rational and objective in complex decision-making processes, and the better they can understand and focus on the demands of the stakeholders. In addition, highly educated general managers have a higher professional quality and higher culture attainment with the ability to analyze and solve problems, and a better information-processing ability than those who are not as highly educated. Therefore, from our point of view, the highly educated TMT will choose more effective communication and solutions when CSR strategy team conflict caused by greater age heterogeneity arises. Third, the more highly educated TMT can effectively address diversified information when it is provided by an age-heterogeneous TMT, thereby contributing to the development and implementation of CSR strategy. Thus, we proposed the following hypothesis:

Hypothesis 3: Top management team education will positively moderate the relationship between team age heterogeneity and corporate social responsibility.

Method

Participants and Procedure

To measure the CSR of the listed Chinese firms, we used the CSR scores and ranking by Rankins CSR Ratings (RKS; **http://www.rksratings.cn/**), following the framework of KLD Research & Analytics, the standard of Global Reporting Initiative guidelines (Global Reporting Initiatives, 2002) and the Social Accountability 8000® standard certification (Social Accountability International, 2001). As Rankins have issued a CSR index since 2008, Chinese firms listed on the Shanghai and Shenzhen stock exchanges with CSR reports from 2008 to 2012 took part in this study. The selection procedure and distribution of observations during the time period are shown in Table 1. We obtained the firms' financial information and industry affiliation data from the CSMAR database and annual reports.

Dependent Variable

The dependent variable was the CSR scores and ranking from RKS. RKS has developed the MCT Social Responsibility Report evaluation system in which a structured expert scoring method, based on 70 indicators that analyze the content of CSR reports issued by listed firms, is used. With regard to its reliability and

validity, the RKS dataset has been used in previous CSR studies conducted in China (Lau, Lu, & Liang, 2016; L. Liao, Lin, & Zhang, 2018) with satisfactory results.

Table 1. *Participant Selection and Distribution of Observations*

Selection process	2008	2009	2010	2011	2012	Total
A-share listed firms with social responsibility report issued 2009-2012	335	471	518	582	644	2,550
Minus: Firms in the financial industry	(20)	(30)	(34)	(39)	(40)	(163)
Firms with missing data of top management team characteristics and relevant financial information	(6)	(11)	(14)	(5)	(2)	(38)
Special treatment and particular transfer firms	(1)	(4)	(5)	(6)	(4)	(20)
Total participants	308	426	465	532	598	2,329

Independent Variables

Following Finkelstein, Hambrick, and Cannella (2009), we defined the *top management team* as senior management, including the chairman of the board, vice chairman of the board, general managers, vice general managers, vice presidents, and chief accountant/chief financial officer. We combined the generally accepted methods (Richard & Shelor, 2002), and computed *age heterogeneity* as the coefficient of variation (the ratio of the standard deviation of TMT age to the mean of TMT age) in TMT members' ages.

Moderating Variable

Previous findings have shown that the longer TMT members work together, the more beneficial this is to mutual understanding, trust, and interaction (Buyl, Boone, Hendriks, & Matthyssens, 2011). Following Barkema and Shvyrkov (2007), we used the average overlap in the TMT tenure as a proxy for the level of interaction. The measure is defined as:

$$M\text{interact} = 1 / N \sum_{j \neq k} \min(u_j, u_k) \qquad (1)$$

N is the total number of pairwise comparisons and u_j and u_k stand for the individual tenure of two managers $_j$ and $_k$. We first examined the overlap tenure of every pair of TMT members (the smaller value between u_j and u_k) and then averaged the overlap tenure for all the pairs of TMT members.

The TMT's level of education equals the arithmetic mean of each member's level of education. We examined each member's highest level of education using Yang, Zimmerman, and Jiang's (2011) method. Each member's level of education was coded as follows: 5 = a doctorate; 4 = a master's degree; 3 = a bachelor's degree; 2 = higher education completed at a junior college; and 1 = other.

Control Variables

Following previous researchers, we tested the following control variables: firm size (natural log of total assets; Boulouta, 2013); financial performance (return on equity, ROE; net income divided by total equity, Aguinis & Glavas, 2012); leverage (total debt divided by total assets, Lopatta, Jaeschke, & Chen, 2017); book-to-market ratio (B_M; book value of equity divided by market value of equity, Fabrizi, Mallin, & Michelon, 2014); total number of employees (Li & Zhang, 2010); number of years since the firm's initial public offering (firm age, Fage; Oh, Chang, & Martynov, 2011); proportion of shareholding of institutional investors (InsHold; Oh et al., 2011); gross domestic product per person (PerGDP) for the province where the firm is located (Li & Zhang, 2010); and property, an indicator variable equal to one if the firm is controlled by central or local government or agencies, or zero otherwise (Xu, Liu, & Huang, 2015). Year and industry were included as dummy variables.

Model and Hypothesis Testing

To test the relationship between TMT age heterogeneity and CSR (Hypothesis 1), we estimated Model 2 in which the subscripts $_i$ and $_t$, denote the firm and year, respectively. To examine the moderating effect of TMT interaction and education (Hypotheses 2 and 3), we adopted Wooldridge's (2009) approach of employing interaction terms and estimated Models 3 and 4. We tested the hypotheses using an ordinary least squares estimator.

$$CSR_{i,t} = \beta_0 + \beta_1 Hage_{i,t} + \beta_2 Hage_{i,t}^2 + \beta_3 Size_{i,t} + \beta_4 ROE_{i,t} + \beta_5 Leverage_{i,t} + \beta_6 B\_M_{i,t} + \beta_7 Employee_{i,t} + \beta_8 FAge_{i,t} + \beta_9 InsHold_{i,t} + \beta_{10} PerGDP_{i,t} + \varepsilon \quad (2)$$

$$CSR_{i,t} = \beta_0 + \beta_1 Hage_{i,t} + \beta_2 Hage_{i,t}^2 + \beta_3 Minteract_{i,t} + \beta_4 Hage_{i,t} \times Minteract_{i,t} + \beta_5 Hage_{i,t}^2 \times Minteract_{i,t} + \beta_6 Size_{i,t} + \beta_7 ROE_{i,t} + \beta_8 Leverage_{i,t} + \beta_9 B\_M_{i,t} + \beta_{10} Employee_{i,t} + \beta_{11} FAge_{i,t} + \beta_{12} InsHold_{i,t} + \beta_{13} PerGDP_{i,t} + \varepsilon \quad (3)$$

$$CSR_{i,t} = \beta_0 + \beta_1 Hage_{i,t} + \beta_2 Hage_{i,t}^2 + \beta_3 Meducation_{i,t} + \beta_4 Hage_{i,t} \times Meducation_{i,t} + \beta_5 Hage_{i,t}^2 \times Meducation_{i,t} + \beta_6 Size_{i,t} + \beta_7 ROE_{i,t} + \beta_8 Leverage_{i,t} + \beta_9 B\_M_{i,t} + \beta_{10} Employee_{i,t} + \beta_{11} FAge_{i,t} + \beta_{12} InsHold_{i,t} + \beta_{13} PerGDP_{i,t} + \varepsilon \quad (4)$$

Results

Descriptive statistics are shown in Table 2. As the mean of CSR is relatively low, given the maximum of 82.438, this suggests that the CSR level of China's listed firms is low and needs improvement. The maximum and minimum CSR means suggest that there is an obvious difference among the firms. In regard to education, the majority of TMT members held a bachelor's degree.

The regression analysis results are reported in Table 3. As shown in Model 2 of Table 3, we observed a significant positive effect of TMT age heterogeneity on

CSR. In addition, the effect of the TMT age heterogeneity-squared term on CSR was significantly negative, as expected. Thus, TMT age heterogeneity has an inverted U-shaped relationship with CSR. Therefore, although an initial increase in TMT age heterogeneity can improve CSR, high TMT age heterogeneity is destructive after a certain point, leading to lower CSR. There is thus an optimal point for age heterogeneity in relation to CSR when age heterogeneity takes the form of 0.110 [-0.418 / (-1.893 × 2)].

Table 2. *Descriptive Statistics*

	N	*M*	*SD*	Minimum	Maximum
CSR_t	2,329	34.354	11.900	11.690	82.438
$Hage_t$	2,329	0.139	0.045	0.000	0.385
$Minteract_t$	2,329	3.030	1.089	0.847	8.065
$Meducation_t$	2,329	3.460	0.439	1.563	4.692
$Size_t$	2,329	2.84 e+10	10.56 e+10	0.03 e+10	216.88 e+10
ROE_t	2,329	0.098	0.125	-3.037	0.749
$Leverage_t$	2,329	0.493	0.198	0.014	0.946
B_M	2,329	0.694	0.272	0.066	5.074
$Employee_t$	2,329	12609.713	38017.760	28.000	552810.000
$FAge_t$	2,329	3578.010	1882.117	2.000	7932.000
$InsHold_t$	2,329	0.202	0.187	0.000	0.956
$PerGDP_t$	2,329	48144.997	21590.348	9428.000	95123.000

Note. All variables are in their original form. CSR = corporate social responsibility, Hage = age heterogeneity, ROE = return on equity, B_M = book-to-market ratio, Fage = firm age, InsHold = proportion of institutional investors, Per GDP = gross domestic product per person.

Table 3. *Regression Results*

Variables	Model 1 CSR_t	Model 2 CSR_t	Model 3 CSR_t	Model 4 CSR_t	Model 5 CSR_t	Model 6 CSR_t
$Size_t$	0.002***	0.002***	0.002***	0.001***	0.001***	0.001***
	(4.05)	(4.05)	(4.08)	(3.99)	(3.89)	(3.94)
ROE_t	0.113***	0.114***	0.117***	0.120***	0.111***	0.111***
	(4.50)	(4.57)	(4.68)	(4.80)	(4.45)	(4.46)
$Leverage_t$	0.015	0.013	0.012	0.015	0.007	0.007
	(1.06)	(0.92)	(0.89)	(1.07)	(0.50)	(0.49)
B_M_t	0.046***	0.046***	0.046***	0.044***	0.044***	0.045***
	(3.88)	(3.88)	(3.87)	(3.71)	(3.78)	(3.85)
$Employee_t$	0.008***	0.008***	0.008***	0.008***	0.007***	0.007***
	(5.79)	(5.76)	(5.71)	(5.87)	(5.48)	(5.50)
$FAge_t$	-0.007**	-0.007**	-0.006**	-0.006**	-0.008***	-0.008***
	(-2.56)	(-2.57)	(-2.17)	(-2.09)	(-2.69)	(-2.74)
$InsHold_t$	0.053***	0.053***	0.053***	0.053***	0.043***	0.043***
	(4.45)	(4.49)	(4.50)	(4.48)	(3.68)	(3.67)
$PerGDP_t$	0.012**	0.011**	0.011**	0.012**	0.007	0.007
	(2.53)	(2.36)	(2.33)	(2.53)	(1.47)	(1.51)

Table 3 continued

Variables	Model 1 CSR_t	Model 2 CSR_t	Model 3 CSR_t	Model 4 CSR_t	Model 5 CSR_t	Model 6 CSR_t
Property	0.017***	0.011*	0.010*	0.010*	0.002	0.002
	(3.20)	(1.95)	(1.82)	(1.82)	(0.36)	(0.37)
$Hage_t$		0.418*	0.397	1.696***	0.501**	0.402
		(1.66)	(1.57)	(3.30)	(2.00)	(1.52)
$Hage_t^2$		-1.893**	-1.850**	-5.107***	-2.021**	-1.692**
		(-2.33)	(-2.28)	(-3.24)	(-2.51)	(-1.99
$Minteract_t$		-0.004*	0.029***			
		(-1.90)	(2.70)			
$Hage_t \times Minteract_t$			-0.363***			
			(-2.94)			
$Hage_t^2 \times Minteract_t$			0.863**			
			(2.40)			
$Meducation_t$			0.035***	0.034***		
			(6.23)	(6.14)		
$Hage_t \times Meducation_t$				0.124		
				(0.43)		
$Hage_t^2 \times Meducation_t$				0.075		
				(0.07)		
Constant	0.114**	0.109*	0.114*	-0.013	0.048	0.054
	(2.00)	(1.83)	(1.91)	(-0.18)	(0.80)	(0.90)
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2,329	2,329	2,329	2,329	2,329	2,329
R^2	.277	.281	.282	.285	.293	.293
Adjusted R^2	.267	.271	.272	.275	.283	.283
F	30.305	28.951	28.190	26.909	29.722	28.015
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000

Note. The *t* value is shown in parentheses. All continuous variables are winsorized at 1% and 99% to mitigate outliers. CSR = corporate social responsibility, Hage = age heterogeneity, ROE = return on equity, B_M = book-to- market ratio, Fage = firm age, InsHold = proportion of institutional investors, PerGDP = gross domestic product per person.
* $p < .10$, ** $p < .05$, *** $p < .01$.

As shown in Model 4 of Table 3, the coefficient of Hage × *M*interact is negative and that of Hage² × *M*interact is positive, with CSR as the dependent variable. To clearly indicate the moderating effect of TMT interaction, we plotted the relationship between TMT age heterogeneity and CSR for the three values of TMT interaction (see Figure 2). Following the method of Henderson, Miller and Hambrick (2006), we selected the values: small = μ – σ, medium = μ, large = μ + σ, where μ and σ are the mean and standard deviation of the TMT interaction. There is an inverted U-shaped relationship between TMT age heterogeneity and CSR for each level of TMT interaction. Thus, Hypothesis 1 was supported.
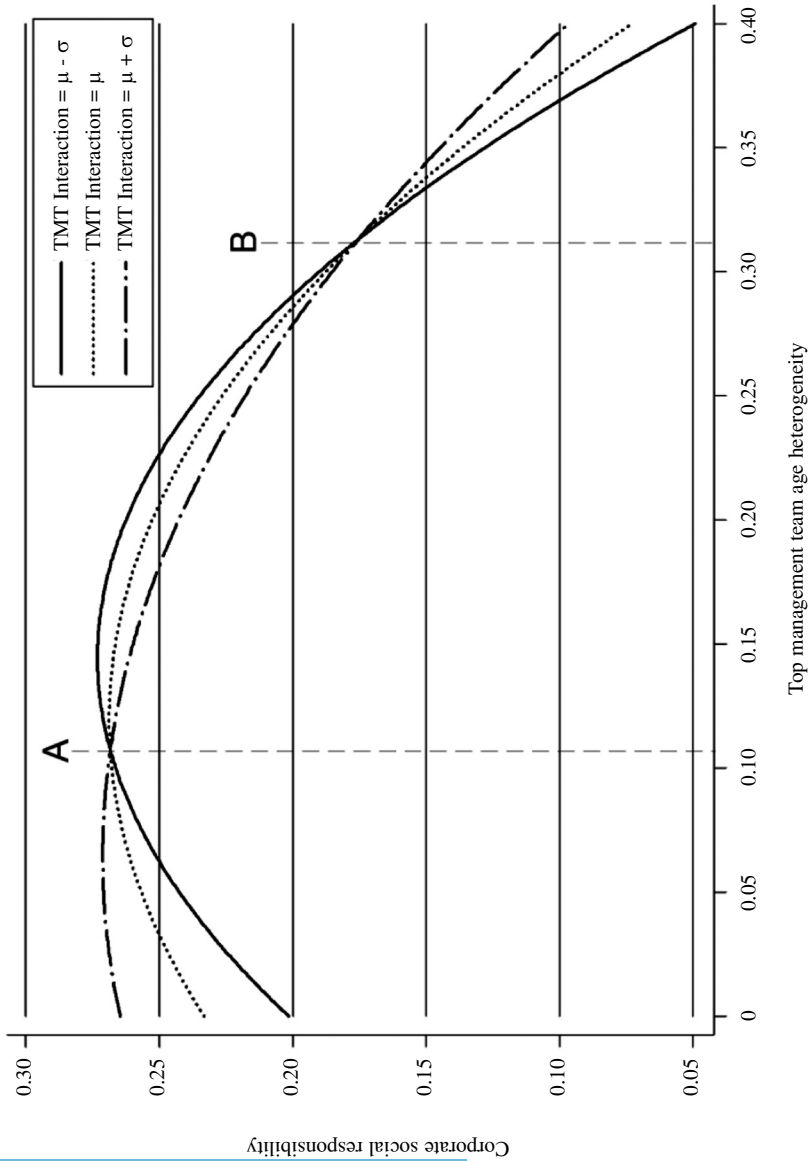
Figure 2. The moderating role of top management team (TMT) interaction in the relationship between TMT age heterogeneity and corporate social responsibility.

However, the moderating effect of TMT interaction is different at different levels of TMT age heterogeneity (see Figure 2). For example, TMT interaction has a positive moderating effect when the level of TMT age heterogeneity ranges from 0 to A or greater than B; conversely, it has a negative moderating effect when the level of TMT age heterogeneity ranges from A to B. To determine if that result held across the entire observed range of TMT interaction, following Henderson et al., (2006), we used Model 4 to calculate the partial derivative, ∂ CSR / ∂ Hage. The result shows that the above conclusion was supported for each observed value of TMT interaction; therefore, Hypothesis 2 was partially supported. As indicated in Model 5 of Table 3, the coefficient of TMT mean education is significantly positively correlated with CSR, suggesting that the higher the mean for TMT education level, the better is the CSR performance. However, as shown in Model 6 of Table 3, the coefficient of Hage $\times$ *M*education and of Hage^2 $\times$ *M*education are both nonsignificantly positive with CSR as the dependent variable. This result shows that the TMT mean education level did not play a moderating role in the relationship between TMT age heterogeneity and CSR performance. Thus, Hypothesis 3 was not supported. This result also means that although the mean education level of the TMT can affect the fulfillment of social responsibility, it does not effectively moderate the differences in cognitive values caused by age heterogeneity.

Robustness Tests

We conducted two robustness tests. First, as high-polluting industries are likely to trigger serious environmental pollution, they are usually subject to strict government and public scrutiny. Therefore, to ensure that our results were not driven by the outlier, we excluded participant firms belonging to either an environmentally or socially sensitive industry; we then re-estimated our model. The results show that coefficients of main variables maintained their sign and are statistically significant (see Table 4).

Second, as we consider that the effects of TMT structure on CSR will take time to show up, we ran the analysis again using lagged instead of current period CSR. All findings documented in the previous analyses were confirmed (see Table 5).

Table 4. *Regression Results With Companies in Low-Polluting Industries*

Variables	Model 1 CSR$_t$	Model 2 CSR$_t$	Model 3 CSR$_t$	Model 4 CSR$_t$	Model 5 CSR$_t$	Model 6 CSR$_t$
Hage$_t$		0.590*	0.591*	1.762***	0.669**	0.591*
		(1.78)	(1.78)	(2.85)	(2.01)	(1.68)
Hage$_t^2$		-2.613**	-2.640**	-5.812***	-2.788**	-2.530**
		(-2.40)	(-2.43)	(-3.08)	(-2.57)	(-2.20)
*M*interact$_t$			-0.004*	0.024*		
			(-1.78)	(1.83)		

Table 4 continued

Variables	Model 1 CSR_t	Model 2 CSR_t	Model 3 CSR_t	Model 4 CSR_t	Model 5 CSR_t	Model 6 CSR_t
$Hage_t \times Minteract_t$				-0.328**		
				(-2.25)		
$Hage_t^2 \times Minteract_t$				0.861**		
				(2.03)		
$Meducation_t$					0.019**	0.019**
					(2.55)	(2.55)
$Hage_t \times Meducation_t$						0.148
						(0.36)
$Hage_t^2 \times Meducation_t$						-0.147
						(-0.10)
Constant	0.151**	0.143*	0.149**	0.038	0.105	0.108
	(2.11)	(1.91)	(1.99)	(0.42)	(1.37)	(1.42)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1492	1492	1492	1492	1492	1492
R^2	.298	.305	.306	.309	.308	.308
Adjusted R^2	.285	.291	.292	.293	.293	.293
F	22.214	21.354	20.797	19.732	20.953	19.678
Prob>F	0.000	0.000	0.000	0.000	0.000	0.000

Note. CSR = corporate social responsibility, Hage = age heterogeneity.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Table 5. *Regression Results with Lagged Corporate Social Responsibility*

Variables	Model 1 CSR_t	Model 2 CSR_t	Model 3 CSR_t	Model 4 CSR_t	Model 5 CSR_t	Model 6 CSR_t
$Hage_{t-1}$		0.430	0.405	0.661**	0.537**	0.477*
		(1.62)	(1.53)	(2.18)	(2.04)	(1.73)
$Hage_{t-1}^2$		-1.814**	-1.758**	-1.813**	-2.011**	-1.804**
		(-2.12)	(-2.06)	(-2.12)	(-2.37)	(-2.04)
$Minteract_{t-1}$			-0.004*	0.007		
			(-1.73)	(1.05)		
$Hage_{t-1} \times Minteract_{t-1}$				-0.078*		
				(-1.74)		
$Meducation_{t-1}$					0.037***	0.037***
					(6.55)	(6.50)
$Hage_{t-1} \times Meducation_{t-1}$						0.178
						(0.60)
$Hage_{t-1}^2 \times Meducation_{t-1}$						-0.269
						(-0.26)
Constant	0.101*	0.086	0.090	0.047	0.023	0.028
	(1.86)	(1.47)	(1.54)	(0.75)	(0.40)	(0.47)

Table 5 continued

Variables	Model 1 CSR_t	Model 2 CSR_t	Model 3 CSR_t	Model 4 CSR_t	Model 5 CSR_t	Model 6 CSR_t
Control variables	Yes	Yes	Yes	Yes	Yes	Yes
Year effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	2241	2213	2213	2213	2213	2213
R^2	.267	.270	.271	.272	.284	.285
Adjusted R^2	.258	.260	.261	.261	.274	.273
F	27.823	26.046	25.348	24.694	27.057	25.480
Prob > F	0.000	0.000	0.000	0.000	0.000	0.000

Note. The *t* value is shown in parentheses. CSR = corporate social responsibility, Hage = age heterogeneity.
* $p < .10$, ** $p < .05$, *** $p < .01$.

Discussion

In this study we analyzed and empirically examined whether, and how, TMT age heterogeneity affects CSR, and if TMT interaction and education moderate this relationship. We have contributed to the literature in three ways: First, we focused on social rather than financial performance, which has been the main focus in previous studies. We thus emphasized the role of TMT age heterogeneity in shaping firm performance, and explained the underlying mechanisms by which TMT age heterogeneity affects CSR. Second, we included two internal factors (TMT interaction and education) as moderators instead of external factors, which have mostly been used in previous studies. Our findings will help firms improve the relationship between TMT age heterogeneity and CSR with their own factors. Third, with our focus on emerging economies, our findings cast light on the future development of CSR in countries with emerging economies, including China. As these countries are quite different from institutional settings in Western countries, where studies have mainly been conducted, Chinese firms' CSR decisions may be different from those made in Western countries. Therefore, results of studies of Chinese firms operating in emerging economies can contribute to their decision making, and also facilitate Western researchers' understanding of the Chinese market.

Our results show an inverted U-shaped relationship between TMT age heterogeneity and CSR. In addition, TMT interaction played a moderating role in this relationship, namely, a positive moderating role when the level of TMT age heterogeneity was small or excessively large, and a negative moderating effect in other situations. A possible explanation for this phenomenon is the variation we recorded in the moderating effect of TMT interaction. First, when the level of TMT age heterogeneity was low, TMT age homogeneity played a major positive

role (i.e., better cohesion and less emotional conflict in the team), and TMT interaction further enhanced this positive effect, thereby improving the quality of TMT strategic decisions and CSR performance.

Second, when the level of TMT age heterogeneity was moderate, our calculations that a higher level of age heterogeneity is more conducive to strategic decision quality, as advocated by information/decision-making theory, were validated. However, the new thinking, ideas, and behavior of the TMT would be assimilated into the increase in TMT interaction, reducing the positive effect of age heterogeneity.

Third, when the level of TMT age heterogeneity was excessively high, TMT interaction eased the negative effects of cognitive and emotional conflict. This was beneficial to the improvement of CSR performance. Thus, future researchers should not only consider the positive effect of TMT age heterogeneity, but also focus more on its negative effect. In addition, it is vital to consider TMT internal moderating factors, such as interaction and education. Our findings are helpful and significant for the understanding of CSR strategy, as well as for the improvement of human resource management.

There are several limitations in this study. First, as our sample period was restricted by the availability of the RKS, longitudinal panel data and lagged effects analysis can be performed when more ranking data are available. Second, we suggest that future researchers use a sample of unlisted firms, for which the CSR requirements and standards are different from those of listed firms. Third, as cross-country studies would be very useful, future researchers can use an international or global sample.

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