

Corporate social responsible disclosure and cost of equity capital: Evidence from the Chinese stock market

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ABSTRACT

As one of the most important emerging markets, the Chinese stock market has received more attention from the investors around the world. We focus on the effect of corporate social responsible disclosure on the cost of equity capital and the information channel that may play a mediating role between corporate social responsible disclosure and the cost of equity capital in the Chinese context. this paper conducted empirical research based on a sample of China Shanghai and Shenzhen A-share listed companies in years 2010–2018. The results showed that: (1) Corporate social responsible disclosure can reduce the cost of equity capital; (2) Corporate social responsible disclosure can decrease the price synchronization; (3) price informativeness plays a mediating role. These effects are nearly supported by further tests concerning about environmentally sensitive or non-sensitive firms, state-owned or non-state-owned firms. Tests on the firms registered in the eastern China still show the similar results while tests on western and middle China show no significant effects of Corporate social responsible on cost of equity capital, indicating the regional difference.

Key Words: Corporate Social Responsibility (CSR); cost of equity capital; mediating effect; price synchronization.

INTRODUCTION

Sustainable development has nearly reached the consensus around the world economies in order to respond to the global environmental and climate changes and can thus maintain a long-run benefits and wellbeing of human societies. Corporate social responsibility (CSR) is defined as “the commitment of business to contribute to sustainable economic development, working with employees, their families, the local community and society at large to improve their quality of life” [1]. Consistent with sustainable development, the concept of CSR provides guidelines for the corporate behaviors and leads them to operate in an economically, socially, and environmentally sustainable way.

Beyond ethical concerns and benefits to the society, CSR can create value for the corporations. The CSR activities help to promote brand image and enhance its reputation [2]-[4]. CSR is a

strategic management tool and can be like insurance to hedge the future risks [5]. Some types of CSR activities will be likely to create goodwill and offer insurance-like protection [6]. The insurance effect of CSR is more valuable for firms with higher litigation risks [7].

Specifically, CSR disclosure can reduce the cost of equity capital. Prior research has demonstrated the negative relationship between CSR and the cost of equity capital [8],[9]. The negative relationship between CSR reporting quality and the cost of equity capital, which is more pronounced for those firms operating in environmentally sensitive industries [10]. By using an international sample covering 31 countries, a negative association between CSR disclosure and the cost of equity capital and this relationship is more pronounced in stakeholder-oriented countries [11]. Firms with higher CSR scores have significantly lower cost of equity capital, and state-owned enterprises have better CSR and lower cost of equity capital but weaker effect in reducing the cost of equity capital than non-state-owned enterprises [12]. CSR can substantially decrease firms' cost of equity capital where the legal protection of investors is high [9].

CSR can reduce the cost of equity capital through three channels: information, risk, and investor [9],[12]. Beyond the financial information published regularly, CSR disclosure can release more non-financial information to the market and thus reduce the information asymmetry between managers and investors [13]-[15]. With more firm-specific information disclosed, the stock can be priced more informatively and efficiently [16],[17]. CSR engagements can improve firms' information environment and thus lower their financing costs [18].

Besides the risks derived from information asymmetry as well as lower transparency, the CSR disclosure can also reduce other risks. CSR engagement can send signals to the capital market and decrease the risks from environmental regulation and stakeholder litigation, and thus lower financing costs [5],[19]. CSR disclosure improves the firm's information environment and thus has significant effect on the behaviors of investors [18]. CSR disclosure sends a positive signal to the market and convinces the investors to enjoy the expected rate of return from the firm [4],[20]. The investors' preferences for socially responsible firms can divest "sin" stocks (e.g., such as tobacco, alcohol firms) and make the demand for these stocks less, thus increasing the cost of equity capital for these firms [12],[21].

In this article, we focus on the effect of CSR disclosure on the cost of equity capital in the Chinese context. As one of the most important emerging markets, the Chinese stock market has received more attention from the investors around the world. It is meaningful to examine how CSR concepts are perceived or take effect in this market. Moreover, we further investigate the information channel that may play a mediating role between CSR and the cost of equity capital, i.e., demonstrating the indirect effect of CSR.

Based on previous discussion, we proposed the following three hypotheses.

H1: CSR disclosure is negatively related to the cost of equity capital.

H2: CSR disclosure is positively related to the price informativeness.

H3: The price informativeness plays a mediating role between CSR and the cost of equity capital. Regarding the hypotheses, H1 is obviously consistent with the previous research, except for its focus on the Chinese market and we examine this relationship by employing a recent dataset. H2 tests if CSR disclosure helps to improve the firm's information efficiency, i.e., the informativeness of the stock price, which is different from the information asymmetry (such as bid-ask spread used in the prior research). H3 further examines the mediating role or indirect effect of CSR disclosure on the cost of equity capital.

The remainder of this paper is organized as follows: Section 2 outlines the data and descriptive statistics; Section 3 explains the models and the results for empirical tests; Section 4 conducts further analysis about industry, ownership, and area; Section 5 concludes this paper with some discussions.

DATA, VARIABLES, AND DESCRIPTIVE STATISTICS

Data and variables

CSR disclosure data is from Rankins CSR Ratings (RKS)¹. RKS makes a comprehensive evaluation from integrity, content, technique, and industry. The higher the score, the higher the quality of CSR disclosure.

Referring to the cost of equity capital in previous research, we use PEG model [22] and OJ model [23]. The PEG model is as the following:

$$R_{PEG} = \sqrt{(EPS_{t+2} - EPS_{t+1})/P_t}.$$

R_{PEG} Denotes the cost of equity capital; EPS is the analyst forecasted earnings per share where the subscript $t+2$ or $t+1$ is the time; P_t is the price at the time t .

The OJ model is as the following:

$$R_{OJ} = A + \sqrt{\frac{EPS_{t+1}}{P_t}(g_{t+2} - (\gamma - 1)) + A^2}$$
$$A = \frac{1}{2}((\gamma - 1) + \frac{DPS_{t+1}}{P_t})$$
$$g_{t+2} = \sqrt{(EPS_{t+2} - EPS_{t+1})/EPS_{t+1}}$$

R_{OJ} denotes the cost of equity capital; EPS has the same meaning as in PEG model; DPS is expected dividend per share, $DPS_{t+1} = k * EPS_{t+1}$, where k is the average dividend payout ratio in

¹ Rankins CSR Ratings (RKS), established in 2007, is a rating agency in China that is engaged in providing an objective and scientific evaluation about CSR for responsible investors, consumers and the public.

the past three time periods; the long-run growth rate $g_p = \gamma - 1$, used 5% as its value [23]. The OJ model is only meaningful when $EPS_{t+2} > EPS_{t+1} > 0$.

The price synchronization is used as the (reverse) proxy to reflect the price informativeness, i.e., pricing efficiency or information environment of the firms [16],[17],[24].

$$R_{it} = \theta_0 + \theta_1 Market_{it} + \theta_2 Industry_{it} + \varepsilon_{it} .$$

R_{it} is return of the stock i at the time t (weekly); $Market_{it}$ is the market return weighted by market values (weekly); $Industry_{it}$ is industry return (weekly), i.e., the average return of the stocks belonging to the same industry with the stock i . The price synchronization is defined as the following:

$$SYNCH_{it} = LN(R_{it}^2 / (1 - R_{it}^2)).$$

R^2 reflects to what extent the stock return is determined by the market and industry returns, i.e., how much the stock price synchronizes with the market and industry. The higher synchronization is resulted from less firm-specific information, thus indicating less information transparency and lower pricing efficiency.

Table 1 lists the variables used in this paper and gives their definitions. Except CSR data from RKS as previous explained, most of the other data used are from CSMAR³ and RESSET⁴. Continuous variables are winsorized at 1% and 99% quantiles.

Table 1. The variables and definitions

Variables	Definition
R _{PEG}	the cost of equity capital, calculated from PEG model
R _{OJ}	the cost of equity capital, calculated from MPEG model
R _{MPEG}	the cost of equity capital, calculated from OJ model
R _{AVG}	the cost of equity capital, calculated from the previous models
CSR	corporate social responsibility disclosure, using the natural logarithm of rating values from RKS
SYNCH	the synchronicity of stock price with the market and industry
FERROR	the analysts' forecasting error
BM	the book-to-market ratio, i.e., the firm's book value divided by its market value
SIZE	the firm scale, using the natural logarithm of the firm's market value
Beta	risk coefficient calculated by CAPM model
Turnover	stock liquidity, yearly average of the daily turnover rate (trading volume divided by the number of shares in circulation)
ROA	return on assets, using EBIT divided by average balance of assets

² We calculate the industry return by excluding the stock i from its industry for preventing spurious correlations and eliminating multilinearity. Similarly, we calculate the market return by removing the industry that stock i belongs to.

³ The China Stock Market & Accounting Research (CSMAR) is a commercial database that provides data on the Chinese stock market and the financial statements of the listed firms.

⁴ RESSET is a corporation that specializes in providing financial databases and investment software development.

LEV	asset liability ratio, total liabilities divided by total assets
Top10	the sum of the shareholding ratios of the top ten shareholders
InstHoldPct	the aggregate shareholding ratio of the institutional investors
ANA	the number of analysts following, using the natural logarithm of the analysts number plus one
IndDirPct	the proportion of independent directors on board, i.e., the number of independent directors divided by the number of board members
DirNum	the number of board members, using the natural logarithm of the number of board members plus one
AuditBig4	the dummy variable for audit quality, setting it as 1 if the firm's auditor belongs to the big four audit firms; otherwise, 0

Sample and descriptive statistics

We select listed stocks in the Chinese A-share stock market from 2010 to 2018. The following firms are removed: (1) financial firms; (2) the firms marked as ST or * ST; (3) the firms that meets $EPS_{t+2} < EPS_{t+1}$ or $EPS_{t+2} < 0$ or $EPS_{t+1} < 0$; (4) firms with omitted values for variables used in Table 1. Finally, we obtain a sample consisting 3771 firm-year observations. Table 2 shows the descriptive statistics for the sample. The mean value of CSR disclosure is 40.05, with the maximum 89 and the minimum 14.15, i.e., the disclosure quality is low while the volatility is high. The cost of equity capital, calculated by PEG (OJ) model, has the mean value 0.112 (0.139), maximum 0.398 (1.145), and minimum 0 (0.036). For robustness tests, the values (R_{MPEG}) calculated by MPEG model are also listed as well as the average of these three equity costs (R_{AVG}). The price synchronization (SYNCH) has the mean value 0.523, maximum 1, and minimum 0.0009.

Table 2 Descriptive statistics

Var	Mean	Max	Min	Sd	Median
CSR	40.05	89	14.15	12.56	37.45
R _{PEG}	0.112	0.398	0.000	0.042	0.108
R _{OJ}	0.139	1.145	0.036	0.049	0.133
R _{MPEG}	0.137	2.186	0.000	0.067	0.128
R _{AVG}	0.129	1.139	0.015	0.050	0.123
SYNCH	0.523	1.000	0.001	0.192	0.539
FERROR	1.409	269.873	0.000	5.882	0.479
BM	0.674	1.165	0.147	0.255	0.684
SIZE	23.790	27.290	21.190	1.228	23.710
ANA	2.383	4.331	0.693	0.853	2.485
ROA	0.052	0.211	-0.052	0.045	0.041
LEV	0.490	0.856	0.064	0.195	0.504
Turnover	0.891	3.895	0.024	0.834	0.658
Beta	1.072	1.787	0.423	0.272	1.083
InstHoldPct	0.364	0.926	0.005	0.267	0.316
TOP10	0.604	0.936	0.245	0.157	0.607
Dirnum	2.572	3.555	1.792	0.287	2.565
IndDirPct	0.364	0.875	0.125	0.093	0.364
Audit Big4	0.166	1.000	0.000	0.372	0.000

Table 3. Correlation coefficients

	R _{PEG}	R _{OJ}	R _{MPEG}	R _{AVG}	CSR	SYNCH	BM	SIZE	ANA
R _{OJ}	0.884***								
R _{MPEG}	0.719***	0.938***							
R _{AVG}	0.890***	0.993***	0.954***						
CSR	-0.052***	-0.046***	-0.003	-0.031*					
SYNCH	0.045***	0.026	0.048***	0.042***	0.100***				
BM	0.338***	0.281***	0.319***	0.329***	0.197***	0.178***			
SIZE	0.092***	0.059***	0.103***	0.091***	0.473***	0.205***	0.368***		
ANA	0.134***	0.115***	0.139***	0.138***	0.157***	0.049***	-0.086***	0.351***	
ROA	-0.006	-0.007	0.037**	0.012	-0.057***	-0.055***	-0.462***	-0.062***	0.385***
LEV	0.284***	0.221***	0.188***	0.236***	0.140***	0.058***	0.528***	0.481***	-0.027*
Turnover	-0.147***	-0.129***	-0.168***	-0.158***	-0.200***	0.030*	-0.278***	-0.303***	-0.194***
Beta	0.01	-0.007	-0.032**	-0.014	-0.083***	0.227***	-0.008	-0.131***	-0.111***
InstHoldPct	-0.079***	-0.072***	-0.026	-0.057***	0.289***	-0.022	0.128***	0.357***	0.121***
TOP10	-0.057***	-0.035**	0.021	-0.018	0.241***	0.079***	0.166***	0.272***	0.134***
Dirnum	0.023	0.009	0.021	0.019	0.093***	0.087***	0.207***	0.224***	0.002
IndDirPct	-0.046***	-0.043***	-0.050***	-0.049***	-0.006	-0.014	-0.121***	-0.037**	0.054***
Audit Big4	0.009	-0.004	0.035**	0.017	0.338***	0.089***	0.219***	0.442***	0.173***

	ROA	LEV	Turnover	Beta	InstHoldPct	TOP10	Dirnum	IndDirPct
LEV	-0.487***							
Turnover	-0.086***	-0.088***						
Beta	-0.165***	0.054***	0.202***					
InstHoldPct	0.054***	0.070***	-0.393***	-0.068***				
TOP10	0.103***	0.041**	-0.251***	-0.170***	0.356***			
Dirnum	-0.139***	0.219***	-0.045***	-0.017	0.048***	0.032**		
IndDirPct	0.070***	-0.130***	0.041**	-0.016	-0.046***	0.022	-0.325***	
Audit Big4	0.011	0.142***	-0.188***	-0.102***	0.192***	0.294***	0.117***	-0.019

T statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Table 3 gives the correlations between variables. The CSR disclosure shows the negative relation with the cost of equity capital such as R_{PEG} and R_{OJ}. Except high correlations between the variables for the cost of equity capital, there exists no close correlation between the other variables.

Models, results, and robustness tests

Models and results

The following equations are used to test the three hypotheses.

$$CoEC_{it} = \alpha_0 + \alpha_1 CSR_{it} + \sum_m \alpha_m Control_{i,m} + \tau_i + \varepsilon_{it} \quad (\text{Eq. 1})$$

$$SYNCH_{it} = \beta_0 + \beta_1 CSR_{it} + \sum_m \beta_m Control_{i,m} + \tau_i + \varepsilon_{it} \quad (\text{Eq. 2})$$

$$CoEC_{it} = \gamma_0 + \gamma_1 CSR_{it} + \gamma_2 SYNCH_{it} + \sum_m \gamma_m Control_{i,m} + \tau_i + \varepsilon_{it} \quad (\text{Eq. 3})$$

Control denotes the control variables used in the empirical tests. Equation 1 is used to test H1 and examine the overall effect of CSR on the cost of equity capital (CoEC). Equation 2 is to test H2 and demonstrate the effect of CSR on price synchronization (SYNCH). Equation 3 is to test H3 and show the mediating role of price synchronization (SYNCH) between CSR and CoEC.

Table 4. Empirical tests of CSR effects on the cost of equity capital

Var	Model 1.1	Model 1.2	Model 2.1	Model 3.1	Model 3.2
	R _{PEG}	R _{OJ}	SYNCH	R _{PEG}	R _{OJ}
CSR	-0.0176*** (-4.27)	-0.0161*** (-3.16)	-0.0912*** (-4.53)	-0.0168*** (-4.06)	-0.0152*** (-2.98)
SYNCH				0.00914** (-2.43)	0.00951** (-2.05)
BM	0.0761*** (-14.33)	0.0758*** (-11.54)	0.230*** (-8.85)	0.0740*** (-13.77)	0.0737*** (-11.07)
SIZE	-0.00935*** (-4.80)	-0.0116*** (-4.82)	0.0277*** (-2.91)	-0.00960*** (-4.93)	-0.0119*** (-4.92)
ANA	0.0101*** (-8.64)	0.0117*** (-8.1)	-0.00596 (-1.04)	0.0102*** (-8.69)	0.0118*** (-8.14)
ROA	0.169*** (-7.24)	0.124*** (-4.27)	0.0443 (-0.39)	0.169*** (-7.23)	0.123*** (-4.26)
LEV	0.0438*** (-4.97)	0.0287*** (-2.63)	-0.130*** (-3.02)	0.0450*** (-5.1)	0.0299*** (-2.74)
Turnover	-0.00385*** (-4.21)	-0.00376*** (-3.33)	0.0353*** (-7.89)	-0.00418*** (-4.52)	-0.00410*** (-3.59)
Beta	0.00657** (-2.39)	0.0019 (-0.56)	0.229*** (-17.07)	0.00448 (-1.56)	-0.000276 (-0.08)
InstHoldPct	-0.0114*** (-3.52)	-0.00939** (-2.34)	-0.0660*** (-4.15)	-0.0108*** (-3.32)	-0.00876** (-2.18)
TOP10	-0.0224** (-2.26)	-0.0237* (-1.94)	0.00297 (-0.06)	-0.0224** (-2.26)	-0.0238* (-1.94)
_cons	0.307*** (-6.94)	0.393*** (-7.17)	-0.139 (-0.64)	0.309*** (-6.97)	0.394*** (-7.2)
R-squared	0.1808	0.1316	0.1337	0.1824	0.1328
F-statistic	65.18	44.76	45.59	59.89	41.12
N	3771	3771	3771	3771	3771
Sobel test				-0.000833** (-2.14)	-0.000867* (-1.86)
Goodman test1				-0.000833** (-2.10)	-0.000867* (-1.83)
Goodman test2				-0.000833** (-2.18)	-0.000867* (-1.90)
Mediating effect coef.				-0.000833** (-2.14)	-0.000867* (-1.86)
Direct effect coef.				-0.016761*** (-4.06)	-0.015205*** (-2.98)
Total effect coef.				-0.017594*** (-4.27)	-0.016072*** (-3.16)

mediating effect ratio	4.73%	5.39%
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T statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

* Sobel test for R_{PEG} uses model 1.1, model 2.1 and model 3.1.

* Sobel test for R_{OJ} uses model 1.2, model 2.1 and model 3.2.

Table 4 gives the empirical results. CSR shows a significant and negative relation with CoEC in Model 1.1 and 1.2, supporting H1. Model 2 shows that CSR is significantly and negatively associated with SYNCH, consistent with H2. Model 3.1 and 3.2 shows that when controlling SYNCH, the improvement of CSR still has a negative relationship with the CoEC. Combining Model 3.1 with Model 2.1 and Model 1.1, we can see that the increased CSR leads to the reduction of the cost of equity capital and a decreased SYNCH, but the coefficient of CSR in model 3.1 is smaller than 1.1, which shows that price synchronization plays a partial intermediary role in CSR and the cost of equity capital. The results of the Sobel tests strengthen the regression analyses and give the proportion of the mediating effects, i.e., about 4.73% for CoEC in R_{PEG} model. Similar results are shown for R_{OJ} model.

Robustness tests

We run robustness tests in several ways. First, we substitute the measure for CoEC with R_{MPEG} as follows [22].

$$R_{MPEG} = \frac{dps_{t+1}}{P_t} + \sqrt{\left(\frac{dps_{t+1}}{P_t}\right)^2 + \frac{EPS_{t+2} - EPS_{t+1}}{P_t}}$$

The symbols are the same meaning as previous measures for CoEC. We also use the average of all the three measures R_{AVG} as the new measure to run tests. The results are shown in Table 5, mostly consistent with the previous ones in Table 4. The direct effect of CSR on CoEC is insignificant for R_{MPEG}, but the negative effect of CSR on SYNCH is significant, indicating the existence of indirect influencing channel of CSR on CoEC...

Table 5 Robustness tests of CSR effects on CoEC

	Model 1.3	Model 1.4	Model 2.2	Model 3.3	Model 3.4
	R _{MPEG}	R _{AVG}	SYNCH	R _{MPEG}	R _{AVG}
CSR	-0.0115 (-1.63)	-0.0151*** (-2.99)	-0.0912*** (-4.53)	-0.0102 (-1.44)	-0.0140*** (-2.78)
SYNCH				0.0144** (-2.24)	0.0110** (-2.4)
BM	0.119*** (-13.07)	0.0903*** (-13.9)	0.230*** (-8.85)	0.116*** (-12.55)	0.0878*** (-13.34)
SIZE	-0.0123*** (-3.68)	-0.0111*** (-4.65)	0.0277*** (-2.91)	-0.0127*** (-3.80)	-0.0114*** (-4.78)
ANA	0.0164*** (-8.22)	0.0127*** (-8.92)	-0.00596 (-1.04)	0.0165*** (-8.27)	0.0128*** (-8.97)
ROA	0.214*** (-5.34)	0.169*** (-5.9)	0.0443 (-0.39)	0.213*** (-5.32)	0.168*** (-5.89)
LEV	0.00565 (-0.37)	0.0260** (-2.42)	-0.130*** (-3.02)	0.00752 (-0.5)	0.0275** (-2.55)
Turnover	-0.00492*** (-3.15)	-0.00418*** (-3.74)	0.0353*** (-7.89)	-0.00543*** (-3.44)	-0.00457*** (-4.05)
Beta	-0.000235 (-0.05)	0.00275 (-0.82)	0.229*** (-17.07)	-0.00353 (-0.72)	0.000224 (-0.06)
InstHoldPct	-0.0116** (-2.10)	-0.0108*** (-2.73)	-0.0660*** (-4.15)	-0.0107* (-1.92)	-0.0101** (-2.54)
TOP10	-0.0331* (-1.95)	-0.0264** (-2.18)	0.00297 (-0.06)	-0.0331* (-1.95)	-0.0264** (-2.18)
_cons	0.367*** (-4.83)	0.356*** (-6.56)	-0.139 (-0.64)	0.368*** (-4.86)	0.357*** (-6.6)
R-squared	0.1328	0.1614	0.1337	0.1343	0.1631
F-statistic	45.22	56.86	45.59	41.63	52.3
N	3771	3771	3771	3771	3771
Sobel test				-0.001311** (-2.00)	-0.001004** (-2.12)
Goodman test1				-0.001311** (-1.97)	-0.001004** (-2.08)
Goodman test2				-0.001311** (-2.05)	-0.001004** (-2.16)
Mediating effect coef.				-0.001311** (2.00)	-0.001004** (-2.12)
Direct effect coef.				-0.01018 (-1.14)	-0.014049*** (-2.78)
Total effect coef.				-0.011491 (-1.63)	-0.015052*** (-2.99)
mediating effect ratio				11.41%	6.67%

T statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

* Sobel test for R_{PEG} uses model 1.3, model 2.2 and model 3.3.

* Sobel test for R_{OJ} uses model 1.4, model 2.2 and model 3.4.

Second, we substitute price synchronization with analyst forecast error [8], [15]. As one type of participants in capital markets, analysts play an important role in collecting and transferring information and thus their forecast errors can (adversely) reflect the firm's information environment.

As shown in Table 6, the decreasing effect of CSR on CoEC is significant and the mediating role of analyst forecast error (FERROR) is demonstrated by its significant coefficient as well as the Sobel tests, i.e., H1 and H3 are supported. The coefficient of CSR on FERROR is negative but insignificant in Model 2.3, showing weak support for H2.

Table 6. Robustness tests of CSR effects on CoEC and FERROR

	Model 1.5	Model 1.6	Model 2.3	Model 3.5	Model 3.6
	R _{PEG}	R _{OJ}	FERROR	R _{PEG}	R _{OJ}
CSR	-0.0240*** (-5.20)	-0.0237*** (-4.16)	-0.298 (-1.03)	-0.0231*** (-5.09)	-0.0227*** (-4.04)
FERROR				0.00274*** (-9.05)	0.00345*** (-9.19)
BM	0.0737*** (-12.74)	0.0719*** (-10.05)	0.457 (-1.26)	0.0723*** (-12.71)	0.0701*** (-9.97)
SIZE	-0.0102*** (-4.88)	-0.0118*** (-4.58)	0.124 (-0.94)	-0.0105*** (-5.12)	-0.0123*** (-4.82)
ANA	0.0110*** (-8.8)	0.0122*** (-7.83)	0.0509 (-0.64)	0.0109*** (-8.81)	0.0120*** (-7.84)
ROA	0.171*** (-6.92)	0.128*** (-4.19)	-24.26*** (-15.62)	0.238*** (-9.36)	0.212*** (-6.75)
LEV	0.0500*** (-5.29)	0.0364*** (-3.11)	-1.671*** (-2.81)	0.0546*** (-5.85)	0.0421*** (-3.66)
Turnover	-0.00334*** (-3.42)	-0.00359*** (-2.98)	0.141** (-2.3)	-0.00373*** (-3.89)	-0.00409*** (-3.45)
Beta	0.00562** (-2)	0.00152 (-0.44)	0.07 (-0.4)	0.00543* (-1.96)	0.00128 (-0.37)
InstHoldPct	-0.0120*** (-3.55)	-0.00990** (-2.38)	-0.752*** (-3.55)	-0.00993*** (-2.99)	-0.00735* (-1.79)
TOP10	-0.0177* (-1.66)	-0.0161 (-1.22)	-0.676 (-1.01)	-0.0158 (-1.50)	-0.0137 (-1.06)
_cons	0.346*** (-7.15)	0.421*** (-7.03)	1.468 (-0.48)	0.342*** (-7.18)	0.416*** (-7.06)
R-squared	0.1964	0.14	0.0909	0.2051	0.1492
F-statistic	65.3	43.51	26.71	62.65	42.58
N	3458	3458	3458	3458	3458
Sobel test				-0.001651*** (-3.01)	-0.002009*** (-3.01)
Goodman test1				-0.001651*** (-3.00)	-0.002009*** (-3.00)
Goodman test2				-0.001651*** (-3.02)	-0.002009*** (-3.02)

Mediating effect coef.	-0.001651*** (-3.01)	-0.002009*** (-3.01)
Direct effect coef.	-0.011955*** (-5.03)	-0.010062*** (-3.50)
Total effect coef.	-0.136046*** (-5.71)	-0.012071*** (-4.10)
mediating effect ratio	12.14%	16.64%

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

* Sobel test for R_{PEG} uses model 1.5, model 2.3 and model 3.5.

* Sobel test for R_{OJ} uses model 1.6, model 2.3 and model 3.6.

Third, we run tests for mitigating endogeneity. For omitted variables, we concern about corporate governance (the ratio of independent directors on board, the number of the board) and auditing quality (big audit firms' services). Table 7 demonstrates the effects of CSR on CoEC and SYNCH as well as the mediating role of SYNCH between CSR and CoEC, consistent with previous result.

Table 7 Additional control variables for robustness tests

	Model 1.7 R _{PEG}	Model 1.8 R _{OJ}	Model 2.4 SYNCH	Model 3.7 R _{PEG}	Model 3.8 R _{OJ}
CSR	-0.0177*** (-4.27)	-0.0161*** (-3.16)	-0.0904*** (-4.47)	-0.0168*** (-4.06)	-0.0153*** (-2.98)
SYNCH				0.00897** (-2.39)	0.00921** (-1.98)
BM	0.0761*** (-14.31)	0.0758*** (-11.54)	0.230*** (-8.84)	0.0740*** (-13.75)	0.0737*** (-11.07)
SIZE	-0.00927*** (-4.75)	-0.0114*** (-4.74)	0.0282*** (-2.96)	-0.00952*** (-4.88)	-0.0117*** (-4.84)
ANA	0.0101*** (-8.61)	0.0116*** (-8.06)	-0.00616 (-1.08)	0.0101*** (-8.67)	0.0117*** (-8.1)
ROA	0.169*** (-7.23)	0.123*** (-4.27)	0.0435 (-0.38)	0.169*** (-7.22)	0.123*** (-4.25)
LEV	0.0439*** (-4.98)	0.0289*** (-2.65)	-0.130*** (-3.01)	0.0451*** (-5.11)	0.0301*** (-2.76)
Turnover	-0.00381*** (-4.17)	-0.00368*** (-3.26)	0.0355*** (-7.92)	-0.00413*** (-4.47)	-0.00401*** (-3.51)
Beta	0.00649** (-2.36)	0.00186 (-0.55)	0.229*** (-17.02)	0.00443 (-1.54)	-0.000254 (-0.07)
InstHoldPct	-0.0119*** (-3.62)	-0.0103** (-2.55)	-0.0686*** (-4.29)	-0.0113*** (-3.43)	-0.00967** (-2.38)
TOP10	-0.0222** (-2.23)	-0.0229* (-1.86)	0.0058 (-0.12)	-0.0222** (-2.23)	-0.0230* (-1.87)

Dirnum	-0.00431 (-1.05)	-0.00925* (-1.82)	-0.0244 (-1.21)	-0.00409 (-0.99)	-0.00902* (-1.77)
IndDirPct	-0.00866 (-0.85)	-0.0107 (-0.85)	-0.0332 (-0.66)	-0.00836 (-0.82)	-0.0104 (-0.82)
Audit Big4	0.00345 (-0.64)	0.00607 (-0.91)	0.00296 (-0.11)	0.00342 (-0.63)	0.00604 (-0.9)
_cons	0.320*** (-7.1)	0.415*** (-7.47)	-0.0798 (-0.36)	0.320*** (-7.12)	0.416*** (-7.49)
R-squared	0.1816	0.1333	0.1344	0.1831	0.1345
F-statistic	50.36	0.1333	35.25	47.24	32.75
N	3771	3771	3771	3771	3771
Sobel test				-0.000812** (-2.11)	-0.000833* (-1.81)
Goodman test1				-0.000812** (-2.065)	-0.000833* (-1.77)
Goodman test2				-0.000812** (-2.15)	-0.000833* (-1.85)
Mediating effect coef.				-0.000812** (-2.11)	-0.000833* (-1.81)
Direct effect coef.				-0.016849*** (-4.06)	-0.015305*** (-2.98)
Total effect coef.				-0.017686*** (-4.27)	-0.016138*** (-3.16)
mediating effect ratio				4.60%	5.16%

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

* Sobel test for R_{PEG} uses model 1.7, model 2.4 and model 3.7.

* Sobel test for R_{OJ} uses model 1.8, model 2.4 and model 3.8.

For reversal causality, we use two stage least square (2SLS) method to make further tests. Model 4 in Table 8 is the first stage, i.e., regressing CSR on its lagged value [25] and the average CSR score from the firms that register at the same province. Then at the second stage the estimated CSR values are used to test H1, H2 and H3. Table 8 shows consistent results with previous ones in Table 4.

Table 8 2SLS Tests for endogeneity

	Model 4	Model 1.9	Model 1.10	Model 2.5	Model 3.9	Model 3.10
	CSR	RPEG	ROJ	SYNCH	RPEG	ROJ
CSR		-0.0390*** (-6.20)	-0.0383*** (-4.64)	-0.0666** (-2.03)	-0.0383*** (-6.08)	-0.0375*** (-4.55)
CSR*SYNCH					0.0115*** -2.6	0.0111* -1.91
L_csr1	0.845*** (-82.57)					
mean_locate	0.160*** (-5.28)					
BM	0.00483 (-0.35)	0.0853*** (-11.86)	0.0857*** (-9.1)	0.385*** (-10.29)	0.0808*** (-10.96)	0.0814*** (-8.42)
SIZE	0.0107*** (-3.35)	-0.0109*** (-4.13)	-0.0138*** (-4.01)	0.0294** (-2.15)	-0.0112*** (-4.26)	-0.0141*** (-4.11)
ANA	0.00167 (-0.45)	0.0109*** (-7.29)	0.0121*** (-6.22)	-0.0109 (-1.41)	0.0110*** (-7.38)	0.0123*** (-6.28)
ROA	0.0815 (-1.04)	0.201*** (-6.58)	0.166*** (-4.15)	0.0991 (-0.62)	0.200*** (-6.56)	0.165*** (-4.12)
LEV	0.0124 (-0.64)	0.0548*** (-4.62)	0.0364** (-2.34)	-0.182*** (-2.94)	0.0569*** (-4.79)	0.0384** (-2.47)
Turnover	0.0130*** (-3.17)	-0.000375 (-0.31)	-0.00105 (-0.66)	0.0522*** (-8.2)	-0.000976 (-0.78)	-0.00163 (-1.00)
Beta	-0.0231** (-2.36)	0.00607* (-1.85)	0.00296 (-0.69)	0.249*** (-14.64)	0.0032 (-0.93)	0.000209 (-0.05)
InstHoldPct	-0.0299** (-2.58)	-0.0103** (-2.57)	-0.00847 (-1.62)	-0.0513** (-2.47)	-0.00968** (-2.43)	-0.0079 (-1.51)
TOP10	0.0854*** (-4.5)	-0.00202 (-0.15)	-0.00192 (-0.11)	-0.00152 (-0.02)	-0.00201 (-0.15)	-0.0019 (-0.11)
_cons	-0.276** (-2.40)	0.395*** (-6.73)	0.500*** (-6.5)	-0.371 (-1.21)	0.399*** (-6.81)	0.504*** (-6.56)
R-squared	0.8062	0.2779	0.1837	0.1618	0.2303	0.1576
N	2537	2537	2537	2537	2537	2537
Sobel test					-0.00076666 (-1.60)	-0.00073583 (-1.39)
Goodman test1					-0.00076666 (-1.53)	-0.00073583 (-1.31)
Goodman test2					-0.00076666 (-1.68)	-0.00073583 (-1.49)
Mediating effect coef.					-0.000767 (-1.60)	-0.000736 (-1.39)
Direct effect coef.					-0.038276 ***	-0.037526***

Total effect coef.	(-6.08)	(-4.55)
	-0.039042***	-0.038262***
	(-6.20)	(-4.64)
mediating effect ratio	1.96%	1.92%

t statistics in parentheses * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

* Sobel test for R_{PEG} uses model 1.9, model 2.5 and model 3.9.

* Sobel test for R_{OJ} uses model 1.10, model 2.5 and model 3.10.

CONCERNS ABOUT INDUSTRY, OWNERSHIP, AND REGION

Environmentally sensitive industries (firms)

The effects of CSR on the cost of equity capital may differ in different industries. The environmentally sensitive industries (such as electricity, thermal production and supply, chemical fiber manufacturing, oil, and gas extraction and etc.) are usually paid more attention to by the investors and regulating agencies. Table 9 and 10 test for the heterogeneity between environmentally sensitive and non-sensitive firms according to their industries. The results show the more pronounced effect of CSR on CoEC during the environmentally non-sensitive firms, i.e., the increasing CSR disclose quality can decrease the CoEC. The stronger effect during the environmentally non-sensitive firms may result from their non-sensitivity to environment (which is usually one important concern in the core concepts of CSR). Since this non-sensitivity, their CSR disclosure behavior may be voluntary and thus can have an increasing marginal effect, i.e., more active in CSR behaviors and releasing more firm-specific information to the markets.

Besides, the reducing effect of CSR on SYNCH and the mediating role of SYNCH between CSR and CoEC are demonstrated among environmentally sensitive and non-sensitive firms, nearly consistent with previous results.

Table 9 Tests on environmentally sensitive firms

	Model 1.1	Model 1.2	Model 2.1	Model 3.1	Model 3.2
	R _{PEG}	R _{OJ}	SYNCH	R _{PEG}	R _{OJ}
CSR	-0.0108*	-0.0127	-0.0784**	-0.0117*	-0.0137
	(-1.68)	(-1.37)	(-2.53)	(-1.82)	(-1.47)
CSR*SYNCH				0.00313*	0.00343
				(-1.88)	(-1.43)
BM	0.0724***	0.0715***	0.210***	0.0700***	0.0689***
	(-8.85)	(-6.07)	(-5.35)	(-8.46)	(-5.78)
SIZE	-0.00905***	-0.0145***	0.0108	-0.00912***	-0.0145***
	(-2.59)	(-2.87)	-0.64	(-2.61)	(-2.88)
ANA	0.00619***	0.00869***	0.0101	0.00610***	0.00859***
	(-3.41)	(-3.32)	(-1.15)	(-3.36)	(-3.28)
ROA	0.195***	0.156***	0.082	0.194***	0.154***
	(-6.99)	(-3.87)	(-0.61)	(-6.95)	(-3.84)
LEV	0.0537***	0.0197	-0.103	0.0550***	0.0211
	(-4.05)	(-1.03)	(-1.61)	(-4.14)	(-1.1)
Turnover	-0.00108	-0.00118	0.0301***	-0.00143	-0.00156
	(-0.75)	(-0.57)	(-4.33)	(-0.98)	(-0.74)
Beta	0.00971**	0.00163	0.183***	0.00763*	-0.000661
	(-2.39)	(-0.28)	(-9.38)	(-1.81)	(-0.11)
InstHoldPct	-0.00553	-0.00175	-0.0970***	-0.00441	-0.000522
	(-1.12)	(-0.25)	(-4.10)	(-0.89)	(-0.07)
TOP10	-0.0128	-0.0115	0.0563	-0.0134	-0.0121
	(-0.78)	(-0.49)	(-0.71)	(-0.82)	(-0.51)
_cons	0.266***	0.449***	0.221	0.269***	0.452***
	(-3.33)	(-3.9)	(-0.58)	(-3.36)	(-3.92)
R-squared	0.1605	0.0901	0.1293	0.1629	0.0917
F-statistic	21.77	11.28	16.91	20.13	10.45
N	1436	1436	1436	1436	1436

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Table 10 Tests on environmentally non-sensitive firms

	Model 1.1	Model 1.2	Model 2.1	Model 3.1	Model 3.2
	R _{PEG}	R _{OJ}	SYNCH	R _{PEG}	R _{OJ}
CSR	-0.0205*** (-3.83)	-0.0175*** (-2.97)	-0.105*** (-3.92)	-0.0209*** (-3.91)	-0.0179*** (-3.04)
CSR*SYNCH				0.00246* (-1.93)	0.00221 (-1.58)
BM	0.0725*** (-10.36)	0.0727*** (-9.47)	0.242*** (-6.9)	0.0702*** (-9.92)	0.0707*** (-9.09)
SIZE	-0.0111*** (-4.65)	-0.0122*** (-4.66)	0.0353*** (-2.95)	-0.0114*** (-4.78)	-0.0125*** (-4.76)
ANA	0.0134*** (-8.77)	0.0142*** (-8.45)	-0.0172** (-2.24)	0.0136*** (-8.87)	0.0143*** (-8.53)
ROA	0.0992*** (-2.9)	0.0566 (-1.5)	0.00267 (-0.02)	0.0992*** (-2.9)	0.0566 (-1.5)
LEV	0.0354*** (-3.03)	0.0311** (-2.42)	-0.156*** (-2.66)	0.0369*** (-3.15)	0.0324** (-2.52)
Turnover	-0.00529*** (-4.58)	-0.00511*** (-4.03)	0.0384*** (-6.62)	-0.00565*** (-4.83)	-0.00543*** (-4.23)
Beta	0.00392 (-1.09)	0.00152 (-0.38)	0.252*** (-13.99)	0.00165 (-0.44)	-0.000527 (-0.13)
InstHoldPet	-0.0166*** (-3.85)	-0.0153*** (-3.22)	-0.0377* (-1.74)	-0.0163*** (-3.77)	-0.0150*** (-3.15)
TOP10	-0.0282** (-2.23)	-0.0292** (-2.11)	-0.0309 (-0.49)	-0.0280** (-2.22)	-0.0291** (-2.09)
_cons	0.372*** (-6.89)	0.417*** (-7.04)	-0.26 (-0.96)	0.379*** (-7.02)	0.424*** (-7.14)
R-squared	0.2146	0.1851	0.1434	0.2162	0.1862
F-statistic	49.3	40.97	30.21	45.22	37.5
N	2335	2335	2335	2335	2335

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Ownership

According to the ownership type, the listed firms can be categorized into state owned or non-state-owned group. Usually, the state-owned firms are burdened with more social responsibility [12]. Meanwhile, they may easily have access to resources and gain support from governments, thus increasing profitability [26]. Accordingly, the CSR behaviors and their effects may be different between state owned and non-state-owned firms.

Table 11 and 12 give results for testing the state owned and non-state-owned groups. Consistent with previous results, they show that the CSR disclosure quality can reduce the CoEC and price synchronization. Moreover, the reducing effects tend to be stronger in the non-state-owned firms. This phenomenon may result from the weakness of non-state-owned firms for financing by comparing with state owned firms. The non-state-owned firms must be more active in CSR behaviors to promote corporate image and thus lead to lower capital cost.

Table 11 Tests on state owned firms

	Model 1.1	Model 1.2	Model 2.1	Model 3.1	Model 3.2
	R _{PEG}	RoJ	SYNCH	R _{PEG}	RoJ
CSR	-0.0115** (-2.14)	-0.0145** (-2.08)	-0.0647** (-2.51)	-0.0122** (-2.26)	-0.0154** (-2.21)
CSR*SYNCH				0.00197 (-1.49)	0.00277 (-1.61)
BM	0.0756*** (-10.47)	0.0752*** (-8.04)	0.238*** (-6.87)	0.0738*** (-10.09)	0.0727*** (-7.67)
SIZE	-0.0107*** (-3.76)	-0.0144*** (-3.90)	0.00757 (-0.55)	-0.0107*** (-3.77)	-0.0144*** (-3.92)
ANA	0.00894*** (-5.77)	0.0115*** (-5.75)	-0.00372 (-0.50)	0.00897*** (-5.8)	0.0116*** (-5.77)
ROA	0.200*** (-5.8)	0.143*** (-3.22)	0.228 (-1.38)	0.198*** (-5.75)	0.141*** (-3.16)
LEV	0.0531*** (-4.4)	0.0353** (-2.26)	-0.0852 (-1.47)	0.0538*** (-4.45)	0.0363** (-2.32)
Turnover	-0.00340*** (-2.59)	-0.00235 (-1.38)	0.0370*** (-5.88)	-0.00368*** (-2.77)	-0.00274 (-1.59)
Beta	0.0102*** (-2.89)	0.00717 (-1.58)	0.232*** (-13.81)	0.00847** (-2.29)	0.00479 (-1)
InstHoldPct	-0.0120*** (-2.99)	-0.00736 (-1.42)	-0.0721*** (-3.76)	-0.0115*** (-2.85)	-0.00659 (-1.27)
TOP10	-0.0162 (-1.11)	-0.0257 (-1.36)	0.077 (-1.1)	-0.0168 (-1.15)	-0.0264 (-1.40)
_cons	0.304*** (-4.71)	0.441*** (-5.28)	0.173 (-0.56)	0.306*** (-4.75)	0.445*** (-5.33)
R-squared	0.165	0.1128	0.1351	0.166	0.1141
F-statistic	35.38	22.75	27.96	32.38	20.94
N	2249	2249	2249	2249	2249

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Table 12 Tests on non-state-owned firms

	Model 1.1	Model 1.2	Model 2.1	Model 3.1	Model 3.2
	R _{PEG}	R _{OJ}	SYNCH	R _{PEG}	R _{OJ}
CSR	-0.0242*** (-3.69)	-0.0149** (-2.01)	-0.127*** (-3.77)	-0.0244*** (-3.73)	-0.0151** (-2.03)
CSR*SYNCH				0.00306* (-1.92)	0.00227 (-1.25)
BM	0.0756*** (-9.28)	0.0755*** (-8.16)	0.233*** (-5.57)	0.0730*** (-8.86)	0.0737*** (-7.86)
SIZE	-0.0105*** (-3.64)	-0.0115*** (-3.53)	0.0380** (-2.57)	-0.0108*** (-3.76)	-0.0118*** (-3.61)
ANA	0.0125*** (-6.66)	0.0124*** (-5.83)	-0.0127 (-1.33)	0.0126*** (-6.74)	0.0125*** (-5.88)
ROA	0.130*** (-4.04)	0.0991*** (-2.71)	-0.0474 (-0.29)	0.130*** (-4.06)	0.0995*** (-2.72)
LEV	0.0335** (-2.49)	0.0197 (-1.29)	-0.140** (-2.02)	0.0351*** (-2.61)	0.0209 (-1.36)
Turnover	-0.00446*** (-3.41)	-0.00511*** (-3.44)	0.0386*** (-5.75)	-0.00489*** (-3.69)	-0.00544*** (-3.61)
Beta	-0.000551 (-0.12)	-0.00693 (-1.36)	0.226*** (-9.78)	-0.00301 (-0.65)	-0.00876* (-1.65)
InstHoldPct	-0.0117* (-1.91)	-0.0120* (-1.73)	-0.0258 (-0.82)	-0.0114* (-1.87)	-0.0118* (-1.70)
TOP10	-0.0397*** (-2.73)	-0.0273* (-1.65)	-0.0824 (-1.10)	-0.0389*** (-2.67)	-0.0267 (-1.61)
_cons	0.381*** (-5.84)	0.409*** (-5.52)	-0.209 (-0.62)	0.388*** (-5.95)	0.415*** (-5.59)
R-squared	0.2259	0.1824	0.1403	0.2284	0.1835
F-statistic	33.06	25.28	18.49	30.47	23.13
N	1522	1522	1522	1522	1522

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Region

Presently, regional difference is still great in China for their different economic situations and development stage. The eastern China has a well-established market economy and the firms may take active in sustainable development to attract attentions from investors and build good reputations.

Table 13, 14 and 15 give the results for testing the firms located in eastern China, central China, and western China. The results show that the reducing effect of CSR on CoEC in eastern China is pronounced, consistent with previous results. But the effects of CSR in in central and western China

are not significant, which may result from their focus on economic profits and less attention to social responsibility.

Table 13 Tests on firms located in eastern China

	Model 1.1	Model 1.2	Model 2.1	Model 3.1	Model 3.2
	R _{PEG}	R _{OJ}	SYNCH	R _{PEG}	R _{OJ}
CSR	-0.0225*** (-4.73)	-0.0217*** (-4.14)	-0.0917*** (-3.86)	-0.0229*** (-4.82)	-0.0221*** (-4.21)
CSR*SYNCH				0.00204* (-1.79)	0.00182 (-1.44)
BM	0.0780*** (-12.76)	0.0787*** (-11.69)	0.235*** (-7.69)	0.0762*** (-12.31)	0.0771*** (-11.3)
SIZE	-0.0104*** (-4.73)	-0.0112*** (-4.65)	0.0324*** (-2.97)	-0.0106*** (-4.83)	-0.0114*** (-4.73)
ANA	0.00998*** (-7.39)	0.0106*** (-7.11)	-0.00546 (-0.81)	0.0100*** (-7.44)	0.0106*** (-7.14)
ROA	0.160*** (-5.87)	0.125*** (-4.16)	-0.0451 (-0.33)	0.160*** (-5.88)	0.125*** (-4.16)
LEV	0.0412*** (-4.02)	0.0368*** (-3.26)	-0.147*** (-2.86)	0.0424*** (-4.13)	0.0378*** (-3.35)
Turnover	-0.00411*** (-3.92)	-0.00393*** (-3.41)	0.0395*** (-7.55)	-0.00441*** (-4.16)	-0.00420*** (-3.59)
Beta	0.00493 (-1.54)	0.00128 (-0.36)	0.244*** (-15.28)	0.00309 (-0.92)	-0.00036 (-0.10)
InstHoldPct	-0.0116*** (-3.10)	-0.00904** (-2.19)	-0.0538*** (-2.87)	-0.0112*** (-2.99)	-0.00867** (-2.09)
TOP10	-0.0362*** (-3.26)	-0.0289** (-2.36)	-0.00653 (-0.12)	-0.0362*** (-3.26)	-0.0288** (-2.36)
_cons	0.361*** (-7.24)	0.405*** (-7.37)	-0.263 (-1.05)	0.367*** (-7.35)	0.410*** (-7.45)
R-squared	0.2017	0.1716	0.1387	0.2028	0.1723
F-statistic	57.19	46.88	36.47	52.33	42.83
N	2890	2890	2890	2890	2890

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Table 14 Tests on firms located in central China

	Model 1.1	Model 1.2	Model 2.1	Model 3.1	Model 3.2
	R _{PEG}	R _{OJ}	SYNCH	R _{PEG}	R _{OJ}
CSR	-0.00183 (-0.16)	0.00656 (-0.49)	-0.0498 (-0.91)	-0.00251 (-0.22)	0.00625 (-0.46)
CSR*SYNCH				0.00163 (-0.54)	0.000737 (-0.2)
BM	0.0506*** (-3.75)	0.0541*** (-3.33)	0.0821 (-1.23)	0.0502*** (-3.71)	0.0539*** (-3.31)
SIZE	-0.00685 (-1.29)	-0.00399 (-0.63)	-0.00796 (-0.30)	-0.00675 (-1.27)	-0.00394 (-0.62)
ANA	0.0117*** (-3.72)	0.0127*** (-3.35)	0.0131 (-0.84)	0.0116*** (-3.69)	0.0126*** (-3.33)
ROA	0.228*** (-3.71)	0.177** (-2.4)	-0.214 (-0.71)	0.230*** (-3.73)	0.178** (-2.4)
LEV	0.0839*** (-3.12)	0.0621* (-1.92)	-0.103 (-0.78)	0.0846*** (-3.14)	0.0624* (-1.93)
Turnover	-0.0035 (-1.51)	-0.00419 (-1.50)	0.017 (-1.49)	-0.0036 (-1.54)	-0.00424 (-1.51)
Beta	0.00201 (-0.3)	-0.00396 (-0.49)	0.198*** (-6.03)	0.000879 (-0.13)	-0.00447 (-0.53)
InstHoldPct	-0.0144* (-1.77)	-0.0181* (-1.86)	-0.115*** (-2.87)	-0.0137* (-1.67)	-0.0178* (-1.80)
TOP10	0.00957 (-0.32)	-0.00179 (-0.05)	-0.0778 (-0.53)	0.00996 (-0.34)	-0.00161 (-0.05)
_cons	0.164 (-1.41)	0.117 (-0.84)	0.74 (-1.29)	0.162 (-1.39)	0.116 (-0.83)
R-squared	0.1855	0.1293	0.1579	0.1862	0.1294
F-statistic	7.72	5.03	6.36	7.03	4.57
N	447	447	447	447	447

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

Table 15 Tests on firms located in western China

	Model 1.1	Model 1.2	Model 2.1	Model 3.1	Model 3.2
	R _{PEG}	R _{OJ}	SYNCH	R _{PEG}	R _{OJ}
CSR	0.000212 (-0.02)	-0.000296 (-0.01)	-0.0889 (-1.60)	-0.00125 (-0.10)	-0.00241 (-0.10)
CSR*SYNCH				0.00617* (-1.88)	0.00895 (-1.46)
BM	0.0899*** (-5.19)	0.0747** (-2.32)	0.306*** (-3.93)	0.0830*** (-4.71)	0.0647* (-1.97)
SIZE	-0.00496 (-0.69)	-0.0275** (-2.05)	-0.00823 (-0.25)	-0.00463 (-0.65)	-0.0270** (-2.01)
ANA	0.00816** (-2.29)	0.0159** (-2.4)	-0.0238 (-1.49)	0.00871** (-2.45)	0.0167** (-2.51)
ROA	0.176*** (-2.73)	0.077 (-0.64)	0.746** (-2.57)	0.159** (-2.45)	0.0517 (-0.43)
LEV	0.0457** (-1.97)	-0.0189 (-0.44)	-0.00907 (-0.09)	0.0460** (-1.99)	-0.0186 (-0.43)
Turnover	-0.00123 (-0.42)	-0.000315 (-0.06)	0.0339** (-2.55)	-0.00203 (-0.68)	-0.00148 (-0.27)
Beta	0.0194** (-2.31)	0.0103 (-0.65)	0.164*** (-4.32)	0.0159* (-1.84)	0.0051 (-0.32)
InstHoldPct	-0.0052 (-0.49)	0.00179 (-0.09)	-0.0792* (-1.67)	-0.00342 (-0.32)	0.00438 (-0.22)
TOP10	0.0591* (-1.76)	-0.0043 (-0.07)	0.201 (-1.33)	0.0541 (-1.61)	-0.0115 (-0.18)
_cons	0.0665 (-0.4)	0.707** (-2.31)	0.564 (-0.76)	0.0631 (-0.39)	0.702** (-2.29)
R-squared	0.1567	0.074	0.142	0.1656	0.0799
F-statistic	6.15	2.64	5.48	5.96	2.61
N	434	434	434	434	434

t statistics in parentheses * p < 0.1, ** p < 0.05, *** p < 0.01

CONCLUSION

This paper investigates the effects of corporate social responsibility (CSR) on the cost of equity capital (CoEC). By focusing on the Chinese stock market, we select listed firms from 2010 to 2018 and further examines the mediating role of price informativeness (synchronization) between CSR and CoEC. The empirical tests mostly support the proposed hypotheses: (1) CSR disclosure can reduce the cost of equity capital; (2) CSR disclosure can decrease the price synchronization, indicating more firm-specific information in the stock price; (3) price informativeness plays a

mediating role. These effects are nearly supported by further tests concerning about environmentally sensitive or non-sensitive firms, state-owned or non-state-owned firms. Tests on the firms registered in the eastern China still show the similar results while tests on western and middle China show no significant effects of CSR on CoEC, indicating the regional difference.

This paper studies the impact of corporate social responsibility information disclosure on the cost of equity capital based on the price informativeness mechanism, and further discusses whether there are differences in the impact of environmental nature, property right nature and place of registration on the two at the same marketization level. This research helps to deepen stakeholders' understanding of corporate social responsibility report; It is conducive to the implementation of effective corporate social responsibility communication mechanism; Help to promote the improvement of enterprise management; It is conducive to the improvement of the quality of corporate social responsibility information disclosure; It helps to promote the sustainable development of enterprises.

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