



Doing well by doing good: unpacking the black box of corporate social responsibility

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Abstract

Businesses worldwide have increasingly embraced the corporate social responsibility (CSR) concept in their operations, and hence the popular saying ‘doing well by doing good’. Previous literature has not yet reached a consensus on the nature of the relationship between CSR and corporate financial performance (CFP). To contribute to the resolution of the issue, this article examines the relationship through evidence from China’s renewable energy enterprises. To evaluate the effect of CSR on CFP, this study takes CSR as a construct that consists of corporate responsibilities for (i) shareholders, (ii) employees, (iii) customers, suppliers, and consumers, (iv) the natural environment, and (v) social contributions. Based on data of the listed firms in China’s renewable energy from 2010 to 2016, this study shows that overall CSR can enhance CFP. For China’s renewable energy industry, shareholder and environmental dimensions of CSR positively affect CFP, while the responsibility for non-shareholder stakeholders, particularly for customers, suppliers and consumers, demonstrates a negative effect. No significant effect is identified between the responsibility for social contributions and CFP, and neither is between employee responsibility and CFP.

Keywords Financial performance · ESG · Sustainability · Accountability · Business · China

Introduction

CSR has gradually been engaged by companies of varying sizes worldwide, not just in large-scale companies, in both developed and developing countries. It has been treated as an opportunity to develop competitive advantages, and thus a key to sustaining business development and economic profits. In the literature, some perceive CSR in a narrow sense, regarding it as provision of products and services to society

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at a profit (Friedman, 1970). Nowadays, there has been a consensus that companies should also shoulder other certain responsibilities that go beyond these economic obligations (Schwartz & Saiia, 2012); the ‘external’ components such as employees’ health and well-being and corporate impacts on environmental quality should also be incorporated. CSR can be considered a three-dimension construct that consists of economic, social, and environmental aspects (Uddin et al., 2008), which has been entitled the Triple Bottom Line (TBL) (Elkington, 1994). This study thus draws on the idea of Uddin et al. (2008) and defines CSR as “*the continuing commitment by business to behave according to business ethics and contribute to economic development while improving the quality of the life of the workforce and their families as well as the local community and society at large.*”

The association between CSR and CFP has been investigated in the literature, but how CSR affects CFP is still an unresolved issue. For example, McWilliams and Siegel (2001) found no obvious influence of CSR engagement on CFP. Yet, Gangi et al. (2020) identified positive impacts on firms’ profitability, while Zhang et al. (2019) demonstrated that CSR may hurt corporate values. Yet, previous studies usually assess one dimension of CSR, such as corporate pro-environmental behaviour (Zhang et al., 2019), or take CSR as a whole and apply composite indicators provided by external agencies to assess the CSR-CFP relationship (Aguinis & Glavas, 2012), which can be one of the key reasons why different conclusions are generated on the CSR-CFP relationship. This study thus aims to take CSR as a construct to reveal how each aspect of CSR contributes to CFP. This can more clearly depict how CSR contributes to firm performance that cannot be performed using reductionist CSR scoring systems: in such systems, two firms can get same CSR scores but may perform distinguishingly in each CSR dimension.

This study aims to unpack the black box of CSR and investigate how different aspects of corporate responsibilities contribute to CFP. Data on China’s renewable energy industry from 2010 to 2016 is collected for empirical tests. China faces multiple sustainability issues caused by its rapid economic growth, including both ecological footprints (e.g., Li et al., 2021; Gao et al., 2022a), and social well-being and quality of life (e.g., Qiao et al., 2022; Shen et al., 2021; Wu et al., 2022a). China’s renewable energy industry is a unique, interesting, but understudied sector for the exploring CSR-CFP relationship. The industry has grown rapidly since 2009, due to the national strategic planning for promoting cleaner production and tackling climate change (Zhang et al., 2013; Zhen et al., 2021; Yu et al., 2021). The total employment in the industry reached 4.1 million in 2018, making up 39% of the total of the world (Zhen et al., 2021). With the substantial development of the industry, renewable energy companies in China have currently been challenged to seek other sustainable business practices both for the natural environment and stakeholders, including commercial partners, employees, and customers (Feng et al., 2018). Thus, this research is designed to provide understanding of the CSR-CFP nexus in the renewable energy industry of China. This study uses the CSR data presented by Hexun.com, since Hexun is the most comprehensive third-party CSR scoring agency in China (Yi et al., 2021). The database has been widely used in previous research on CSR in China’s listed firms (e.g., Pan et al., 2014a, b; Yi et al., 2021; Zhang et al., 2021).

Literature review and hypothesis development

CSR and CFP

Friedman (1970) conceptualises CSR from a neo-classical economic perspective. Friedman believes a firm's only social responsibility is to maximise its profits while conforming to law and ethical custom, mainly because (i) policy decisions ought to be left to the public sector while for the private sector profit maximisation can eventually bring about social welfare maximisation, and (ii) managers who serve as fiduciary agents of shareholders for acquiring wealth through investment in the corporation cannot misappropriate their money for other uses (Schwartz & Saiaa, 2012; Jensen & Meckling, 1976; Ross, 1973). Yet, it is nowadays a consensus that CSR should go beyond profits, because the ethical and philosophical discussions have pushed the boundaries of companies' ethical obligations. In other words, what a company should do nowadays have go beyond Friedman's ethical standards. These obligations involve, for instance, the values of citizenship, integrity, transparency, caring, and justice (Schwartz & Saiaa, 2012).

Researchers worldwide still observed an inconsistent relationship between CSR and CFP; in the literature, empirical analyses have demonstrated positive, negative, curvilinear, and no effects (Feng et al., 2018). One of the reasons why no consistent conclusion has been made is the different CSR definitions the studies draw up. In turn, many of them have applied different CSR indicators, mostly unidimensional, to measure its effect on economic performance (Bai & Chang, 2015; Inoue & Lee, 2011). This study considers CSR in a broad term based on the TBL (i.e., economic, social, and environmental aspects). It contains corporate responsibility for both shareholders and non-shareholder stakeholders, including corporate philanthropic responsibility, and responsibility to protect the environment. According to Ronald Coase's notion of transaction costs, better engagement in CSR can help manage their relationships with stakeholders and the public, leading to a decline in transaction costs (Barnett, 2007). We believe these transaction costs can involve three key elements: (i) the cost of customers finding producers and their products; (ii) the cost of negotiating deals with customers; (iii) the cost of ensuring employee engagement. Thus, we posit:

Hypothesis 1 CSR has a positive effect on CFP.

However, this way of presenting the above hypothesis, as many previous studies measuring CSR did, can risk making unreliable interpretations if the multiple dimensions behind the CSR concept are not well examined. For example, in theory, CSR may promote CFP by reducing the transaction costs from the customer, employee, and societal perspectives. However, in reality, it might be only one of them that takes effect to promote firm performance. That is to say, based upon unidimensional CSR measurement, we still cannot be sure of which CSR aspects actually take effect to improve firm performance. Thus, this study would further frame CSR with the TBL structure and stakeholder theory, in order to more carefully examine which CSR dimensions can take actual effects.

Shareholder responsibility and CFP

Many previous studies use a unidimensional indicator to measure CSR (Inoue & Lee, 2011). Yet, Clarkson (1995) showed that the stakeholder theory can be used to better evaluate CSR; the stakeholder theory has been initially developed in the 1960s for the management of relationships between companies and their primary stakeholders (i.e. people without whom companies cannot survive) and has gradually become a dominant theory in the area of organizational management and business ethics from the 1980s. With the help of the stakeholder theory, CSR can be divided into diverse aspects: responsibilities for shareholders, non-shareholder stakeholders, the environment, and the public. As Friedman (1970) points out, the manager that runs a company has fiduciary duty to make investments and launch practices for improving shareholder value. According to the CSR system developed by Hexun.com, corporate responsibility for shareholders measures a company's ability to grow, repay debts, and invest in research and development. Thus, the relationship between shareholder responsibility and CFP could be rather clear:

Hypothesis 2 Corporate responsibility for shareholders has a positive effect on CFP.

Non-shareholder stakeholder responsibility and CFP

Companies also shoulder responsibilities for other stakeholders, including employees and customers. Employees benefit from CSR practices such as a safer and healthier working environment and opportunities for professional development (El Akremi et al., 2018). In turn, they can be more satisfied with their jobs, so companies can reach lower turnover and absenteeism, higher productivity as well as higher organizational commitment among the employees (Berman et al., 1999; De Roeck et al., 2016; Ali et al., 2010). In addition, customers that are more satisfied with the products and services a company provide, such as through providing more quality or innovative products, or better after-sales services, could have more intentions to repurchase these products and they might be more willing to pay premium prices (Homburg et al., 2005; Marín et al., 2012), leading to increased sales and improved financial performance. In contrast, low-quality products through irresponsible practices may lead to more lawsuits and less patronage, and thus decrease financial performance (Berman et al., 1999). Thus, hypotheses 3(a) and 3(b) are proposed:

Hypothesis 3(a) Employee responsibility has a positive effect on CFP.

Hypothesis 3(b) Customer responsibility has a positive effect on CFP.

Environmental responsibility and CFP

Previous studies have shed light on the benefit of bearing environmental responsibility on CFP, though there is still no consistent conclusion. For instance, McPeak

& Tooley (2008) stated that firms with a high level of environmental responsibility will exhibit higher CFP. Companies with improved environmental awareness enact their environmental responsibilities via practices such as renewable energy innovation and deployment, launching or taking part in environmental protection programs, and other business operations related to pollution and waste reduction (Mezher et al., 2010). This may improve corporate competitiveness and promote social reputation among stakeholders (Gao et al., 2021), leading to more sales and better financial performance. Specifically, the 'green' reputation built on practicing environmental responsibility can be regarded as a reliable and observative signal to external stakeholders whilst assessing the firm (Mukherjee et al., 2018; Xia et al., 2022), in particular for firms in the emerging markets (Mukherjee et al., 2022). Additionally, implementing environmental responsibilities can also decrease the costs for compliance with environmental laws and regulations and enhancement of operational efficiencies (Russo & Fouts, 1997). Corporate attention to the environment might also be benefited from tax deducted or subsidies, as well as relaxed environmental regulations, which decreases operational costs. Thus, the following hypothesis is inferred:

Hypothesis 4 Environmental responsibility has a positive effect on CFP.

Social contribution responsibility and CFP

Many previous studies show that corporate contributions to society can contribute to firm performance. One of the key indicators used to measure the social contribution aspect of CSR is through calculating the charitable donations or monetary giving in a calendar year, and this measurement has been adopted by a great body of literature (e.g., Wang et al., 2021; Liu et al., 2021). A meta-analysis conducted by Orlitzky et al. (2003) points out that philanthropical responsibility plays the most significant effect between CSR and CFP, compared to other dimensions of CSR. These philanthropic donation activities can improve corporate reputation (Brammer & Millington, 2005). Thus, they might be useful for attracting public attention and thus leads to improved financial performance. Kacperczyk (2009) also points out that good relationships between corporations and society can bring about better market-based financial performance. These relationships enable an organization's long-term growth (Freeman & Phillips, 2002; Ditlev-Simonsen & Wenstøp, 2013). We thus put forward the following hypothesis:

Hypothesis 5 Social contribution responsibility has a positive effect on CFP.

Research methods

Sample and data sources

All A-share listed China's renewable energy firms are collected as the research sample, and the CSR scoring system developed by Hexun.com is utilized to access CSR data. [Appendix A](#) lists the CSR indicator framework designed by Hexun. A rich body of literature has used the CSR rating reports by Hexun to study China's CSR issues, which have been regarded as one of the most effective and accurate data sources to measure CSR in China (Zhong et al., 2019). In comparison to other CSR data providers that mostly depend on CSR reports separately released by firms, Hexun also incorporates data from annual reports (Tang et al., 2019). Afterwards, these CSR rating scores are matched with financial data from China Stock Market & Accounting (CSMAR), one of the largest financial databases of Chinese listed companies and the primary source of research data on China's stock markets. Given that Hexun.com provides CSR scores since 2010 and one of our key control variables, R&D investment, is not available on the CSMAR platform after 2017¹, our research sample starts in 2010 and ends in 2016.

Once the initial sample is attained, this study excludes: (1) firms that have been marked as requiring special treatment because of the financial losses in several consecutive years; and (2) the observations with incomplete information. Then, we winsorize all continuous variables at the 1% and 99% levels so as to minimize the influence of extreme outliers. Ultimately, 1034 observations from 169 listed A-share firms in China's renewable energy industry remained.

Dependent variable

Corporate financial performance

The return on assets (ROA) indicates the proportion of net income (after taxes) to total assets, which has been widely applied as the key metric of CFP (Shahbaz et al., 2020). This study uses ROA to measure the financial performance of China's renewable energy firms.

Independent variable

CSR and its five dimensions

Hexun rates CSR performance according to its indicator system, which is listed in [Appendix A](#). There are three levels of indicators within the system; the second-level indicators are built on the third-level indicators, and the first-level indicators can be attained by aggregating the second-level indicators. Hexun aggregates all the first-level indicators to determine a firm's overall CSR score, including the responsibili-

¹ Similarly, we found that Wu et al. (2022b) who studied government subsidies and innovation investment within China's renewable energy firms also encountered the same situation.

ties for (i) shareholders, (ii) employees, (iii) customers, (iv) the environment, and (v) social contributions.

Control variables

In order to ensure the precision of the model, this study takes several control variables into account and included them in the model, including firm size (*FirmSize*), firm age (*FirmAge*), the annual research and development investment (*R&DInv*), firm leverage (*FirmLvg*), and the annual growth rate of operating revenues (*GrowRev*). Therein, firm age is measured by the number of years since the firm was established, and then this study takes the natural logarithm of this variable, thereby making it naturally distributed and balanced. In accordance with Hernández et al. (2020), the quantity of total employees is used as a proxy to determine the size of the firm. McWilliams and Siegel (2000) stressed that the inconsistency of CSR-CFP correlation should be due to the exclusion of R&D investment in the regression models. Thus, our models include it as a control variable. In addition, firm leverage plays a key role in controlling the financial risk of firms and accordingly affects the decision-making process (Xu et al., 2016). With reference to Xu et al. (2016), this study measures firm leverage through the proportion of a firm's year-end asset liability.

Econometric models

Effect of overall CSR on CFP

Model 1 is used to test the effect of overall CSR on CFP, and several confounding variables are controlled, which is shown in the following equation:

Model 1:

$$\begin{aligned} CFP_{i,t} = & \alpha + \beta_1 CSR_{i,t} + \beta_2 FirmSize_{i,t} + \beta_3 FirmAge_{i,t} \\ & + \beta_4 R\&DInv_{i,t} + \beta_5 FirmLvg_{i,t} \\ & + \beta_6 GrowRev_{i,t} + Firm\ Fixed\ Effects \\ & + Year\ Fixed\ Effects + \epsilon_{i,t} \end{aligned}$$

where i represents the firm unit, t refers to the observed time point, *CFP* denotes corporate financial performance, and *CSR* indicates a CSR score which generally measures the overall performance of corporate shareholder responsibility, employee responsibility, customer, supplier, and consumer responsibility, environmental responsibility, and social contribution responsibility. Besides, the group of control variables is composed of firm size (*FirmSize*), firm age (*FirmAge*), R&D investment (*R&DInv*), firm leverage (*FirmLvg*), and the annual growth of revenue (*GrowRev*). In the end, firm fixed effect and year fixed effect is simultaneously controlled in the regression in order to mitigate unobserved heterogeneous issue.

Effect of five CSR dimensions on CFP

Model 2 bridges these five CSR dimensions (i.e. shareholder responsibility, employee responsibility, customer responsibility, environmental responsibility, and social contribution responsibility) to CFP, whilst controlling for *FirmSize*, *FirmAge*, *R&DInv*, *FirmLvg*, *GrowRev*.

Model 2:

$$\begin{aligned} CFP_{i,t} = & \alpha + \beta_1 Sh_resp_{i,t} + \beta_2 Empl_resp_{i,t} + \beta_3 Cust_resp_{i,t} \\ & + \beta_4 Env_resp_{i,t} + \beta_5 Soc_resp_{i,t} \\ & + \beta_6 FirmSize_{i,t} + \beta_7 FirmAge_{i,t} + \beta_8 R\&DInv_{i,t} \\ & + \beta_9 FirmLvg_{i,t} + \beta_{10} GrowRev_{i,t} \\ & + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \epsilon_{i,t} \end{aligned}$$

where i represents the firm unit, t refers to the observed time point, CFP denotes corporate financial performance. Besides, Sh_resp , $Empl_resp$, $Cust_resp$, Env_resp , and Soc_resp respectively indicate shareholder responsibility, employee responsibility, customer responsibility, environmental responsibility, and social contribution responsibility. The same set of control variables as well as firm fixed effect and year fixed effect are added into the equation as well.

Moreover, this study employs the panel-corrected standard errors approach to resolve panel heteroscedasticity and possible contemporaneous error correlation (Wang et al., 2008).

Time-lagging effect tests

Several studies pointed out that current CSR engagement may lead to future CFP improvements (Fombrun, 2005; Margolis et al., 2007). Thus, this study adjusts model 1 and model 2 through regressing CFP on lagged overall CSR (Model 3) and lagged CSR aspects (Model 4) respectively, as illustrated in the following equations:

Model 3:

$$\begin{aligned} CFP_{i,t+\tau} = & \alpha + \beta_1 CSR_{i,t} + \beta_2 FirmSize_{i,t} + \beta_3 FirmAge_{i,t} \\ & + \beta_4 R\&DInv_{i,t} + \beta_5 FirmLvg_{i,t} + \beta_6 GrowRev_{i,t} \\ & + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \epsilon_{i,t} \end{aligned}$$

Model 4:

$$\begin{aligned} CFP_{i,t+\tau} = & \alpha + \beta_1 Sh_resp_{i,t} + \beta_2 Empl_resp_{i,t} + \beta_3 Cust_resp_{i,t} \\ & + \beta_4 Env_resp_{i,t} + \beta_5 Soc_resp_{i,t} + \beta_6 FirmSize_{i,t} \\ & + \beta_7 FirmAge_{i,t} + \beta_8 R\&DInv_{i,t} \\ & + \beta_9 FirmLvg_{i,t} + \beta_{10} GrowRev_{i,t} \\ & + Firm\ Fixed\ Effects + Year\ Fixed\ Effects + \epsilon_{i,t} \end{aligned}$$

where $\tau \in \{1, 2, 3\}$.

Interaction effect tests

Each category of CSR may compete for limited corporate resources, and thus CSR studies need also to investigate the interaction effect of different CSR dimensions on CFP (Wang et al., 2016). Taking inspiration from it, we take a step forward to systematically test the interaction effects between five CSR aspects and CFP.

Results and discussion

Descriptive statistics and correlation analysis

The descriptive statistics of our sample are reported in Table 1. It appears that the average ROA value is 0.041 over the period from 2010 to 2016 and ranges from -0.132 to 0.381 , indicating unbalanced profitability in China's renewable energy industry. Likewise, overall CSR performance is 33.427 on average, and the value of standard deviation (21.281) implies that this industry suffers from a rather varying CSR performance. The variable of shareholder responsibility is averaged at 14.522 with a standard deviation of 5.117. The average value of employee responsibility is 4.362, and that of customer responsibility is 4.616. As to environmental responsibility, the average value is 4.545 with a standard deviation of 7.109, ranging from 0 to 24.000. The social contribution responsibility varies from -5.000 to 17.760 , which has an average value of 5.374 with a standard deviation of 4.265. Besides, in order to display the trend of each kind of responsibility over the period, we compute the average score of these five CSR dimensions in each year, as shown in Fig. 1². As the figure shows, all types other than shareholder responsibility experienced a remarkable fall since 2013.

Table 1 Descriptive statistics

	Obs.	Mean	S.D	Min	Max
ROA	1034	0.041	0.037	-0.132	0.381
CSR	1034	33.427	21.281	-6.390	85.800
Shareholder responsibility	1034	14.522	5.117	3.890	25.950
Employee responsibility	1034	4.362	4.211	0.010	15.000
Customer responsibility	1034	4.616	6.885	0.000	20.000
Environmental responsibility	1034	4.545	7.109	0.000	24.000
Social contribution responsibility	1034	5.374	4.265	-5.000	17.760
FirmSize	1034	22.018	1.484	19.331	27.057
FirmAge	1034	2.752	0.318	1.609	3.296
R&DInv	1034	14.129	7.607	0.000	22.455
FirmLvrg	1034	0.528	0.183	0.092	0.920
GrowRev	1034	14.246	27.710	-37.906	125.011

²Non-shareholder responsibility is composed of employee responsibility and customer responsibility.

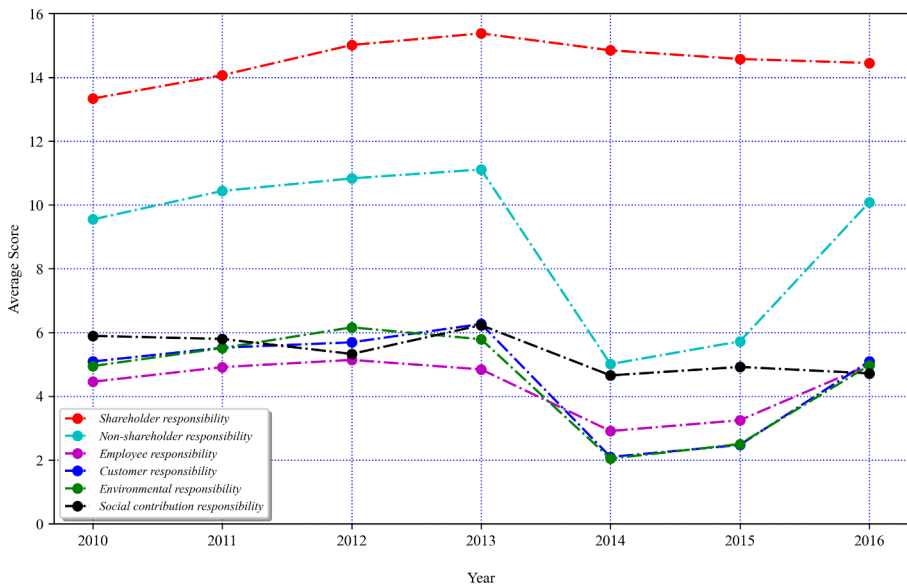


Fig. 1 The trend of each categorical responsibility over the sample period

Table 2 reports the correlation coefficient matrix. ROA is positively correlated with an overall CSR score of $r = 0.270$ ($p < 0.01$). Also, ROA is significantly correlated with these five CSR aspects. In detail, ROA and shareholder responsibility are positively correlated with $r = 0.663$ ($p < 0.01$); ROA and employee responsibility are positively correlated with $r = 0.208$ ($p < 0.01$); ROA and customer responsibility are positively correlated with $r = 0.098$ ($p < 0.01$); ROA and environmental responsibility are positively correlated with $r = 0.169$ ($p < 0.01$); while ROA and social contribution responsibility are negatively correlated with $r = -0.107$ ($p < 0.01$). Moreover, the overall CSR score is respectively correlated with its five CSR aspects, that is, $r = 0.564$ ($p < 0.01$) (shareholder responsibility), $r = 0.876$ ($p < 0.01$) (employee responsibility), $r = 0.922$ ($p < 0.01$) (customer responsibility), $r = 0.907$ ($p < 0.01$) (environmental responsibility) and $r = 0.407$ ($p < 0.01$) (social contribution responsibility). One may find that there is a relatively high Pearson correlation among these variables, suggesting a potential multicollinearity issue in our sample. We employed the indicator-variance inflation factors (VIF) measure in order to address the concern. It turns out that the max VIF value (6.34) is well below the accepted threshold level (Chatterjee & Price, 1977), as can be seen in Appendix B. Additionally, these statistically significant correlations also inspire us to verify the presence of interaction effects of CSR dimensions on CFP.

Table 2 Correlation coefficient matrix

Variables	1	2	3	4	5	6	7	8	9	10	11
1 ROA	1.000										
2 Shareholder responsibility	0.663 ^{***} (0.000)	1.000									
3 Employee responsibility	0.208 ^{***} (0.000)	0.377 ^{***} (0.000)	1.000								
4 Customer responsibility	0.098 ^{***} (0.002)	0.339 ^{***} (0.000)	0.815 ^{***} (0.000)	1.000							
5 Environmental responsibility	0.169 ^{***} (0.000)	0.351 ^{***} (0.000)	0.878 ^{***} (0.000)	0.861 ^{***} (0.000)	1.000						
6 Social contribution responsibility	-0.107 ^{***} (0.001)	0.088 ^{***} (0.005)	0.122 ^{***} (0.000)	0.315 ^{***} (0.000)	0.154 ^{***} (0.000)	1.000					
7 FirmSize	0.144 ^{***} (0.000)	0.432 ^{***} (0.000)	0.318 ^{***} (0.000)	0.296 ^{***} (0.000)	0.335 ^{***} (0.000)	0.169 ^{***} (0.000)	1.000				
8 FirmAge	0.004 (0.888)	0.102 ^{***} (0.001)	-0.024 (0.446)	0.026 (0.406)	-0.049 (0.116)	0.072 ^{**} (0.021)	0.043 (0.168)	1.000			
9 R&DInv	0.129 ^{***} (0.000)	0.055 [*] (0.076)	0.104 ^{***} (0.001)	-0.048 (0.126)	0.087 ^{***} (0.005)	-0.254 ^{***} (0.000)	0.235 ^{***} (0.000)	-0.136 ^{***} (0.000)	1.000		
10 FirmLvrgr	-0.245 ^{***} (0.000)	-0.040 (0.200)	-0.009 (0.770)	0.078 ^{**} (0.012)	0.030 (0.331)	0.187 ^{***} (0.000)	0.404 ^{***} (0.000)	0.102 ^{***} (0.001)	-0.070 ^{**} (0.025)	1.000	
11 GrowRev	0.250 ^{***} (0.000)	0.058 [*] (0.061)	0.075 ^{***} (0.016)	0.058 [*] (0.065)	0.089 ^{***} (0.004)	0.002 (0.958)	0.001 (0.966)	-0.173 ^{***} (0.000)	-0.017 (0.581)	0.051 (0.104)	
12 CSR	0.270 ^{***} (0.000)	0.564 ^{***} (0.000)	0.876 ^{***} (0.000)	0.922 ^{***} (0.000)	0.907 ^{***} (0.000)	0.407 ^{***} (0.000)	0.410 ^{***} (0.000)	0.026 (0.397)	-0.003 (0.915)	0.062 ^{**} (0.045)	0.078 ^{**} (0.012)

Note: p -values in parentheses; ^{*} $p < 0.1$, ^{**} $p < 0.05$, ^{***} $p < 0.01$ (two-tailed)

Empirical results

Overall CSR and CFP

Table 3 reports the result of panel regression for the effect of overall CSR on CFP. Therein, specification (1) reports the effect of control variables and overall CSR score on CFP in the current period. It appears that there was a slight positive relationship between the overall CSR score and CFP ($\beta = 0.007$ at the 1% level). In addition, firm size was found to positively affect CFP, and firms with higher growth rates of operating revenue tend to have greater CFP. As expected, R&D investment is positively associated with CFP for China's renewable energy firms, and higher levels of firm financial leverage are likely to hurt CFP.

Accordingly, H1 is accepted, indicating that CSR will exert a positive effect on CFP of China's renewable energy firms. This finding is consistent with Margolis et al. (2007) who also empirically evidenced a positive but slight relationship between overall CSR performance and CFP. In addition, this relationship has also been identified in the energy sector under other circumstances (e.g., Pătări et al., 2012; Arslan-Ayaydin & Thewissen, 2015). One reason why this happens in China's renewable energy industry can be that a good CSR record serves as an important risk-management strategy that provides an insurance effect on CFP in a changing policy environment (Minor & Morgan, 2011; Xia et al., 2022; Fombrun, 2005).

CSR Dimensions and CFP

Table 4 reports the empirical result of panel regression for the effect of five CSR dimensions on CFP. Therein, the specification (1) and (2) respectively regressed CFP on control variables and on five CSR aspects. It can be found that adding five aspects increases R^2 by 27.2%, suggesting that the addition of fine-grained CSR dimensions yielded a better-specified model. Specification (2) in Table 4 reports a distinct correlation between CFP and five CSR aspects regarding the significance levels and coefficients. More specifically, shareholder responsibility³ (where $\beta = 0.108$ at the 1% level); employee responsibility (where $\beta = 0.005$ without significance); customer responsibility (where $\beta = -0.03$ at the 1% level); environmental responsibility (where $\beta = 0.016$ at the 5% level); and social contribution responsibility (where $\beta = 0.007$ without significance).

Thus, H2 and H4 are accepted while H3 and H5 are rejected. As noted earlier, shareholder responsibility gauges the capability of growing, repaying debt, and innovation, which could serve as an economic basis for carrying out CSR activities and in turn determine the degree to which firms benefit their CFP from CSR engagements (Cegarra-Navarro et al., 2016). In this sense, China's renewable energy firms that

³ One concern may be that the positive sign and significance may be driven by the potential overlaps between shareholder responsibility and ROA since Appendix A reveals that two core indicators for shareholder responsibility are 'return on assets' and 'return on investment'. To rule out this potential, we made a trial by excluding both indicators - 'return on assets' and 'return on investment' from Appendix A and rerun relevant regressions. In fact, the results remained largely unchanged (not reported), which reassured us that this should be less of an issue.

engaged in more shareholder-responsible activities will translate into superior financial performance to their counterparts. This is in accordance with Pan et al. (2014a, b) who found that addressing shareholders' concern is advantageous to reducing costs inside firms. Consistent with a rich body of literature (e.g., Arslan-Ayaydin & Thewissen, 2015; McPeak & Tooley, 2008; Liang & Liu, 2017; Song et al., 2017) that evidenced an intimate relationship between higher profitability and greater environmental responsibility, we also concluded that placing more emphasis on bearing environmental responsibility will help China's renewable energy firms gain more financial returns. In line with Pan et al. (2014a, b), this study documented that there is no significant relationship between employee responsibility and CFP and that a negative relationship exists between customer responsibility and CFP. Besides, the result suggested that dedicating more social contribution has no significant relationship with firms' CFP, which was against some studies which held that firms are capable of reaping financial benefits from socially responsible behaviours (Hull & Rothenberg, 2008; Gangi et al., 2020). Rather, this study provides parallel evidence to the literature that social contribution responsibility exerts a neutral effect on CFP impact on CFP, which is akin to the conclusion drawn by Teoh et al. (1999) and McWilliams and Siegel (2001).

Time-lagging effect tests

Specification (2)-(4) in Table 3 indicated that overall CSR engagement in previous years is not significantly correlated to CFP in current year, and this finding is in accordance with Jung (2020) in Korea, Chang and Kuo (2008) in Taiwan, and Nuber et al. (2019) in Germany. And interestingly, we find that the coefficient of

Table 3 Panel regression for the effect of overall CSR on CFP (with panel-corrected standard error)

	(1)	(2)	(3)	(4)
	CFP_{t+0}	CFP_{t+1}	CFP_{t+2}	CFP_{t+3}
CSR	0.007*** (0.001)	0.001 (0.002)	-0.000 (0.002)	-0.001 (0.002)
FirmSize	0.441*** (0.068)	0.498*** (0.087)	0.556*** (0.093)	0.401*** (0.107)
FirmAge	-1.645*** (0.452)	-1.697*** (0.608)	-1.468** (0.656)	0.193 (0.881)
R&DInv	0.011** (0.005)	0.005 (0.006)	-0.002 (0.009)	-0.007 (0.009)
FirmLvrg	-1.469*** (0.260)	-1.896*** (0.341)	-1.415*** (0.354)	-1.417*** (0.388)
GrowRev	0.005*** (0.001)	0.006*** (0.001)	0.000 (0.001)	0.002 (0.001)
_cons	-4.864*** (1.800)	-5.503** (2.429)	-7.575*** (2.536)	-8.588*** (3.194)
<i>Firm fixed effect</i>	YES	YES	YES	YES
<i>Year fixed effect</i>	YES	YES	YES	YES
<i>Within R²</i>	0.250	0.205	0.101	0.080
<i>Obs.</i>	1034	804	671	533

Note: Standard errors in parentheses. *p<0.10, **p<0.05, ***p<0.01

overall CSR even turns from positive to negative over time. Specification (3)–(5) in Table 4 suggests that (1) one-year lagged shareholder responsibility can exert a positive effect on CFP (where $\beta=0.040$ at the 1% level) despite the downward effect size; (2) one-year lagged customer responsibility is found to have a smaller but still significantly negative effect on CFP; (3) one-year lagged environmental responsibility has a weaker positive effect on CFP; and (4) the significance and coefficient of employee responsibility and social contribution responsibility remain unchanged over the lagged period. Interestingly, it is found that the symbols of some of them showed opposite patterns in comparison to non-lagged cases. For instance, the coefficient of shareholder responsibility still kept positive for two years lagged (specification (4) in Table 4) but switched to be significantly negative for three years lagged (specification (5) in Table 4).

Table 4 Panel regression for the effect of CSR dimensions on CFP (with panel-corrected standard error)

	(1)	(2)	(3)	(4)	(5)
	CFP_{t+0}	CFP_{t+0}	CFP_{t+1}	CFP_{t+2}	CFP_{t+3}
Shareholder responsibility		0.108*** (0.005)	0.040*** (0.007)	0.003 (0.008)	-0.020** (0.008)
Employee responsibility		0.005 (0.012)	-0.003 (0.017)	-0.027 (0.017)	0.021 (0.019)
Customer responsibility		-0.030*** (0.007)	-0.024*** (0.009)	0.007 (0.010)	0.002 (0.012)
Environmental responsibility		0.016** (0.007)	0.017* (0.009)	0.009 (0.009)	-0.009 (0.010)
Social contribution responsibility		0.007 (0.006)	0.007 (0.008)	-0.003 (0.008)	-0.002 (0.008)
FirmSize	0.484*** (0.069)	0.099* (0.059)	0.362*** (0.088)	0.568*** (0.094)	0.374*** (0.108)
FirmAge	-1.642*** (0.458)	-0.400 (0.374)	-1.022* (0.602)	-1.485** (0.672)	-0.243 (0.897)
R&DInv	0.011** (0.005)	0.009** (0.004)	-0.000 (0.006)	-0.001 (0.009)	-0.003 (0.009)
FirmLvrg	-1.576*** (0.262)	-0.857*** (0.215)	-1.581*** (0.336)	-1.412*** (0.354)	-1.381*** (0.388)
GrowRev	0.005*** (0.001)	0.005*** (0.001)	0.007*** (0.001)	0.000 (0.001)	0.001 (0.001)
_cons	-5.508*** (1.818)	-2.038 (1.483)	-4.834** (2.373)	-7.733*** (2.569)	-6.717** (3.284)
Firm fixed effect	YES	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES	YES
Within R ²	0.230	0.502	0.254	0.106	0.097
Increased R ²		0.272	0.024	-0.124	-0.133
Obs.	1034	1034	804	671	533

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 5 the summary of interaction effect tests

No.	Interaction items	Coefficient with statistical significance
1	Shareholder responsibility*Employee responsibility	0.0005
2	Shareholder responsibility*Customer responsibility	0.0006***
3	Shareholder responsibility*Environmental responsibility	0.0006
4	Shareholder responsibility*Socia contribution responsibility	-0.0028***
5	Employee responsibility*Customer responsibility	0.0001
6	Employee responsibility*Environmental responsibility	0.0036***
7	Employee responsibility*Socia contribution responsibility	-0.0020
8	Customer responsibility*Environmental responsibility	-0.0005
9	Customer responsibility*Socia contribution responsibility	-0.0003
10	Environmental responsibility*Socia contribution responsibility	-0.0013

Note: * $p < 0.10$, ** $p < 0.05$,
*** $p < 0.01$

Interaction effect tests

As shown in Table 5, there are ten potential interaction items that need to be respectively tested to verify the presence of interaction effect. This study thus creates a script to examine the effect of each interaction item on CFP. The third column in Table 5 summarizes their coefficients as well as statistical significance. We report the result of the corresponding panel regression containing these interaction items in Table 6. Thereinto, specifications (1)–(3) respectively shed light on testing the effect of specific interaction items on CFP, and it appears that these interactions all present a 1% level of statistical significance, containing the interaction between shareholder responsibility and customer responsibility (where $\beta = 0.0006$ at the 1% level), between shareholder responsibility and social contribution responsibility (where $\beta = -0.0028$ at the 1% level), and between employee responsibility and environmental responsibility (where $\beta = 0.0036$ at the 1% level). These results further deepened our understanding of the nature of the relationship between CSR and CFP, that is, CFP could be influenced by the compositions of CSR in an interactive manner. For example, it can be seen from Fig. 2 that the positive relationship between shareholder responsibility and CFP is more salient when firms bear high (vs. low) customer responsibility. In contrast, Fig. 3 illustrated that the positive effect of shareholder responsibility on CFP is attenuated by taking high (vs. low) social contribution responsibility. Interestingly, we also found that the positive relationship between environmental responsibility and CFP is also strengthened when the score of employee responsibility is high (vs. low), as shown in Fig. 4. Given the negative and significant interactive effect between shareholder responsibility and social contribution responsibility, our arguments that limited corporate resources might will give rise to the likelihood that CSR dimen-

Table 6 Panel regression for the interaction effect model (with panel-corrected standard error)

	(1)	(2)	(3)
Shareholder responsibility	0.107*** (0.007)	0.122*** (0.007)	
Customer responsibility	-0.013*** (0.005)		
Social contribution responsibility		0.025* (0.013)	
Employee responsibility			-0.024 (0.015)
Environmental responsibility			0.019** (0.008)
Shareholder responsibility*Customer responsibility	0.0006*** (0.000)		
Shareholder responsibility*Socia contribution responsibility		-0.0028*** (0.001)	
Employee responsibility*Environmental responsibility			0.0036*** (0.001)
FirmSize	0.341*** (0.088)	0.088 (0.059)	0.480*** (0.069)
FirmAge	-0.995* (0.599)	-0.405 (0.376)	-1.646*** (0.456)
R&DInv	0.001 (0.006)	0.011** (0.004)	0.010** (0.005)
FirmLvrg	-1.577*** (0.334)	-0.830*** (0.216)	-1.564*** (0.262)
GrowRev	0.007*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
_cons	-4.576* (2.353)	-2.030 (1.484)	-5.375*** (1.818)
<i>Firm fixed effect</i>	YES	YES	YES
<i>Year fixed effect</i>	YES	YES	YES
<i>Within R²</i>	0.456	0.496	0.241
<i>Obs.</i>	1034	1034	1034

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

sions compete for financial resources and managerial attention is partially supported, which is grounded in the resource-based view proposed by Wernerfelt (1984).

Additional analysis

Although employee responsibility and customer responsibility show diverse patterns when affecting CFP, it is natural to aggregate them to check the effect of non-shareholder responsibility as well as its interaction with shareholder responsibility on

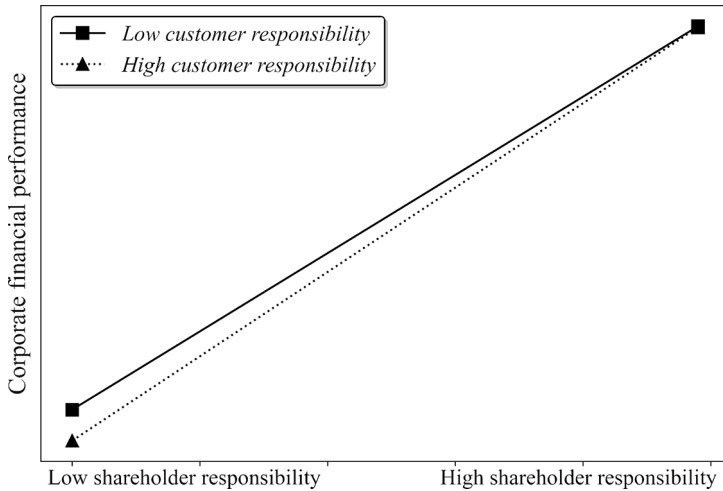


Fig. 2 The interaction effect of shareholder responsibility and customer responsibility on corporate financial performance

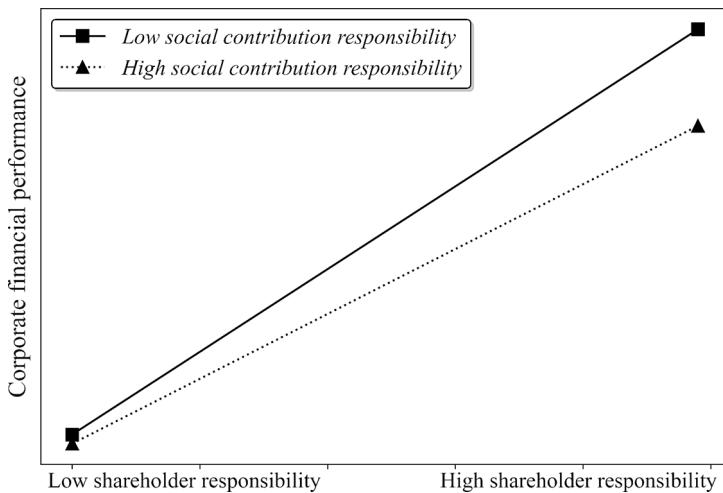


Fig. 3 The interaction effect of shareholder responsibility and social contribution responsibility on corporate financial performance

CFP. Specifications (1) and (2) in Table 7 respectively report the result of regression on shareholder and non-shareholder responsibility, and specification (3) provides evidence of regressing CFP on both shareholder and non-shareholder responsibility at the same time. We found that it was not until after shareholder responsibility is added into the model that non-shareholder responsibility exhibits a significant and negative effect on CFP (where $\beta = -0.009$ at the 1% level). We conjectured that it should be due to the long-lasting conflicts of claims between these two groups since shareholders are prone to claim more profits and dividends or bonuses, yet

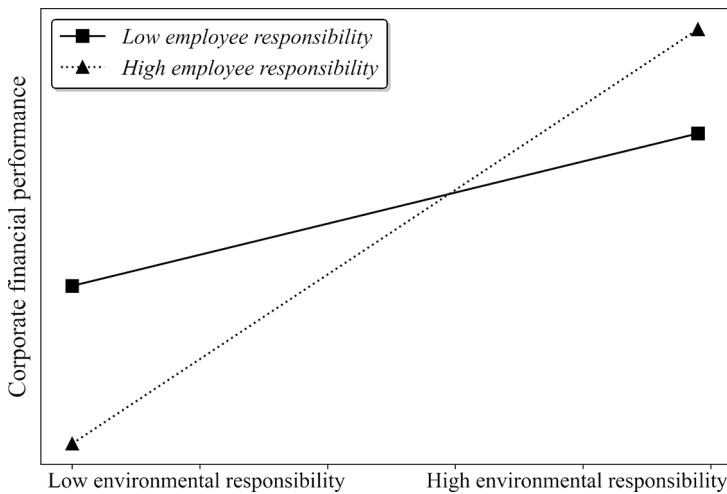


Fig. 4 The interaction effect of employee responsibility and environmental responsibility on corporate financial performance

Table 7 Panel regression for the effect of shareholder and non-shareholder responsibility on CFP (with panel-corrected standard error)

	(1)	(2)	(3)	(4)
Shareholder responsibility	0.106*** (0.005)		0.110*** (0.005)	0.107*** (0.006)
Non-shareholder responsibility		0.001 (0.003)	-0.009*** (0.002)	-0.013** (0.007)
Shareholder responsibility*Non-shareholder responsibility				0.000 (0.000)
FirmSize	0.105* (0.059)	0.482*** (0.069)	0.105* (0.059)	0.107* (0.059)
FirmAge	-0.466 (0.378)	-1.647*** (0.458)	-0.382 (0.376)	-0.370 (0.377)
R&DInv	0.010** (0.004)	0.011** (0.005)	0.009** (0.004)	0.009** (0.004)
FirmLvrg	-0.849*** (0.217)	-1.572*** (0.263)	-0.863*** (0.216)	-0.869*** (0.216)
GrowRev	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.001)
_cons	-2.081 (1.494)	-5.477*** (1.822)	-2.252 (1.484)	-2.289 (1.486)
Firm fixed effect	YES	YES	YES	YES
Year fixed effect	YES	YES	YES	YES
Within R ²	0.487	0.230	0.494	0.500
Obs.	1034	1034	1034	1034

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

non-shareholder stakeholders are most likely to claim for more diverse objectives in addition to economic ones, such as workplace well-being and business ethics. Furthermore, the rightmost column in Table 7 checked the presence of interaction effect between them. The insignificant interaction item suggests that shareholder and non-shareholder responsibility would not interactively exert an effect on CFP.

Robustness check

The existing literature has laid increased emphasis on addressing the potential endogeneity issues regarding the relationship between CSR and CFP (e.g., Awaysheh et al., 2020; Liu et al., 2021), in particular reverse causality and sample selection bias. With the aim of corroborating our estimates, we introduce the two-stage Heckman method and the two-stage least squares (2SLS) instrumental variable method to correct for unobserved endogeneity bias. After revisiting vast CSR studies, three instrumental variables are chosen, that is, board gender diversity, board independence, and the earthquake occurred in China from 2010 to 2018. Shahbaz et al. (2020) concluded that board attributes (such as board gender diversity and board independence) could serve as a good predictor of CSR performance. Zhang et al. (2010) found that earthquake is intimately associated with firms' prosocial activities. Furthermore, it can be reasoned that they are less likely to exert direct influence on CFP. Table 8 summarizes the results of the two-stage least squares regression method, and specification (2) suggests that CSR still positively impacts CFP after controlling for endogeneity (where $\beta = 0.016$ at the 5% level). Additionally, the value of Kleibergen-Paap rk Wald F statistic is greater than 10, which means that our selected instrumental variables have a decent relevance with CFP. Notwithstanding, the p-values for Sargan and Basmann test statistics are 0.099 and 0.100 respectively, indicating that there potentially remains an overidentification issue. As suggested by Angrist and Pischke (2009), we conduct a limited information maximum likelihood (LIML) method to address this issue since LIML is more robust in the case of the bias suffered from weak instruments. The corresponding result is reported in Table 9, therein specification (2) shows that our previous estimate is still sound (where $\beta = 0.018$ at the 10% level). Thereafter, the two-stage Heckman method is conducted to correct for the sample selection bias, and the corresponding result can be found in Table 10. Therein, specification (2) reports an insignificant coefficient of inverse Mill's ratio (IMR), suggesting that the issue of sample selection bias should be less concerned, which corroborates that the CSR score provided by Hexun.com is less likely to suffer from the sample selection bias (Tang et al., 2019). Even in this case, we still found that the coefficient of CSR remains stable (where $\beta = 0.008$ at the 1% level). In a nutshell, these results reassure us that to a large extent, the relationship between CSR and CFP verified in this study should be attributed to being causal.

Table 8 Two-stage least squared instrumental variable method

	(1)	(2)
	First stage	Second stage
CSR		0.016** (0.008)
FirmSize	5.989*** (0.519)	0.025 (0.050)
FirmAge	1.656 (2.179)	0.410*** (0.090)
R&DInv	-0.239** (0.094)	0.013*** (0.004)
FirmLvrg	-10.845** (4.242)	-1.348*** (0.191)
GrowRev	0.057*** (0.021)	0.005*** (0.001)
BGDiv	-1.243 (4.066)	
BIndep	-18.878 (13.050)	
EarthQ	-9.896*** (1.894)	
Constant	-85.082*** (13.300)	-1.777** (0.851)
Firm fixed effect	YES	YES
Year fixed effect	YES	YES
F-statistic	22.73***	17.25***
Kleibergen-Paap rk Wald F statistic	13.154	
Sargan overidentification test/p-value	0.099	
Basman overidentification test/p-value	0.100	
R ²	0.186	0.166
Obs.	1034	1034

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable in the first stage model is the overall CSR score. The instrumental variables in the first stage model are the board gender diversity (BGDiv), the board independence (BIndep) (the percentage of independent directors), and earthquake (EarthQ, a dummy variable). Specification (2) shows the second stage of the two-stage least squares regressions, where the dependent variable is CFP. The first stage model regresses the endogenous variable on instrumental variables and control variables for estimating predicted value. The second stage model regresses the dependent variable on the predicted value and the same control variables. In so doing, the potential endogeneity could be corrected

Theoretical contributions

Many previous studies assess CSR only through a unidimensional indicator (Inoue & Lee, 2011; Bai & Chang, 2015). As demonstrated in the development of the first hypothesis in this article, the economics of transaction costs, having been used in many previous studies to construct hypotheses, implies that CSR can possibly improve firm performance by reducing transaction costs, such as by lowering turnover and improving customer loyalty. Our research then further applies the stakeholder theory and the TBL (i.e., economic, social, and environmental aspects) structure to conceptualise CSR as a multi-dimensional framework, aiming to answer the call from academic and practitioner communities for more attention on unpacking the black box of CSR (Wang et al., 2016; Carroll & Shabana, 2010), and to provide a more effective evaluation on the effect of CSR on CFP. Our research empirically demonstrates that practicing responsibility for primary non-shareholder stakeholders, including employees and customers, and secondary stakeholders, such as the public communities, might not be able to bring about improvements in firm performance. Thus, we here argue

Table 9 Instrumental variable method using a LIML estimation model

	(1)	(2)
	First stage	Second stage
CSR		0.018*
		(0.009)
FirmSize	5.989***	0.010
	(0.519)	(0.061)
FirmAge	1.656	0.406***
	(2.179)	(0.092)
R&DInv	-0.239**	0.013***
	(0.094)	(0.004)
FirmLvrgr	-10.845**	-1.323***
	(4.242)	(0.232)
GrowRev	0.057***	0.005***
	(0.021)	(0.001)
BGDiv	-1.243	
	(4.066)	
BIndep	-18.878	
	(13.050)	
EarthQ	-9.896***	
	(1.894)	
Constant	-85.082***	-1.556
	(13.300)	(1.021)
Firm fixed effect	YES	YES
Year fixed effect	YES	YES
F-statistics	22.73***	23.07***
Kleibergen-Paap rk Wald F statistic	12.545	
Anderson-Rubin overidentification test/p-value	0.100	
Basman overidentification test/p-value	0.106	
R ²	0.186	0.147
Obs.	1034	1034

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable in the first stage is the overall CSR score. The instrumental variables in the first stage are the board gender diversity (BGDiv), the board independence (BIndep) (the percentage of independent directors), and earthquake (EarthQ, a dummy variable). Specification (2) shows the second stage of the limited-information maximum likelihood (LIML) regressions, where the dependent variable is CFP.

that the results that are based on oversimplified CSR measurements, such as the many provided by CSR scoring institutions, can give inaccurate implications regarding the CSR-CFP relationship.

Besides, though CSR-CFP relationship within developed economies has been extensively studied in the literature, this issue in emerging economies has not been well discussed (Bai & Chang, 2015). One important study on this relationship within China's setting is by Bai and Chang (2015). They studied 800 Chinese firms and concluded a positive relationship between corporate responsibility for employees, customers, and society and firm performance. Their discussion and findings could be perceptive, but the positive relationship was identified based on a random selection of companies across a variety of industries. Thus, their results might help draw a general picture of the CSR-CFP relationship in China, but it ignores the differences in such a relationship among different China's industries. For instance, their research combines the data from the apparel industry and the chemical engineering industry. However, how the public reacts to the social donations coming from the two industries

Table 10 Two-stages Heckman selection method

	(1)	(2)
	First stage	Second stage
CSR		0.008*** (0.001)
BGDiv	-0.246 (0.247)	
BIndep	-0.568 (0.825)	
EarthQ	-0.272*** (0.097)	
FirmSize	0.342*** (0.034)	0.187*** (0.061)
FirmAge	-0.107 (0.140)	0.229*** (0.080)
R&DInv	-0.021*** (0.006)	0.005 (0.005)
FirmLvrg	-0.778*** (0.268)	-1.897*** (0.203)
GrowRev	0.005*** (0.002)	0.010*** (0.001)
IMR		0.325 (0.243)
_cons	-5.698*** (0.920)	-4.638*** (1.475)
Firm fixed effect	Yes	Yes
Year fixed effect	Yes	Yes
Pseudo R^2	0.102	
R^2		0.254
Obs.	804	804

Note: Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. The dependent variable in the first stage model is a dummy variable that takes on a value of one if a firm has a CSR score higher than average and zero otherwise. The first stage uses a probit regression model to estimate how the propensity of engaging CSR is affected by EarthQ, BIndep and BGDiv, and control variables. The inverse Mill's ratio (IMR), generated from the first stage regression, has been added into the second stage model so as to correct for the sample selection bias

can be different, thereby leading to different buying intentions and behaviours and thereby different financial outcomes. This study specifically focuses on an emerging and increasingly important industry in China, China's renewable energy industry, to bring more depth into the CSR-CFP discussion.

Through using the CSR rating system developed by Hexun.com, the most comprehensive third-party CSR scoring agency in China (Yi et al., 2021), we find that overall CSR shows a positive relationship with CFP in the industry. And then by looking into the CSR framework developed by Hexun (Appendix B), we further investigate how each aspect affects CFP. Our result demonstrates that the shareholder and environmental aspects positively affect CFP while the customer aspect negatively affects CFP in China's renewable energy industry. The responsibilities for employees and social contributions show no significant effect on CFP in the industry. Our result also shows, generally speaking, enacting responsibility for shareholders improves CFP while practicing responsibility for non-shareholder stakeholders can lead to poorer financial performance.

We also evaluate the lagged effects as well as the interaction effects among different pillars of CSR; the latter part has been understudied in the literature. The

responsibility for shareholders positively affects CFP in year t and $(t+1)$. It then demonstrates no effect on CFP in year $(t+2)$ while then a negative impact in year $(t+3)$. The employee dimension has no significant effect on CFP in all periods. The element of customer responsibility negatively affects CFP in year t and $(t+1)$ while it has no significant effect on CFP in year $(t+2)$ and $(t+3)$. Corporate environmental responsibility positively impacts CFP in year t and $(t+1)$. The social contribution dimension demonstrates no significant effect on CFP in all years. We conjecture that as time elapses, a firm's contributions to society, the environment, and other areas are likely to be inappropriately perceived in part because time could erode people's memories (Sarafidis et al., 2007). And we also found that these firms are most likely to disclose their CSR efforts in annual reports rather than advertise their social contributions in the real world. Generally, we argue that doing good with instant feedback could enable firms to accurately and promptly adjust their CSR strategy. Otherwise, it is possible that quite a lot of firms may discontinue doing good before prosocial behaviour plays an effective role. In addition, our results show that the significance of the positive relationship between the shareholder aspect and CFP can go up as (i) the performance of customer responsibility goes up or (ii) social contribution goes down. When the performance of employee responsibility is high, the significance of the positive relationship between the environmental aspect and CFP is also promoted.

Discussion and conclusion

Issues related to the sustainable development of China's industrial sector have attracted great academic interest these years (e.g., Wu et al., 2019a, b; Xia et al., 2020; Gao et al., 2022b). China's renewable energy industry is a fast-growing industry due to the great policy support from the national government. The industry also strives for using multiple CSR strategies that take care of their stakeholders for developing competitiveness and sustaining financial growth (Feng et al., 2018). However, the relationship between CSR and CFP is still unresolved in the literature. Thus, the study aims to investigate into CSR-CFP relationship in China's renewable energy industry. This study takes into account the economic, social, and environmental aspects of CSR that companies shoulder; particularly, the responsibilities for both shareholders and non-shareholders are considered in our CSR framework.

This study demonstrates that China's renewable energy companies taking responsibility for employees, customers, and community cannot improve CFP at once and over time. The reason why this happens can be the strong political power of China's central government has developed and launched a sequence of policies that support the development of its renewable energy industry. These include laws and regulations, as well as economic encouragement (e.g., subsidies) (Zhang et al., 2009); it has also invested massively in research and development programs and developed multiple renewable energy model projects. These policies and movements play a strong part in pushing the use of renewable energy and expanding the renewable energy industry. Companies thus may consider enacting the responsibilities for employees, customers, and community as less important business practices, compared to their responsibility for their shareholders and the environment; disregarding them would

not greatly affect their financial performance and shouldering them may pose additional costs.

For the industry, practicing the environmental dimension of CSR can generate not only good environmental outcomes but also economic outcomes; investment in innovations in renewable energy could decrease the production cost or/and advance the energy products they supply. Thus, this study indicates that different dimensions of CSR may affect CFP in different ways, and executives who are in support of the saying ‘doing well by doing good’ must learn to consider and embrace CSR as an all-around system. However, overall speaking and by taking advantage of the Hexun CSR framework, CFP can be improved by CSR implementation. This means China’s renewable energy firms investing corporate resources to CSR practices may not cost shareholders, yet it can provide benefits to employee, customer, and social welfare. Thus, our research implies that these companies can at least do good and do well, though they do not necessarily do well by doing good.

Yet, one may point out that since these companies investing in some dimensions of CSR do not necessarily bring about increased economic performance, their CFP can be better improved if they dedicate fewer resources to the public or employee dimensions, such as practicing social donations and employees’ well-being promotion; no effect was identified between taking responsibility for employees with CFP, and no effects are identified between social contribution and CFP, and between customer responsibility and CFP. Instead, they should invest more resources into the environmental dimension, such as environmental innovation, or other programs that can deliver greater payoffs. Yet, it must be noted that taking good care of customers alone may not lead to more financial returns directly, while one of our findings reveals that it can help to enlarge the beneficial effect of pro-environmental behaviour on firms’ financial performance. Also, corporate financial status will benefit more from environmentally friendly initiatives if firms take more responsibility for their employees at the same time. Last, but even more importantly, we believe that financial performance should be not the only reason for practicing CSR. Despite the fact that our results demonstrate doing good may not be directly proportional to financial returns, as Margolis and Elfenbein (2007) pointed out, doing good can be its own rewards.

Limitations and future research

There exist limitations in our study, which can be taken into consideration by further research: (i) more diverse contexts need to be explored for justifying the generalization of our findings; (ii) considering the length limit, this study did not test the potential mediating effect among the CSR dimensions on CFP. For instance, environmental responsibility may serve as a mediator influencing the linkage between social contribution responsibility and CFP. Thus, future studies are recommended to shed light on the potential mediating effect; and (iii) considering the potential time-lagged effect of interactions between CSR aspects, it is advisable for future studies to carry out further investigations.

Appendix

Appendix A. The CSR indicator framework built by Hexun.com

First-level indicator	Second-level indicator	Third-level indicator
Shareholder responsibility	Profitability (10%)	Return on net assets
		Return on total assets
		Profit ratio of core business
		Ratio of profits to cost
	Solvency (3%)	Earnings per share
		Undistributed profit per share
		Quick ratio
		Current ratio
		Cash ratio
		Equity ratio
		Asset-liability ratio
	Return on investment (8%)	Dividend financing ratio
		Dividend yield
		Ratio of dividends to distributed profits
	Punishment (5%)	Number of punishments imposed by the exchange on the company and relevant responsible persons
	Innovation (4%)	Product development expenditure
		Technological innovation concept
		Number of technological innovation projects
Employee responsibility	Employee income and training (5%)	Per capital income of employees
		Employee training
	Safety manufacturing (5%)	Safety check
		Safety training
Customer, suppliers and consumers responsibility	Caring for employees (5%)	Sympathy consciousness
		Sympathy for employees
		Money for expressing sympathy
		Quality management awareness
		Quality management system certificate
Environmental responsibility	Product quality (7%)	Quality management awareness
	After-sale service (3%)	Customer satisfaction survey
	Honesty and mutual benefit (5%)	Fair competition among suppliers
Environmental responsibility	Environmental governance (20%)	Anti-commercial bribery training
		Environmental awareness
		Environmental management system certification
		Amount of environmental protection investment
		Number of pollutant discharge types
Environmental responsibility	Environmental governance (20%)	Number of energy saving types

First-level indicator	Second-level indicator	Third-level indicator
Social contribution responsibility	Contribution value (20%)	Ratio of income tax to total profit
		Amount of public welfare donation

Note: the numbers in brackets of the second column are the weights of second-level indicators; the texts in brackets of the third column refer to the type of data for each third-level indicator. It is noteworthy that the financial sub-indicators for shareholder responsibility, such as return on net assets and return on investment, are attained by reference to firms' financial statements but not directly taken from them.

Appendix B. Multicollinearity check using variance inflation factors (VIF)

Variables	VIF	1/VIF
Shareholder responsibility	1.45	0.686
Environmental responsibility	6.34	0.157
Customer responsibility	5.04	0.198
Employee responsibility	4.88	0.205
Social contribution responsibility	1.29	0.771
FirmSize	1.85	0.540
FirmLvrg	1.39	0.719
R&DInv	1.25	0.796
FirmAge	1.09	0.914
GrowRev	1.05	0.947
Mean VIF	2.56	

Note: The max VIF value (6.34) is well below the accepted threshold level (Chatterjee & Price, 1977) suggesting a minor multicollinearity in our regressions.

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Declarations

Conflict of Interest The authors have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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