

Corporate Social Responsibility, Analyst Focus and Firm Performance

Fangfei Liao *, Rui Zhang and Jiaxuan Song

Department of business and tourism, Sichuan Agricultural University, Sichuan, China

* Corresponding author: liaofangfeixc@163.com

Abstract. Corporate social responsibility can enhance corporate reputation, help companies obtain key resources and attract investors' attention. However, due to the information asymmetry and self-interested behaviour of management existing in the capital market, investors cannot effectively identify enterprises with sufficient competitiveness. In the critical period of transformation and upgrading of China's capital market and in the context of high-quality economic development, this paper focuses on the impact of CSR on corporate performance and its mechanism of action using data from China's A-share listed companies from 2010-2021. The results of the study show that (1) corporate social responsibility has a promotional effect on firm performance; (2) good corporate social responsibility performance attracts analysts' attention; (3) analysts' attention has a partially mediating role in the impact of CSR on firm performance, and CSR enhances firm performance through the supervisory effect and the alleviation of information asymmetry; (4) the CSR's enhancement effect is more significant in non-state-owned enterprises with weaker external regulation and high equity concentration enterprises with stronger internal governance, and the disclosure of non-financial information and internal monitoring by major shareholders in private enterprises can alleviate information asymmetry and play a governance role on management self-interested behaviour. The above findings have implications for deepening corporate social responsibility awareness and promoting corporate value creation.

Keywords: corporate social responsibility, analyst attention, firm performance, information asymmetry.

1. Introduction

Since the 1970s, the topic of Corporate Social Responsibility (CSR) has been promoted in parallel in both theoretical research and corporate practice, and the CSR practice of Chinese enterprises has gradually stepped into a standardized stage of development. CSR practices are not only related to the brand image and market competitiveness of enterprises, but also have a direct impact on their long-term performance and sustainable development. However, there are still a series of problems in China's CSR practice. Enterprises have weak incentives for voluntary disclosure, and the quality of social responsibility disclosure varies. In addition, the alienation of CSR, such as corporate hypocrisy and political rent-seeking, is particularly prominent. The profit-seeking nature of enterprises will eventually offset or even distort their efforts in social responsibility and trigger serious economic consequences.

Stakeholder theory suggests that in the presence of information asymmetry, a dynamic game develops between the firm and its stakeholders. On the one hand, enterprises expect to obtain various resources from various stakeholders, on the other hand, stakeholders do not know which enterprise is trustworthy. In this case, information about corporate social responsibility is often overlooked by investors, and how and who opens the channel of information dissemination is crucial. This paper focuses on the role of information intermediaries on analysts. Earlier studies have focused on the information dissemination role of analysts and the impact on market efficiency, and there is relatively little literature on systematic research combining CSR, analysts' concerns, and firm performance, which provides opportunities and space for this paper's research.

This paper analyses the impact and mechanism of CSR on firm performance using data from Chinese A-share listed companies in Shanghai and Shenzhen from 2010 to 2021. The main contributions are reflected in the following two aspects: first, at the theoretical level, it provides a

literature supplement for the study of the economic consequences of CSR under the perspective of shareholder valueism. There are two opposing hypotheses on the impact of CSR on corporate value, namely shareholder valuationism and management self-interest, and scholars have carried out extensive and in-depth research on this issue. From the perspective of shareholder valorism, CSR can bring key resources to enterprises (Cheng et al., 2014), attract consumers (Baskentli et al., 2019), and form competitive advantages (Gregory et al., 2016), which is conducive to enhancing enterprise value. From management self-interestedness, CSR is prone to adverse economic consequences such as increasing the financial burden of the firm (Schadewitz and Niskala, 2010) and reducing stock returns and return on assets (Di Giuli and Kostovetsky, 2014). Most of the existing literature focuses more on studying the direct effect of taking social responsibility on firm value, with little attention paid to the mechanisms by which social responsibility affects firm performance. This paper examines the impact of CSR on firm performance based on the shareholder valorisation hypothesis of CSR. It is found that firms can convey non-financial information and attract the attention of analysts through CSR, thus monitoring management, alleviating information asymmetry among stakeholders, and improving firm performance. The above findings provide new perspectives and paths to explain the impact of CSR on corporate value, enriching and expanding the existing research system. As China is currently in a critical period of CSR integration with modern management practices and capital market transformation and upgrading, the research in this paper can provide empirical evidence for countries with economies in transition.

Secondly, at the practical level, it deepens enterprises' knowledge of the function of corporate value creation under the orientation of sustainable development, and provides empirical evidence support for listed companies to pay attention to and improve their awareness of social responsibility, and motivate enterprises to consciously fulfil their social responsibility.

2. Literature Review and Theoretical Deduction

2.1. Corporate Social Responsibility

Corporate social responsibility (CSR) refers to the need for corporations to take on further responsibilities to their stakeholders in addition to generating profits and maximizing shareholder wealth (McWilliams and Siegel, 2001). The question of whether CSR is conducive to enhancing corporate value has been hotly debated by scholars, and can generally be summarized as the shareholders' hypothesis, which is conducive to enhancing corporate financial performance, and the management hypothesis, which is detrimental to the long-term value of the enterprise.

(1) Management self-interest

Scholars represented by Friedman believe that enterprises engage in social responsibility to serve the interests of management rather than shareholders. The benefits of CSR are enjoyed by management, but the risks and costs are paid by shareholders. Therefore, CSR itself is an agency cost. Under the managerialism hypothesis, the information transfer effect of CSR is distorted into an information masking effect (Gao Yongqiang et al., 2012), and the implementation of CSR by enterprises will become a tool for management to seek private interests, and the management will use CSR to enhance their own reputations and gain personal benefits (Quan Xiaofeng et al., 2015), and to cover up or divert the public's attention from their misconduct. In addition, an increase in CSR ratings can increase the financial burden on firms (Schadewitz and Niskala, 2010), reduce firms' stock returns and return on assets (Di Giuli and Kostovetsky, 2014), and harm firm value.

(2) Shareholder Valuationism

Shareholder valuationism argues that CSR embodies shareholders' own interests, while managerialist scholars only recognise the short-term effects of CSR performance and fail to examine its long-term effects. CSR is a signalling mechanism through which companies can win the trust and support of various stakeholders (Zhang Zhaoguo et al., 2012), generate significantly positive excess returns during the event window (Zhang Xuan et al., 2019), and have a positive effect on the enhancement of corporate value in the long run (Li Zhibin et al., 2020). In essence, CSR should be

understood as an intangible asset that maintains the foundation of a relationship. By investing in CSR, it is possible to protect and enhance a company's reputation (Fombran, 2005; Freeman et al., 2007) and attract responsible consumers (Hillman and Keim, 2001). Second, by assuming social responsibility, firms can obtain financial resources from socially responsible investors (Kapstein, 2001), improve the ease of financing, and help firms recover quickly from financial difficulties (Choi and Wang, 2009). Studies by domestic scholars have shown that corporate social responsibility can enhance the sustainable development capability and value creation function of enterprises by inhibiting corporate financialisation (Shuwen Liu et al., 2019), driving corporate green transformation (Xiaoqi Wang et al., 2020), and promoting corporate technological innovation (Xue Zhang, 2021). Through the above analyses, this paper proposes the following hypotheses:

H1: Qualifying other conditions, active corporate social responsibility contributes to firm performance.

2.2. Analyst attention

As an important information intermediary in the capital market, analysts' influence on firms is mainly through two paths: the information transmission role of analysts and the corporate governance role of analysts. Analysts can penetrate the complex structure of listed companies, break through the layers of market obstacles, and tap into the effective information of companies (Xu et al., 2013; Zuyun Xue and Chong Wang, 2011; Yiyun Chu and Yongtao Cang, 2008), which reduces the asymmetry of information (Yue Pan et al., 2011), increases the transparency of information of companies (Chuntao Li et al., 2014), and improves the quality of accounting information disclosure (Bai Liu and Ju Tao, 2021). The release of social responsibility information by firms can produce a more desirable publicity effect, which attracts analysts (Yanyan Wang et al., 2014) and more external supervisors to pay attention to the firm (Lai, Wenjing, and Pan, Dawei, 2018), and helps to improve the information content and liquidity of the stock (Zhu, Hongjun, et al., 2007; Irvine, 2003), which leads to a better performance of the firm in the market.

The corporate governance role of analysts also includes the monitoring effect as well as the pressure effect. The supervisory role of analysts can constrain management behaviour, such as curbing management overconfidence and limiting management overinvestment (Liu, Vicky and Wu, Hanzhang, 2021). They can also monitor firms' surplus management (Lang et al., 2004) and reduce firms' surplus management behaviour (Jensen and Meckling, 1976; Healy and Palep, 2001). The analyst pressure effect, on the other hand, is reflected in the fact that increased analyst attention elevates management's pressure to achieve short-term profitability goals, which inhibits management's accrual-based surplus management behaviour while shifting management towards more insidious real surplus management (Yeh, Chen-Gang, and Liu, Mang, 2018) and raises the risk of a stock price collapse (Han, Yanjin et al., 2021). Currently, the possibility of management to make wrong decisions increases, but is not conducive to the business management of the enterprise.

In addition to focusing on corporate financial information, analysts also focus on corporate non-financial information. Securities analysts are a complementary mechanism for the capital market to interpret the value of corporate social responsibility information (Chen Lulan et al., 2014). The information environment in China's emerging market is relatively poor, and according to the market supply balance, to cater for investors' information needs, analysts' attention to corporate non-financial information such as social responsibility information will increase (Dhaliwal et al., 2012), which will help the capital market to recognise the value of corporate social responsibility information. Based on this, this paper proposes the following hypothesis:

H2a: Qualifying other conditions, corporate social responsibility helps increase analyst attention.

H2b: Qualifying the other conditions, corporate social responsibility promotes firm performance by increasing analyst attention.

2.3. Nature of the business and concentration of equity

In terms of origin, China's guidance for enterprises to fulfil their social responsibility began through the issuance of the Guiding Opinions on the Fulfilment of Social Responsibility by Central Enterprises. Therefore, the historical origin determines to a certain extent that SOEs have higher requirements on the issue of social responsibility undertaking. Ownership, as a potential characterization of institutional arrangements, varies greatly across different types of enterprises in terms of resource acquisition (Cao Wei et al., 2023), business objectives (Solarino and Boyd, 2020) and regulatory intensity (Tang Hongxiang et al., 2020), and consequently, in terms of the mechanisms that influence performance.

In addition, the issue of large shareholder governance is also a better entry point. Huang Fangliang et al. (2018) found that equity concentration has a significant positive impact on firm performance. With higher equity concentration, large shareholders usually have greater incentive and ability to monitor management to ensure that their decisions are in the interest of shareholders, which helps to generate considerable equity returns (Wu Yuhui et al., 2010). Firms with high equity concentration tend to have stronger innovation ability, risk-taking ability (Zhu Bing et al., 2018) and governance ability (Lv Xinjun, 2015), which is conducive to the long-term development of the firm. Based on the above analyses, this paper proposes the following hypotheses:

Hypothesis H3a: Restricted to other conditions, the positive impact of social responsibility by state-owned enterprises is less than that of non-state-owned enterprises.

Hypothesis H3b: Qualifying other conditions, the higher the firm's equity concentration, the more pronounced is the positive effect of taking social responsibility.

3. Study design

3.1. Sample Selection and Data Sources

CSR is derived from the listed company score data published by Hexun.com, and the CSR score of CSI is used for robustness testing. Since Hexun.com started to publish the social responsibility scores of listed companies in 2010, considering the availability of CSR performance, this paper selected A-share main board listed companies in China's Shanghai and Shenzhen stock exchanges from 2010 to 2021 as the initial research sample, and processed the initial data as follows: (1) exclude financial and real estate companies; (2) exclude ST, ST* type companies; (3) excluding listed companies with missing financial data; (4) excluding companies listed in both B-share and H-share; and (5) in order to eliminate the influence of extreme values, the selected variables are reduced at the 1% and 99% quantile. After the above screening, 6442 firm-year sample observations are finally obtained.

The rest of the variables were obtained from the Cathay Pacific database and Wind database. Data processing and model estimation were done using Excel 2019 and statistical software R language.

3.2. Measurement of variables

(1) Corporate performance ROA

Some domestic studies have used Tobin's Q value to measure the value of a company (Zhang Hongjun, 2000; Sun Yongxiang et al., 1999). However, since the stock prices of listed companies in China are far from their values, and the replacement value of company assets is difficult to estimate, the stock market really trades only stocks that account for about 40 per cent of the total shares (Wu Shukun, 2002). In this case Tobin's Q value does not really reflect the performance of the company. In view of such considerations, this paper is based on the total assets net profit margin that is commonly used by foreign scholars in studying the relationship between CSR performance and corporate performance to measure corporate performance (Duque Grisales et al., 2021; Velte, 2017). The formula is Total Assets Net Profit Margin = Net Profit/Total Assets Balance, which reflects the

overall profitability of the company. Based on the above analysis, the company's i in the first t year's profit margin of total assets is ROA_{it} .

(2) Corporate Social Responsibility CSR

With the development of stakeholder theory, the use of whether a company meets the needs of multiple stakeholders to measure the company's social responsibility performance has become the mainstream of quantitative research on CSR. In this paper, we refer to Gu Leilei (2020) and select the total score of social responsibility reports of listed companies on Hexun.com to measure corporate social responsibility performance. The data of this measurement system is taken from the social responsibility reports and annual reports released by listed companies on the SSE and SZSE through their official websites, and is examined in terms of five items: shareholders' responsibility, employees' responsibility, suppliers', customers' and consumers' rights and interests' responsibility, environmental responsibility, and social responsibility, and the weighting ratios of the five first-level indicators are adjusted according to the industry, so as to obtain the accurate score. The higher the total score, the better the CSR performance. This paper also uses the CSI's social responsibility score for robustness testing. According to the above analysis, the company's i The CSR performance in the first t year's CSR performance is CSR_{it} The

(3) Analysts focus on Coverage

Previous literature has mainly measured analyst attention in terms of the number of analysts tracking the target company and the number of analysts issuing surplus forecast reports on the target company. In this paper, based on the study of Pan Yue (2011), we use the number of target companies tracked and analysed by analyst teams in the year as a proxy variable for analyst attention, and we use the number of company-related research reports issued by analyst teams as a proxy in the robustness test section. Based on the above analysis, the company's i in the first t year's analyst attention is $Coverage_{it}$.

(4) Control variables

To ensure the reliability of the research results, this paper controls the factors that affect the value of the company. Referring to Li Baixing (2018) and Wang Xiaolu (2017), this paper selects 11 control variables. (1) corporate characteristics variables, including gearing ratio, company size, operating income growth rate, book-to-market ratio, and tax burden; (2) corporate governance variables, including two positions, equity checks and balances, management shareholding ratio, institutional investors' shareholding ratio, and independent directors' ratio; and (3) the degree of marketisation, with reference to Wang Xiaolu's "Report on China's Sub-Provincial Marketisation Index", which is selected from 2016 -2019 average value of the marketisation index as the provincial marketisation index.

Table 1. Definition of variables

Variable type	variable name	variable symbol	variable metric
explained variable	Corporate Performance	ROA	Net profit/total assets
explanatory variable	Corporate Social Responsibility	CSR	Hexun.com Social Responsibility Report Overall Score
intermediary variable	Analyst Focus	Coverage	Number of companies tracked and analysed by analyst teams during the year
control variable	Nature of enterprise	SOE	State-owned enterprises = 1; non-state-owned enterprises = 0
	shareholding concentration	ownership	Shareholding ratio of the largest shareholder
	gearing	leverage	Average balance of total liabilities/average balance of total assets
	Company size	size	Natural logarithm of total enterprise assets
	Revenue growth rate	growth	Growth in operating income/total operating income of the previous year
	Book-to-market ratio	MB	Total assets/total market capitalisation
	tax burden	tax	Income tax expense/operating income
	two jobs in one	dual	If there is a chairman who is also the CEO take 1, otherwise take 0
	Shareholding checks and balances	shrs	Proportion of shares held by the 2nd-5th largest shareholders / proportion of shares held by the first largest shareholder
	Management shareholding	mhldn	Number of shares held by management/total shares
	Institutional investors' shareholding	ihldn	Number of shares held by institutional investors/total shares
	Proportion of independent directors	idr	Percentage of independent directors on the board
	marketability	Market	Average value of the marketisation index, 2016-2019

3.3. Regression model setting

Firstly, this paper validates the relationship between CSR and firm performance. Let $Corp_{it}$ represent ROA_{it} , the basic regression model (1) is set as follows. To avoid redundancy, the control variables in the model are used to be X_{it} denote.

$$Corp_{it} = \beta_0 + \beta_1 CSR_{it} + \sum \beta_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (1)$$

Secondly, this paper conducts a heterogeneity test on H1. Based on the benchmark model, the interaction terms of enterprise nature, equity concentration and CSR are introduced to explore the effects of enterprise nature and equity concentration on the relationship of "CSR-firm performance". The regression models (2) and (3) are set up as follows

$$Corp_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 CSR_{it} \times SOE_{it} + \sum \beta_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (2)$$

$$Corp_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 CSR_{it} \times Ownership_{it} + \sum \beta_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (3)$$

Again, in the part of the analysis of the role mechanism of the impact of CSR on firm performance, this paper uses the B-K method to test the mediating effect of analysts' concern. To analyse this mediating effect, analysts' concern is first regressed on CSR to analyse whether CSR positively affects analysts' concern, and the regression model is set as model (4). Then let company performance do regression on CSR and analysts' concern together, and the regression model is set as model (5).

$$Coverage_{it} = \alpha_0 + \alpha_1 CSR_{it} + \sum \alpha_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (4)$$

$$Corp_{it} = \beta_0 + \beta_1 CSR_{it} + \beta_2 Coverage_{it} + \sum \beta_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (5)$$

Finally, to further identify the moderating roles of corporate nature and equity concentration in the process of corporate performance influence mechanism, this paper breaks down the chain of social responsibility influencing corporate performance into two processes: "CSR-analysts' concern" and "analysts' concern-company performance". This paper breaks down the chain of influence of social responsibility on corporate performance into two processes: "CSR-analysts' concern" and "analysts' concern". The interaction terms of corporate nature and equity concentration are introduced to test the differential effects of these two processes. The regression models (6), (7), (8) and (9) are set as follows.

$$Coverage_{it} = \alpha_0 + \alpha_1 CSR_{it} + \alpha_2 CSR_{it} \times SOE_{it} + \sum \alpha_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (6)$$

$$Coverage_{it} = \alpha_0 + \alpha_1 CSR_{it} + \alpha_2 CSR_{it} \times Ownership_{it} + \sum \alpha_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (7)$$

$$Corp_{it} = \beta_0 + \beta_1 Coverage_{it} + \beta_2 Coverage_{it} \times SOE_{it} + \sum \beta_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (8)$$

$$Corp_{it} = \beta_0 + \beta_1 Coverage_{it} + \beta_2 Coverage_{it} \times Ownership_{it} + \sum \beta_i X_{it} + firm_{it} + year_{it} + \varepsilon_{it} \quad (9)$$

4. Empirical Tests

4.1. Descriptive statistics

Table 2. Descriptive statistics regression of main variables

variant	sample size	average value	median	(statistics) standard deviation	minimum value	maximum values
ROA	15095	0.05	0.04	0.46	-1.08	1.12
CSR	15095	23.77	21.89	78.69	-3.16	73.44
SOE	15095	0.37	0.00	0.23	0.00	1.00
ownership	15095	0.35	0.34	0.02	0.04	0.89
Coverage	15095	10.40	7.00	21.09	0.00	75.00
leverage	15095	0.34	0.32	0.04	0.01	2.04
size	15095	22.21	22.02	1.75	18.22	28.64
growth	15095	3.64	0.08	13.85	-0.99	9.55
MB	15095	0.54	0.50	0.07	0.03	1.84
tax	15095	0.02	0.01	0.01	-0.41	4.20
dual	15095	0.28	0.00	0.20	0.00	1.00
shrs	15095	0.72	0.55	0.37	0.00	4.00
mhldn	15095	0.15	0.01	0.04	0.00	0.90
ihldn	15095	0.46	0.49	0.06	0.00	0.99
idr	15095	0.37	0.33	0.01	0.00	0.80
Market	6442	7.24	7.50	0.85	2.14	8.06

Table 2 shows the descriptive statistics of the variables after the above data processing. It can be seen that the mean and median of corporate performance (ROA) are 0.05 and 0.04 respectively, with a standard deviation of 0.46, indicating that there is a large difference in corporate performance among the sample companies; the mean and median of corporate social responsibility (CSR) are 23.77 and 21.89 respectively, with a standard deviation of 78.69, with a large standard deviation of CSR, indicating that there is a large difference in corporate performance among the sample companies; the nature of enterprise (SOE) is 0.37 and 0.00 respectively, with a standard deviation of 78.69. CSR performance there are large differences; the mean and median of the nature of enterprise (SOE) are 0.37 and 0.00, respectively, with a standard deviation of 0.23, the overall mean is low, indicating that

most of the sample companies are non-state-owned enterprises; the mean and median of the concentration of shareholding (Ownership) are 0.35 and 0.34, respectively, with a standard deviation of 0.02, the standard deviation is small, indicating that the The level of equity is more concentrated among the sample companies; the mean and median of analysts' attention (Coverage) are 10.40 and 7.00, respectively, with a standard deviation of 21.09, and a large difference between the mean and the standard deviation, indicating that there is a large level of analysts' attention among the sample companies; in addition, the results of descriptive statistics of the control variables are in line with the expectations.

4.2. Impact of CSR on firm performance

Table 3. Impact of CSR on firm performance

	(1)	(2)	(3)
	Corp	Corp	Corp
CSR		0.0005***	0.0059***
		(0.00004)	(0.0005)
cons	-0.0519***	-0.0531***	-0.0571***
	(0.0110)	(0.0109)	(0.0110)
leverage	-0.0680***	-0.0669***	-0.0658***
	(0.0028)	(0.0028)	(0.0028)
size	0.0063***	0.0058***	0.0056***
	(0.0005)	(0.0005)	(0.0005)
growth	-0.000003	0.000008	0.000006
	0.00004	(0.00004)	(0.00004)
MB	-0.0602***	-0.0590***	-0.0599***
	(0.0025)	(0.0025)	(0.0025)
tax	0.2251***	0.2182***	0.2242***
	(0.0115)	(0.0114)	(0.0114)
dual	-0.0017	-0.0013	-0.0016
	(0.0011)	(0.0011)	(0.0011)
shrs	-0.0053***	-0.0050***	-0.0055***
	(0.0009)	(0.0008)	(0.0008)
mhldn	0.0508***	0.0505***	0.0479***
	(0.0036)	(0.0035)	(0.0036)
ihldn	0.0460***	0.0439***	0.0447***
	(0.0029)	(0.0029)	(0.0029)
idr	-0.0359***	-0.0369***	-0.0429***
	(0.0090)	(0.0089)	(0.0089)
Market	0.0021***	0.0022***	0.0018**
	(0.0007)	(0.0007)	(0.0007)
Obs	6442	6442	6442
R-squared	0.1776	0.1895	0.1846
firm	Yes	Yes	Yes
year	Yes	Yes	Yes

Note: *, **, *** represent significant at the 10 per cent, 5 per cent, and 1 per cent levels, respectively; robust standard errors are indicated in parentheses. Same as below.

Firstly, this paper tests the impact of CSR on firm performance through model (1). Column (1) of Table 3 shows the regression results with only control variables added. Gearing ratio, book-to-market ratio, equity checks and balances, and the proportion of independent directors all negatively affect firm performance; firm size, tax, management shareholding, institutional investor shareholding, and the degree of marketisation all positively affect firm performance. Column (2) reports the main effects regression results. the coefficient of CSR is 0.0005 and significant at the 1% statistical level, indicating that the higher the level of CSR commitment, the greater the firm's performance

improvement. Specifically, each 1-point increase in CSR score leads to a 0.05% increase in the firm's ROA. Both statistical significance and economic significance, CSR will have a significant enhancement effect on company performance. The test results support H1, the shareholder valorism hypothesis based on CSR, in which corporate social responsibility not only does not increase the total cost of the company, but also helps the company to obtain key external resources, improves the core competitiveness of the company, and reduces the investment risk, which enhances the company's performance. The results of this test support Goss and Roberts (2011), Velte (2017), Li et al. (2018), and Miralles-Quirós et al. (2018) on the value-enhancing effect of CSR performance rather than shareholder costs.

To enhance the credibility of the conclusions, the CSR score is used to replace the Hexun.com CSR score, and the robustness test results are shown in Estimation (3). The coefficient of CSR is 0.0059, and it is significant at 1% statistical level, which indicates that every 1-point increase in the CSR score can lead to an increase of 0.59% in the company's ROA. The test results are consistent with the benchmark regression, proving that the above findings are robust.

4.3. Heterogeneity analysis of the nature of enterprises

China's state-owned enterprises are responsible for certain government functions, such as reducing unemployment through redundancy and supplying products based on government demand. Due to the special characteristics of China's capital market, there may be differences in the requirements of corporate nature on corporate social responsibility. In this paper, we test the effect of heterogeneity in corporate ownership on the relationship between CSR and firm performance through model (2), which includes the interaction term between corporate nature and social responsibility.

The regression results in column (1) of Table 4 show that the coefficient of CSR is significantly positive at the 1% statistical level, and the coefficient of the interaction term between CSR and the nature of the firm is -0.0005 and significant at the 1% statistical level. It indicates that compared to non-state-owned enterprises, the positive effect of social responsibility of state-owned enterprises on the enhancement of corporate performance is weakened, which is consistent with the findings of Li Jinglin et al. (2021). Under the current realistic property rights system arrangement in China, the effect of SOEs' social responsibility performance on corporate performance is weaker than the competitive value of market instruments brought by non-SOEs' social responsibility performance due to the endogenous nature of their social responsibility mission. Non-state-owned enterprises, as market logic-driven enterprises, when embedded with a consensual social responsibility mission, especially those that present a high level of social responsibility performance, have a greater competitive value to the market for non-state-owned enterprises.

The results of the robustness tests are shown in Estimation (3). The coefficient of CSR is significantly positive at the 1% statistical level, and the coefficient of the interaction term between CSR and the nature of the firm is -0.0026 and significant at the 10% statistical level. It indicates that the positive effect of CSR on enhancing firm performance is weaker for SOEs than for non-SOEs. The test results are consistent with the estimation (1), which proves that the above conclusions have good robustness.

4.4. Heterogeneity analysis of equity concentration

Research on the "shareholder governance effect" has pointed out that to pursue equity gains and control gains, large shareholders have strong motivation and ability to monitor management, which has a certain constraint on management's self-interested behaviours (Wu, Yuhui and Wu, Shinanong, 2010). To verify the effect of internal governance on the relationship between CSR and corporate performance, this paper adds an interaction term between equity concentration and CSR in model (3).

According to the regression results in column (2) of Table 4, the coefficient of CSR is significantly positive at the 1% statistical level, and the coefficient of the interaction term between CSR and equity concentration is 0.0009, which is significant at the 1% statistical level. This suggests that the relationship between CSR and firm performance is positively moderated when the "majority

shareholder governance effect" exists, which is consistent with the findings of Xu Liping et al (2006). The higher the shareholding concentration, the higher the positive incentives for controlling shareholders based on the public interest of control, and the more likely they are to maintain effective control over the company's management. Firms with high equity concentration are more willing to invest resources in socially responsible activities, thus sending positive signals to the market, bringing long-term benefits to the firm and improving its performance.

The results of the robustness tests are shown in estimation (4). The coefficient of CSR is significantly positive at the 1% statistical level, and the coefficient of the interaction term between CSR and equity concentration is 0.0038 and significant at the 10% statistical level. It indicates that equity concentration enhances the positive relationship between CSR and firm performance. The test results are consistent with estimation (2), which proves that the above findings are robust.

Based on the above analyses, the opposite moderating effect of firm nature and equity concentration suggests that the promotional effect of CSR on firm performance is more pronounced in non-state-owned firms with weaker external regulation, and high equity concentration firms with stronger internal governance.

Table 4. Heterogeneity analysis

	(1)	(2)	(3)	(4)
	Corp	Corp	Corp	Corp
CSR	0.0008*** (0.00005)	0.0009*** (0.00010)	0.0069*** (0.0007)	0.0072*** (0.0013)
CSR x SOE	-0.0005*** (0.00007)		-0.0026* (0.0011)	
CSR x Ownership		0.0009*** (0.0002)		0.0038* (0.0020)
cons	-0.0652*** (0.0109)	-0.0624*** (0.0112)	-0.0678*** (0.0113)	-0.0627*** 0.0124
leverage	-0.0665*** (0.0028)	-0.0673*** (0.0028)	-0.0656*** (0.0048)	-0.0661*** (0.0028)
size	0.0062*** (0.0005)	0.0059*** (0.0005)	0.0059*** (0.0005)	0.0056*** (0.0005)
growth	0.000010 (0.00004)	0.000009 (0.00004)	0.000004 (0.00004)	0.000006 0.00004
MB	-0.0575*** (0.0025)	-0.0588*** (0.0025)	-0.0587*** (0.0025)	-0.0597*** (0.0025)
tax	0.2180*** (0.0114)	0.2185*** (0.0114)	0.2253*** (0.0114)	0.02244*** (0.0114)
dual	-0.0012 (0.0011)	-0.0013 (0.0011)	-0.0022* (0.0012)	-0.0016 (0.0011)
shrs	-0.0055*** (0.0008)	-0.0058*** (0.0013)	-0.0059*** (0.0009)	-0.0063*** (0.0013)
mhldn	0.0466*** (0.0036)	0.0526*** (0.0044)	0.0441*** (0.0037)	0.0500*** (0.0044)
ihldn	0.0448*** (0.0029)	0.0461*** (0.0040)	0.0458*** (0.0029)	0.0469*** (0.0900)
idr	-0.0354*** (0.0089)	-0.0359*** (0.0089)	-0.0434*** (0.0089)	-0.0422*** (0.0034)
Market	0.0021*** (0.0007)	0.0021*** (0.0007)	0.0017** (0.0007)	0.0018** (0.0007)
Obs	6442	6442	6442	6442
R-squared	0.1936	0.1905	0.1861	0.1847
firm	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes

5. Further analysis

5.1. Mechanisms of action

Table 5. Analysis of intermediation mechanisms

	(1)	(2)	(3)	(4)	(5)	(6)
	Corp	Coverage	Corp	Corp	Coverage	Corp
Coverage			0.0013*** (0.00005)			0.0005*** 0.00002
CSR	0.0005*** (0.00004)	0.0337*** (0.0058)	0.0009*** (0.00004)	0.0059*** (0.0005)	3.2530*** (0.2117)	0.0072*** (0.0005)
cons	-0.0531*** (0.0109)	-87.6300*** (1.7230)	0.0592*** (0.0117)	-0.0571*** (0.0110)	-23.5000*** (4.2610)	0.0539*** (0.0119)
leverage	-0.0669*** (0.0028)	-0.0093 (0.0439)	-0.0669*** (0.0027)	-0.0658*** (0.0028)	1.6540 (1.0860)	-0.0666*** (0.0027)
size	0.0058*** (0.0005)	4.6170*** (0.0843)	-0.00009 (0.0006)	0.0056*** (0.0005)	11.5200*** (0.2097)	0.00009 (0.0006)
growth	0.000008 (0.00004)	-0.0008 (0.0007)	0.00002 (0.00004)	0.000006 (0.00004)	-0.0010 (0.0017)	0.00001 (0.00004)
MB	-0.0590*** (0.0025)	-20.2900*** (0.3889)	-0.0330*** (0.0026)	-0.0599*** (0.0025)	-51.4800*** (0.9605)	-0.0354*** (0.0027)
tax	0.2182*** (0.0114)	12.1500*** (1.7970)	0.2027*** (0.0112)	0.2242*** (0.0114)	30.8500*** (4.437)	0.2096*** (0.0112)
dual	-0.0013 (0.0011)	0.4740** (0.1889)	-0.0019 (0.0012)	-0.0016 (0.0011)	1.0500** (0.4419)	-0.0021 (0.0013)
shrs	-0.0050*** (0.0008)	0.8293*** (0.1333)	-0.0060*** (0.0008)	-0.0055*** (0.0008)	1.9440*** (0.3293)	-0.0064*** (0.0008)
mhldn	0.0505*** (0.0035)	9.6470*** (0.5593)	0.0381*** (0.0035)	0.0479*** (0.0036)	21.3500*** (1.386)	0.0378*** (0.0035)
ihldn	0.0439*** (0.0029)	7.5430*** (0.4527)	0.0342*** (0.0028)	0.0447*** (0.0029)	15.8900*** (1.118)	0.0371*** (0.0028)
idr	-0.0369*** (0.0089)	-0.4573 (1.4030)	-0.0364*** (0.0087)	-0.0429*** (0.0089)	-0.2523 (3.4760)	-0.0428*** (0.0089)
Market	0.0022*** (0.0007)	0.6097*** (0.1192)	0.0017** (0.0007)	0.0018** (0.0007)	1.3765*** (0.2957)	0.0014** (0.0007)
Obs	6442	6442	6442	6442	6442	6442
R-squared	0.1895	0.2849	0.2225	0.1846	0.2987	0.2124
firm	Yes	Yes	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes	Yes	Yes

The above empirical results demonstrate that CSR contributes to the enhancement of firm performance from a shareholder value-based perspective. Further exploration of the underlying mechanism reveals that this effect may be realised through the transmission path of "CSR - analysts' attention - firm performance". That is, CSR behaviour attracts analysts' attention, which in turn reduces information asymmetry, improves monitoring of management, and enhances firm performance. To effectively identify this mechanism, this paper refers to the mediation effect testing procedure proposed by Wen Zhonglin (2004) and Wen Zhonglin and Ye Baojuan (2014), and examines the mediation effect of analysts' attention step by step through models (1), (4) and (5).

Table 5 reports the results of the mediation mechanism test. The results of estimation (1) show that the regression coefficient of CSR is 0.0005 and significant at 1% statistical level. It indicates that each 1-point increase in CSR score can increase the firm's ROA by 0.05%. In estimation (2), the regression coefficient of CSR is 0.0337 and is significant at 1% statistical level. That is, every 1-point increase in CSR can lead to a 3.37% increase in analyst attention. It indicates that good CSR performance provides a power mechanism for the increase in analyst attention. This result is

consistent with the existing literature (Chen Lulan et al., 2014) and H2a is validated. The results of estimation (3) show that the regression coefficient of CSR is 0.0009 and is significant at the 1% statistical level, and the regression coefficient of the analyst concern variable is significantly positive at the 1% statistical level. It shows that the inclusion of the mediating variable analysts' concern amplifies the impact of CSR on firm performance by 0.04%. The results of the above analyses prove that analyst concern plays a partial mediating role in the effect of CSR on firm performance and H2b is supported. Improved CSR performance gains more favour for firms in the capital market. When more analysts pay attention to the enterprise, this can further enhance public supervision of the enterprise and the transparency of the enterprise's information, which produces a more desirable publicity effect, improves investors' understanding of the enterprise, enhances stakeholders' confidence, and makes the company produce better market performance.

To enhance the credibility of the mediation effect findings, this paper uses both the CSR index and the attention of the researched newspaper as proxy variables for CSR and analysts' attention for robustness testing. The regression coefficient of CSR in estimation (4) is 0.0059 and is significant at the 1% statistical level, which means that every 1-point increase in CSR score can make the company's ROA increase by 0.59%. The regression coefficient of CSR in estimation (5) is 3.2530 and is significant at 1% statistical level, i.e., the better the CSR performance, the more the company attracts analysts' attention. The regression coefficient of CSR in estimation (6) is 0.0072 and is significant at 1% statistical level, and the regression coefficient of analysts' attention variable is significantly positive at 1% statistical level. That is, every one-point increase in CSR score can make the company's ROA increase by 0.72%, indicating that the mediating effect of analysts' concern amplifies the impact of CSR on company performance by 0.13%. The robustness test does not change the above conclusion.

5.2. Heterogeneity test

First, this paper uses models (6) and (7) to examine the moderating effects of firm nature and equity concentration on the CSR-analyst focus process. The results of estimation (1) in Table 6 show that the coefficient of CSR is significantly positive at the 1 per cent level, while the coefficient of the interaction term between CSR and nature of the firm is significantly negative at the 10 per cent level. It indicates that firm nature negatively moderates the attractiveness of CSR to analysts, i.e., CSR is more attractive to analysts in non-state-owned firms compared to state-owned firms. There may be two reasons for this: first, due to their public attributes, SOEs usually take more responsibility in CSR and are subject to more public and governmental supervision and higher information transparency. Therefore, its marginal utility of attracting analysts' attention by fulfilling its social responsibility is lower; second, social responsibility is a social mission that SOEs must shoulder, and the positive effect of CSR is relatively weaker in SOEs. While non-SOEs usually focus more on direct economic benefits, when non-SOEs actively fulfil their social responsibility and achieve significant results, they will attract more analysts' attention. The results of estimation (2) show that the coefficient of CSR is significantly positive at the 1% statistical level, and the coefficient of the interaction term of CSR and equity concentration is significantly positive at the 5% statistical level. It indicates that equity concentration positively moderates the relationship between CSR and analysts' attention, i.e., firms with high equity concentration are more likely to attract analysts' attention by taking social responsibility. Firms with high equity concentration tend to have better corporate governance and higher information transparency. At the same time, equity concentration can improve the efficiency of corporate decision-making, making companies more responsive to decisions and stronger in execution. These characteristics can increase analysts' interest in the company and intensify analysts' attention.

Table 6. Heterogeneity analysis of mediated effects

	(1)	(2)	(3)	(4)
	Coverage	Coverage	Corp	Corp
CSR	0.0424***	0.0716***		
	(0.0082)	(0.0147)		
CSR x SOE	-0.0104*			
	(0.0055)			
CSR x Ownership		0.1047**		
		(0.0467)		
Coverage			0.0013***	0.0009***
			(0.00006)	(0.0001)
Coverage×SOE			-0.0002**	
			(0.00009)	
Coverage×ownership				0.0013***
				(0.0003)
cons	-89.1500***	-85.7600***	0.0621***	0.0701***
	(1.733)	(1.741)	(0.0119)	(0.0118)
leverage	0.0550	-0.7513	-0.0676***	-0.0670***
	(0.4374)	(0.4318)	(0.0027)	(0.0027)
size	4.7060***	4.656***	0.0003	-0.00007
	(0.0846)	(0.0528)	(0.0006)	(0.0006)
growth	-0.0009	-0.0009	0.000007	0.000009
	(0.0007)	(0.0007)	(0.00004)	(0.00004)
MB	-19.8600***	-19.5100***	-0.0329***	-0.0333***
	(0.3907)	(0.3835)	(0.0027)	(0.0026)
tax	12.5100***	12.5200***	0.2090***	0.2069***
	(1.793)	(1.7640)	(0.0112)	(0.0112)
dual	0.1945	0.5004**	-0.0027*	-0.0025*
	(0.1811)	(0.1756)	(0.0014)	(0.0011)
shrs	0.6902***	-2.7210***	-0.0066***	-0.0028*
	(0.1338)	(0.2069)	(0.0008)	(0.0013)
mhldn	8.4950***	18.5800***	0.0364***	0.0296***
	(0.5721)	(0.6809)	(0.0036)	(0.0044)
ihldn	7.8930***	17.0000***	0.0366***	0.0270***
	(0.4531)	(0.6160)	(0.0029)	(0.0040)
idr	-0.6384	2.0170	-0.0362***	-0.0391***
	(1.400)	(1.3820)	(0.0088)	(0.0088)
Market	0.5400***	0.5953***	0.0016**	0.0016*
	(0.1192)	(0.1174)	(0.0007)	(0.0007)
Obs	6442	6442	6442	6442
R-squared	0.2892	0.3109	0.2130	0.2144
firm	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes

Table 7. Robustness test for heterogeneity analysis of mediated effects

	(1)	(2)	(3)	(4)
	Coverage	Coverage	Corp	Corp
CSR	4.2290***	4.6140***		
	(0.2656)	(0.5137)		
CSR x SOE	-2.2670***			
	(0.4275)			
CSR x Ownership		4.1550***		
		(1.2920)		
Coverage			0.0005***	0.0003***
			(0.00003)	(0.00005)
Coverage×SOE			-0.00008*	
			(0.00004)	
Coverage×ownership				0.0005***
				(0.0001)
cons	-24.3600***	-23.3300***	0.0628***	0.0689***
	(4.3810)	(4.7220)	(0.0120)	(0.0120)
leverage	1.9400	-0.1506	-0.0678***	-0.0674***
	(1.080)	(1.0710)	(0.0028)	(0.0028)
size	11.9000***	11.6400***	0.0005	0.0001
	(0.2104)	(0.2064)	(0.0006)	(0.0006)
growth	-0.0012	-0.0013	0.000003	0.000006
	(0.0017)	(0.0017)	(0.00004)	(0.00004)
MB	-50.3100***	-49.6900***	-0.0341***	-0.0344***
	(0.9624)	(0.9488)	(0.0027)	(0.0027)
tax	31.9900***	31.7600***	0.2097***	0.2080***
	(4.4110)	(4.3630)	(0.0113)	(0.0113)
dual	0.1246	1.1240**	-0.0026*	-0.0023*
	(0.4459)	(0.4346)	(0.0011)	(0.0011)
shrs	1.4750***	-6.4730***	-0.0065***	-0.0032*
	(0.3296)	(0.5113)	(0.0008)	(0.0013)
mhldn	17.3600***	42.5400***	0.0380***	0.0319***
	(1.4140)	(1.6900)	(0.0036)	(0.0045)
ihldn	17.05***	3.8310***	0.0383***	0.0300***
	(1.1160)	(1.5240)	(0.0088)	(0.0040)
idr	-0.8017	5.7600	-0.0387***	-0.0411***
	(3.4560)	(3.4300)	(0.0088)	(0.0088)
Market	1.1363***	1.3454***	0.0017*	0.0016*
	(0.2948)	(0.2912)	(0.0007)	(0.0007)
Obs	6442	6442	6442	6442
R-squared	0.3075	0.3219	0.2091	0.2102
firm	Yes	Yes	Yes	Yes
year	Yes	Yes	Yes	Yes

Second, the paper examines the moderating effects of firm nature and equity concentration on the analyst focus-firm performance process using models (8) and (9). The regression results in column (3) of Table 6 show that the coefficient of analyst attention is significantly positive at the 1% level, while the coefficient of the interaction term between analyst attention and firm nature is significantly negative at the 5% level. This suggests that state-owned firms weaken the positive relationship of the analyst attention-firm performance process compared to non-state-owned firms. First, because non-SOEs usually seek to maximise profits, they pay more attention to analysts' recommendations to improve their competitiveness in the market. Second, the complex decision-making process of SOEs limits the efficiency of management's response to analysts' recommendations, which is not conducive

to achieving performance improvement. The results in column (4) show that the regression coefficient of analyst attention is significantly positive at the 1% statistical level, and the coefficient of the interaction term of analyst attention and equity concentration is significantly positive at the 1% statistical level. This indicates that equity concentration enhances the positive relationship in the process of Analyst Attention - Firm Performance. Concentrated firms have stronger incentives to disclose financial and non-financial information, which reduces analysts' information gathering costs. Increased analyst attention, in turn, increases market attention and liquidity, further improving firm performance. The above findings further validate the results of the heterogeneity test in the fourth part of the paper.

The results of the robustness tests on the mediation effects heterogeneity analysis are shown in Table 7. The results of estimation (1) show that the coefficient of CSR is significantly positive at the 1% statistical level, and the coefficient of the interaction term of CSR and corporate nature is significantly negative at the 1% statistical level; the results of estimation (3) show that the coefficient of analysts' concern is significantly positive at the 1% statistical level, and the coefficient of the interaction term of analysts' concern and corporate nature is significantly negative at the 10% statistical level. This indicates that firm nature negatively moderates the process of "CSR-Analyst Attention-Firm Performance". The results of estimation (2) show that the coefficient of CSR is significantly positive at the 1% statistical level, and the coefficient of the interaction term of CSR and equity concentration is significantly positive at the 1% statistical level; the results of estimation (4) show that the coefficient of analysts' concern is significantly positive at the 1% statistical level, and the coefficient of the interaction term of analysts' concern and equity concentration is significantly positive at the 1% statistical level. This indicates that equity concentration positively moderates the process of "CSR-analysts' attention-firm performance". The above findings indicate that the regression results are robust.

6. Research findings and policy implications

Over the past decade, China's capital market has undergone a series of regulatory reform measures aimed at improving market transparency, strengthening supervision and preventing systemic risks. At present, China's capital market is in a critical period of transformation and upgrading, and information asymmetry remains an urgent problem to be solved to establish a perfect market mechanism and investment environment. At the same time, with the transformation of China's economic growth model, the awareness of energy saving and environmental protection is gradually gaining popularity. Stakeholders have more and more demand for social responsibility information, and social responsibility information plays an increasingly important role in resource allocation.

This paper empirically examines the relationship between corporate social responsibility and firm performance using panel data of A-share listed companies in Shanghai and Shenzhen from 2010 to 2021. The results of the study show that (1) corporate social responsibility has a facilitating effect on enhancing corporate performance, through which social responsibility not only does not increase shareholder costs, but also helps companies to acquire key resources and enhance core competitiveness; (2) good corporate social responsibility performance enhances corporate reputation, attracts analysts' attention, and helps analysts to more comprehensively assess the long-term value of the company and the potential risks; and (3) CSR has an impact on firm performance through the partial mediation of analysts' attention, i.e., CSR intensifies analysts' attention, which in turn alleviates information asymmetry between investors and firms, enhances stakeholder confidence, and thus promotes the enhancement of firm performance; (4) The enhancement effect of CSR on firm performance is found in non-state-owned firms with weak external regulation and firms with a high level of internal governance. Stronger high equity concentration enterprises are more significant, the disclosure of non-financial information in private enterprises and the internal supervision of major shareholders can play a governance role on the self-interested behaviour of the management, and enhance the transparency of the company's information and the efficiency of decision-making. The

results of the robustness test are consistent with the benchmark regression after considering issues such as measurement error. Based on the above findings, the main takeaways from this paper are as follows:

(1) At the enterprise level, enterprises should pay attention to the concept of social responsibility and the role played by analysts in information transmission and market supervision, to ensure the quality of the disclosure of social responsibility information. Enterprises need to realise that their investment in social responsibility is not an additional cost to the enterprise, and discard negative perceptions such as the burden theory. Ensure the truthfulness and accuracy of the data disclosed in social responsibility reports, and uphold a professional and rigorous attitude. Enterprises should work closely with the analyst community and take the initiative to invite them to participate in CSR behaviours to form a good cooperative relationship. Efforts should be made to build a smooth and stable social responsibility information transmission channel to ensure that analyst groups can pay attention to CSR disclosure information in a timely manner.

At the analyst level, analysts should make reasonable use of CSR information and pay attention to the marginal contribution effect of CSR performance on corporate performance in enterprises with different ownership nature and equity concentration. When conducting research reports on listed companies, analysts should complement CSR information with other financial information to comprehensively analyse, judge and predict the future development of companies.

At the level of the government and regulatory bodies, it is important to improve the social responsibility evaluation system and information disclosure system, and to reward and punish enterprises based on their social responsibility performance. The government and regulatory bodies can assist in introducing common industry standards and incorporating mandatory disclosure of social responsibility information into laws and regulations. At the same time, for enterprises with better social responsibility performance, the government can offer certain incentives in terms of taxes, loans and tenders. For enterprises with poor social responsibility performance or deliberately avoiding negative information disclosure, the government can also impose appropriate penalties to improve the quality and availability of social responsibility information and ensure that analysts have access to true and effective social responsibility information.

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