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The Impact of Enterprise Information Transparency on CSR: Evidence from Listed Companies in China

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ABSTRACT

This article analyzes the impact of enterprise information transparency (TRANS) on CSR, while examines intrinsic mechanism, nonlinear relationship as well as the heterogeneous effect, taking the data of Chinese 711 listed enterprises from 2010 to 2020. This article finds: The improvement of TRANS is conducive to the fulfillment of CSR, noticeably there is a nonlinear relationship of inverted "U-shaped". Corporate reputation, internal control and external concerns play a part in mediating the influence of TRANS on CSR. The impact of TRANS varies significantly according to the responsibility orientation of different stakeholders. Multiple heterogeneity analysis reveals there is a more promotional effect in large-scale, non-state-owned and high marketization intensity enterprises. motional effect in large-scale, non-state-owned and high marketization intensity enterprises.

KEYWORDS

Information Transparency; Corporate Social Responsibility; Inverted "U-Shape"; Mediation Effect; Multiple Heterogeneity

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1. Introduction

As an essential micro-economic subject, implementing social responsibility by enterprises can coordinate economic development, ecological civilization and social harmony, and is an important support for the sustainable development strategy. However, when the conflict between economic interests and social responsibility, some enterprises often one-sided pursuit of immediate economic interests, while ignoring and intentionally avoiding the social responsibility should be borne, which also led to a large number of social problems, such as the enterprise epidemic during the price hiking, for many years in a row of financial counterfeiting and fraudulent issuance, the emission of pollutants in violation of the law to cause air pollution (Hao et al., 2023a), and so on. CSR implies that enterprises should further assume responsibilities to stakeholders in addition to their daily business activities of pursuing profits and enterprise value (Davis, 1973; McWilliams & Siegel, 2001). Implementing corporate social responsibility can bring competitive advantages to enterprises (Jones & Wicks, 1999), and is one of the inevitable choices and core competencies for sustainable development of enterprises (Donaldson, & Dunfee, 1999; Shaukat, Qiu & Trojanowski, 2016; Shi et al, 2023). Therefore, how to further enhance the willingness of CSR, balance social responsibility and enterprise economic interests, as well as promote their sustainable development is a major research topic worthy of in-depth discussion in the academic community.

The information mechanism is important to mitigate information asymmetry between enterprises and external stakeholders (Kundeliene & Leitoniene, 2015). And the poor performance of CSR is often due to the short-sighted behavior of enterprises, aiming at profit maximization while neglecting their responsibilities to society and the environment, and avoiding external supervision and recourse by hiding their relevant information (Lindgreen & Swaen, 2010). Information transparency, as an important indicator of overall corporate information, undoubtedly provides a "new way of thinking" to promote CSR (Bushman et al., 2004). As an information indicator with both internal and external monitoring, can information transparency have a positive impact on CSR? If so, what are the mechanisms? What are the specific aspects of CSR? Will the effect change with the improvement of information transparency? Clarifying these questions will help raise awareness of CSR, promote the harmonization of social responsibility and corporate economic interests. At the same time, it is conducive to high-quality economic development.

There are four marginal contributions to our research. First, the study explores the impact of information transparency (TRANS) on CSR and the potential mechanism from three perspectives: corporate reputation, internal control and external concerns. Second, an unbalanced panel model is introduced to answer whether inverted "U" shape relationship exist? Third, decomposing CSR, the influence on the responsibility of different stakeholders of enterprises is further examined. Fourth, the heterogeneous impacts of information transparency on CSR is analyzed from three perspectives: size, property rights and institutional environment. Figure 1 illustrates the overall structure of this paper.

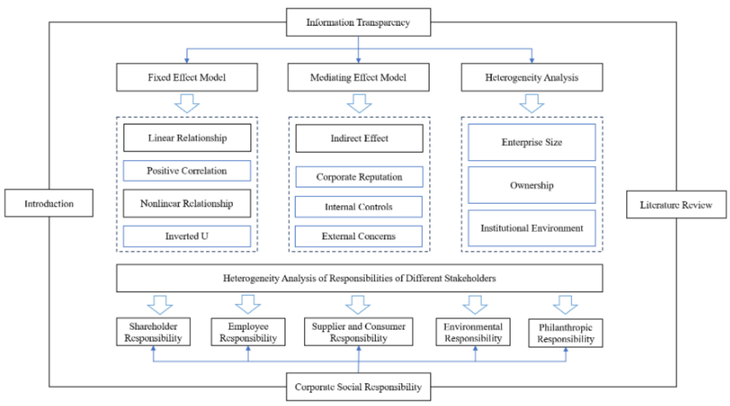

Figure 1. Research framework diagram.

2. Literature Review

Existing literatures mainly discuss the following: definition, measurement and economic consequences of information transparency; definition, economic consequences and influencing factors of CSR.

2.1. Information Transparency (TRANS)

At the beginning of the study, this paper first needs to clarify the definition of information transparency. Lazarus and McManus (2006) classify information transparency into two types: internal and external. The former considers information transparency as a result of the internal communication behavior of an organization, which characterizes the extent to which internal employees have access to the information needed for their duties. The latter considers information transparency as a result of an organization's external communication behavior, i.e., the availability of corporate information containing potential economic activities to the outside world, or directly defined as the corporate information environment (Bushman et al., 2004). Thus, information transparency is not only important for market participants to understand company situation, but also a characteristic of the external environment that firms need to refer to when making important decisions (Simon, 2006).

Earlier studies measured information transparency mainly by single indicators: the degree of surplus management (Kothari et al., 2009; Hutton et al., 2008), the overall quality of accounting information (Firth et al., 2015), the degree of analyst tracking (Armstrong et al., 2014), media coverage (Dai et al., 2015) as well as related transactions (Li et al., 2011). The influencing factors of corporate transparency tend to be complex and diversified, so most scholars propose to construct a comprehensive evaluation index of multi-indicator information transparency. Lang et al. (2012) construct a comprehensive information transparency index from five aspects: the degree of corporate surplus management, whether to hire a "Big 5" accounting firm to audit the company's financial reports, whether to comply with international accounting standards, the degree of analyst tracking and the accuracy of analysts' surplus forecast. Based on this, most scholars in China refer to the Shenzhen Stock Exchange (SZSE) disclosure ratings to measure information transparency in light of the actual situation of the Chinese market (Xin et al., 2014; Xiang and Lu, 2020).

The existing literature posits that there are two distinct forms of information transparency: internal transparency and external transparency. Internal transparency in a company can be likened to the harmonious communication between internal organs within a body (Street & Meister, 2004). On the other hand, external transparency refers to the proactive dissemination of information by an enterprise to facilitate effective communication with external stakeholders (Bushman et al., 2004). From the external environment perspective, improved corporate information transparency can improve information asymmetry, enhance investor confidence (Healy et al., 1999), improve enterprise financing ability, and reduce stock price volatility risk and collapse risk (Hutton et al., 2009; Xiang and Lu, 2020). In the meantime, the relationship between ESG ratings and trade credit is moderated by the level of information transparency, whereby higher levels of information transparency result in a more gradual shape of the inverted U-shaped curve and a shift towards the left of the inflection point (Zheng & Aishan, 2023). From the perspective of internal operation, the independent management and decision-making authority of enterprises enables them to selectively disclose information that enhances their corporate image in order to attract investors, consumers, and talent, thereby influencing the transparency of information within the organization (Hutton et al., 2009). The level of information transparency has a direct impact on the cost of equity capital, with higher levels of transparency resulting in lower costs (Duarte et al., 2008). The employees contribute their time and expertise to the organization, with the expectation of receiving fair compensation and reasonable working conditions (Hill & Jones, 1992). By ensuring information transparency, employees can access the necessary information to align themselves effectively with suitable positions. In addition to that, improving corporate information transparency can increase the willingness of firms to innovate, stimulate managers' internal R&D incentives, and reduce enterprise operating cost (Dan et al., 2014), thus improving the performance of business operations.

2.2. Corporate Social Responsibility (CSR)

CSR means enterprises take responsibility for the public and the environment while generating profits together with assuming economic and legal responsibilities to stakeholders (Carroll, 1979). In terms of conceptual connotation, CSR is a sustainable orientation of enterprises, which prompts enterprises to assume corresponding social responsibilities in the process of operation and management in the face of multiple stakeholders, and promotes the creation of comprehensive value and shared value covering economic, social and environmental aspects for multiple stakeholders (Li and Xiao, 2011).

The consequences of CSR are categorized into financial performance impacts and non-financial performance impacts. Existing research on the former is controversial. Based on the stakeholder theory, most scholars believe that corporate fulfillment of social responsibility can be mutually beneficial and win-win with stakeholders, so as to get the support and valuable resources from stakeholders, and the enterprise can then attract more consumers, expand market share, improve competitiveness, and achieve better financial performance (Dmytriyev et al., 2021; Donaldson, 2011; Jones et al., 2018). Some scholars also believe that there is a negative (Walsh, 2003), irrelevant (Peloza, 2009) or U-shaped relationship (Wang et al., 2008). While the research on the latter is mainly manifested in improving corporate image and reputation (Brammer & Pavelin, 2010; Wang & Qian, 2011), obtaining governmental recognition support (Wang, 2017), and enhancing customer satisfaction and employee loyalty (Luo & Bhattacharya, 2006; Jones et al., 2014), etc. These studies have promoted the concept of CSR, and more and more companies have begun to actively engage in CSR practice activities.

Existing literature mainly explores the influencing factors of CSR fulfillment in terms of internal characteristics and external environment. Among them, internal characteristics affecting CSR mainly include factors such as economic capacity (Jensen, 2002), financial performance (Margolis & Walsh, 2003; Zu & Song, 2008), corporate culture, management characteristics (Mcguinness et al., 2016), institutional investor characteristics (Kim et al., 2019), and analyst tracking (Adhikari & Binay, 2016). The external environment mainly includes factors such as the intensity of government intervention, legal system (Goergen et al., 2017), pressure of public opinion and public environmental awareness (Hao et al., 2023b). Information transparency, as an initiative to balance the internal and external environments of enterprises, can not only reflect the immediate existence of relevant problems within the enterprise in a timely manner, but also enhance the trust between the enterprise and stakeholders and accept external supervision, attract more partners and resources to support, thus motivating the company to better fulfill CSR. However, there is little literature on the relationship between information transparency and CSR.

3. Theoretical analysis and research hypotheses

3.1. Information transparency and corporate social responsibility

Information transparency provides the necessary foundation and monitoring mechanism for CSR. First, information transparency is an important prerequisite for CSR. Some scholars posit that transparency signals play a pivotal role in corporate social responsibility communication, thereby enhancing public trust in enterprises (Park & Ha, 2020; Cambier & Poncin, 2020). So, only by improving information transparency and publicly disclosing information about its social responsibility strategy, objectives, policies, implementation and performance to the internal and external world can stakeholders fully understand the performance of enterprises in social responsibility and supervise and evaluate them. Second, information transparency helps to enhance the accountability of enterprises. When an enterprise publicly discloses its socially responsible behavior, stakeholders can be held accountable for situations that do not meet expectations, pushing the enterprise to correct mistakes and improve practices. The efficiency of environmental regulation and the accountability of local governments and enterprises can be enhanced through more rapid and precise identification of environmental stakeholders (Hao et al., 2023c). At the same time, when an enterprise realizes that its behavior is being publicly assessed and monitored, it can also help it strengthen its internal management system to ensure the fulfillment of its social responsibility. Third, information transparency motivates enterprises to improve their social responsibility performance. For consumers, information transparency refers to the extent to which they comprehend a company's information during their interactions (Eggert & Helm, 2003). Therefore, public disclosure of information exposes the company to external evaluation and comparison. An enterprise's own social responsibility performance is closely related to the choices made by consumers and investors, prompting it to take improvement measures to enhance its social responsibility performance.

To summarize, information transparency provides stakeholders with a basis for monitoring and assessment by providing accurate and comprehensive information and publicly disclosing CSR. With public monitoring and accountability mechanisms, enterprises can better fulfill CSR, meet stakeholders' expectations and achieve sustainable development. Therefore, we propose the hypotheses:

Hypothesis 1: Information transparency promotes CSR.

3.2. Non-linear Influence of Information Transparency on CSR

Information transparency, as an important channel to promote good communication and interaction between enterprises and stakeholders, is crucial to the fulfillment of CSR by enterprises, but it may also be limited by the constraints of other factors. The signaling effect of CSR strategies according to signaling theory may vary depending on the level of transparency (Spence, 1973; Connelly et al., 2010), indicating that different levels of transparency can impact the effectiveness of CSR (Yu et al., 2022). (1) When corporate information transparency is low, stakeholders and society at large lack understanding of corporate behavior and decision-making, and are unable to supervise and pursue responsibility for irresponsible behavior, which weakens the incentive for corporations to fulfill CSR. Therefore, against the background of more serious information asymmetry, improving information transparency is conducive to the ability of external investors to monitor management's short-sighted behavior more effectively, prompting enterprises to take positive actions to respond to stakeholders' needs and concerns. In turn, it establishes a good corporate image and reputation, which is conducive to the enterprise to obtain greater benefits in the exchange of resources and better fulfill the relevant social responsibility. (2) However, high transparency of corporate information may increase the marginal cost of information disclosure. In the absence of independent authoritative certification and monitoring mechanisms, enterprises are very likely to be compelled by conflicts of interest and performance pressure to make false disclosure of relevant information to cover up the real fulfillment of their social responsibility. At the same time, increased information transparency also provides stakeholders with the opportunity to participate in the decision-making process of CSR fulfillment. If stakeholders participate in an inappropriate manner, for example, by misusing or manipulating information to achieve their own interests, enterprises may be subjected to undue pressure, resulting in the poor fulfillment of their social responsibility. In other words, there is an optimal equilibrium of information transparency for CSR, and it is not the more transparent the more beneficial. We propose hypothesis:

Hypothesis 2: Information transparency impact CSR by non-linear inverted "U" curve.

3.3. Mediating effects of corporate reputation, internal control and external monitoring

The Reputation Theory suggests that corporate reputation is an important intangible asset for firms (Berrone et al., 2007), and that good reputational capital helps firms to create important points of differentiation (Keller, 2018) and gain competitive advantage (Fombrun, 1996). The acquisition of organizational reputation can enhance enterprises' sales revenue, bolster organizations' strategic initiative, attract and retain top talents, foster consumer trust, mitigate unnecessary government regulations on businesses, and minimize legal disputes (Pharoah, 2003). Whereas, establishing uniqueness and integrity and maintaining transparency and consistency of information are important sources for acquiring reputation (Heugens & Pursey, 2004). In addition, a good reputation puts pressure on firms to be more socially responsible. On the one hand, information transparency makes firms' socially responsible behaviors more open and visible, helping firms to build a good image and reputation, and increasing firm recognition and trust. A good reputation helps an enterprise gain consumer favor and brand loyalty, gain investor support, attract good employees to join, and establish cooperative relationships with the government and other stakeholders, pushing CSR more actively. On the other hand, problems in public disclosure will damage enterprise reputation, and the company has an incentive to maintain and improve its reputation out of self-interest and competitive advantage. Forced by the pressure from stakeholders, consumers and investors, enterprises are more likely to stimulate their own motivation to improve CSR in order to adapt to the expectations of consumers and investors on corporate social responsibility. We propose hypothesis:

Hypothesis 3: Increased information transparency can motivate and strengthen CSR by improving their reputation.

Internal control (optimizing the internal governance of an enterprise) can implement effective supervision of the financial reliability, compliance and operational efficiency of an enterprise to ensure its compliance and sustainable development (Li & Zhang, 2017). Good internal control will improve the overall efficiency and competitiveness, reduce operational risks, enhance the reputation and trust of enterprises, and enable them to better fulfill their social responsibilities (Haleblian & Finkelstein, 1993). First of all, information transparency can provide key information for internal control and emphasize the establishment of an accountability system to prevent the emergence of misbehavior and irregularities and improve internal control efficiency. At the same time, internal control safeguards the fairness and transparency in formulating strategies, managing risks, and promoting social responsibility programs by establishing a standardized decision-making process, clarifying decision-making authority and responsibility, and establishing an effective internal monitoring mechanism. Secondly, information transparency encourages open and positive communication among employees and across departments, leading to better synergy and improving the effectiveness of internal control, which helps integrate information related to social responsibility. In addition, internal control is an important part of business management. By improving information transparency, management can strengthen internal control based on comprehensive and accurate information, identify and respond to risk factors timely, and enhance the effectiveness of CSR fulfillment. We propose hypothesis:

Hypothesis 4: Increased information transparency will enhance CSR by strengthening internal control.

Based on the Information Asymmetry Theory, external attention can disclose more information about the fulfillment of CSR, reduce information asymmetry with stakeholders, and help to form a monitoring and incentive mechanism for CSR, which will make enterprises strengthen their social responsibility and achieve sustainable development. It should be noted that for CSR, analysts' attention is more professional and in-depth than media attention. The latter is mainly for the public to understand the company's dynamics and the factors behind the events, while the former is to provide professional advice and assessment through research and analysis. On the one hand, when the data and information related to CSR performance are more open and transparent, analysts can more comprehensively and accurately assess, supervise and motivate the fulfillment of CSR, enhance CSR engagement by increasing the dissemination of information to the public and government (Hu et al.,2021).

Enterprises pay more attention to their CSR performance in order to maintain their reputation and increase investor trust. On the other hand, external attention can promote cooperation and sharing of best practices among enterprises. Through information transparency, enterprises can learn from each other and the experiences and practices of other enterprises in social responsibility performance, and at the same time, with the expertise and insight of analysts, they can better understand the expectations and needs of external stakeholders, and then make corresponding improvements and innovations in CSR performance. Therefore, we propose hypothesis:

Hypothesis 5: Increased information transparency will promote the fulfillment of CSR by strengthening external concerns (Figure 2).

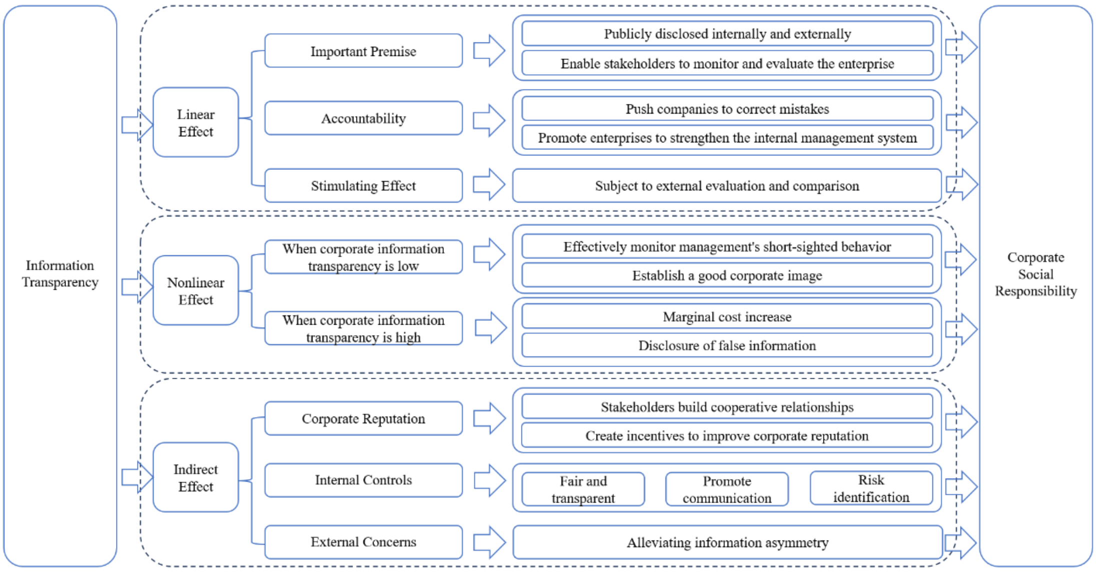

Figure 2. Mechanism analysis diagram.

4. Research design

4.1. Data Source

To explore the impact of information transparency (TRANS) on CSR, 711 Chinese A-share listed enterprises with 7821 annual observations are included in the sample from 2010 to 2020. In order to ensure the research reliability, we process sample as follows: (1) excluding ST, *ST and PT listed enterprises; (2) excluding enterprises with missing and abnormal relevant financial data; (3) excluding financial and insurance listed enterprises; and (4) to exclude the influence of extreme values, variables are Winsorized at 1% level. The CSR data in this paper comes from the CSR reports on Hexun.com, the internal control index of enterprises comes from DIB database, and other data comes from CSMAR database and the annual reports of listed companies. In this paper, Stata 16.0 statistical software is used in the process of data processing and econometric analysis.

4.2. Regression model setting

To explore the effect of information transparency on CSR, the following model is set up:

$$CSR_{i,t} = \alpha_0 + \alpha_1 TRANS_{i,t} + Controls_{i,t} + \sum Industry + \sum Year + \varepsilon_{i,t} \quad (1)$$

Where $CSR_{i,t}$ is the level of social responsibility commitment of corporate *i* in year *t*, $TRANS_{i,t}$ represents corporate information transparency, *Controls* is an ensemble of control variables, *Industry* and *Year* denote year and industry fixed effects respectively, and $\varepsilon_{i,t}$ represents error term.

To verify the mediating roles in the relationship between information transparency and CSR, the following models is developed:

$$Mediators_{i,t} = \beta_0 + \beta_1 TRANS_{i,t} + Controls_{i,t} + \sum Industry + \sum Year + \varepsilon_{i,t} \tag{2}$$

$$CSR_{i,t} = \delta_0 + \delta_1 TRANS_{i,t} + \delta_2 Mediators_{i,t} + Controls_{i,t} + \sum Industry + \sum Year + \varepsilon_{i,t} \tag{3}$$

Among them, $Mediators$ is the set of mediating variables, and the rest of the variables are same with the previous paper.

In addition, in order to verify nonlinear relation relationship between information transparency and CSR, this paper introduces the quadratic term of information transparency and establishes the following model:

$$CSR_{i,t} = \lambda_0 + \lambda_2 TRANS_{i,t} + \lambda_3 TRANS_{i,t}^2 + Controls_{i,t} + \sum Industry + \sum Year + \varepsilon_{i,t} \tag{4}$$

Where, the variables are consistent with the previous section.

4.3. Variable Measurement and Descriptive Statistical Analysis

(1) Explained variable: CSR. This paper refers to Gu et al. (2020) to select the total score of social responsibility report of listed companies in Hexun.com, the measurement system from the shareholders' responsibility, employees' responsibility, suppliers, customers and consumers' rights and responsibilities, environmental responsibility and social responsibility of the five dimensions of the evaluation. Meanwhile, the disclosure of Rankins CSR Ratings' social responsibility report for robustness test (table 1).

Table 1. Variable definition.

Type	Variable Name	symbol	Variable definition
Explained variable	Corporate Social Responsibility	*CSR*	Hexun.com's overall score takes the natural logarithm
Independent variable	Information Transparency	*TRANS*	According to the comprehensive information transparency index
Mediating variables	Corporate Reputation	*REP*	Based on the Reputation Evaluation System
	Internal Controls	*IC*	Natural logarithm of DIB internal control index
	External Concerns	*EA*	Natural logarithm of the sum of analysts' attention and research reports' attention plus one
Control variables	Company Size	*Size*	Natural logarithm of annual total assets
	Asset-liability ratio	*Lev*	Total responsibility/total assets at the end of the year
	Return on Total Assets	*ROA*	Net profit/average balance of total assets
	Board Size	*Board*	The natural logarithm of board number
	Two Positions in one	*Dual*	When the chairman of the Board of Directors is CEO, *Dual* = 1; When the Board chairman of the of Directors is not CEO, *Dual* = 0
	Cash Flow Ratio	*Cashflow*	Net cash flow from operating activities/total assets
	Company Age	*Age*	Take the natural logarithm of the number of (difference between the current year and the year of incorporation plus 1)
	Shareholding ratio of the largest shareholder	*Top1*	Number of shares held by the first largest shareholder/total shares

(2) Independent variable: information transparency (TRANS). Referring to Xin et al. (2014), from the surplus quality, information disclosure assessment index, analyst tracking number, analyst surplus forecast accuracy and whether the company hired the "big four" audit in the current year, this paper constructs a comprehensive index of information transparency to measure.

(3) Mediating variables: corporate reputation (REP), internal control (IC) and external attention (EA). For REP, this paper refers to Guan and Zhang (2019), who constructed a reputation evaluation system to calculate the corporate reputation score. Measurement of internal control (IC), this paper selects the natural logarithm of the DIB internal control index. Measurement of external attention (EA), referring to Zhou et al. (2014), this paper selects the attention by analysts and research reports to measure the degree of external attention. Combined with the foregoing, analysts' research and analysis of CSR and other related information is more in-depth than the media, and is more representative of the external evaluation of enterprises.

(4) Control variables. Drawing on existing literature research (Liu and Lu, 2018), this paper selects return on total assets (ROA), gearing ratio (Lev), enterprise size (Size), board size (Board), two positions (Dual), cash flow ratio (Cashflow), company age (Age), and the first largest shareholder's shareholding ratio (Top1).

The descriptive statistics for the main variables are presented in Table 2. The mean value of CSR is 3.077, with a minimum value of -4.605 and a maximum value of 4.509, yielding a standard deviation of 0.671. These findings indicate significant variations in CSR scores across different enterprises over time. The mean value of enterprise information transparency (TRANS) is reported as 0.36, ranging from a minimum of 0.01 to a maximum of 0.958, with a standard deviation of 0.164. This suggests substantial disparities in the level of information transparency among various enterprises. The mean value for EA is calculated as 2.31, with a minimum score of zero and a maximum score reaching up to 5.628. The standard deviation for EA is found to be 1.573. These results highlight noticeable discrepancies in the attention given by analysts and related research reports towards different companies. The remaining variables exhibit minimal dispersion, indicating the rationality behind sample selection.

Table 2. Descriptive statistics.

Item	Variable	Obs	Mean	SD	Min	Max
Dependent Variable	*CSR*	7,619	3.077	0.671	-4.605	4.509
Independent Variables	*TRANS*	7,821	0.360	0.164	0.0100	0.958
Mediator variable	*REP*	6,500	6.026	2.907	1	10
	IC	7,576	6.495	0.130	4.749	6.885
	EA	7,821	2.310	1.573	0	5.628
Control variables	*Size*	7,821	22.19	1.196	0	26.43
	Lev	7,821	0.426	0.197	0.0274	0.925
	ROA	7,821	0.0467	0.0557	-0.370	0.238
	Board	7,821	2.154	0.189	1.609	2.708
	Cashflow	7,821	0.0496	0.0697	-0.224	0.283
	Age	7,821	2.780	0.413	1.099	3.611
	Dual	7,821	0.252	0.434	0	1
	Top1	7,821	0.341	0.148	0.0813	0.758

5. Empirical analysis

5.1. Correlation analysis

Before estimating the regression model, this paper conducts a correlation analysis of the variables in Table 3. The correlation coefficient TRANS-CSR is significantly positive, indicating that there is a positive relation between TRANS and CSR without taking into account the influence of other variables, initially supporting the hypothesis 1. The correlation coefficients between CSR and the control variables are significant overall, indicating control variables are reasonable. Additionally, correlation coefficients and VIF values show it does not have serious multicollinearity problems.

Table 3. Correlation test of variables.

Variable	CSR	TRANS	REP	IC	EA	Size	Cashflow
CSR	1						
TRANS	0.345***	1					
REP	0.065***	0.237***	1				
IC	0.315***	0.301***	0.158***	1			
EA	0.326***	0.699***	0.324***	0.279***	1		
Size	0.178***	0.338***	0.163***	0.089***	0.286***	1	
Cashflow	0.175***	0.219***	0.131***	0.087***	0.187***	-0.00300	1
Age	-0.059***	-0.038***	-0.125***	-0.140***	-0.208***	0.289***	-0.00700
ROA	0.336***	0.346***	0.206***	0.268***	0.396***	-0.026**	0.371***
Lev	-0.00900	0.00800	-0.076***	0.0100	-0.0110	0.496***	-0.160***
Board	0.093***	0.136***	0.00600	0.068***	0.114***	0.178***	0.044***
Dual	-0.023**	0.0160	0.043***	0.0130	0.079***	-0.085***	-0.029**
Top1	0.090***	0.084***	0	0.121***	0.045***	0.082***	0.052***
	Age	ROA	Lev	Board	Dual	Top1	
Age	1						
ROA	-0.190***	1					
Lev	0.239***	-0.345***	1				
Board	0.0100	0.043***	0.111***	1			
Dual	-0.106***	0.029**	-0.111***	-0.169***	1		
Top1	-0.158***	0.115***	0.068***	-0.00800	-0.037***	1	

5.2. The impact of information transparency on CSR

Based on model (1), this paper adopts progressive regression, and Table 4 is the regression results.

Table 4. Benchmark regression results.

Variable	(1) CSR	(2) CSR	(3) CSR
TRANS	1.0505***	0.8999***	0.8974***
	(12.79)	(10.93)	(10.91)
Size		0.0354**	0.0323*
		(2.17)	(1.94)
Lev		-0.1143	-0.1384
		(-1.31)	(-1.61)
ROA		1.6188***	1.5357***
		(7.14)	(6.45)
Board		-0.0053	0.0036
		(-0.07)	(0.05)
Cashflow			0.2978***
			(2.68)
Age			0.0691*
			(1.72)
Dual			-0.0451*
			(-1.69)
Top1			0.0734
			(0.58)
_cons	2.8251***	2.0867***	1.9364***
	(94.05)	(5.72)	(5.53)
Time-fixed	Yes	Yes	Yes
Industry-fixed	Yes	Yes	Yes
N	7619	7619	7619
R^2	0.117	0.133	0.135

In Table 4, column (1) presents the regression results without incorporating control variables, while columns (2) and (3) exhibit the regression results with successive inclusion of control variables. The outcomes in all three columns demonstrate a statistically significant positive relationship at the 1% significance level. Based on the findings displayed in column (3), there is a substantial positive correlation between corporate information transparency and CSR score logarithm, indicating that for every one standard deviation increase in information transparency, the CSR score increases by 14.72%. This signifies that higher levels of information transparency among enterprises are associated with greater emphasis on social responsibility, thereby enhancing corporate social responsibility performance. Consequently, hypothesis 1 is validated.

The possible reasons are as follows: The increase in information transparency necessitates companies to internally and externally disclose more comprehensive and reliable corporate information. In doing so, stakeholders can gain a thorough understanding of the enterprise, hold it accountable for any deviations from expectations during its operation and management processes, and promptly rectify any improper conduct to ensure the fulfillment of social responsibility and enhancement of social responsibility performance. Moreover, heightened transparency also intensifies competition among enterprises, compelling them to strive for higher levels of social responsibility performance in order to attract more consumers and investors with the aim of achieving profit targets.

5.3. Mediation mechanism test of information transparency on CSR

To test hypotheses 3-5, this paper adopts the sequential test of mediating effect (Wen & Ye, 2014). Columns (1) - (2) in Table 5 suggest that information transparency promotes CSR by enhancing corporate reputation. Columns (3) - (4) show that information transparency enhances the performance of firms in fulfilling social responsibility through enhancing internal control. Columns (5) - (6) show that information transparency promotes CSR by enhancing external attention.

Table 5. Test results of the mediatory mechanism.

Variable	Corporate Reputation		Internal Controls		External Concerns	
	(1)REP	(2)CSR	(3)IC	(4)CSR	(5)EA	(6)CSR
TRANS	1.186***	0.271***	0.196***	0.678***	5.053***	0.800***
	(7.615)	(4.740)	(12.465)	(8.727)	(41.477)	(8.384)
REP		0.042***				
		(5.844)				
IC				0.861***		
				(8.994)		
EA						0.019**
						(1.993)
Control	Yes	Yes	Yes	Yes	Yes	Yes
_cons	2.535	1.887***	6.739***	-4.516***	-5.875***	2.048***
	(1.207)	(7.290)	(49.856)	(-5.587)	(-3.166)	(6.010)
Time	Yes	Yes	Yes	Yes	Yes	Yes
Industry	Yes	Yes	Yes	Yes	Yes	Yes
Sobel Z		-0.0306***		0.1656***		0.1824***
N	6500	6469	7576	7382	7821	7619
R^2	0.067	0.153	0.147	0.161	0.465	0.136

In Column (1), β_1 is positive significantly, meaning improving information transparency can improve corporate reputation. Further, after including the mediating variable corporate reputation, Column (2) shows that

δ_1 and δ_2 are significantly positive, and the estimated coefficient of information transparency (0.271) is smaller than the estimated coefficient of the main regression (0.8974), and the Sobel Z value passes the test of significance, which suggests that corporate reputation plays a partial mediating role, and Hypothesis 3 is verified. Transparently disclosed information helps to build corporate trust and reputation, attracts more consumers and investors, brings competitive advantage to the enterprise, and further motivates the enterprise to pay attention to social responsibility, and continuously improve and fulfill it. In addition, when an enterprise's information disclosure is transparent, it is easier for stakeholders to understand the enterprise's behavior and make suggestions or criticisms about its social responsibility performance, and such participation can help enterprises better understand social expectations and improve their social responsibility performance activities.

In Column (3), β_1 is significantly positive, meaning increased information transparency helps firms to strengthen internal control. Further, after including the mediating variable internal control. Column (4) shows that δ_1 and δ_2 are significantly positive, and the estimated coefficient of information transparency (0.678) is smaller than that of the main regression (0.8974), and the Sobel Z value passes the test of significance, which suggests internal control is a mediating mechanism in the impact of information transparency on corporate social responsibility, Hypothesis 4 is verified. Improving corporate information transparency can provide internal management with more comprehensive and accurate key information on social responsibility, and also helps to strengthen internal communication and collaboration and integrate other effective information. Accordingly, enterprises can identify risk factors affecting the fulfillment of CSR in a timely manner and strengthen the supervision and accountability of internal behaviors, thus enhancing the effectiveness of CSR fulfillment.

In column (5), β_1 is significantly positive, indicating increased TRANS attracts more external attention. Further, after including the mediating variable external attention. Column (6) shows that δ_1 and δ_2 are significantly positive, and δ_1 (0.8000) is smaller than that of the main regression (0.8974), and the Sobel Z value passes the significance test, showing external attention is a partial mediator, and hypothesis 5 is tested. When the enterprise information is more transparent, the external can better monitor and evaluate the fulfillment of CSR, and continuously motivate the enterprise to improve and enhance the fulfillment level. At the same time, enterprises can take this opportunity to learn from the practical experience of other enterprises in fulfilling their social responsibility, understand the expectations and requirements of external stakeholders, and promote CSR.

5.4. Robustness Tests

5.4.1. Endogeneity

There is a certain degree of mutual causality between information transparency and CSR studied in this paper, i.e., firms with better social responsibility performance may also promote the improvement of corporate information transparency, and there is an endogeneity problem caused by omitted variable bias. Therefore, in this paper, information transparency (〖TRANS〗_(-2)) with a lag of two periods is selected as an instrumental variable, and the regression of information transparency and CSR are re-estimated using 2SLS regression method. Column (1) in Table 6 shows the first-stage correlation test, the coefficient of 〖TRANS〗_(-2)is significantly positive, and the F-statistic value of the first stage is much larger than 10, which indicates that the explanatory variables and the selected instrumental variables are highly correlated with each other, and the correlation assumption is satisfied. In the second-stage regression, the coefficient of TRANS is significant, indicating the conclusions still hold after considering endogeneity.

Table 6. Endogeneity test.

Variable	(1) Phase I TRANS	(2) Phase II CSR
$TRANS_{-2}$	0.4691***	
	(33.65)	
$TRANS$		0.8965***
		(0.121)
Control	Yes	Yes
_cons	-0.4734***	1.4036***
	(-6.84)	(0.223)
Time-fixed	Yes	Yes
Industry-fixed	Yes	Yes
N	6208	6208
R^2	0.4279	0.1920
F-test Phase I F-test	1132.25***	

5.4.2. Other robustness tests

We also conducts the following robustness tests:

(1) Replacement variables. We assign Corporate Social Responsibility Scoring Rating (RCSR) A, B, C, D and E as 4, 3, 2, 1 and 0 respectively to repaint the explanatory variable CSR. Column (1) in Table 7 show that the regression results are robust.

(2) Replacement of measurement model. In this paper, Tobit model is used for regression. Column (2) shows that the regression results are still robust.

Table 7. Other robustness tests.

Variable	(1) RCSR	(2) CSR
TRANS	0.2354***	0.8333***
	(3.57)	(17.75)
Control	Yes	Yes
_cons	0.8682***	1.2168***
	(3.17)	(7.90)
Time fixed	Yes	Yes
Industry fixed	Yes	Yes
Pseudo R2		0.1139
Log likelihood		-6636.9694
N	7813	7619
R^2	0.150	

5.4.3. Bootstrap test for mediation effect

This paper uses Bootstrap method to further verify whether the mediation effect is established, using Bootstrap method to carry out 1000 repetitive sampling and construct 95% error correction confidence intervals, if the confidence intervals do not contain 0, then it proves that the mediation effect is established. Table 8 is the result, the 95% confidence intervals of corporate reputation, internal control and external concern do not contain 0, i.e. the mediation effect is established and hypotheses 2-4 are further verified.

Table 8. Bootstrap analysis results of mediating effects.

Variable	(1) Corporate reputation (REP)	(2) Internal Controls (IC)	(3) External Attention (EA)
Bootstrap indirect effect	-0.0306***	0.1649***	0.1824***
	(-5.11)	(9.89)	(5.04)
95% confidence interval	[-0.0454, -0.0207]	[0.1349, 0.2028]	[0.1111, 0.2517]
Sample size	6469	7382	7619

6. Extensional analysis

6.1. Nonlinear test

Table 9 reports the estimation results using the baseline model (3).

Table 9. Non-linear effect of information transparency on CSR.

Variable	(1) CSR
TRANS	2.0234***
	(7.17)
$TRANS^2$	-1.4973***
	(-4.60)
Control	Yes
_cons	1.7513***
	(5.01)
Time-fixed	Yes
Industry-fixed	Yes
N	7619
R^2	0.141

In Table 9, the estimated coefficients of *TRANS* are 2.0234 and *TRANS2* are -1.4973, which are significant, confirming there is an inverted "U-shape" nonlinear impact, i.e., with the increase of information transparency, its impact on CSR changes from promotion to suppression, and Hypothesis 2 is verified. That is, with the increase of information transparency, its impact on CSR changes from promotion to inhibition, and hypothesis 2 is verified. When there is a serious information asymmetry between enterprises and stakeholders, improving information transparency can encourage the outside world to effectively monitor the behavior and decision-making of enterprises. Companies will fulfill CSR more cautiously and honestly in order to win a good reputation and increase brand value, so as to obtain more support from external resources. However, as information transparency increases, the marginal cost of disclosure also increases, and in the absence of accountability and monitoring mechanisms, enterprises are prone to falsely disclose social responsibility-related information in pursuit of short-term interests. Increased transparency of corporate information also provides opportunities for irresponsible stakeholders to misuse or manipulate information for their own benefit. Enterprises may thus be subjected to undue pressure, which may also lead to poor fulfillment of their social responsibilities. Therefore, the impact of increased information transparency on CSR can be characterized as non-linear due to the constraints of other external factors.

6.2. Heterogenous effects of TRANS on the Responsibilities of Different Stakeholders

In this paper, the Hexun.com CSR rating index is specifically divided into five dimensions: shareholder responsibility (Stkhld), employee responsibility (Employ), supplier and consumer responsibility (Supcustm), environmental responsibility (Envir), and philanthropic responsibility (Social), to further examine the effect of information transparency on the responsibility of different stakeholders of enterprises. Table 10 is the result.

Table 10. Heterogenous effects of TRANS on the responsibility of different stakeholders of the enterprise.

Variable	(1) Stkhld	(2) Employ	(3) Supcustm	(4) Envir	(5) Social
TRANS	0.9144***	0.1247	-0.0701	-0.0665	0.2303***
	(14.78)	(1.12)	(-0.71)	(-0.67)	(2.94)
Control	Yes	Yes	Yes	Yes	Yes
_cons	1.6927***	-1.5647**	-0.0375	-0.0864	1.1261***
	(7.32)	(-2.09)	(-0.08)	(-0.20)	(3.09)
Time-fixed	Yes	Yes	Yes	Yes	Yes
Industry-fixed	Yes	Yes	Yes	Yes	Yes
N	7607	7761	7813	7813	7237
R^2	0.134	0.059	0.166	0.163	0.009

The results presented in Table 10 demonstrate significant variations in the influence of information transparency on the social responsibility ratings of different stakeholders. In Column (1), it is evident that information transparency has a significantly positive impact on shareholder responsibility rating at the 1% level. Columns (2) to (4) reveal that information transparency positively affects employee responsibility ratings, while negatively impacting supplier and consumer responsibility ratings as well as environmental responsibility ratings. However, it is worth noting that the regression results did not reach statistical significance. Furthermore, Column (5) highlights that information transparency significantly contributes to an enhanced social responsibility rating.

The enhancement of information transparency can significantly enhance a company's shareholder responsibility rating and charitable responsibility rating for the following potential reasons: Shareholders, as internal stakeholders, benefit from improved access to comprehensive insights into the company's operational conditions and investment-related information. Consequently, an improvement in corporate information transparency ensures shareholders' access to pertinent corporate data, thereby elevating enterprises' shareholder responsibility ratings. Furthermore, open and transparent information dissemination enables the public to gauge enterprises' philanthropic performance, fostering a greater willingness among companies to assume accountability for charitable matters. This commitment contributes towards cultivating a favorable corporate image and reputation while generating additional benefits for businesses. Henceforth, enhancing information transparency facilitates an elevation in enterprises' charitable responsibility ratings.

The employee responsibility rating of the enterprise is not significantly affected by information transparency; however, the regression results show a positive correlation. This can be attributed to the fact that higher levels of information transparency subject the enterprise to scrutiny from multiple stakeholders, including its internal employees. Recognizing the significance of employee welfare enables enterprises to harness their enthusiasm, stimulate creativity, foster team spirit, and thereby establish a favorable corporate image and generate greater benefits for the company. Consequently, enhanced transparency in information may serve as an incentive for companies to prioritize employee well-being.

The impact of information transparency on a firm's supplier and consumer responsibility ratings is not significant. However, the regression result shows a negative correlation, possibly due to: The enhancement of information transparency is also susceptible to exposing irregularities in the supply chain or unjust distribution of benefits, as well as environmental pollution and excessive consumption, which may result in criticism or resistance from suppliers, consumers, and the general public. In the short term, companies are faced with more stringent requirements and higher expectations due to competitive pressures, which could potentially have a negative impact on fulfilling corporate responsibilities.

6.3. Heterogeneity effects from enterprise size, ownership and institutional environment

This paper does the heterogeneity tests from three perspectives: firm size, ownership and institutional environment.

First, in terms of firm size, it has been shown that firm size has an influential effect on the fulfillment of CSR (Owusu-Ansah, 1998). As shown in the first two columns of Table 11, information transparency positively drives and improves CSR in both large and small-scale enterprises, with the improvement effect being more pronounced in large-scale enterprises. The reasons can be outlined as follows: in comparison to small businesses, large companies enjoy greater recognition and exert a more extensive economic and social influence. Consequently, their decisions and actions tend to attract the attention and evaluation of external stakeholders, while also being subject to stricter regulatory requirements imposed by governments and other regulators. Simultaneously, large enterprises typically possess more abundant resources and capabilities for implementing social responsibility initiatives. Therefore, the enhancement of information transparency has a more pronounced impact on large enterprises, prompting them to place increased emphasis on fulfilling their own social responsibilities with a view to enhancing their corporate social responsibility performance.

Table 11. Results of the heterogenous effects from enterprise size, ownership and institutional environment.

Variable	(1) CSR Large-scale enterprises	(2) CSR Small-scale enterprises	(3) CSR State-owned enterprises	(4) CSR Non-State-owned Enterprises	(5) CSR High marketization degree	(6) CSR Low marketization degree
TRANS	0.4552***	0.1981***	0.3713***	0.7244***	0.8778***	0.7510***
	(7.96)	(3.54)	(3.51)	(9.53)	(7.15)	(7.30)
Control	Yes	Yes	Yes	Yes	Yes	Yes
_cons	2.9179***	1.4713***	1.9835***	1.7777***	1.9329***	1.9077***
	(9.19)	(3.00)	(5.03)	(4.91)	(5.06)	(5.11)
Time-fixed	Yes	Yes	Yes	Yes	Yes	Yes
Industry-fixed	Yes	Yes	Yes	Yes	Yes	Yes
N	7619	7619	7619	7619	7619	7619
R^2	0.116	0.107	0.108	0.123	0.121	0.117

Second, from the perspective of enterprise ownership, studies have shown that there are differences in the social responsibility performance of enterprises of different ownerships (Huang et al., 2009). As shown in columns (3) - (4), information transparency promotes non-state-owned CSR to a greater extent. The reasons can be outlined as follows: in comparison to state-owned enterprises, non-state-owned enterprises are confronted with more intense competitive pressure and rely heavily on investor support and resources. Non-state-owned enterprises frequently disclose pertinent information to effectively communicate their commitment towards sustainable management, environmental protection, and social welfare to both internal and external stakeholders. This approach aims at establishing a positive brand image and reputation while enhancing investors' trust and recognition of the enterprise, ultimately leading to financial support from investors. Consequently, higher levels of information transparency prompt non-state-owned enterprises to further strengthen their efforts in fulfilling their social responsibilities, thereby maintaining investors' trust in the enterprise.

Thirdly, from the perspective of institutional environment, it has been shown that the degree of marketization also affects the performance of CSR (Zhou et al., 2019). As shown in column (5) - (6), information transparency contributes to the social responsibility of both high and low marketization intensity firms, and it is more obvious in firms with high marketization intensity. Possible reasons are as follows: In a highly market-oriented environment, enterprises face increasingly intense competitive pressure. To attract consumers and investors, enterprises strive to be more transparent in showcasing their business conditions, social responsibility, and other relevant information to the public. This approach enables them to enhance their brand image, gain trust and goodwill from the public, attract more consumers to choose their products or services, and ultimately secure financial support. Therefore, when marketization is high, information transparency plays a stronger role in promoting corporate social responsibility.

7. Conclusions and Implications

This study explores the impact of information transparency on CSR as well as its internal mechanism by empirically analyzing 711 listed companies panel data from 2010 to 2020. It is found that (1) information transparency is conducive to promoting CSR, and the conclusion still holds after endogeneity treatment and robustness test. (2) Corporate reputation, internal control and external concerns play partial mediating roles. (3) There is an inverted "U-shaped" nonlinear relationship between information transparency and CSR, i.e., as information transparency increases, its impact on CSR changes from promotion to suppression. (4) The impact of information transparency on the responsibility orientation of different stakeholders is significantly differentiated, with a facilitating effect on shareholders' responsibility, employees' responsibility and charity responsibility, and a negative effect on suppliers' and consumers' responsibility and environmental responsibility. (5) Differentiating between size, property rights and institutional environment for heterogeneity analysis, it is found that the promotional effect of information transparency on CSR is more significant in large-scale, non-state-owned and high marketization intensity enterprises. Based on the above conclusions, this paper draws the following insights:

First, improve the corporate information disclosure system and strengthen the supervision of the internal management system. Drawing on the "plain English" rules issued by the U.S. Securities and Exchange Commission, the Exchange has taken the lead in organizing the formulation of a code of terms for the disclosure of information by listed companies, and has pushed to turn the requirement for concise expressions of information disclosure into a mandatory requirement. Improve the evaluation system of corporate information disclosure quality, implement a classification and rating mechanism for CSR-related information, introduce investors and third-party organizations to participate in the evaluation, and regularly publish the social responsibility scores of listed companies, so as to promote listed companies to accept public supervision and consciously do a good job in information disclosure and fulfillment of social responsibility. Meanwhile, enterprises should establish a sound internal control mechanism, enhance the function of the board of directors and its independence, strengthen the constraints on the behavior of internal personnel, improve the risk assessment and risk management system, and ensure the truthfulness and accuracy of corporate information disclosure, so as to prompt enterprises to seriously fulfill their social responsibility.

Secondly, external regulatory mechanisms should be strengthened, emphasis should be placed on public opinion campaigns, and the public's awareness of social responsibility should be raised. Governments at all levels should strengthen their efforts to supervise the social responsibility of regional and industrial enterprises, formulate corresponding local and industrial regulations, establish a responsibility system for local government and industrial authorities, and take necessary punitive measures against those enterprises that do not assume social responsibility actively. We should strengthen the social supervision of enterprises such as news and public opinion, industrial organizations and international organizations. Attention should be paid to public opinion propaganda, guiding the public to pay attention to the issue of CSR and actively participate in the supervision. Give full play to the role of news and public opinion to create an atmosphere in which the whole society jointly supervises the fulfillment of CSR.

Thirdly, the spirit of corporate integrity should be shaped and importance should be attached to maintaining corporate reputation. In terms of information disclosure, enterprises should utilize diversified forms to present the true situation of the company to a wide range of stakeholders, thereby winning more loyal customers and resource support in order to better fulfill their social responsibilities. In addition, enterprises should focus on product quality and technological innovation, establish a unique corporate culture and effective public relations mechanisms, provide a fair compensation system and employee participation in decision-making mechanisms, actively participate in social media platforms, and respond to customer questions and feedback in a timely manner, etc. to shape the corporate brand image and good reputation, and to promote enterprise sustainable development.

This study provides significant evidence regarding the correlation between corporate information transparency and corporate social responsibility. However, there are still certain limitations to consider. Primarily, this study primarily focuses on the short-term association between information transparency and corporate social responsibility while neglecting an analysis of their long-term relationship. Additionally, although this paper identifies a nonlinear connection between information transparency and corporate social responsibility, it does not explore potential mechanisms through testing. In future research, models such as system GMM and dynamic threshold can be employed to further investigate possible long-term impacts, allowing for a more comprehensive discussion on the nonlinear relationship between information transparency and corporate social responsibility.

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Conflict of interest

The author claims that the manuscript is completely original. The author also declares no conflict of interest.

Author contributions

Xiaoli Hao: Conceptualization, Methodology, Funding acquisition, Project administration; Resources, Data curation, Writing – original draft, Writing - review & editing. **Ke Li**: Conceptualization, Methodology, Investigation, Supervision, Writing-review & editing. **Shufang Wen**: Conceptualization, Methodology, Project administration, Supervision, Writing - original draft, Writing - review & editing.

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