

ESG Performance and Corporate Financial Performance under Public Opinion Crisis

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Abstract. In recent years, firms have suffered more and more frequent losses of reputation and interests due to public opinion crises, and firms can effectively establish a good brand image, accumulate corporate reputation, and obtain economic benefits by improving their ESG performance. Therefore, firms can improve their ESG performance, convey positive signals to the public through their good ESG performance in the event of negative news or even a public opinion crisis, and then make up for losses. This paper selects the data of public opinion, ESG and financial indicators of Chinese A-share listed companies from 2017-2024 for empirical analysis and robustness test, and draws the following conclusions: public opinion crisis significantly inhibits financial performance, while improving ESG level can effectively weaken its negative effects, which are different according to the media attention of firms. Finally, this paper summarizes the research findings, reflects on its theoretical and management implications, and puts forward targeted suggestions.

Keywords: ESG, public opinion crisis, financial performance

1. Introduction

With the prevalence of online media, the speed and scope of public opinion transmission are not the same as before, and the destructive power of public opinion is also increasing. Once negative news emerges, a public-opinion storm is likely to ensue, which will have a serious impact on the reputation and interests of firms. How to mitigate losses promptly during a public opinion crisis has emerged as a critical challenge for all firms.

Meanwhile, investors and consumers pay more attention to a firm's ESG performance because of the spread of the sustainable development concept. By improving their ESG performance, firms can effectively establish a good brand image, accumulate corporate reputation, and then benefit from it. Furthermore, firms with enhanced ESG performance can transmit positive signals to the public during negative news events or full-scale public opinion crises, thereby offsetting losses.

Based on this, this paper collates and analyzes the existing literature, clarifies the current research status and shortcomings, and theoretically analyzes the impact of ESG level on financial performance in public opinion crisis according to stakeholder theory, corporate reputation theory, and sustainable development theory. This paper selects the public opinion, ESG, and financial index data of Chinese A-share listed companies from 2017-2024, carries out regression analysis and robustness tests, and tests the hypothesis. Through empirical analysis, it is concluded that a public

opinion crisis will impact financial performance negatively, and firms can weaken this negative impact by improving ESG performance, and this regulatory effect will be different according to the media attention of firms. Finally, this paper summarizes this research, reflects on and gives relevant suggestions for firms.

2. Literature review and theoretical assumptions

2.1. Negative public opinion and financial performance

Public opinion is the object of public discussion on various social phenomena, while a public opinion crisis is the public opinion involving people's interests arising from a special stimulus [1]. In modern society, where online media and online social networking tend to be mainstream, the main carrier of public opinion has changed into the Internet, showing the unique characteristics of interaction, immediacy, Emotionalization, and group polarization of online public opinion [2]. After the outbreak of online events, the public is more inclined to vent negative emotions such as anger and anxiety, which is rapidly contagious and resonates with more netizens, thus explaining the phenomenon of higher frequency and stronger destructive public opinion crises in the Internet age [3,4].

At present, favorable sentiment enhances performance. For example, Ding Pei and others have found that the number of online comments and likes can have a positive impact on sales through text mining research, thus improving the revenue of firms. Social media can affect consumers' brand identity [5].

Theory shows that a good reputation helps firms win trust and support and gain advantages in market competition; otherwise, it will cause economic losses. First, according to the theory of corporate reputation, corporate reputation is an important factor for consumers to choose merchants and price expectations. A good corporate reputation can bring more trust and support to firms, so as to occupy a dominant position in market competition and obtain more profits. Secondly, according to the theory of information dissemination, the activity of social public opinion is the process of continuous transmission of information. Public opinion will transmit positive or negative signals about firms to the public. In recent years, the speed and scope of network dissemination have fast, and the activity and influence of public opinion are increasing. The attitude of social public opinion will play a key role in the reputation of firms. Therefore, the public opinion crisis suffered by firms will have a negative impact on the reputation of firms, and then affect the financial performance of firms.

Based on the above analysis, this study makes the following research hypotheses:

H1: Public opinion crisis will impact financial performance negatively.

2.2. Public opinion crisis, ESG, and financial performance

ESG is a corporate development strategy or ethics that comprehensively considers the environment, corporate social responsibility, and corporate governance [6]. ESG has evolved into a widely adopted framework for assessing corporate sustainability [7]. Currently, most researchers believe that ESG performance can boost revenue [8]. However, some people also hold different views that investments in environmental governance and social responsibility do not significantly enhance revenues and may merely escalate costs, and the two are negatively correlated [9]. In addition, in the process of studying the impact of ESG performance on financial performance, some researchers believe that this impact has a time lag [10].

According to this paper, when a company invests more in ESG construction and achieves good results, it may gain more economic benefits. First, according to the theory of sustainable development, firms need to limit environmentally damaging activities, assume social responsibility, and achieve transparency and efficiency of corporate governance to ensure the sustainability of long-term development of firms. These ESG forms help firms establish a good reputation among stakeholders; Secondly, these days, more consumers in China are paying attention to the ESG performance of firms because of the popularization of green life, and are usually more willing to choose firms with good ESG performance; Thirdly, good ESG performance can improve the investment attractiveness of firms, reduce financing constraints, and bring more capital and resources to firms. Therefore, firms can improve their financial performance by improving ESG performance.

To sum up, corporate public opinion and ESG performance can play a role in corporate reputation, and then affect the acquisition of corporate interests. Especially in the face of a public opinion crisis, excellent ESG performance can demonstrate positivity, restore corporate reputation, alleviate negative public sentiment, and then win the trust and understanding of consumers and investors, reducing the negative impact of the public opinion crisis on financial performance.

According to the above analysis, this study makes the second hypothesis:

H2: When firms encounter a public opinion crisis, the higher the ESG level, the smaller the impact on financial performance.

2.3. The moderating effect of media attention on ESG level and financial performance

Media attention will have an impact on the public opinion environment and the reputation of firms. First, in the current network-dominated public opinion environment, the role of the media has been enlarged, and the media can quickly form a trend in the public opinion field with the help of its advantages of a large audience and great influence. Secondly, according to the theory of limited attention, people have a preference for information processing. For investors, this preference depends on whether the information is significant, the channels for investors to obtain information, and the ability to process information. Compared with the annual reports issued by firms and the reports of financial institutions, the company information reported by the media is obviously more acceptable to more people. Because of its strong emotion and easy access, this news trend will have a more significant impact on consumers and investors than other information sources. Therefore, those firms that the media pay more attention to and report more will often be spread more rapidly by the media when they suffer a public opinion crisis, form a public opinion crisis faster, and have a more significant impact on the performance of firms. Third, the media tends to focus more on big companies with higher brand awareness, which also encounter similar difficulties as state-owned firms; that is, the public has higher expectations and requirements for them, so they are less sensitive to their good ESG performance. Therefore, the difference in media attention may lead to a difference in the ESG regulatory effect.

Therefore, here comes the last research hypothesis:

H3: The higher the media attention of firms, the worse the compensation effect of their ESG performance on performance under the public opinion crisis.

3. Research design

3.1. Sample selection and data sources

Given the great changes in the public opinion environment in recent years and the continuous improvement of the ESG system, this paper takes A-share listed companies from 2017-2024 as the research sample, excluding the samples with incomplete financial information, deleting the samples with st, st *, and financial industry and the lack of data on key variables. At the same time, the main research variables are condensed at the upper and lower 1% level, and a total of 13974 observations are obtained.

The corporate financial data and media public opinion data are from the CNRDS database, and the ESG data are from the Bloomberg database.

3.2. Variable definition

For explanatory variables, the public opinion crisis index (crisis) is calculated from the data of newspapers and online news related to firms. 0 means that there is no public opinion crisis at all, and 1 means that the public opinion crisis is extremely serious. The formula is as follows:

$$\text{Crisis} = 3/4 * \text{Netcrisis} + 1/4 * \text{Papercrisis}$$

Among them, Netcrisis said that the proportion of negative news in online financial news, and Papercrisis said that the proportion of negative news in newspaper financial news. Public opinion crisis index is the most tried variable setting. This study mainly studies the performance of firms under public opinion crisis, so it uses the number of negative news reports and the proportion of negative news related to firms every year to calculate the public opinion crisis index. It has tried to use the weighted number of standardized negative news and emotional tendency scores (positive news 1, neutral news 0, negative news - 1), but the final index is weakly affected by the total amount of news, which essentially reflects the proportion of negative news. Therefore, it uses a more intuitive weighted proportion of negative news in the network and newspapers. Considering the relatively high proportion of online media audiences in recent years, it gives a coefficient of 3/4 to online financial news. In fact, this coefficient is close to the calculation idea of Janis Fadner's coefficient (media supervision index), which is an innovative attempt to measure the public opinion environment of firms in this study.

For the explained variables, this paper uses the rate of return on total assets to measure the financial performance of firms. In the robustness test, ROOE was used as an alternative variable.

For the regulatory variables, this paper sets up two regulatory variables: first, ESG performance. This paper takes the rating scores of ESG performance in the Bloomberg database as the quantitative indicators of enterprise ESG, and carries out logarithmic processing. Second, media attention. The number of news reports related to firms is processed by natural logarithms using the network and newspaper media in CNRDS.

For the control variables, as shown in Table 1, 10 representative variables were selected as control variables in this paper.

Table 1. Variable description

Variable category	Variable name	Variable symbol	Variable definition
Explanatory variable	Public opinion crisis index	Crisis	The public opinion environment of firms is weighted by the proportion of negative news
Explained variable	Financial performance	ROA	Return on total assets
Moderating variable	Corporate ESG index	ESG	Total score of enterprise environment, society, and Governance
	Media attention	Med	The total amount of News reported by corporate media is taken as the natural logarithm
	Corporate age	Age	Year of establishment
	Corporate size	Siz	The total assets of the enterprise are taken as the natural logarithm
	Corporate debt ratio	Lev	Debt ratio in corporate financial statements
	Corporate cash level	Frc	Proportion of cash flow
	Proportion of fixed assets	Fix	Proportion of fixed assets
	Ability to grow	Gro	Growth rate of business income of firms in the past three years
	Board size	Boa	The number of directors is taken as the natural logarithm
Control variable	Agency cost	Agc	Ratio of enterprise management expenses to business income
	Proportion of independent directors	Ind	Proportion of independent directors
	Equity concentration	Top1	Shareholding ratio of the largest shareholder

3.3. Model building

In order to test the research hypothesis H1, the following regression model is constructed (1):

$$ROA_{i,t} = \alpha_0 + \alpha_1 Crisis_{i,t} + \sum \alpha_k Control_{i,t,k} + \varepsilon_{i,t} \quad (1)$$

Among them, *i* refers to individual firms, *t* refers to the year, α is the regression coefficient of model (1) and model (2), $ROA_{i,t}$ is the financial performance of firms, $Crisis_{i,t}$ is the public opinion crisis index, $ESG_{i,t}$ is the ESG score of firms, and $Control_{i,t,k}$ is a series of control variables. $\varepsilon_{i,t}$ is a random error term. Regression model (1) can test the relationship between financial performance and corporate public opinion. If the coefficient α_1 is significant, it shows that the public opinion crisis index of firms can significantly affect financial performance, which is significantly positively correlated when $\alpha_1 > 0$ and negatively correlated when $\alpha_1 < 0$.

In order to test the research hypothesis H2, the following regression model is constructed (2), which introduces the interaction between the public opinion crisis index and the ESG score.

$$ROA_{i,t} = \beta_0 + \beta_1 Crisis_{i,t} + \beta_2 ESG_{i,t} + \beta_3 Crisis_{i,t} \times ESG_{i,t} + \sum \beta_k Control_{i,t,k} + \varepsilon_{i,t} \quad (2)$$

To test H3, the interactive terms of public opinion crisis index, ESG performance, and media attention are introduced based on model (2). Model (3) can test the regulatory effect of media attention on corporate public opinion, ESG, and financial performance.

$$ROA_{i,t} = \varphi_0 + \varphi_1 Crisis_{i,t} + \varphi_2 ESG_{i,t} + \varphi_3 Crisis_{i,t} \times ESG_{i,t} + \varphi_4 Med_{i,t} + \varphi_5 Crisis_{i,t} \times ESG_{i,t} \times Med_{i,t} + \sum \varphi_k Control_{i,t,k} + \varepsilon_{i,t} \quad (3)$$

4. Empirical research

4.1. Descriptive statistics

Table 2 shows the statistical results of various indicators of sample firms from 2017-2024. It can be seen that the overall degree of public opinion crisis faced by the sample firms is not high, and the descriptive statistical results of the variables are similar to the results of most financial performance studies, which proves the effectiveness of the samples selected in this paper.

Table 2. Descriptive statistics of variables

Variable	Observations	Average value	Standard Deviation	Min	Max
ROA	13974	0.049	0.055	-0.192	0.238
Crisis	13974	0.328	0.108	0.000	0.835
ESG	13974	3.619	0.592	1.638	4.318
Med	13974	4.104	1.793	0.000	8.177
Age	13974	16.235	6.448	1.000	65.000
Siz	13974	22.339	2.385	20.03	27.84
Lev	13974	0.461	1.416	0.008	0.899
Frc	13974	0.053	0.051	-0.196	0.281
Fix	13974	0.328	0.139	0.005	0.675
Gro	13974	4.132	0.294	3.059	6.213
Boa	13974	2.17	0.184	1.609	2.713
Agc	13974	0.128	0.062	0.000	0.341
Ind	13974	0.421	0.110	0.004	0.581
Top1	13974	0.338	0.131	0.086	0.899

4.2. Regression analysis

According to the benchmark models (1) and (2), regression analysis is carried out to regress the main effect of public opinion crisis index on financial performance, the regulatory effect of adding ESG score, and the interaction between ESG score and public opinion crisis index. In column (1), there is a significant correlation between the public opinion crisis index and financial performance in the main effect ($p < 0.05$), and the coefficient is negative ($\alpha_1 = -0.338$). In column (2), there is a significant correlation between the public opinion crisis index and financial performance in the main effect ($p < 0.01$), and the coefficient is negative ($\alpha_1 = -0.351$). These results collectively confirm that public opinion crises exert a negative impact on firm performance, consistent with Hypothesis H1 and validating the construct validity of the Crisis variable.

Columns (3) and (4) are the regression results of model (2), of which column (3) does not control the fixed effect of industry and time, and column (4) controls the fixed effect of industry and time. In column (3), there is a significant correlation between the public opinion crisis index and financial performance ($p < 0.01$) and the coefficient is negative ($\beta_1 = -0.385$), while the interaction between ESG

score and public opinion crisis index is significant ($p<0.05$) and the coefficient is positive ($\beta_3=0.019$), which is different from the positive and negative signs of β_3 and β_1 . It shows that the ESG statement will have a negative regulatory effect on public opinion crisis and financial performance. In column (4), there is a significant correlation between public opinion crisis index and financial performance ($p<0.01$), and the coefficient is negative ($\beta_1=-0.392$), and the interaction between ESG score and public opinion crisis index is significant ($p<0.01$), and the coefficient is positive ($\beta_3=0.021$). Different from the positive and negative signs of β_3 and β_1 , it also shows that the ESG statement will have a negative regulatory effect on public opinion crisis and financial performance.

To sum up, Table 3 proves that the public opinion crisis faced by firms will hurt the performance of firms, and ESG scores have a significant negative regulatory effect on the relationship between the two; that is, good ESG performance can reduce this negative impact, which successfully verifies the assumptions H1 and H2.

Table 3. Benchmark model regression results

	(1)	(2)	(3)	(4)
Crisis	-0.338** (-2.53)	-0.351*** (-3.82)	-0.385*** (-3.10)	-0.392*** (-3.31)
ESG			0.039 (1.47)	0.032** (2.15)
Crisis×ESG			0.019** (2.13)	0.021*** (2.98)
Controls	YES	YES	YES	YES
Industry	NO	YES	NO	YES
Year	NO	YES	NO	YES
N	13974	13974	13974	13974
R ²	0.18	0.24	0.28	0.31

Note: ***, **, and * represent the significant levels of 1%, 5% and 10% respectively, and the T value is in brackets, the same below.

According to the regression model (3), the regulatory effects of enterprise property rights structure and media attention on ESG's compensation for enterprise public opinion and enterprise performance are analyzed by regression. In column (1) of Table 4, the interaction term of enterprise ESG score and public opinion crisis index is significant ($p<0.01$) and the coefficient is positive ($\phi_3=0.022$), while the triple interaction term of enterprise ESG score, public opinion crisis index and media attention is significant ($p<0.05$) and the coefficient is negative ($\phi_5=-0.113$), which is different from the sign of ϕ_3 . In column (2), the interaction term of enterprise ESG score and public opinion crisis index is significant ($p<0.01$) and the coefficient is positive ($\phi_3=0.028$), while the triple interaction term of enterprise ESG score, public opinion crisis index and media attention is significant ($p<0.01$) and the coefficient is negative ($\phi_5=-0.162$). After controlling for the fixed effects of industry and time, the sign of ϕ_3 and ϕ_5 is still different. Columns (1) and (2) show that media attention plays a negative role in ESG's compensation for performance under public opinion crisis, that is, the lower the media attention received by firms, the better the compensation effect of ESG performance on performance under public opinion crisis, which successfully verifies the research hypothesis H3.

Table 4. Regression analysis results of media attention regulation effect

	(1)	(2)
Crisis	-0.151*** (-3.84)	-0.337*** (-4.34)
ESG	0.064** (1.99)	0.095** (2.44)
Crisis×ESG	0.022*** (2.72)	0.028*** (4.84)
Med	0.051** (2.01)	0.600*** (3.04)
Crisis×ESG×Med	-0.113** (-2.21)	-0.162*** (-3.86)
Constant	-0.342 (-0.26)	-0.298 (-0.20)
Controls	YES	YES
Industry	No	No
Year	No	No
N	13974	13974
R ²	0.35	0.46

4.3. Robust test

In Table 5, columns (1) and (2) are the main effect regression of the enterprise public opinion index on ROE, and columns (3) and (4) are ESG. In order to verify the robustness, this study uses the return on net assets instead of the return on total assets for regression analysis. In the event of a public opinion crisis, it has a compensating effect on performance, verifies the robustness of the benchmark regression conclusion, and reconfirms the hypothesis H1.

Table 5. Results of ROE replacement robustness test

	(1)	(2)	(3)	(4)
Crisis	-0.632*** (-2.68)	-0.742*** (-2.87)	-0.842*** (-3.21)	-0.885*** (-3.46)
ESG			0.072 (1.31)	0.062 (1.46)
Crisis×ESG			0.027*** (2.74)	0.039*** (3.37)
Constant	0.743 (0.23)	0.719 (0.34)	-0.512 (-0.64)	-0.615 (-0.71)
Controls	YES	YES	YES	YES
Industry	NO	YES	NO	YES
Year	NO	YES	NO	YES
N	13974	13974	13974	13974
R ²	0.17	0.19	0.23	0.29

Rupamanjari's study found that there is a lag between ESG and financial performance. To further verify the robustness of the conclusion, ROA will be regressed on the basis of model (1) and model (2) as Table 6. Columns (1) and (3) are the regression results of the model (2) after the lag treatment of ROA in Table 4, while columns (2) and (4) are the regression results of the model (2) after the lag treatment of ROA in the first phase. The results once again verify the negative regulatory effect of ESG on the relationship between public opinion crisis and corporate performance, supporting H1.

Table 6. ESG delay processing robust test results

	(1)	(2)	(3)	(4)
Crisis	-0.385*** (-3.10)	-0.241** (-2.20)	-0.392*** (-3.31)	-0.267* (-1.89)
ESG	0.039 (1.47)	0.056** (1.98)	0.032** (2.15)	0.033** (2.50)
Crisis×ESG	0.019** (2.13)	0.028** (2.01)	0.021*** (2.98)	0.018*** (2.64)
Constant	-0.291 (-0.18)	-0.375 (-0.31)	-0.274 (-0.21)	-0.412 (-0.17)
Controls	YES	YES	YES	YES
Industry/year	NO	NO	YES	YES
ROA Delay	NO	YES	NO	YES
N	13974	13974	13974	13974
R ²	0.28	0.23	0.31	0.27

5. Conclusion

Based on stakeholder theory, corporate reputation theory, information dissemination theory and sustainable development theory, in view of the increasing frequency of public opinion crises in Internet firms and the continuous escalation of their destructive power, this paper theoretically discusses the feasibility of firms using ESG to make up for the negative impact of public opinion crises through literature analysis, and then verifies this hypothesis through the regulatory effect model. On this basis, further studies the impact of media awareness, and ensures the reliability of the research through a stability test. Finally, the following conclusions are drawn: public opinion crises have an adverse impact on financial performance, and improving ESG performance can weaken this impact. In addition, this correlation is also affected by the nature of enterprise property rights and media attention. When firms suffer from a public opinion crisis, the performance compensation effect of firms with low media attention is more significant than that of firms with high media attention.

In the Internet era, the crisis of public opinion will seriously affect the normal operation and development of firms. The suggestions for firms are as follows: To avoid falling victim to public opinion crises, firms should first strengthen internal governance, standardize operations and employee conduct, and minimize the likelihood of negative news; In addition, firms need to remain vigilant at any time, pay attention to changes in the public opinion field, take timely response strategies, and get out as soon as possible; Finally, improving ESG performance can weaken the negative impact of public opinion crisis on financial performance, so firms should deeply integrate ESG concept into daily operation, achieve sustainable development in environmental protection, social responsibility and corporate governance, establish a good corporate public image, and then avoid the harm caused by public opinion crisis.

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