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Financial ESG and Corporate Sustainable Development: the Moderating Effect of Attention

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금융업 ESG와 기업의 지속 가능한 발전: 관심도 조절 역할

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Abstract ESG is a kind of financial data that pays more attention to corporate environment, social responsibility and corporate governance. This study explores the relationship between ESG and corporate sustainable development through empirical analysis. This study uses the regression method of fixed effects to conduct empirical research on the data of China's A-share listed companies from 2015 to 2020. The research results show that: good ESG performance can promote the sustainable development of enterprises. At the same time, the higher the attention, the better the ESG performance can promote the sustainable development of enterprises. This study enriches the related research on ESG and has certain reference value for promoting the sustainable development of enterprises.

Key Words : ESG, Sustainable development, Financial industry, Media attention, Public attention

요 약 ESG는 기업 환경, 사회적 책임 및 기업 거버넌스에 더 많은 관심을 기울이는 재무 데이터이다.이 연구는 실증 분석을 통해 ESG와 기업의 지속 가능한 발전 사이의 관계를 탐구한다.이 연구는 2015-2020년 중국 A주 상장 기업의 데이터에 대한 실증 연구를 수행하기 위해 고정 효과 회귀 방법을 사용한다.연구 결과에 따르면 ESG가 잘 수행되면 기업의 지속 가능한 발전을 촉진할 수 있다.동시에 관심이 높을수록 ESG 성능이 우수할수록 기업의 지속 가능한 발전 능력을 촉진할 수 있다.이 연구는 ESG에 대한 관련 연구를 풍부하게 하고 기업의 지속 가능한 발전을 촉진하는 데 일정한 참고 가치가 있다.

주제어 : ESG, 지속가능발전, 금융업, 미디어 관심도, 대중 관심도

1. Introduction

Since the reform and opening up, China's economy has achieved a qualitative leap [1]. At the beginning of the reform and opening up, economic growth was achieved by sacrificing the environment and substituting processing [2]. With the advancement of China's science and technology, the economic growth model has also begun to transform, from OEM to independent innovation [3,4]. At the same time, no longer sacrifice the environment for economic growth [5]. Issues such as global warming, smog, and global energy shortages

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have become the common concerns of the whole world [6]. In order to actively respond to environmental issues and achieve green and sustainable development, the "Paris Agreement" and the 2030 Agenda for Sustainable Development have been implemented, and environmental protection has become a consensus around the world[7]. As an important participant in environmental protection, enterprises should also increase investment in environmental protection while developing the economy [8]. ESG focuses on corporate environmental responsibility, social responsibility and corporate governance. It can not only reflect the financial data of the company, but also enable investors and the government to understand the performance of the company's environmental protection [9]. ESG is an effective evaluation tool to implement the concept of green development and achieve sustainable development [10].

Regarding the research on ESG, many scholars have carried out research on it. M. C. Dos Santos & F. H. Pereira(2022) studied the scoring method of ESG performance [11]; A. Toscano et al.(2022) studied the relationship between ESG and stock liquidity taking the UK as an example, based on stock liquidity and stock returns [12]; E. Saygili et al.'s (2022) research shows that environmental disclosure has a negative impact on corporate financial performance [13]; X. Yuan's (2022) research shows that ESG disclosure reduces the risk of financial violations [14]. China's research on ESG started late and is still in the exploratory stage, and further research is needed in the future [15].

Therefore, this study explores the relationship between ESG performance and corporate sustainable development through empirical analysis. At the same time, attention (media attention, public attention) is introduced as an adjustment variable, and the research is carried out by taking China's listed A-share financial industry as an example.

The innovations of this study are as follows: (1) This study takes the financial industry as an example, which is different from other related ESG studies that exclude the financial industry. The financial indicators of the financial industry are quite different from those of other industries. For the convenience of research, many scholars have excluded the financial industry, but many investors are keen on the financial industry. Therefore, taking the financial industry as an example to conduct research can give investors who like to invest in the financial industry (2) This study explores the relationship between ESG and corporate sustainable development, which is different from other related research on the impact of ESG and corporate financial performance. At present, there are few studies on the relationship between ESG and corporate sustainable development. The research in this paper can enrich the related research on ESG.

2. Literature Review and Research Hypotheses

ESG is the abbreviation of Environment, Society, and Government. It was first proposed by the United Nations Global Compact in June 2004[15,16]. Some scholars also have doubts about this. For example, L. Wang & X. Yang (2022), C. Wu & S. Chen(2022) pointed out that ESG was first proposed in 2006[17,18]. According to the original text found by R. Yuan et al. (2022) [15] and the research of most scholars, it is confirmed that ESG was first proposed in 2004.

ESG is a kind of financial data that pays more attention to and examines the contribution of enterprises to environmental protection and social responsibility fulfillment, while promoting sustainable economic development [19]. According to the signal transmission theory [20], companies with better ESG performance can send positive signals to the capital market, increase the trust of external investors, win the favor of stakeholders, and help companies achieve better sustainable development [21].

Therefore, this paper proposes research hypothesis 1:

H1: ESG performance has a positive impact on corporate sustainable development

The theory of media governance believes that the media can effectively reduce information asymmetry through its information dissemination function, and exert corporate governance functions through external mechanisms such as reputation mechanisms [22]. Media governance theory points out that the media plays a role in corporate governance through information dissemination and supervision functions. According to the information dissemination mechanism [23], the media, as an informal external supervision, can increase the transparency of company information, enable investors, the government and other stakeholders to understand the situation of the company, better supervise managers, and control managers. Decisions have impact and can contribute to maximizing shareholder value.

Media attention includes newspaper media attention and network media attention [24]. Newspaper media attention mainly refers to the media system with newspapers as the main body[25]; Internet media attention refers to the relevant reports on enterprises by Internet media, including the number of articles published and reprinted by Internet media related to enterprises. The number of newspaper media attention and network media attention reports are called the newspaper media attention and network media attention respectively.

The higher the media attention, the higher the company's popularity, and the greater the social pressure the company faces, which can not only promote the company's awareness of environmental protection, but also enhance the company's value and realize the sustainable development of the company [26].

Therefore, this paper proposes research hypotheses 2 and 3:

H2: Newspaper media attention has a positive moderating effect on the impact of ESG performance on corporate sustainable development

H3: Internet media attention has a positive moderating effect on the impact of ESG performance on corporate sustainable development

The degree of public attention refers to the degree of public concern of investors, the government, etc., and is the premise for the public to respond to corporate behavior [27]. According to the theory of legitimacy and reputation mechanism [28], when an enterprise's behavior deviates from environmental protection, public attention will cause public opinion, which will have a negative impact on the reputation of the enterprise and affect the sustainable development of the enterprise. In order to achieve sustainable development and protect the public's own rights and interests, enterprises will be more active in increasing environmental protection and better achieve sustainable development of enterprises.

The research of J. Qin & T. Q. Peng (2016) is about the impact of public concern on environmental issues. The research results show that public concern plays an external supervision role and can assist the government to better manage the environment [29]; the research of J. Cheng & Y. Liu(2018) It shows that public concern has an impact on corporate behavior [30], which will promote enterprises to better participate in environmental protection and achieve sustainable development of enterprises.

Therefore, this paper proposes research hypothesis 4:

H4: Public attention has a positive moderating effect on the impact of ESG performance on corporate sustainable development

Fig. 1 presents the model of this study.

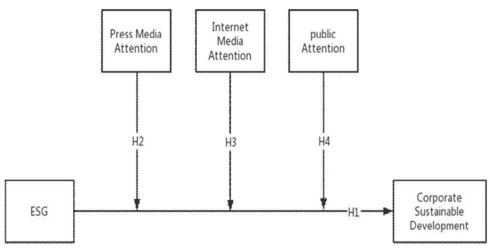

Fig. 1. Research model

3. Research Design

3.1 Data and Samples

This study selects the financial industry of China's listed A shares from 2015 to 2020 as the research object, and obtains a total of 588 sample values. The following elements are excluded from the data: 1. Samples with missing data; 2. ST listed companies. The ESG data in this study comes from the ESG data of Bloomberg Consulting Company, which have E, S, G and ESG total scores respectively; the data of newspaper media attention, online media attention and public attention come from China Research Data Service Platform (CNRDS database); the rest of the data comes from the Guotaian database and annual reports published by listed companies.

In order to alleviate the high collinearity between the interaction term and the independent and moderator variables, the independent and moderator variables were centralized in this study [31]. At the same time, some main continuous variables were logarithmized in this study.

3.2 Variable definition

3.2.1 Dependent Variable Enterprise Sustainable Development

This article draws on the practice of X. Zhang(2013) and adopts the Van Horn sustainable growth model as a measure of corporate sustainable development [32].

3.2.2 Independent Variable ESG

Most scholars use the Thomson Reuters database and Bloomberg ESG data to measure ESG indicators[33,9]. The research object of this paper is the financial industry. In view of China's national conditions, the Chinese third-party institution system for ESG indicator construction is not perfect. Therefore, this paper draws on the practice of C. Zhang & S. Jin (2022) and selects the more mature and authoritative Bloomberg Consulting Company ESG data[9]. The data includes not only the total ESG score, but also the scores for each item of corporate environmental responsibility (E), social responsibility (S), and corporate governance (G).

3.2.3 Moderated Variables

The media attention degree (media attention degree of newspapers and periodicals and network media attention degree) of moderating variables draws on the practice of L. Liu et al. Metrics[34]. NMA is the total number of newspaper media news plus 1 and takes the value of natural logarithm; OMA is the total number of online media news plus 1 and takes the value of natural logarithm.

As for the measurement of the adjustment variable public attention (PA), L. Wu et al. (2022) used the Baidu search index to measure [35], and other scholars have used questionnaire surveys or data from the China Research Data Service Platform (CNRDS database) as Proxy variable[27]. This paper adopts the approach of M. Ruan & F. Xiao(2022) [27], selects the data from the China Research Data Service Platform (CNRDS database), and uses the Internet search index of listed companies as a proxy variable for public attention.

3.2.4 Control variables

In order to exclude other factors from interfering with the results of this study, this study draws on the research results of Liu et al. age), ownership concentration (top1), enterprise nature (soe), and year effect (year) are used as control variables in this study. Please refer to Table 1 for specific variables and their definitions.

3.3 Model construction

In order to support Hypothesis 1 of this study, that is, ESG performance has a positive impact on corporate sustainable development, a regression model (1) that controls the annual effect is constructed.

$$CS_t = \beta + \beta_1 \times ESG_t + \Sigma\beta \mathrm{Control}_t + \varepsilon \qquad (1)$$

Table 1. List of variable definitions

Variable Type	Variable Name	Variable Code	Variable Definitions
Dependent variable	Corporate Sustainable Development	CS	Net sales interest rate * income retention rate * (1 + equity ratio) / [(1 / total asset turnover rate) - sales net interest rate * income retention rate * (1 + equity ratio)]
Independent variable	ESG Responsibility Score	ESG	Bloomberg ESG Score
Moderator	Press media attention	NMA	Add 1 to the total number of news in newspapers and periodicals to take the natural logarithm
	Internet media attention	OMA	The total number of online media news plus 1 to take the natural logarithm
	Public Attention	PA	Add 1 to the Internet search index of listed companies to take the natural logarithm
Control variable	Enterprise Size	SIZE	The natural logarithm of the total assets at the end of the year
	Solvency	LEV	Total liabilities at the end of the year/Total assets at the end of the year
	Growth	GRO	Operating Income Growth Rate
	Business Age	AGE	Ln (observation year - company registration year + 1)
	Concentration of Ownership	TOP1	Shareholding ratio of the largest shareholder
	Nature of Business	SOE	Dummy variable, 1 for state-owned holdings, 0 otherwise
	Annual Effect	YEAR	Year dummy variable

In order to further explore the moderating effect of media attention (newspaper media attention, online media attention) and public attention on ESG and its impact on corporate sustainable development, that is, to verify assumptions 2-4, a regression model is constructed to control the annual effect (2)-(4).

$$CS_t = \beta + \beta_1 \times ESG_t + \beta_2 \times NMA_t + \beta_3 \times ESG_t \times NMA_t + \Sigma\beta \mathrm{Control}_t + \varepsilon \quad (2)$$

$$CS_t = \beta + \beta_1 \times ESG_t + \beta_2 \times OMA_t + \beta_3 \times ESG_t \times OMA_t + \Sigma\beta \mathrm{Control}_t + \varepsilon \quad (3)$$

$$CS_t = \beta + \beta_1 \times ESG_t + \beta_2 \times PA_t + \beta_3 \times ESG_t \times PA_t + \Sigma\beta \mathrm{Control}_t + \varepsilon \quad (4)$$

Among them, CS represents the sustainable development of the dependent variable, ESG represents the independent variable, NMA represents the attention of newspapers and periodicals, OMA represents the attention of online media, PA represents the degree of public attention, Control represents the control variable, and β-β_3 represents the coefficient of each variable , t represents the research year, and ε is the random disturbance item.

4. Empirical Analysis

4.1 Descriptive Statistics

The descriptive statistics of the data are shown in Table 2. The average, maximum, and minimum values of corporate sustainable development (CS) are 5.526, 57.81, and -0.689, respectively, which means that corporate sustainable development capabilities in the financial industry vary greatly, and some companies have poor sustainable development capabilities; ESG The average, maximum, and minimum values are 16.68, 52.63, and 0, respectively, which means that the ESG of different companies in the financial industry differs greatly and the overall ESG performance is not good; the average, maximum, and minimum values of newspapers and media attention are 4.831 , 10.15, 0, which means that the media attention of different companies in the financial industry varies greatly, which indirectly reflects the possible moderating effect of media attention on newspapers and periodicals; The difference between the minimum values is also very significant, which indirectly reflects its possible regulating effect.

Table 2. Descriptive Statistics

VARIABLES	N	Mean	Sd	Min	Max
CS	588	5.526	6.727	−0.689	57.81
ESG	588	16.68	13.92	0	52.63
NMA	588	4.831	2.648	0	10.15
OMA	588	6.567	2.610	0	10.77
PA	588	10.32	4.361	0	16.26
SIZE	588	25.77	2.460	19.25	31.14
LEV	588	0.742	0.201	0.0196	0.947
GRO	588	0.317	1.356	−0.847	17.90
AGE	588	3.260	0.234	2.398	3.689
TOP1	588	30.96	17.35	4.310	77.35
SOE	588	0.534	0.499	0	1

4.2 Correlation analysis

The correlation analysis of the samples is shown in Table 3. It can be seen that there is a positive and significant positive correlation between the sustainable development capability of enterprises and ESG, which supports Hypothesis 1 of this study to a certain extent. The variance inflation factors (VIF) were all less than 4, with an average value of 1.93. That means multicollinearity is negligible for the main outcome of this study.

Table 3. Correlation analysis

Variable	CS	ESG	NMA	OMA	PA	SIZE	LEV	GRO	AGE	TOP1	SOE
CS	1										
ESG	0.269***	1									
NMA	0.281***	0.543***	1								
OMA	0.206***	0.522***	0.932***	1							
PA	0.091**	0.356***	0.391***	0.515***	1						
SIZE	0.374***	0.491***	0.605***	0.429***	-0.00500	1					
LEV	0.310***	0.221***	0.389***	0.246***	-0.166***	0.805***	1				
GRO	0.158***	-0.0510	-0.102**	-0.087**	0.0280	-0.0360	0.00800	1			
AGE	0.069*	0.358***	0.201***	0.219***	0.254***	0.079*	-0.0460	-0.0150	1		
TOP1	-0.0210	0.112***	-0.0360	-0.0590	0.121***	-0.0170	-0.147***	0.090**	0.081**	1	
SOE	0.0290	0.170***	0.144***	0.125***	0.182***	0.0540	0.00300	0.0200	0.080*	0.234***	1

Note: "*", "**" and "***" in the table represent significant at the 10%, 5%, and 1% levels, respectively.

4.3 Regression Analysis

The regression analysis results are shown in Table 4. In column (1), ESG has a positive and significant correlation (0.045) to corporate sustainable development, at the 5% level. It shows that the better the ESG performance, the better the sustainable development ability of the enterprise. So Hypothesis 1 is verified.

In column (2), the regression coefficient between ESG performance and corporate sustainability is significantly positive (0.045), at the 5% level. At the same time, the interaction term between ESG and newspaper media attention is significantly positively correlated with corporate sustainable development capabilities at the 1% level, with a regression coefficient of 0.027. This shows that when ESG performance is good, the higher the attention of newspapers and media, the better the sustainable development ability of enterprises. Newspaper media attention has a positive moderating effect on the impact of ESG on corporate sustainable development. So Hypothesis 2 is verified.

In column (3), the regression coefficient between ESG performance and corporate sustainability is significantly positive (0.048), at the 5% level. At the same time, the interaction item of ESG and online media attention is significantly positively correlated with the sustainable development capability of enterprises at the 1% level, and the regression coefficient is 0.022. This shows that when ESG performance is good, the higher the attention of online media, the better the sustainable development ability of the enterprise. The degree of online media attention has a positive moderating effect on the impact of ESG on corporate sustainable development. Therefore, Hypothesis 3 is verified.

In column (4), the regression coefficient between ESG performance score and corporate sustainable development capability is significantly positive (0.044), at the 5% level. At the same time, the interaction term of ESG and public attention is significantly positively correlated with the sustainable development ability of enterprises at the 1% level, and the regression coefficient is 0.010. This shows that when ESG performance is good, the higher the public attention, the better the sustainable development ability of the enterprise. Public attention has a positive moderating effect on the impact of ESG on corporate sustainable development. Therefore Hypothesis 4 is verified.

Table 4 Regression Analysis

VARIABLES	(1) CS	(2) CS	(3) CS	(4) CS
ESG	0.045**	0.045**	0.048**	0.044**
	(2.16)	(2.16)	(2.20)	(2.05)
NMA		-0.103		
		(-0.78)		
ESG*NMA		0.027***		
		(3.91)		
OMA			-0.063	
			(-0.51)	
ESG*OMA			0.022***	
			(2.97)	
PA				0.070
				(1.04)
ESG*PA				0.010**
				(2.29)
SIZE	0.785***	0.704***	0.710***	0.742***
	(4.36)	(3.37)	(3.66)	(4.11)
LEV	1.353	1.427	1.338	1.299
	(0.68)	(0.72)	(0.67)	(0.65)
GRO	0.673***	0.669***	0.669***	0.676***
	(4.12)	(4.12)	(4.12)	(4.15)
AGE	-0.277	-0.506	-0.307	-0.139
	(-0.27)	(-0.51)	(-0.31)	(-0.14)
TOP1	-0.013	-0.017	-0.014	-0.014
	(-0.97)	(-1.28)	(-1.05)	(-1.05)
SOE	-0.218	0.062	-0.058	-0.122
	(-0.48)	(0.14)	(-0.13)	(-0.27)
Constant	-11.241**	-8.381	-9.145*	-11.551**
	(-2.38)	(-1.64)	(-1.90)	(-2.44)
Year FE	YES	YES	YES	YES
Observations	588	588	588	588
R-squared	0.260	0.282	0.276	0.267

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

4.4 Robustness test

Considering the bias caused by omitted variables and endogenous problems, selects ESG performance score lagged one period (LESGt) as an instrumental variable, and uses the 2SLS method for robustness test.

Regression models (5) and (6) are the first-stage and second-stage models of 2SLS, respectively.

$$ESG_t = \beta + \beta_1 \times LESG_t + \Sigma\beta \text{Control}_t + \varepsilon \quad (5)$$

$$CS_t = \beta + \beta_1 \times ESG_t + \Sigma\beta \text{Control}_t + \varepsilon \quad (6)$$

Among them, LESG is the ESG data lagging one period.

The regression results of 2SLS are shown in Table 5. In the first stage (column 1), the regression coefficient of LESG and ESG was significantly positive (1.002) at the 1% level; The regression coefficient of corporate sustainable development capability is significantly positive (0.041) at the 10% level. The above results show that after considering endogenous issues, there is still a significant positive correlation between ESG realization and corporate sustainable development capabilities, which once again verifies the correctness of hypothesis 1.

Table 5. Robustness Test Regression Analysis

VARIABLES	(1) First Stage ESG	(2) Second Stage CS
LESG	1.002***	
	(75.52)	
ESG		0.041*
		(1.93)
SIZE	0.309***	0.866***
	(2.75)	(4.68)
LEV	-1.928	-0.479
	(-1.55)	(-0.24)
GRO	0.002	0.530***
	(0.02)	(3.49)
AGE	0.491	-0.245
	(0.78)	(-0.24)
TOP1	-0.007	-0.005
	(-0.78)	(-0.37)
SOE	0.263	-0.545
	(0.93)	(-1.20)
Constant	-7.742***	-17.340***
	(-2.61)	(-3.56)
Year FE	YES	YES
Observations	470	470
R-squared	0.958	0.228

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

5. Conclusion and Enlightenment

5.1 Research conclusion

This study selected the data of China's listed A-share financial industry from 2015 to 2020 as the research object, and used the fixed-effect model of the control year to study the relationship between ESG performance and corporate sustainable development capabilities. At the same time, the media attention degree (newspaper media attention degree, network media attention degree) and public attention degree are introduced to adjust the variables, and the relationship between ESG and the sustainable development ability of enterprises is studied.

Research indicates:

1. ESG has a positive impact on the sustainable development ability of enterprises;
2. Newspaper media attention has a positive moderating effect on the impact of ESG on corporate sustainable development capabilities;
3. The attention of online media has a positive moderating effect on the impact of ESG on the sustainable development ability of enterprises;
4. Public attention has a positive moderating effect on the impact of ESG on corporate sustainable development.

5.2 Suggestions

As the government, regulators, stakeholders, and companies pay more attention to ESG, the better the company's ESG performance and the higher the attention it receives, it will not only get a good reputation evaluation from the government, regulators, etc., but also improve the company's performance. The company's sustainable development capabilities, thus gaining the recognition and support of investors, shareholders and the government.

The research conclusion of this paper is consistent with the research conclusion of M. M. Miralles-Quirós et al. (2019) [36], which shows that when enterprises fulfill their corporate environmental responsibilities, social responsibilities and corporate governance, they will not reduce their corporate sustainable development capabilities, but will instead affect their stocks. Prices, etc. have a promotional effect. In the future, enterprises can continue to improve or maintain good corporate environmental responsibility, social responsibility and corporate governance, among which, the emphasis is on strengthening the performance of environmental responsibility.

The research conclusion of this article also gives some suggestions to investors who like to invest in the financial industry: choosing companies with good ESG performance may be more suitable as investment targets.

5.3 Limitations

The impact of ESG on corporate sustainability may not be suitable for all industries. At the same time, in view of the availability and completeness of data, this study only uses the ESG score of Bloomberg Consulting to carry out empirical research, lacking comparative data. With the development and improvement of China's ESG indicator system, future research can use different ESG scores to verify the impact of ESG on the sustainable development capabilities of listed companies. At the same time, in the future, further research on ESG's impact on corporate sustainable development capabilities can be conducted for other industries to further verify the relationship between ESG and corporate sustainable development capabilities.

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