

The impact of ESG on management tone: Empirical evidence from China

Ying Hu¹, Xuanming Zhang^{2,*}

¹ School of Electrical and Optoelectronic Engineering, West Anhui University, Luan 237012, China

² School of Insurance and Economics, University of International Business and Economics, Beijing 100029, China

* Corresponding author: Xuanming Zhang, wxczxm20020706@163.com

CITATION

Hu Y, Zhang X. The impact of ESG on management tone: Empirical evidence from China. *Forum for Economic and Financial Studies*. 2024; 2(1): 1276.
<https://doi.org/10.59400/feefs.v2i1.1276>

ARTICLE INFO

Received: 8 March 2024

Accepted: 15 March 2024

Available online: 15 April 2024

COPYRIGHT



Copyright © 2024 by author(s).

Forum for Economic and Financial Studies is published by Academic Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.

Forum for Economic and Financial Studies is published by Academic Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.

Forum for Economic and Financial Studies is published by Academic Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.

Forum for Economic and Financial Studies is published by Academic Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.

Forum for Economic and Financial Studies is published by Academic Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.

Forum for Economic and Financial Studies is published by Academic Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.

<https://creativecommons.org/licenses/by/4.0/>

<https://creativecommons.org/licenses/by/4.0/>

Abstract: This paper examines the effect and mechanism of ESG (Environmental, Social, and Governance) performance on management tone from the perspective of psychology and behavioral finance. The study found that ESG performance can significantly improve the enthusiasm of managers' intonation, which is more obvious when the population density of the enterprise is higher. The mechanism analysis shows that the ESG performance of enterprises mainly affects the tone of managers through two channels: reducing financing constraints and improving financial performance. This paper examines the internal logic of ESG practice on managers' emotional tendencies from the perspective of psychology and behavioral finance, and reveals that ESG practice does not make managers become negative.

Keywords: ESG performance; management tone; financing constraints; financial performance; population density

1. Introduction

In recent years, ESG (Environmental, Social, and Governance) practices and investments have become a hot topic, and more and more companies are engaging in ESG practices. As of 31 October 2022, the number of A-share companies disclosing ESG reports has reached 1462, accounting for 31.21% [1]. However, despite the rapid acceleration in the number of companies disclosing ESG reports in China, the disclosure ratio is still far below the international average. As Mark Murphys, the godfather of emerging market investment, said in the first "ESG Global Leaders Summit", management often fails to realize the importance of ESG, and the company's investment in ESG, such as charitable donations and green technology innovation, is destined to be difficult to recover in the short term, which conflicts with management's goal of meeting the performance criteria in the short term. The biggest obstacle for companies to improve their ESG performance is management's attitude [2]. Therefore, it is necessary to clarify management's emotional attitude toward ESG in Chinese listed companies to more accurately predict the ESG development posture of Chinese listed companies and provide empirical evidence for relevant departments to formulate measures.

Moreover, as ESG development is a concrete action of sustainable development strategy, population density, as an important part of environmental, demographic, and development pressure, may affect the relationship between corporate ESG development and management's affective attitude. Most contemporary studies on the impact of corporate ESG performance are based on financial data analysis, which accounts for less than 10% of the annual reports of listed companies. Therefore, the consequences of the impact of corporate ESG performance measured by financial data may not be comprehensive. Compared to financial information, textual data,

which accounts for 90% of the data sources, has rapidly developed and matured with the advancement of text analysis technology and data processing. Text analysis techniques, mainly measuring management tone with positive and negative terms, can extract positive and negative management words, i.e., management tone, from the Management's Analysis and Discussion (MD&A) section of annual reports to measure the positivity of management's sentiment toward the future [3]. The MD&A section not only contains management's plans for the next year's development but also conveys management's views on the current and future development of the company.

To address the above issues, this paper uses textual analysis methods and attempts to investigate the effects and mechanisms of corporate ESG performance on management's current and future affective tendencies from the perspectives of behavioral finance and psychology. It is found that corporate ESG performance enhances management's positive perceptions of the present and future by reducing financing constraints and improving financial performance, and is expressed in the MD&A section of listed companies' annual reports. Moreover, the promotion effect of corporate ESG performance on management tone is more pronounced when the population density of the city where the company is located is higher. Since MD&A is easier to manipulate and less regulated than financial data, when management is influenced by factors such as improving stock price or meeting investors' expectations, it may lead to management tone manipulation to deliberately show positive views on the present and future of the company. The results are robust. In addition, this paper also conducts robustness tests by replacing the explanatory variable management tone and the explanatory variable corporate ESG performance, adding the executive military experience in executive personal attributes, the one-period and two-period lagged ESG variables, and using the instrumental variable mean ESG rating within the municipality where the company is located each year.

Compared with existing studies, the possible contributions of this paper are mainly in the following aspects. First, it expands the research perspective on the consequences of corporate ESG performance. Unlike the existing literature, which is mostly based on the study of the financial dimension or the innovation dimension of firms, this paper takes a different approach by exploring the perceptions of corporate decision makers on the consequences of ESG from the perspective of managers' emotions. Second, it deepens the research on management tone analysis. Most of the existing studies that use management tone as an explanatory variable to predict the future performance of information risk [3], and financial distress [4]. This paper, however, expands the perspective of management tone based research by using management tone as the dependent variable and as a measure of how positively management views the company in the present and future. Third, it is unclear whether management holds a positive or negative view of ESG inputs. Theoretically, ESG inputs can reduce agency problems and improve corporate efficiency [5], but they can also take away corporate resources [6] and even become a tool for management to pursue its own interests [7], which is a "double-edged sword", and this paper provides empirical evidence to answer this question from management's perspective based on MD&A texts.

2. Literature review and research hypothesis

2.1. Literature review

The existing literature on ESG can be broadly divided into two main categories: ESG disclosure motivations and resulting economic consequences. In terms of ESG disclosure motivations, firm-level characteristics such as size, industry, and gaining a competitive advantage are key factors [8–10]. Meanwhile, potential influencing factors include the role of future performance signals and avoidance of strict future government disclosure regulations [10,11]. With regard to the economic consequences of ESG disclosure, there are positive, negative, and irrelevant findings, with most of the findings being positive. For instance, ESG disclosure can indirectly enhance the corresponding financial performance by affecting corporate surplus and customer satisfaction, among other factors [12]. However, some scholars have also identified a negative correlation between ESG and firm performance based on the profit maximization perspective or not [13,14]. Additionally, some studies have found that the impact of ESG on firm value can vary depending on the circumstances [15]. In summary, although there is a wealth of research on the economic consequences of ESG performance, the pros and cons of ESG for firms are still not distinct. Therefore, studying the attitudes of management as ESG decision-makers may offer a new perspective.

Given the highly artistic nature of Chinese language expressions and people's ability to interpret the deeper meanings embedded in words, management tone is extremely valuable to the study of business [16]. There are two perspectives on the study of management tone. First, management tone provides important incremental information, in addition to financial data, that helps predict a company's future performance. Second, the MD&A section is more flexible than financial data and lacks the constraints of the relevant legal system, allowing management to manipulate the tone for self-interest motives and create textual features that cater to investor preferences and meet their expectations [17,18]. Therefore, some scholars believe that the authenticity of MD&A texts is unpredictable and often a mixed message. In summary, under the view of incremental information, MD&A can help predict management's current and future attitudes toward the firm, but it is crucial to control for the possibility of tone manipulation by managers.

2.2. Research hypothesis

We propose two research hypotheses to examine the relationship between corporate ESG performance and business credit financing costs.

Firstly, based on sustainability theory, a company's ability to sustain its operations affects its financing costs, and ESG performance serves as a practical indicator that investors use to evaluate a company's sustainability. Although implementing ESG measures may bring short-term costs, it can also help companies reduce costs and increase efficiency in the long run. Aras and Crowther [19] have shown that good corporate ESG performance is linked to better energy use efficiency and innovation performance. Innovations in technology lead to more efficient use of resources and lower unit costs. This implies that companies with strong ESG

performance are more competitive in the market and therefore, more likely to obtain business credit.

Secondly, information asymmetry theory suggests that the information gap between investors and enterprises hampers the development of commercial credit financing capability [20], and enhancing the transparency of enterprise information can effectively alleviate the information gap, thereby reducing the financing costs of enterprises. ESG reports provide additional information beyond financial reports disclosed by listed companies, conveying more internal information to investors such as surplus management, insider trading, and other proxy issues [21]. At the same time, ESG information disclosure can increase analysts' attention and understanding of the company, helping to bridge the information gap and reduce information asymmetry. Thus, good corporate ESG performance can reduce financing constraints by reducing the degree of information asymmetry.

From a psychological perspective, managers who are satisfied with the company's current operations and confident in its future tend to use a positive tone when writing annual reports. This means that the management tone not only signifies good corporate performance but also reflects the managers' true emotions [22]. Good ESG performance enhances the company's external reputation and reflects the managers' competence. Furthermore, it can reduce financing constraints and improve financial performance, alleviating psychological and practical pressures on managers. Therefore, good ESG performance can boost managers' confidence in the future, and this positive sentiment will be reflected in the Management Discussion and Analysis (MD&A) section of the annual report. Based on this, the following hypothesis is proposed:

- H1a: Corporate ESG performance can increase management tone motivation.

However, according to the impression management view, managers may use qualitative means to subtly manage the company's image when the business situation does not meet investors' expectations. This includes manipulating the content of the annual report text, which has become one of the most important ways for managers to violate the interests of other investors. Furthermore, from a self-interest perspective, managers may engage in insider trading by manipulating the tone to maintain their good reputation or pursue their own interests. There is empirical evidence indicating that the tone positivity of annual report texts is positively correlated with the number of shares sold by managers after the announcement of the annual report, suggesting the possibility of tone manipulation [17]. Therefore, it can be argued that ESG performance may not significantly influence managers' tone. Based on this, the following hypothesis is proposed:

- H1b: Corporate ESG performance does not increase managerial tone motivation.

3. Study design

3.1. Sample selection

The sample of this research comprises A-share listed corporations in Shanghai and Shenzhen from 2010 to 2020. The sample underwent a filtering process following specific criteria: we excluded financial and insurance companies, as well

as firms listed as ST and *ST. It is worth clarifying that “ST” and “*ST” are unique identifiers used to denote companies that have received special treatment due to financial or operational difficulties. Corporations with unavailable data for benchmark regression were also omitted. After performing this screening, we ended up with a total of 19,944 sample observations. To reduce the influence of outliers, we implemented winsorize to all continuous variables at the 1% upper and lower thresholds. The data for annual reports were obtained from the Juchao Information Website, while the ESG rating, and data related to corporate finance and governance, were sourced from the CSMAR database. As for population density data, they were retrieved from the Wind database.

3.2. Model construction and variable definition

Model construction: To test the effect of ESG performance on management tone, the following model is constructed:

$$TONE_{i,t} = \alpha_0 + \alpha_1 ESG_{i,t} + \alpha_2 Controls_{i,t} + Industry + Year + \varepsilon_{i,t} \quad (1)$$

In Equation (1), the dependent variable TONE represents management tone, while the independent variable ESG signifies corporate ESG performance. Controls represent control variables, including company size (Size), capital structure (Lev), total net asset margin (ROA), corporate growth (Growth), number of directors (Board), proportion of independent directors (Indep), top shareholder shareholding (Top1), equity balance (Balance), and ownership structure (SOE). In addition, Industry and Year denote industry and year fixed effects.

Variable definitions:

Management tone: We measure optimism about the future from the perspective of behavioral finance and psychology by using Python’s “Jieba” Chinese word-splitting module along with Loughran and McDonald’s [23] dictionary translated by Youdao Dictionary to automatically classify the text content of “Management Discussion and Analysis” in annual reports of listed companies. We use Henry [24], Price et al.’s [1] formulas to construct TONE1 and TONE2:

$$TONE1 = \frac{(POST - NEG)}{(POST + NEG)} \quad (2)$$

$$TONE2 = \ln \frac{(1 + POST)}{(1 + NEG)} \quad (3)$$

Here POST indicates the number of positive emotion words, and NEG signifies the number of negative emotion words. The TONE indicator is positively correlated with management tone positivity; a higher Tone value reflects a more optimistic management mindset.

ESG performance: We use the ESG rating index of China Securities to proxy for enterprise ESG performance in this paper. The index is based on the ESG rating models of Europe and the United States while considering the local characteristics of China, with broader coverage and a longer period of assessment. Specifically, we use the CSI ESG rating where “C to AAA” represents the lowest rating and “1 to 9” indicates the highest rating.

3.3. Descriptive statistics

Table 1 presents the descriptive statistics for the key variables. The mean values of management tone (TONE1 and TONE2) are 0.391 and 0.795, respectively. The minimum values are 0.045 and -0.588 , indicating that the number of positive words in both management discussion and analysis texts is greater than the number of negative words, and the overall management tone is positive. The mean value of ESG is 6.531, with a maximum value of 9 and a minimum value of 1, implying significant differences in ESG performance among different companies. However, the overall performance is favorable.

Table 1. Descriptive statistical analysis of key variables.

Variables	N	Mean	Std.dev	Min	Max
TONE1	19,944	0.391	0.133	0.045	0.705
TONE2	19,944	0.795	0.605	-0.588	2.639
ESG	19,944	6.531	1.193	0	9
Size	19,944	22.39	1.297	19.480	26.240
Lev	19,944	0.466	0.208	0.066	0.966
ROA	19,944	0.033	0.068	-0.299	0.216
Growth	19,944	0.178	0.557	-0.629	4.070
Board	19,944	2.143	0.198	1.609	2.708
Indep	19,944	0.375	0.054	0.333	0.571
Top1	19,944	0.340	0.147	0.085	0.733
Balance	19,944	0.659	0.570	0.025	2.615
SOE	19,944	0.468	0.499	0	1

4. Analysis of the empirical results

4.1. Corporate ESG performance and management tone: A test of aggregate effects

Table 2 displays the regression results examining the impact of firm ESG performance on management tone. In columns (1) and (3), the regression analysis controls solely for industry and year fixed effects. The coefficients for ESG and TONE1, as well as TONE2, are 0.017 and 0.046, respectively, both statistically significant at the 1% level. These findings tentatively suggest a positive association between ESG performance and management tone. Columns (2) and (4) present the regression results after incorporating additional control variables. The coefficients for ESG in relation to TONE1 and TONE2 are 0.007 and 0.017, respectively, both significant at the 1% level. These results continue to support the notion that stronger ESG performance corresponds to a more optimistic outlook from management regarding the company's present and future prospects. Thus, these findings provide support for hypothesis H1a.

Table 2. Regression results of ESG and management tone.

Variables	(1) TONE1	(2) TONE1	(3) TONE2	(4) TONE2
ESG	0.017*** (0.0007)	0.007*** (0.0008)	0.046*** (0.0033)	0.017*** (0.0036)
Constant	0.392*** (0.0114)	0.163*** (0.0199)	0.750*** (0.0513)	0.015 (0.0913)
Controls	NO	Yes	NO	Yes
Year and Ind	Yes	Yes	Yes	Yes
N	19,944	19,944	19,944	19,944
R-squared	0.221	0.294	0.239	0.284

Note: *, ** and *** indicate significant at the 10%, 5% and 1% levels, respectively, with standard errors in parentheses. Same below.

4.2. Corporate ESG performance and management tone: A test of mediating channel effects

In this section, we examine the mediating channel effects of corporate ESG performance on management tone, in accordance with theoretical derivation of hypothesis H1. Corporate ESG performance may impact management tone in two ways: 1) by demonstrating good sustainability and reducing information asymmetry, ESG performance can lower financing constraints, thus increasing management's optimism about future corporate development; and 2) by improving financial performance through promoting innovation performance, enhancing resource efficiency, and so on, ESG performance can increase management's optimism about current corporate development.

We first examine the mediating effect of financing constraints, using the KZ index and WW index as proxies, which are commonly used to measure the degree of financing constraints [25]. Since the relationship between ESG and management tone has been established in the previous section, it will not be repeated here. As shown in **Table 3**, columns (1) and (4) indicate that ESG has a significantly negative effect on both KZ and WW, demonstrating that corporate ESG performance can reduce financing constraints. Moreover, columns (2), (3), (5), and (6) reveal that both KZ and WW indexes are negatively significant for management tone proxies, TONE1 and TONE2, implying that financing constraints decrease management optimism about the future of the firm. These results confirm the path of "corporate ESG performance → (lower) financing constraints → (higher) management tone," suggesting that enhancing corporate ESG performance can improve executives' positive perceptions of corporate future by decreasing financing constraints, which is reflected in the MD&A text of annual reports.

Secondly, we examine the mediating effect of financial performance. Building on Nie et al. [26] study, we conducted a three-stage test using corporate return on assets (ROA) and return on net assets (ROE) as proxies for corporate financial performance. As presented in **Table 4**, columns (1) and (4) indicate that ESG has a significantly positive effect on both ROA and ROE at the 1% level, suggesting that improving corporate ESG performance can enhance financial performance. Moreover, columns (2), (3), (5), and (6) demonstrate that the proxies for

management tone, TONE1 and TONE2, exhibit significantly positive coefficients at the 1% level for ROA, ROE, and ESG. This confirms the path of “corporate ESG performance → (improved) financial performance → (improved) management tone,” implying that enhancing corporate ESG performance can lead to executives’ more positive views of their companies’ future through improved financial performance, which is reflected in the MD&A text of annual reports.

Table 3. Tests of mediating effects of financing constraints.

Variables	(1) KZ	(2) TONE1	(3) TONE2	(4) WW	(5) TONE1	(6) TONE2
KZ	-	-0.003*** (0.0007)	-0.008*** (0.0031)	-	-	-
WW	-	-	-	-	-0.005* (0.0028)	-0.045*** (0.0128)
ESG	-0.019** (0.0083)	0.007*** (0.0008)	0.017*** (0.0036)	-0.004** (0.0020)	0.007*** (0.0008)	0.016*** (0.0036)
Controls	Y	Y	Y	Y	Y	Y
Year and Ind	Y	Y	Y	Y	Y	Y
N	19,944	19,944	19,944	19,944	19,944	19,944
R-squared	0.659	0.295	0.284	0.331	0.294	0.284

Table 4. Tests for mediating effects of financial performance.

Variables	(1) ROA	(2) TONE1	(3) TONE2	(4) ROE	(5) TONE1	(6) TONE2
ESG	0.006*** (0.0004)	0.007*** (0.0008)	0.017*** (0.0036)	0.011*** (0.0009)	0.008*** (0.0008)	0.019*** (0.0036)
ROA	-	0.439*** (0.0136)	1.578*** (0.0625)	-	-	-
ROE	-	-	-	-	0.186*** (0.0062)	0.660*** (0.0282)
Controls	Y	Y	Y	Y	Y	Y
Year and Ind	Y	Y	Y	Y	Y	Y
N	19,944	19,944	19,944	19,944	19,944	19,944
R-squared	0.271	0.294	0.284	0.203	0.290	0.281

4.3. Corporate ESG performance and management tone: A test of moderating effects

As the world population continues to grow, population density has become an important factor influencing ecological and environmental patterns in the pursuit of sustainable development [27]. Therefore, in balancing population, environment, and economic development concerns, population density has become a crucial parameter for local governments to consider when addressing ESG development pressure. In this regard, we sought to determine whether management would be more sensitive to corporate ESG performance under population density pressure. The regression results are presented in **Table 5**. Notably, the interaction term PD_ESG is significantly positive with TONE1 and TONE2 at the 1% and 5% levels,

respectively, implying that population density further strengthens the positive relationship between corporate ESG performance and management optimism. Specifically, the positive correlation between the degree of management optimism and ESG performance is enhanced even more by population density. Precisely, the higher the population density, the greater the pressure on firms to meet local sustainability objectives. As such, when firms demonstrate better ESG performance, management of firms located in highly populated areas will exhibit greater optimism about the future.

Table 5. Tests for moderating effects of population density.

Variables	(1) TONE1	(2) TONE2
ESG	0.004*** (0.0013)	0.006 (0.0059)
PD	-0.027*** (0.0081)	-0.085** (0.0373)
PD_ESG	0.004*** (0.0012)	0.012** (0.0055)
Controls	Y	Y
Year and Ind	Y	Y
N	17,559	17,559
R-squared	0.296	0.281

Note: Population density is missing in Xinjiang and Tibet, so the sample size has been reduced.

4.4. Robustness test

Proxy variables for corporate ESG performance: To capture corporate ESG performance, we followed the method of Chen and Liu [28] and summed the dummy variables for the six elements of product advantage, philanthropic volunteer activities, social controversy advantage, diversity advantage, corporate governance advantage, employee relations advantage, and environmental advantage in the CNRDS database as proxy variables (CNRESG). As shown in columns (1) and (2) of **Table 6**, replacing the variables of corporate ESG performance did not alter the conclusions drawn in this paper.

Table 6. Robustness test regression results.

Variables	(1) TONE1	(2) TONE2	(3) YD1	(4) YD2	(5) TONE1	(6) TONE2
CNRESG	0.029*** (0.0048)	0.046** (0.0227)	-	-	-	-
ESG	-	-	0.001*** (0.0001)	0.008*** (0.0009)	0.002*** (0.0002)	0.006* (0.0033)
ABTONE	-	-	-	-	0.964*** (0.0022)	1.821*** (0.0305)
CJ	-	-	-	-	0.007*** (0.0013)	-0.006 (0.0184)

Table 6. (Continued).

Variables	(1) TONE1	(2) TONE2	(3) YD1	(4) YD2	(5) TONE1	(6) TONE2
CX	-	-	-	-	0.007*** (0.0004)	0.012** (0.0059)
Controls	Y	Y	Y	Y	Y	Y
Year & Ind	Y	Y	Y	Y	Y	Y
N	6112	6112	19,944	19,944	19,944	19,944
R-squared	0.337	0.296	0.309	0.373	0.934	0.393

Note: CNRESG has a reduced sample size due to missing data required in CNRDS.

Proxy variables for management tone: The full textual tone of listed companies' annual reports was adopted as a proxy variable for management's tone. Since annual reports, as an important means for management to disclose the company's business status to the public, may also be influenced by managers in parts other than MD&A, we used Price et al.'s [1] approach to measure management tone using (number of positive words—number of negative words)/total number of words and (number of positive words—number of negative words)/(number of positive words + number of negative words). Replacing the variables of management tone did not affect the findings of this paper, as presented in columns (3) and (4) of **Table 6**.

Endogeneity test: Firstly, we tested the issue of omitted variables. Davis et al. [29] have shown that personal characteristics of executives may impact management tone. Thus, following Wang [30], we included the dummy variable of chairman's military experience (1 for chairman with military experience, 0 otherwise) as a control variable for testing. Secondly, as management tone is susceptible to manipulation, we added the variable of management tone manipulation ABTONE, using He Kang and Wan Li-Mei's approach. Finally, to test whether management honestly expresses its emotional disposition towards the firm's present and future, we measured corporate integrity culture in four dimensions according to Zuo et al. [31]: whether the cultural propaganda contains words related to integrity connotation (with 0, otherwise with 1), new lawsuits and become defendants, fine expenditures, and public censure of executives, and included integrity culture CX in the model for testing. Columns (5) and (6) of **Table 6** demonstrate that our conclusions remain robust after adding the three control variables of executives' military experience, management tone manipulation, and corporate integrity culture.

Table 7. Robustness test regression results.

Variables	(1) TONE1	(2) TONE2	(3) TONE1	(4) TONE2
ESG	0.006*** (0.0009)	0.014*** (0.0039)	0.006*** (0.0009)	0.012*** (0.0043)
Controls	Y	Y	Y	Y
Year and Ind	Y	Y	Y	Y
N	16,682	16,682	14,221	14,221
R-squared	0.260	0.280	0.237	0.273

Note: The sample size was reduced because the ESG was lagged by 1 and 2 periods, respectively.

Secondly, lagging the explanatory variables can help alleviate the problem of two-way causality. To address this in our study, we lagged the independent variable ESG by one and two periods. As illustrated in **Table 7**, regression outcomes for lagged one period are presented in (1) and (2), while regression results for lagged two periods are displayed in (3) and (4). Both the lagged ESG and management tone (TONE1 and TONE2) are notably and positively associated at the 1% level, suggesting that the baseline regression findings remain robust.

Finally, we utilized the instrumental variable method. Based on Benlemlih and Bitar [32], we selected the mean value of the ESG rating of the firm’s location city in each year (IV_ESG) as an instrumental variable. The ESG performance of each firm is influenced by the ESG performance of listed companies within the local municipality where it is located, satisfying the relevance requirement. Meanwhile, the ESG rating of firms within the local municipality where it is located is not directly related to the firm’s development and management’s optimism, satisfying the exogeneity requirement. Therefore, we employed 2SLS for the regression of instrumental variables, and column (1) of **Table 8** presents the regression results of the first stage, indicating that IV_ESG satisfies the relevance requirement as it is significantly positive at the 1% level. Columns (2) and (3) display the regression results of the second stage, and ESG is significantly and positively correlated with TONE1 and TONE2 at the 1% level, indicating that the findings of this paper are robust.

Table 8. Regression results of the instrumental variables method.

Variables	(1) ESG	(2) TONE1	(3) TONE2
ESG	-	0.009***	0.024***
	-	(0.0020)	(0.0091)
IV_ESG	0.793***	-	-
	(0.0123)	-	-
Controls	Y	Y	Y
Year and Ind	Y	Y	Y
N	19,944	19,944	19,944
R-squared	0.387	0.291	0.280

5. Research conclusions and implications

This article explores the impact and mechanism of corporate ESG performance on management tone from the perspective of psychology and behavioral finance. The empirical study demonstrates that corporate ESG performance has a significant positive effect on management tone. Specifically, better corporate ESG performance is associated with more positive management tone through two mediating paths: reducing financing constraints and improving financial performance. Furthermore, the positive effect of corporate ESG performance on management tone positivity is more pronounced in regions with higher population density.

In the robustness test section, this paper tests the findings by adding control variables, such as management tone manipulation, corporate integrity culture, and managers’ military experience, lagged one-period and two-period explanatory

variables, and using the instrumental variable mean ESG of the prefecture-level city where the firm is located. These results suggest that corporate ESG performance can improve management's optimism about the current and future of the firm, after excluding the manipulation of management tone positivity for self-interest perspective.

The findings of this article have several implications. Firstly, it reveals the intrinsic mechanism and empirical evidence that corporate ESG performance promotes positive management sentiment, which may shift the mindset of managers from corporate profit maximization to stakeholder value maximization. Secondly, it provides reasonable speculation for the continued practice of ESG inputs in companies, which are crucial for sustainable economic development. Thirdly, it highlights that the market-oriented mechanism with Chinese characteristics does not put too much pressure on management due to the political orientation toward ESG development and sustainable development. Fourthly, it emphasizes the importance of the harmonious coexistence between human beings and nature, and corporate management's sensitivity to ESG performance in areas with higher population density reflects their contribution towards sustainable development.

The findings can inform long-term policy-making by emphasizing the importance of creating enabling environments for ESG integration. Policymakers can draw on these insights to design regulations and incentives that align corporate incentives with sustainable development goals.

However, the study's context-specific findings, particularly those related to China, may limit their generalizability to other regions. This highlights the need for caution when applying these insights universally. Future research could explore the applicability of these findings in different cultural and regulatory settings to understand the global implications of ESG performance on management sentiment.

Additionally, longitudinal studies could provide deeper insights into the long-term impacts of ESG integration on corporate strategy, performance, and societal outcomes.

Author contributions: Conceptualization, YH and XZ; methodology, YH; software, YH; validation, YH and XZ; formal analysis, YH; investigation, YH; resources, YH; data curation, YH; writing—original draft preparation, YH; writing—review and editing, YH; visualization, YH; supervision, YH; project administration, YH; funding acquisition, XZ. All authors have read and agreed to the published version of the manuscript.

Conflict of interest: The authors declare no conflict of interest.

References

1. Price SM, Doran JS, Peterson DR, et al. Earnings conference calls and stock returns: The incremental informativeness of textual tone. *Journal of Banking & Finance*. 2012; 36(4): 992-1011. doi: 10.1016/j.jbankfin.2011.10.013
2. Friede G. Why don't we see more action? A metasyntesis of the investor impediments to integrate environmental, social, and governance factors. *Business Strategy and the Environment*. 2019; 28(6): 1260-1282. doi: 10.1002/bse.2346
3. Liu YS, Chen YY. Management tone and credit risk warning of listed companies: Research based on the content analysis of company annual report text. *Financial Economics Research*. 2018; 4: 46-54.
4. Chen YY. Financial distress prediction of listed companies based on information disclosure text: Research based on the

- sample of Chinese annual report management discussion and analysis. *China Management Science*. 2019; 7: 23-34.
5. Anwar R, Malik JA. When Does Corporate Social Responsibility Disclosure Affect Investment Efficiency? A New Answer to an Old Question. *SAGE Open*. 2020; 10(2): 215824402093112. doi: 10.1177/2158244020931121
 6. Bénabou R, Tirole J. Individual and Corporate Social Responsibility. *Economica*. 2009; 77(305): 1-19. doi: 10.1111/j.1468-0335.2009.00843.x
 7. Krüger P. Corporate goodness and shareholder wealth. *Journal of Financial Economics*. 2015; 115(2): 304-329. doi: 10.1016/j.jfineco.2014.09.008
 8. Cowen SS, Ferreri LB, Parker LD. The impact of corporate characteristics on social responsibility disclosure: A typology and frequency-based analysis. *Accounting, Organizations and Society*. 1987; 12(2): 111-122.
 9. Cho CH, Patten DM. The role of environmental disclosures as tools of legitimacy: A research note. *Accounting, Organizations and Society*. 2007; 32(7-8): 639-647. doi: 10.1016/j.aos.2006.09.009
 10. Ryou JW, Tsang A, Wang KT. Product Market Competition and Voluntary Corporate Social Responsibility Disclosures†. *Contemporary Accounting Research*. 2022; 39(2): 1215-1259. doi: 10.1111/1911-3846.12748
 11. Zhang L, Tang Q, Huang RH. Mind the Gap: Is Water Disclosure a Missing Component of Corporate Social Responsibility? *The British Accounting Review*. 2021; 53(1): 100940. doi: 10.1016/j.bar.2020.100940
 12. Radhakrishnan S, Tsang A, Liu R. A Corporate Social Responsibility Framework for Accounting Research. *The International Journal of Accounting*. 2018; 53(4): 274-294. doi: 10.1016/j.intacc.2018.11.002
 13. Roberts RW. Determinants of corporate social responsibility disclosure: An application of stakeholder theory. *Accounting, Organizations and Society*. 1992; 17(6): 595-612.
 14. Guiral A, Moon D, Tan H, et al. What Drives Investor Response to CSR Performance Reports? *Contemporary Accounting Research*. 2019; 37(1): 101-130. doi: 10.1111/1911-3846.12521
 15. Li X, Tsang A, Zeng S, Zhou G. CSR reporting and firm value: International evidence on management discussion and analysis. *China Accounting and Finance Review*. 2021; 23(2): 102-145.
 16. Kile CO, Phillips ME. Using Industry Classification Codes to Sample High-Technology Firms: Analysis and Recommendations. *Journal of Accounting, Auditing & Finance*. 2009; 24(1): 35-58. doi: 10.1177/0148558x0902400104
 17. Zhu ZH, Xu WH. Does annual report tone manipulation, inefficient investment, and earnings management exist in listed companies? *Auditing and Economic Research*. 2018; 3: 63-72.
 18. Baker M, Wurgler J. Appearing and disappearing dividends: The link to catering incentives. *Journal of Financial Economics*. 2004; 73(2): 271-288. doi: 10.1016/j.jfineco.2003.08.001
 19. Aras G, Crowther D. Governance and sustainability. *Management Decision*. 2008; 46(3): 433-448. doi: 10.1108/00251740810863870
 20. Liu HH, Feng YJ. Does economic policy uncertainty affect corporate social responsibility information disclosure? *Journal of Beijing Technology and Business University (Social Sciences)*. 2020; 5: 70-82.
 21. Dremptic S, Klein C, Zwergel B. The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. *Journal of Business Ethics*. 2019; 167(2): 333-360. doi: 10.1007/s10551-019-04164-1
 22. LI F. The Information Content of Forward-Looking Statements in Corporate Filings—A Naïve Bayesian Machine Learning Approach. *Journal of Accounting Research*. 2010; 48(5): 1049-1102. doi: 10.1111/j.1475-679x.2010.00382.x
 23. Loughran T, McDonald B. When is a Liability not a Liability? Textual Analysis, Dictionaries and 10-Ks. *The Journal of Finance*. 2011; 66(1): 35-65.
 24. Henry E. Are Investors Influenced by How Earnings Press Releases Are Written? *Journal of Business Communication*. 2008; 45(4): 363-407. doi: 10.1177/0021943608319388
 25. Livdan D, Sapriza H, Zhang L. Financially Constrained Stock Returns. *The Journal of Finance*. 2009; 64(4): 1827-1862.
 26. Nie HH, Lin JN, Cui MY. Is ESG a feasible way for companies to promote common prosperity? *Learning and Exploration*. 2022; 328(11): 107-116+2.
 27. Kong DY, Chen HG, WU KS. The evolution of “Production-Living-Ecological” space, eco-environmental effects and its influencing factors in China. *Journal of Natural Resources*. 2021; 36(5): 1116. doi: 10.31497/zrzyxb.20210503
 28. Chen XS, Liu HD. Does investor attention affect the ESG performance of listed companies? Evidence from network search volume. *Journal of Zhongnan University of Economics and Law (Online)*. 2023.
 29. Davis AK, Ge W, Matsumoto D, et al. The effect of manager-specific optimism on the tone of earnings conference calls. *Review of Accounting Studies*. 2014; 20(2): 639-673. doi: 10.1007/s11142-014-9309-4

30. Wang YF, Xu YK. Does the military experience of senior executives affect corporate governance? Evidence from China's listed companies. *Management Review*. 2020; 32(1): 153-165.
31. Zuo R, Ma XJ, Li YJ. Corporate integrity culture, internal control, and innovation efficiency. *Statistics and Decision*. 2020; 36(9): 154-158.
32. Benlemlih M, Bitar M. Corporate Social Responsibility and Investment Efficiency. *Journal of Business Ethics*. 2016; 148(3): 647-671. doi: 10.1007/s10551-016-3020-2