Parameter Analysis and Impact Analysis of Enterprise ESG Scores

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Abstract. ESG is a method of evaluating the sustainability of business operations and their impact on social values from three dimensions: environmental, social, and corporate governance. The impact and degree of ESG on enterprises need to be studied. This paper collects various parameters of 21541 enterprises, including stock liquidity, enterprise size, establishment years, and so on. This paper explores the impact of the core explanatory variable ESG on the remaining variables. This paper uses correlation testing to analyze the strong correlation between ESG and enterprise size and lifespan. This paper further uses benchmark regression, robustness testing, and mediation effects to analyze the channels and pathways through which ESG significantly enhances a company's stock liquidity. The research conclusion suggests that ESG can reduce information asymmetry in enterprises, increase the attention of institutional investors, thereby unleashing the trading potential of enterprises and enhancing their stock liquidity. This study provides a good explanation for the impact of ESG scores on companies.

Keywords: ESG score; Stock liquidity; Correlation testing; Mediating effect.

1   Introduction

In June 2004, the United Nations Global Compact first proposed the concept of ESG, advocating that companies should not only value business performance, but also comprehensively consider three aspects: environmental protection, social responsibility, and corporate governance. At the 2015 Sustainable Development Summit, the United Nations once again proposed the guiding principles of ESG [1].

In recent years, China has been in a new stage of economic development. The report of the 20th National Congress of the Communist Party of China also put forward higher requirements for green transformation and environmental pollution prevention and control, proposing the "dual carbon" strategy of "carbon peak" and "carbon neutrality", and requiring the country to take the path of green, low-carbon and high-quality development [2]. Under the "dual carbon" goal, China's economy will transform towards a green and low-carbon direction. At this time, practicing the ESG concept is the only

way to achieve sustainable development and an important policy for achieving high-quality economic development in China.

The impact of ESG performance on corporate financial performance. The research on ESG concepts in foreign countries started relatively early, and academic research on ESG has been conducted for over 30 years [3]. However, there is relatively little research on the relationship between ESG and corporate performance. This paper will explore the impact of ESG on stock liquidity to verify its influence on corporate performance.

A few researchers believe that ESG is a hindrance to corporate financial performance, and there is a negative correlation between ESG and corporate financial performance. Garcia believes that while strengthening ESG, it is difficult to coordinate the development of the economy and draws negative correlation conclusions [4]. Enterprises investing too much energy and money in ESG management may not see immediate returns, leading to negative correlation conclusions.

Most researchers believe that ESG has a positive correlation with corporate performance. Ademi, B et al., studied US S&P 500 companies and found that companies with excellent ESG performance perform better financially and have higher market value [5]. Ghosh believes that organizations with sustainable performance also have higher financial performance [6]. On the one hand, ESG ratings can have a certain economic impact [7-9]. On the other hand, it will affect asset pricing [10-11]. Investors, academic researchers, and financial media will be attracted by a company's ESG rating, which in turn affects asset pricing [12-13].

But, Yu and Wang believe that the environment is negatively correlated with the economy [14]. Wright Ferris believes that overly transparent systems can seriously affect corporate performance. For example, a withdrawal announcement can have a significant negative excess return on the company's stock[15]. Early investors may have blindness, and a small amount of negative information can affect their overall judgment.

In further research, Almeyda and Darmansya considered ROA, ROC, Stock price and PE to measure financial performance [16]. The latest research shows that the impact of ESG on corporate performance varies and explores the mechanism of the positive correlation between ESG and corporate performance. On this basis, this paper will also explore the impact mechanism of ESG scores on the liquidity of corporate stocks.

2   Data Collection and Descriptive Analysis

2.1   Data Collection

This study searched for information on listed companies from 2013 to 2022, including ESG ratings and relatively complete publicly available data. And further delete enterprises with incomplete data. Finally, 21541 companies were collected, including 13 types of information.

When collecting data, there may be bias in the conclusions of this study because only companies with complete data were selected.

Table 1. Variable Description.

Variable	meaning
Liquidity	dependent variable: stock liquidity
ESG	Core explanatory variable ESG
Size	The natural logarithm of enterprise size
Age	natural logarithm of company establishment years
LEV	Asset liability ratio
ROE	Return on equity
ATO	Asset turnover ratio
SOE	Nature of equity
Growth	Revenue growth rate
Dual	Dual employment integration
Id	Proportion of independent directors
Board	Board size
Top1	Concentration of equity

As shown in Table 1. Including stock liquidity, core explanatory variable ESG, natural logarithm of company size, natural logarithm of company establishment years, asset liability ratio, return on equity, asset turnover ratio, equity nature, revenue growth rate, dual role integration, proportion of independent directors, board size and equity concentration.

2.2 Descriptive Analysis

This paper first conducts descriptive statistics on each variable to observe their distribution.

Table 2. Descriptive statistics of variables

Variable	Number	Mean	Stv.	Min	Max
Liquidity	21,541	-4.093	4.490	-28.411	-0.166
ESG	21,541	27.666	10.691	9.699	59.082
Size	21,541	22.519	1.338	19.780	26.456
Age	21,541	3.004	0.284	2.197	3.611
LEV	21,541	45.059	20.664	6.107	93.709
ROE	21,541	3.133	6.670	-26.065	21.709
ATO	21,541	63.496	45.703	5.851	273.687
SOE	21,541	0.447	0.497	0.000	1.000
Growth	21,541	15.668	45.784	-59.457	306.571
Dual	21,541	0.232	0.422	0.000	1.000
Id	21,541	37.665	5.472	33.333	57.143
Board	21,541	2.132	0.197	1.609	2.708
Top1	21,541	32.946	14.741	8.020	72.880

As shown in Table 2, the average value of the dependent variable Liquidity is -4.093, the standard deviation is 4.490, the minimum value is -28.411, and the maximum value is -0.166, indicating that the stock liquidity of each company fluctuates greatly. The average value of the core explanatory variable ESG is 27.666, with a standard deviation of 10.691, fluctuating between 9.699 and 59.082. This indicates that the ESG performance of the selected sample companies in this paper has some fluctuations, but not very large. In the control variables, the average value of the natural logarithm size of the enterprise size is 22.51, the standard deviation is 1.338, the minimum value is 19.780, and the maximum value is 26.456. The average value of the natural logarithm AGE of the company's establishment years is 3.004, with a standard deviation of 2.197. The average value of the asset liability ratio (LEV) is 45.059, with a standard deviation of 20.664. The minimum value is 6.107, and the maximum value is as high as 93.709, reflecting a significant change in the asset liability ratio of the sample companies. The average return on equity (ROE) is 3.133, with a standard deviation of 6.670, fluctuating between -26.065 and 21.709, with significant differences. The average asset turnover rate ATO is 63.496, with a standard deviation of 45.703. The minimum value is 5.851, and the maximum value is as high as 273.687. The average value of equity nature is 0.447, indicating that a considerable portion of the sample selected in this paper belongs to state-owned or collectively owned enterprises. The average revenue growth rate of Growth is 15.668, with a standard deviation of 45.784, fluctuating between -59.457 and 306.571, indicating significant differences in revenue growth rates among different companies. The average value of dual employment is 0.232, reflecting that the proportion of companies with dual employment is relatively small. The average value of the independent director ratio Id is 37.665, with a standard deviation of 5.472. The average size of the Board is 2.132, with a standard deviation of 0.197. The average value of equity concentration Top1 is 32.946, with a standard deviation of 14.741.
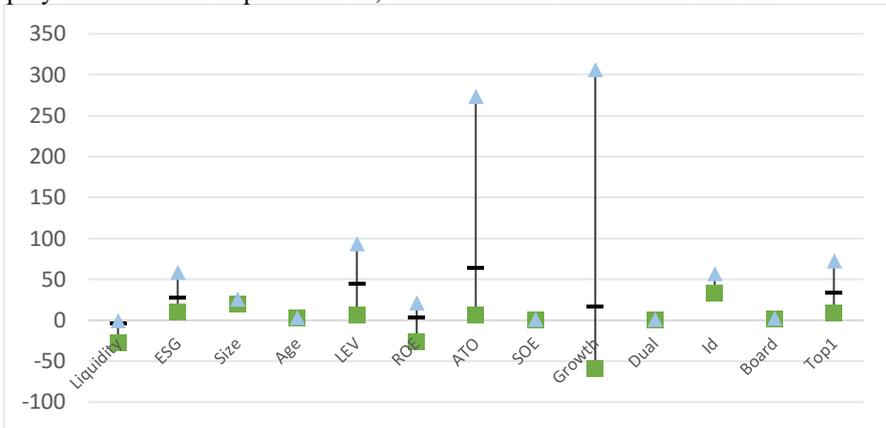

Fig. 1. Description of each parameter.

As shown in Figure 1, the distribution range of each parameter, among which the "growth" distribution is the widest.

3   Correlations

The main purpose of correlation analysis is to evaluate whether there is a relationship between two or more variables, as well as the strength and direction of this relationship. Through correlation analysis, we can understand the interactions between variables and provide a basis for further in-depth analysis or decision-making.

This paper further tests the correlation between various variables and calculates the Pearson correlation coefficients between them. The results are shown in Table 3. From the results, it can be seen that there is a significant weak correlation between the explained variable Liquidity and ESG, with a correlation coefficient of 0.10 and reaching a significance level of 0.1, indicating that as ESG increases, Liquidity also increases, and the two show a consistent trend.

Table 3. Correlation test of variables

	Liquidity	ESG	Size	Age	LEV	ROE	ATO	SOE	Growth	Dual	Id	Board	Top1
Liquidity	1.00												
ESG	0.10*	1.00											
Size	0.42*	0.14*	1.00										
Age	0.08*	0.13*	0.16*	1.00									
LEV	0.01	0.02*	0.44*	0.16*	1.00								
ROE	0.16*	0.06*	0.10*	-0.05*	-0.32*	1.00							
ATO	0.03*	0.07*	0.07*	0.02*	0.13*	0.18*	1.00						
SOE	0.06*	0.00	0.28*	0.10*	0.23*	-0.04*	0.03*	1.00					
Growth	-0.03*	-0.03*	0.03*	-0.03*	0.02*	0.24*	0.15*	-0.04*	1.00				
Dual	-0.03*	-0.03*	-0.14*	-0.07*	-0.09*	0.00	-0.03*	-0.26*	0.02*	1.00			
Id	0.00	0.01	0.02*	-0.03*	0.01	-0.03*	-0.02*	-0.03*	-0.01	0.10*	1.00		
Board	0.10*	0.04*	0.25*	0.05*	0.12*	0.05*	0.01*	0.22*	-0.01*	-0.17*	-0.54*	1.00	
Top1	-0.01	0.00	0.26*	-0.11*	0.07*	0.14*	0.09*	0.28*	0.00	-0.10*	0.03*	0.06*	1.00

Note: * indicates significant at the 0.1 level.

Among other control variables, there is a strong positive correlation between enterprise size (Size) and the dependent variable (Liquidity), with a correlation coefficient of 0.42 and reaching a significance level of 0.1, indicating that larger enterprises have higher stock liquidity. The return on equity (ROE), board size, and liquidity also show a significant positive correlation, with correlation coefficients of 0.16 and 0.10, respec-

tively, indicating that ROE and board size can also improve the stock liquidity of enterprises to a certain extent. The correlation between other variables and liquidity is weak. The correlation coefficients of enterprise size, enterprise age, and ESG among explanatory variables and control variables are 0.14 and 0.13, respectively, and both are significant, indicating that the larger the enterprise size and the longer the age, the better its ESG performance. The correlation between other control variables and ESG is relatively weak.

4   Multicollinearity Test

Generally speaking, multiple variables included in a regression model need to be tested for high collinearity to avoid inconsistent estimation results. Usually, the VIF variance inflation coefficient of each variable in the calculation model is required to be less than 10. After adopting OLS regression estimation, the VIF values of each variable were calculated in this paper.

Table 4. Multicollinearity test

Variable	VIF	1/VIF
Board	1.62	0.62
LEV	1.59	0.63
Size	1.57	0.64
Id	1.47	0.68
ROE	1.38	0.72
SOE	1.27	0.79
Top1	1.19	0.84
ATO	1.10	0.91
Dual	1.10	0.91
Growth	1.09	0.91
Age	1.09	0.92
ESG	1.05	0.96
Mean VIF	1.29	

As shown in Table 4. From the results, it can be seen that the VIF values of each variable are far below 10, with an average of 1.29. Therefore, there is no significant multicollinearity among the variables, which can be further analyzed.

5   Benchmark Regression

Benchmark regression involves performing benchmark regression on the model to obtain the coefficients of the core explanatory variables, and determining the impact of

the studied parameters on the dependent variable based on the sign, size, and significance of the coefficients.

This paper first presents the benchmark regression results of various variables on liquidity. To compare the differences in the models, this paper only includes the core explanatory variable ESG in Model 1 and does not control for annual and individual effects. In the model, only the core explanatory variable ESG is included, but annual and individual effects are controlled. Model 3 includes core explanatory variables ESG and other control variables, but does not control for annual and individual effects. Model 4 includes all variables and controls for annual and individual effects. The regression results are shown in Table 5. From the results, it can be seen that Model 1 has a low adjusted R-squared value of only 0.011, indicating that the fitting effect is low when only ESG is included as a variable. But the F-value of the model is significant, indicating that it can generalize from sample conclusions to the overall population. The regression coefficient of ESG is 0.048, reaching a significance level of 0.01, indicating that the higher the ESG, the greater the liquidity of the company's stocks. This hypothesis has been preliminarily validated. The results of Model 2 remain consistent, with the regression coefficient of ESG increasing to 0.050 after controlling for fixed effects of year and company, also reaching a significance level of 0.01, indicating that ESG still has a significant impact on improving stock liquidity.

Table 5. Benchmark regression results

Variable	Model 1	Model 2	Model 3	Model 4
ESG	0.048***	0.050***	0.009***	0.004*
	(14.12)	(13.00)	(3.66)	(1.65)
Size			1.792***	1.695***
			(71.84)	(68.99)
Age			0.230**	-0.389***
			(2.35)	(-3.67)
LEV			-0.042***	-0.038***
			(-25.64)	(-24.50)
ROE			0.054***	0.057***
			(11.55)	(12.56)
ATO			0.003***	0.004***
			(4.73)	(6.83)
SOE			0.056	0.055
			(0.93)	(0.96)
Growth			-0.007***	-0.009***
			(-11.10)	(-14.59)
Dual			0.131**	0.110*
			(1.98)	(1.74)
Id			-0.010*	-0.006
			(-1.73)	(-1.00)
Board			-0.392**	-0.042
			(-2.28)	(-0.25)

			-0.043***	-0.039***
Top1			(-21.99)	(-20.78)
_cons	-5.416***	-5.492***	-41.171***	-38.241***
	(-49.40)	(-49.78)	(-59.67)	(-54.46)
year FE	NO	YES	NO	YES
enterprise FE	NO	YES	NO	YES
N	21,541	21,541	21,541	21,541
Adjusted R-Square	0.011	0.011	0.243	0.240
F	96.03	169.05	6889.94	544.66
Prob.	0.000	0.000	0.000	0.000

Note: *, * *, * * * respectively indicate significance at the 0.1, 0.05, and 0.01 levels; The value of t is in parentheses.

In Model 3, control variables were added, and the R-squared of the model increased to 0.243, greatly enhancing the explanatory power. The results showed that the regression coefficient of ESG remained significant at 0.009, but showed a significant decrease compared to Model 1 and Model 2, indicating that some of the impact of ESG on stock liquidity was explained by other control variables. However, it can still be seen that ESG has a significant positive effect on stock liquidity. Model 4 controls for year and company effects, and the results show that the regression coefficient for ESG is 0.004, which is also significant. Therefore, the positive effect of ESG on stock liquidity has been validated. The better a company performs in terms of environment, society, and governance, the more it can help improve its stock liquidity, attract investor attention, and enhance investor sentiment. Among the control variables, the regression coefficient of enterprise size (Size) is 1.685 and reaches a significance level of 0.01, indicating that the larger the enterprise size, the higher the stock liquidity of the enterprise. The regression coefficient of return on equity (ROE) is also significantly positive, at 0.057, indicating that the higher the ROE, the better the liquidity of the company's stock. The impact of asset turnover ratio (ATO) and dual employment on stock liquidity is also significantly positive, with coefficients of 0.004 and 0.110, respectively. However, the regression coefficients for enterprise age and asset liability ratio (LEV) are significantly negative, at -0.389 and -0.038, respectively, indicating that the longer the full age and higher the asset liability ratio, the poorer the stock liquidity and the less likely it is to attract investors' attention and favor. The regression coefficients for asset growth rate (Growth) and equity concentration (Top1) are -0.009 and -0.039, respectively, reflecting their significant negative effects on stock liquidity.

6   Robust Test

Robustness testing is mainly used to evaluate the stability and reliability of statistical models in the face of imperfect or outlier data, which is an indispensable part of model statistics.

To verify the robustness of the regression results, this study adopted the method of replacing core explanatory variables and lagged core explanatory variables. As shown in Table 6, during the process of replacing the core explanatory variable ESG, the original ESG score was changed to Huazheng ESG rating, and the samples with ESG rating of Class A were assigned a value of 3, Class B was assigned a value of 2, and Class C was assigned a value of 1. This resulted in the ESG rating variable ESG_Rank for each sample, which was then regressed again. The results showed that the regression coefficient was 0.661 and reached a significance level of 0.01, indicating that after replacing explanatory variables, the positive effect of ESG on stock liquidity remained significant. The higher the rating, the better the stock liquidity.

Table 6. Robust test

Variable	Replace explanatory variables	Lagged explanatory variable
ESG_Rank	0.661*** (14.88)	-
ESG L1.	-	0.007** (2.13)
control variable	control	control
_cons	-30.539*** (-36.73)	-38.000*** (-42.03)
Year FE	YES	YES
Enterprise FE	YES	YES
N	17,228	19,390
Adjusted R-Square	0.223	0.219
F	452.11	3252.59
Prob.	0.000	0.000

Note: *, * *, * * * respectively indicate significance at the 0.1, 0.05, and 0.01 levels; The value of t is in parentheses.

Due to the fact that the core explanatory variable and the dependent variable are often in the same period, their causal relationship may only show a positive effect due to the influence of other variables, that is, during the same period, the explanatory variable may affect the dependent variable, but the dependent variable may also affect the explanatory variable, and the causal relationship may be reversed. To avoid this issue, this paper treats the core explanatory variables as lagged by one period, which affects the stock liquidity of the next year based on the current ESG performance, thereby removing the mutual influence of the same period in time. Only the current ESG may affect the stock liquidity of the next year. If the regression result is still positive and significant, it indicates that ESG is the factor affecting the improvement of stock liquidity. The regression results of lagged explanatory variables show that the regression coefficient of ESG L1. is 0.007 and reaches a significance level of 0.05, indicating that

after lagged explanatory variables, the impact of ESG on stock liquidity is still significantly positive.

From the model results of replacing explanatory variables and lagged explanatory variables, it can be seen that ESG still has a significant and positive impact on the liquidity of corporate stocks. Therefore, the regression results in the previous section are robust.

7   Analysis of Intermediary Effect

The purpose of the mediation effect test is to explore whether the influence of an independent variable on the dependent variable is indirectly achieved through the mediation variable, in order to determine the mechanism of the mediation variable between the independent variable and the dependent variable.

As can be seen from the previous text, ESG can significantly enhance a company's stock liquidity, but the specific channels and paths through which it affects stock liquidity are directions worth further analysis. This paper introduces two mediating variables, namely information asymmetry (Infor) and institutional investor attention, to further analyze whether ESG affects the degree of information asymmetry and institutional investor attention of companies, thereby causing changes in market sentiment and liquidity towards company stocks. The results are shown in Table 7.

Table 7. Analysis of intermediary effect

Model	The mediating effect of information asymmetry in Info			The mediating effect of institutional investor attention		
Explained Variable	info	Liquidity	Liquidity	attention	Liquidity	Liquidity
info		-0.017***	-0.017***			
		(-9.75)	(-9.67)			
attention					0.027***	0.027***
					(13.97)	(13.92)
ESG	-0.038***		0.008***	0.153***		0.005**
	(-3.45)		(3.48)	(9.01)		(2.19)
control variable	control	control	control	control	control	control
_cons	-121.892***	-43.296***	-0.033***	121.918***	-44.540***	-0.044***
	(-41.05)	(-54.57)	(-14.67)	(24.02)	(-55.17)	(-22.91)
Year FE	YES	YES	YES	YES	YES	YES
Enterprise FE	YES	YES	YES	YES	YES	YES
N	21,541	21,541	21,541	21,541	21,541	21,541
Adjusted R-Square	0.420	0.246	0.246	0.0557	0.2693	0.269

Note: *, * *, * * * respectively indicate significance at the 0.1, 0.05, and 0.01 levels; The value of t is in parentheses.

From the mediation effect model of information asymmetry in info, it can be seen that the regression coefficient of ESG on info is -0.038, which reaches a significance level of 0.01, indicating that ESG will significantly reduce the level of information asymmetry and improve the market transparency of enterprises. In the regression results of information asymmetry on liquidity, information asymmetry also has a negative effect on stock liquidity, with a regression coefficient of -0.017, reaching a significance level of 0.01. That is to say, the higher the degree of information asymmetry of a company, the worse its stock liquidity. The regression results of combining information asymmetry info and ESG on stock liquidity show that info has a regression coefficient of -0.017 and ESG has a regression coefficient of 0.008, both reaching a significant level of 0.01. Therefore, information asymmetry can reduce a company's stock liquidity, while ESG can improve a company's stock liquidity by reducing the level of information asymmetry. There is a mediating effect of information asymmetry in the impact of ESG on stock liquidity. Generally speaking, when the market observes that institutional investors hold a high proportion of shares in a company, doubts will inevitably arise. However, if the company has a high ESG evaluation and can gain more trust from the public, this can alleviate the market's doubts about the company, increase its attention, and further obtain better stock liquidity.

In the mediation effect model results of institutional investors' attention, firstly, the regression coefficient of ESG on attention is 0.153, which reaches a significance level of 0.01, indicating that the higher the ESG level of a company, the higher the attention of institutional investors. ESG level can attract institutional investors to further understand and analyze the company. The regression coefficient of institutional investors' attention to stock liquidity is 0.027, which also reaches a significant level of 0.01, indicating that the higher the level of institutional investors' attention, the easier it is to invest in enterprises, and thus the better the stock liquidity. When both factors return to stock liquidity, the regression coefficients for institutional investor attention and ESG are 0.027 and 0.005, respectively, and both are significant. Therefore, institutional investor attention has a significant mediating effect on the impact of ESG on stock liquidity. When the ESG level is higher, it is easier to attract institutional investors to conduct research and analysis on the company, understand its situation, and further increase the circulation level of the company's stocks in the market, enhancing the trading vitality of the company.

Therefore, the results of the two mediation models indicate that ESG can reduce information asymmetry in enterprises, increase the attention of institutional investors, thereby unleashing the trading potential of enterprises and enhancing their stock liquidity. ESG can not only improve stock liquidity on its own, but also influence the level of information asymmetry and investor attention of companies, thereby affecting stock liquidity and enhancing trading efficiency for both companies and the market.

8   Conclusion

This paper collects various parameters from 21541 enterprises. The core explanatory variable ESG has a strong positive correlation with stock liquidity.

This paper uses correlation testing to analyze the strong correlation between ESG and firm size and age. This paper further uses benchmark regression, robustness testing, and mediation effects to analyze the channels and paths through which ESG significantly improves the stock liquidity of enterprises.

This study analyzed the impact mechanism of ESG scores on stock liquidity. The research conclusion suggests that ESG scores can reduce information asymmetry in enterprises and increase the attention of institutional investors, thereby unleashing the trading potential of enterprises and enhancing their stock liquidity.

After drawing conclusions from this study and examining the actual situation, it can be seen that the ESG rating and stock liquidity of "Yanjing Beer" are both very high. Similarly, there are "Phoenix Bamboo Textile", "Morning Light Biology", "Yunnan Nengtou" and so on.

Acknowledgment

References

1. Krantz, T., & Krantz, T. (2024). The History of ESG: A Journey towards Sustainable Investing. IBM Blog. https://www.ibm.com/blog/environmental-social-and-governance-history/.
2. Briefing, C. (2023, November 20). China Carbon Emissions Reduction—"Dual Control" Mechanism Explained. China Briefing News. https://www.china-briefing.com/news/china-carbon-emissions-reduction-dual-control-explained/.
3. Bagh, T., Fuwei, J., & Khan, M. A. (2024). Corporate ESG Investments and Firm's Value under the Real-Option Framework: Evidence from Two World-Leading Economies. Borsa Istanbul Review, 24, 324-340. https://doi.org/10.1016/j.bir.2024.01.002.
4. Garcia A S, Mendes Da-Si-lvaW, Orsato R J . Sensitive industries produce better ESG performance:Evidence from emerging markets [J]. Journal of Cleaner Production, 2017. 150(MAY1).
5. Ademi, B. , & Klungseth, N. J. . (2022). Does it pay to deliver superior esg performance? evidence from us s&p 500 companies. Journal of Global Responsibility.
6. Ghosh, A. (2013). Corporate Sustainability and Corporate Financial Performance: The Indian Context. Working Paper Series WPS No. 721/January 2013, Indian Institute of Management. http://financelab.iimcal.ac.in/resdoc/WPS%20721.pdf.
7. Servaes, H., and Tamayo, A. (2013). The impact of corporate social responsibility on firm value: The role of customer awareness. Manage. Sci. 59, 1045–1061.
doi: 10.1287/mnsc.1120.1630.
8. Cheng, B., Ioannou, I., and Serafeim, G. (2014). Corporate social responsibility and access to finance. Strategic. Manage. J. 35, 1–23. doi: 10.1002/smj.2131.
9. Khan, M., Serafeim, G., and Yoon, A. (2016). Corporate sustainability: first evidence on materiality. Account. Rev. 91, 1697–1724. doi: 10.2308/accr-51383.

10. Engle, R. F., Giglio, S., Kelly, B., Lee, H., and Stroebel, J. (2020). Hedging climate change news. Rev. Financ. Stud. 33, 1184–1216. doi: 10.1093/rfs/hhz072.
11. Pedersen, L. H., Fitzgibbons, S., and Pomorski, L. (2021). Responsible investing: the ESG-efficient frontier. J. Finan. Econ. 142, 572–597. doi: 10.1016/j.jfineco.2020.11.001.
12. Chatterji, A. K., Durand, R., Levine, D. I., and Touboul, S. (2016). Do ratings of firms converge? Implications for managers, investors and strategy researchers. Strategic. Manage. J. 37, 1597–1614. doi: 10.1002/smj.2407.
13. Gibson Brandon, R., Krueger, P., and Schmidt, P. S. (2021). ESG rating disagreement and stock returns. Financ. Anal. J. 77, 104–127. doi: 10.1080/0015198X.2021.1963186.
14. Yu, J. Q., & Wang, Y. (2021). Research on the Impact of Corporate ESG Performance on Corporate Value from the Perspective of Ecological Civilization—Taking Listed Manufacturing Companies in Beijing, Tianjin and Hebei as an Example. Financial Theory Research, No. 2, 81-91.
15. FERRIS W S P. Agency Conflict and Corporate Strategy: The Effect of Divestment on Corporate Value[J]. Strategic Management Journal, 1997, (1) : 77 - 83.
16. Almeyda, R., & Darmansya, A. (2019). The Influence of Environmental, Social, and Governance (ESG) Disclosure on Firm Financial Performance. Aptech Proceeding International Seminar on Applied Technology, Science & Arts: Development of Green Agro-Industry to Support Human Life Sustainability, No. 5, 278. https://doi.org/10.12962/j23546026.y2019i5.6340.