

ESG Score Boosts Stock Excess Returns: From the Perspective of Information



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Abstract: This study examines whether environmental, social, and governance (ESG) performance improves risk-adjusted stock returns and identifies the information-transmission channels underlying this relationship. Using an unbalanced panel of 1,104 Chinese A-share listed firms from 2011 to 2019 and Bloomberg ESG scores, the analysis employs a two-way fixed-effects model with firm-level clustered standard errors. The baseline results show that higher ESG scores are significantly associated with higher stock excess returns, measured by the Sharpe ratio. Mechanism tests further indicate that ESG performance affects stock returns by alleviating information asymmetry, concentrating investors' limited attention, and strengthening investor confidence. The information-asymmetry channel exhibits a masking effect, whereas analyst coverage and investor confidence operate as partial mediators. The baseline findings remain robust after using lagged ESG scores, applying a city-peer ESG instrumental variable in a two-stage least-squares framework, replacing the dependent and explanatory variables, adding additional controls, and winsorizing continuous variables. Heterogeneity tests show that the positive ESG effect is stronger for non-state-owned firms, heavily polluting firms, and firms located in more market-oriented regions. Further analysis indicates that the environmental and governance dimensions are the principal drivers of the aggregate ESG effect and that institutional ownership partially mediates the ESG-return relationship. Overall, the findings show that ESG performance is relevant not only to corporate fundamentals but also to the transmission and incorporation of firm-specific information into stock prices, with implications for listed firms, investors, financial institutions, and regulators.

Keywords: ESG; Information Transmission; Information Asymmetry; Limited Attention; Investor Confidence; Stock Excess Returns

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1 Introduction

Environmental, social, and governance (ESG) performance extends conventional financial analysis by incorporating firms' environmental responsibility, stakeholder relations, and governance quality. It therefore provides investors with information on long-term risks, strategic resilience, and intangible assets that may not be fully reflected in accounting statements. ESG has become an important framework for responsible investment and corporate sustainability [1]. In China, the carbon-neutrality agenda, gradual improvement of listed-company disclosure rules,

and expanding demand for responsible investment have accelerated ESG adoption. At the same time, differences in disclosure quality and investor information-processing capacity make China a useful setting for examining whether ESG information is effectively priced.

The question is economically important because stock excess returns depend on both expected profitability and risk. ESG practices may enhance expected cash flows by improving stakeholder cooperation, reputation, innovation,

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and operating efficiency. They may also reduce environmental, legal, governance, and reputational risks. However, ESG investment can impose current costs, and weak disclosure may allow symbolic compliance or greenwashing. The net effect on risk-adjusted returns is therefore theoretically ambiguous and requires empirical testing.

The relevance of information transmission is particularly strong in China's capital market, where information acquisition and interpretation remain uneven across investors. ESG scores are transmitted through corporate reports, analysts, the media, and investor trading. High-quality disclosure and media scrutiny can reduce uncertainty and information-acquisition costs. Yet these effects depend on whether ESG information is credible, recognized, and incorporated into stock prices [2]. A high score that is not understood by investors may have little pricing effect, whereas credible and salient information may alter both expected returns and perceived risk.

This study asks whether corporate ESG scores increase stock excess returns and, if so, through which information-transmission channels. Using Bloomberg scores and Chinese A-share data, it tests three mechanisms—information asymmetry, limited attention, and investor confidence. It also addresses reverse causality and omitted-variable concerns, examines heterogeneity by ownership, pollution intensity, and regional marketization, and evaluates the separate E, S, and G dimensions and the mediating role of institutional ownership. The study contributes by focusing on risk-adjusted returns measured by the Sharpe ratio, opening the information-transmission 'black box,' and providing evidence from a major emerging market.

2 Literature Review

2.1 ESG, Firm Value, and Investment Outcomes

ESG research generally links responsible corporate behavior to both economic and social outcomes. At the firm level, stronger ESG performance may lower financing costs by reducing information risk and expanding access to green finance. It may also improve operating efficiency through better governance, employee relations, and resource use, while reducing environmental, legal, and reputational exposure. These channels can jointly enhance long-term firm value [3]. However, ESG activities also require resources, and their benefits may be delayed or contingent

on firms' financial capacity and external institutions.

Evidence on investment outcomes is mixed but increasingly supports a positive ESG premium. High-ESG firms can generate additional returns, particularly when market conditions deteriorate and investors value resilience [4]. Responsible behavior may create 'moral capital' that protects reputation, stakeholder support, and cash flows during adverse events [5]. Institutional investors also display preferences for firms with stronger ESG performance [6]. Institutional investor participation may reinforce valuation effects and improve the incorporation of firm-specific information into prices.

ESG may further support sustainable innovation and intangible value. Firms that invest in employees, environmental improvement, product safety, and stakeholder relationships can build durable competitive advantages that markets may initially underprice [7]. Conversely, managerial self-interest may lead firms to undertake costly or symbolic ESG projects that do not improve fundamentals. These competing arguments imply that the direction and magnitude of the ESG-return relationship depend on how ESG affects cash flows, risk, and investor beliefs.

2.2 ESG and Stock Excess Returns

Stock excess returns reflect the compensation investors receive beyond the risk-free benchmark after accounting for risk. Traditional asset-pricing explanations focus on firm fundamentals and systematic risk, whereas behavioral research emphasizes heterogeneous beliefs, limited attention, and sentiment [8]. ESG information can operate through both perspectives: it may alter expected cash flows and risk, and may also change the way investors evaluate and trade stocks.

Prior studies associate stronger ESG performance with lower stock price crash risk and higher firm value [9, 10]. ESG disclosure can reduce the accumulation of negative information, improve stakeholder relations, and strengthen firms' ability to absorb adverse shocks. Other evidence links ESG to higher stock returns through lower price synchronicity, greater investor attention, and stronger resilience during crises [6, 11]. Research also reports positive ESG risk premia in China's A-share market [4]. Nevertheless, findings differ across ownership types, industries, regions, and ESG rating systems, indicating that the institutional environment and the measurement of returns matter.

Two gaps remain. First, much of the literature emphasizes firm value, raw returns, or crash risk rather than risk-adjusted stock excess returns. A positive raw return does

not imply superior performance if it is accompanied by higher volatility. Second, existing mechanism tests often focus on internal corporate channels, such as financing constraints or innovation, while less attention is paid to how ESG information is transmitted to and processed by market participants.

This study addresses these gaps in three ways. It evaluates the ESG-return relationship using the Sharpe ratio, which jointly reflects return and total risk; it applies a mediation framework to information asymmetry, limited attention, and investor confidence; and it combines endogeneity, robustness, heterogeneity, dimension-specific, and institutional-ownership tests within a unified empirical design. This structure follows the empirical logic commonly used in ESG mechanism studies while adapting it to an information-transmission perspective.

3 Theoretical Analysis and Research Hypotheses

ESG embeds environmental responsibility, stakeholder relations, and governance quality into corporate strategy

and operations [12]. Signaling theory predicts that firms with favorable private information have incentives to communicate credible signals to distinguish themselves from weaker firms. ESG performance can serve this role by revealing management quality, risk control, and long-term orientation. Stakeholder theory further suggests that responsible firms obtain trust, resources, and cooperation from employees, customers, creditors, suppliers, communities, and investors. These benefits can improve operating performance and reduce exposure to stakeholder conflict.

Better ESG performance can improve stock excess returns through both return and risk channels. Positive ESG signals may raise expected cash flows and valuations by strengthening reputation, stakeholder support, and access to resources. Stronger governance and risk management can reduce volatility, litigation, regulatory penalties, and the probability of severe negative events. ESG may also attract informed investors and reinforce confidence in future performance [13]. Because the Sharpe ratio increases when expected excess returns rise or total risk falls, both channels predict a positive aggregate effect. Accordingly, the first hypothesis is:

H1: Higher ESG scores increase stock excess returns.

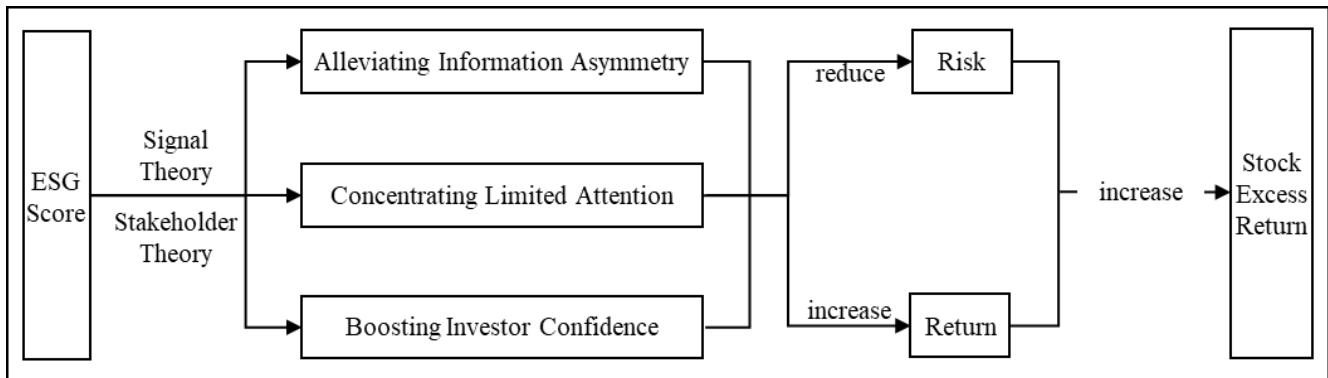


Figure 1 Mechanism of ESG Score Influencing Stock Excess Return

3.1 Information Asymmetry Channel

ESG disclosure supplements financial statements with firm-specific non-financial information. Firms with stronger ESG performance tend to disclose more voluntarily and establish better communication with external stakeholders [14]. Environmental indicators reveal exposure to regulation and pollution liabilities, social indicators provide information on employees, customers, and supply chains, and governance indicators reflect oversight and investor protection. Greater transparency reduces investors'

information-acquisition costs and limits managerial concealment of adverse information. It also enables investors to distinguish firm-specific fundamentals from market-wide signals, thereby reducing reliance on speculative trading or herding behavior. Because market-based information asymmetry affects corporate financing choices and investors' assessment of firm risk [15], more credible ESG information should improve price informativeness and reduce uncertainty. As ESG-related risks and opportunities are incorporated into prices more accurately, the mismatch between perceived risk and expected return is also reduced. This channel can raise the Sharpe ratio by lowering stock

risk and limiting mispricing. Thus:

H2: Higher ESG scores increase stock excess returns by alleviating information asymmetry.

3.2 Limited Attention Channel

Investor attention is scarce, and complex information is incorporated into prices more slowly than salient and accessible information [16]. This constraint is especially relevant in a market with substantial retail participation and heterogeneous information-processing ability [17]. ESG reports can be lengthy and multidimensional, but ratings summarize this information into a comparable signal. By converting dispersed environmental, social, and governance information into a standardized measure, ESG ratings lower the cognitive and search costs associated with evaluating corporate sustainability. High-ESG firms are also more likely to attract analysts, media coverage, and institutional investors. Analyst research reduces search and interpretation costs, directs attention to material firm characteristics, and accelerates the incorporation of information into prices. Greater attention allows investors to process not only conventional financial indicators but also information on long-term risks, stakeholder relations, and governance quality, thereby mitigating rational inattention. More concentrated attention can therefore reduce underreaction, mispricing, and risk. Therefore:

H3: Higher ESG scores increase stock excess returns by concentrating investors' limited attention on the firm.

3.3 Investor Confidence Channel

Investors translate market information into beliefs, confidence, and trading decisions. Strong ESG performance signals stable operations, effective risk management, and long-term commitment to stakeholders. It may also attract institutional ownership, providing an additional favorable signal to individual investors [6]. The participation of professional investors can further validate the credibility of ESG information and strengthen market expectations regarding the firm's future performance. ESG-generated moral capital can cushion negative shocks [5], while transparent ESG practices reduce the accumulation of undisclosed bad news [18]. Firms with stronger stakeholder relationships and risk-management capacity are therefore perceived as more resilient when market conditions deteriorate or adverse events occur. Confidence affects valuation because optimistic investors are more willing to hold the

stock and less likely to sell in response to temporary uncertainty. By stabilizing expectations, supporting stock demand, and reducing excessive price fluctuations, ESG may simultaneously raise returns and reduce volatility. Hence:

H4: Higher ESG scores increase stock excess returns by strengthening investor confidence.

4 Research Design

4.1 Sample and Data

The sample comprises Chinese A-share listed firms from 2011 to 2019. The period ends before Bloomberg changed its ESG scoring framework in 2021. After screening, the unbalanced panel contains 8,743 firm-year observations for 1,104 firms over nine years.

Financial firms, PT/ST/*ST firms, observations with severe missing values, and abnormal observations are excluded. ESG scores are obtained from Bloomberg; financial and market variables are collected from Wind, CSMAR, and related databases.

4.2 Model and Variables

The following two-way fixed-effects model is used to estimate the effect of ESG scores on stock excess returns:

$$Sharpe_{i,t} = \beta + \beta_1 ESG_{i,t} + \gamma_1' CONTROL_{i,t} + \mu_{1i} + \lambda_{1t} + \varepsilon_{i,t} \quad (1)$$

The dependent variable, Sharpe, is the firm's annual Sharpe ratio, calculated as the annualized stock return minus the annualized risk-free rate, divided by the standard deviation of annualized returns. It measures the risk premium per unit of total risk and is applicable to individual stocks [19].

The key explanatory variable is the Bloomberg ESG score. Bloomberg combines quantitative and qualitative information across 21 themes and 122 indicators under the environmental, social, and governance pillars. Its long coverage of Chinese firms and model-driven scoring approach provide a consistent continuous measure of ESG performance.

Control variables include firm size (Size), return on assets (ROA), leverage (Lev), the shareholding ratio of the five largest shareholders (Top5), firm age (FirmAge), state ownership (SOE), and a loss indicator (Loss). Firm and year fixed effects absorb time-invariant firm characteristics and common macroeconomic shocks; standard errors are

clustered at the firm level.

Table 1 Descriptive Statistical Results of Variables

	Obs	Mean	Min	Median	Max	SD
Sharpe	8743	0.228	-1.625	0.203	4.009	1.162
ESG	8743	72.918	41.190	73.130	92.930	5.275
Size	8743	23.057	19.447	22.925	28.636	1.345
ROA	8743	0.048	-0.775	0.040	0.675	0.069
Lev	8743	0.475	0.008	0.486	0.899	0.202
Top5	8743	0.551	0.070	0.549	0.992	0.163
FirmAge	8743	2.874	0.693	2.944	3.714	0.346
SOE	8743	0.510	0.000	1.000	1.000	0.500
Loss	8743	0.077	0.000	0.000	1.000	0.267

Table 1 reports the descriptive statistics. Sharpe varies substantially across firms (mean 0.228; standard deviation 1.162), as do ESG scores (mean 72.918; range 41.190-92.930). The sample covers firms of different sizes and financial conditions: mean ROA is 4.8%, mean leverage is 47.5%, mean Top5 ownership is 55.1%, 51.0% of observations are state-owned, and 7.7% report a loss.

5 Empirical Results and Analysis

5.1 Benchmark Regression Results

5.1.1 Baseline Results

Table 2 reports the baseline estimates. In column (1), the ESG coefficient is 0.020 and significant at the 5% level. Economically, a one-point increase in the ESG score is associated with a 0.020 increase in the Sharpe ratio. Relative to the sample mean and standard deviation of Sharpe, the increment equals 6.14% and 1.2%, respectively. Column (2) adds firm size, profitability, leverage, ownership concentration, firm age, state ownership, and loss status. The ESG coefficient remains positive and significant at the 5% level, showing that the result is not explained by observable firm characteristics. The estimates support H1: firms with higher ESG scores earn higher risk-adjusted stock returns.

Table 2 Benchmark Regression Results

Variable	(1) Sharpe	(2) Sharpe
ESG	0.020** (1.98)	0.017** (2.01)
Size		-0.057*** (-6.13)
ROA		0.426*** (6.46)
Lev		0.205*** (5.56)
Top5		0.178*** (3.59)
SOE		0.014

Variable	(1) Sharpe	(2) Sharpe
		(0.55)
Loss		-0.005 (-0.37)
FirmAge		0.121** (2.20)
Control Variable	NO	YES
Individual Fixed Effect	YES	YES
Time Fixed Effect	YES	YES
N	8743	8743
R2	0.818	0.821

Note: ***, **, * respectively mean significant at the level of 1%, 5% and 10%, and the T value calculated by using the company level clustering standard error is in brackets, the same below unless otherwise specified.

The positive coefficient is consistent with ESG reducing firm-specific risks and generating reputational capital that protects firms during adverse events [5]. These channels can stabilize prices while supporting expected returns.

5.1.2 Endogeneity Tests

Reverse causality may arise because firms with strong stock performance have more resources and incentives to improve ESG. Given the relatively long interval of annual data, contemporaneous ESG and stock performance may influence each other within the same period. Firms earning higher excess returns may have stronger financial capacity, reputational incentives, and managerial willingness to invest in ESG practices, while current stock returns cannot affect ESG performance realized several years earlier. Columns (1)-(3) of Table 3 therefore use ESG lagged by one, three, and five years. All lagged coefficients remain positive and significant at the 5% level. The persistence across increasingly long lags indicates that the effect is not driven solely by contemporaneous feedback and suggests that ESG information has a durable influence on stock performance [11, 20].

The analysis also uses the mean ESG score of other listed

firms in the same registration city (ESG_IV) as an instrument. Firms located in the same city are exposed to similar environmental regulation, social norms, media scrutiny, public pressure, and competitive conditions, which may generate peer effects in ESG disclosure and investment decisions. Managers may imitate nearby firms to maintain legitimacy, respond to stakeholder expectations, or avoid falling behind local competitors. These common local influences make peer ESG performance relevant to the focal firm's ESG score. At the same time, the ESG choices of other local firms should not directly determine the focal firm's excess return after firm and year fixed effects and controls are included. This peer-based instrument is therefore intended to isolate the exogenous component of ESG performance.

The Anderson canonical-correlation LM statistic is 23.53 ($p = 0.000$), rejecting underidentification at the 1% level. The Cragg-Donald Wald F statistic is 20.475, exceeding the 10% Stock-Yogo critical value of 16.38 and reject-

ing weak identification. These results indicate that the instrument is sufficiently correlated with the endogenous ESG variable and provides meaningful identifying variation. Columns (4)-(5) of Table 3 report the first- and second-stage results of the two-stage least-squares estimation. In the first stage, ESG_IV significantly predicts the focal firm's ESG score, confirming the relevance condition. In the second stage, the fitted ESG coefficient remains significantly positive, showing that the positive relationship persists after the potentially endogenous component of ESG is removed. The consistency between the ordinary fixed-effects estimates, the lagged-variable results, and the instrumental-variable estimates strengthens the credibility of the empirical findings. Although no instrument can eliminate every identification concern, the diagnostic statistics and stable coefficient indicate that the selected instrument is relevant and sufficiently strong, thereby supporting the causal interpretation of the baseline result.

Table 3 Regression Results of Dealing with Endogenous Problems

Variable	(1)	(2)	(3)	(4)	(5)
	Explanatory variable lag			Instrumental variable regression	
	Lag by 1 period	Lag by 3 period	Lag by 5 period	The first stage	The second stage
	Sharpe	Sharpe	Sharpe	ESG	Sharpe
ESG					0.290** (1.97)
LESG	0.0183** (2.04)				
L3ESG		0.0249** (2.05)			
L5ESG			0.0359** (1.99)		
ESG_IV				0.023*** (4.52)	
Control Variable	YES	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES	YES
N	7558	5321	2496	8547	8547
R2	0.789	0.764	0.635		0.791
Anderson Canon. LM				23.533 [0.000]	
Cragg-Donald Wald F				20.475 {16.38}	

Note: ***, **, * respectively indicate significant at the level of 1%, 5% and 10%, the T value calculated by using the company level clustering standard error is in parentheses, [] is the p value of Anderson Canon LM statistics, and the value in {} is the critical value at the level of 10% of stock Yogo test.

5.1.3 Heterogeneity Analysis

Ownership. Columns (1)-(2) of Table 4 show positive ESG coefficients for both ownership groups, with a larger coefficient for non-state-owned firms. State-owned firms already carry policy and social mandates, often enjoy implicit support, and typically possess established reputations.

An incremental ESG improvement may therefore convey less new information to investors. For non-state-owned firms, improved ESG can more clearly distinguish the firm from peers, reduce concerns about governance and environmental responsibility, and produce a stronger valuation response [10].

Pollution intensity. Firms are classified according to the

Industry Classification Directory for Environmental Verification of Listed Companies [21]. Columns (3)-(4) show a larger ESG coefficient for heavily polluting firms. These firms face greater exposure to environmental regulation, litigation, remediation costs, and reputational damage. Accordingly, an improvement in ESG performance is more informative about green upgrading, compliance, and long-term risk reduction. The larger coefficient is consistent with investors assigning greater value to ESG signals when underlying environmental risk is high.

Marketization. Regional marketization is measured using the provincial marketization index, and firms are divided at the sample median [22]. Columns (5)-(6) show that ESG is significant only in highly market-oriented regions and has a larger coefficient there. In such regions, weaker government intervention, stronger legal institutions, more developed intermediaries, and more efficient capital allocation increase the credibility and pricing efficiency of corporate information. In less market-oriented regions, administrative relationships and weaker market discipline may reduce the incremental information content of ESG scores.

Table 4 Regression Results of Heterogeneity

Variable	Nature of property right		Enterprise pollution degree		Marketization degree	
	(1) Non-state-owned	(2) State-owned	(3) Non-heavy-pollution	(4) Heavy-pollution	(5) Low-market-ization	(6) High-market-ization
ESG	0.0211** (2.14)	0.0184** (2.07)	0.0199** (2.09)	0.0257** (2.04)	0.0132 (1.19)	0.0245** (2.00)
Control Variable	YES	YES	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES	YES	YES
N	4178	4418	5671	2897	4204	4312
R2	0.849	0.825	0.830	0.822	0.843	0.828

5.2 Mechanism Tests

The mediation analysis follows the recursive-equation approach [23]. Model (2) regresses each mechanism variable on ESG, establishing whether ESG affects the proposed

channel. Model (3) adds the mechanism variable to the baseline return equation. In equations (2)-(3), M denotes the mechanism variable and X the control vector. A significant product of coefficients indicates an indirect effect. Effects with the same sign imply mediation; opposite signs imply masking.

$$Mediator_{i,t} = \theta + \theta_1 ESG_{i,t} + \gamma_2' CONTROL_{i,t} + \mu_{2i} + \lambda_{2t} + \tau_{i,t} \quad (2)$$

$$Sharpe_{i,t} = \varphi + \varphi_1 Mediator_{i,t} + \varphi_2 ESG_{i,t} + \gamma_3' CONTROL_{i,t} + \mu_{3i} + \lambda_{3t} + \xi_{i,t} \quad (3)$$

The three mechanism variables are the information-asymmetry index (ASY), analyst coverage (ANA), and a composite investor-confidence index (SENT). All remaining variables and fixed effects are defined as in the baseline model.

5.2.1 Information Asymmetry

ASY is constructed from stock liquidity, illiquidity, and return-reversal indicators using principal component analysis. These market-microstructure measures capture trading frictions and adverse-selection costs associated with private information. The first component has an eigenvalue above one and explains more than 70% of the common variation; a larger ASY indicates greater information asymmetry [15].

Table 5 shows that ESG significantly reduces ASY at the

1% level, supporting H2. Better ESG performance improves disclosure incentives and adds environmental, social, and governance information to conventional financial reports. It also provides external investors with a more complete picture of risk management, stakeholder relations, and internal control. These effects increase transparency and reduce uncertainty [14, 18].

When ASY is added to the return equation, its coefficient is significantly negative. Because the indirect and direct effects have opposite signs, ASY produces a masking effect. The absolute indirect effect is 0.908. In substantive terms, ESG has a direct component that is weaker after information asymmetry is controlled, but it simultaneously reduces ASY, and lower ASY increases stock excess returns. The information channel therefore offsets part of the direct effect and improves the overall return outcome.

Table 5 Identification of the Masking Effect of Information Asymmetry

Variable	(1) SHARPE	(2) ASY	(3) SHARPE
ESG	0.017** (2.01)	-0.113*** (-5.66)	-0.026** (-2.05)
ASY			-0.209*** (-19.70)
Sobel test (Z value)	Masking variable: information asymmetry -6.885*** Effective- Negative Conduction		
Ind_eff test(P-val)	0.000 Indirect Effect Established		
Control variable Fixed individual & time	YES	YES	YES
N	8622	8304	8304
R2	0.821	0.795	0.843

5.2.2 Limited Attention

Limited attention is measured by the number of analysts following firm i in year t (ANA). Analysts act as information intermediaries between listed firms and investors. They collect, verify, and interpret complex disclosures, issue forecasts and recommendations, and draw market attention to material changes. Analyst coverage therefore captures the extent to which scarce investor attention is directed toward the firm [16].

Table 6 shows that ESG significantly increases analyst coverage at the 1% level, supporting H3. High-ESG firms

provide more accessible information and are more likely to attract professional analysis. Analysts can transform multi-dimensional ESG information into more understandable assessments, lowering information-processing costs for investors and accelerating the incorporation of firm-specific information into prices [2].

ANA is significantly positive in the return equation. The indirect effect is 0.006, accounting for 18.1% of the total effect and 22.1% of the direct effect. Analyst coverage therefore partially mediates the positive effect of ESG scores on stock excess returns. ESG continues to have a significant direct effect, indicating that attention is an important but not exclusive transmission channel.

Table 6 Identification of the Mediating Effect of Limited Attention

Variable	(1) SHARPE	(2) ANA	(3) SHARPE
ESG	0.017** (2.01)	1.503*** (5.08)	0.0271*** (2.61)
ANA			0.004*** (7.39)
Sobel test (Z value)	Mediating variable: limited attention -4.783*** Effective- Positive Conduction		
Ind_eff test (P-val)	0.000 Indirect Effect Established		
Control variable Fixed individual & time	YES	YES	YES
N	8622	8351	8351
R2	0.821	0.726	0.837

5.2.3 Investor Confidence

Investor confidence (SENT) is constructed from nine firm and market indicators: operating revenue growth, ROE, stock return, leverage, size, book-to-market ratio,

momentum, Tobin's Q, and turnover. Each indicator is orthogonalized with respect to fundamentals, and principal component analysis is applied to the residual components. The first two principal components explain 85% of total variance, indicating that SENT captures the common variation in investor optimism not directly attributable to firm fundamentals.

Table 7 shows that ESG significantly increases SENT at the 1% level, supporting H4. Strong ESG performance signals stable stakeholder relationships, institutional recognition, and risk-management capacity [6, 13]. Firms that communicate credible environmental and governance practices are also less likely to surprise investors with severe negative events. These signals improve expectations about future cash flows and downside protection.

SENT is significantly positive in the return equation. The indirect effect is 0.003, accounting for 17.5% of the total effect and 21.2% of the direct effect. Investor confidence therefore partially mediates the ESG-return relationship. As with analyst coverage, the ESG coefficient remains significant after the mediator is included, showing that confidence operates alongside other direct and indirect channels.

Table 7 Identification of the Mediating Effect of Investor Confidence

Variable	(1) SHARPE	(2) SENT	(3) SHARPE
ESG	0.017** (2.01)	0.046*** (3.51)	0.016*** (2.01)
SENT			0.074*** (12.36)
Sobel test (Z value)	Mediating variable: investor confidence 2.581*** Effective- Positive Conduction		
Ind_eff test (P-val)	0.009 Indirect Effect Established		
Control variable			
Fixed individual & time	YES	YES	YES
N	8622	8099	8073
R2	0.821	0.576	0.831

Overall, ESG affects stock excess returns through all three information-transmission channels. Information asymmetry generates a masking effect, while limited attention and investor confidence generate partial mediation effects.

5.3 Robustness Tests

First, the Treynor ratio replaces the Sharpe ratio. It is calculated as the annualized excess return divided by stock beta. The ESG coefficient remains positive and significant at the 5% level in column (1) of Table 8.

Second, all continuous variables are winsorized at the 5th and 95th percentiles. Column (2) reports an ESG estimate close to the baseline and significant at the 5% level.

Third, total asset turnover, operating cash flow, and revenue growth are added as controls. The ESG coefficient in column (3) remains positive, significant, and similar in magnitude.

Fourth, the continuous Bloomberg score is converted into a nine-level categorical variable (ESG_NEW). Column (4) again reports a positive coefficient that is significant at the 5% level. The four tests consistently support the baseline result.

Table 8 Robustness Test

Variable	(1) Replace the explained variable Treynor	(2) Winsorize Sharpe	(3) Add control varia- ble Sharpe	(4) Replace the explan- atory variable Sharpe
ESG	0.0310** (2.33)	0.0142** (1.98)	0.0161** (1.99)	
ESG_NEW				0.129** (2.01)
Initial control variable	YES	YES	YES	YES
Add control variable	NO	NO	YES	NO
Individual fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES
N	8733	8618	8550	8616
R2	0.455	0.830	0.823	0.822

6 Further Analysis

6.1 Environmental, Social, and Governance Dimensions

Because ESG aggregates three distinct pillars, this section estimates the effects of Bloomberg's environmental (E), social (S), and governance (G) scores separately and jointly.

A higher E score signals lower exposure to pollution incidents, environmental litigation, regulatory penalties, and remediation costs. Environmental improvement can protect corporate reputation and reduce price declines after adverse news [20, 24]. It also supplies investors with firm-specific information about resource efficiency, emissions management, and regulatory preparedness. When this information reduces uncertainty or attracts environmentally oriented capital, demand for the stock and risk-adjusted returns may increase [11].

The effect of S is theoretically ambiguous. Social responsibility can create moral capital, strengthen employee and customer loyalty, and cushion negative shocks [5]. However, social programs consume current resources; their benefits may emerge only in the long run, and managers

may use selective disclosure to pursue private reputational benefits. The net effect therefore depends on whether stakeholder benefits exceed direct costs and agency problems [9, 10].

A higher G score can improve board oversight, managerial discipline, operating efficiency, and investor protection. Better governance limits tunneling and opportunistic behavior, improves the quality of strategic decisions, and strengthens communication with shareholders and other stakeholders. These effects reduce risk and support confidence and valuation [3, 13]. Governance information may also be more directly comparable across firms than some environmental or social indicators, making it easier for investors to price.

Table 9 shows that E and G are positively related to stock excess returns at the 1% level, whereas S is insignificant. The separate coefficients are 0.028 for E, 0.003 for S, and 0.045 for G. When all three are included simultaneously, the significance of G declines but it remains the dominant dimension, while S becomes negative and insignificant. Overall, governance has the strongest effect, followed by environmental performance; the social effect remains uncertain. The result suggests that investors place greater weight on dimensions with clearer implications for risk control and shareholder protection.

Table 9 Effects of the E, S, and G Dimensions

Variable	(1) Sharpe	(2) Sharpe	(3) Sharpe	(4) Sharpe
E	0.0277*** (4.19)			0.055*** (5.47)
S		0.00319 (0.97)		-0.004 (-0.45)
G			0.0453*** (3.50)	0.025* (1.83)
Control variable	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES
N	7260	8422	8629	7282
R2	0.821	0.772	0.0360	0.040

6.2 Institutional Ownership as a Mediator

Institutional investors possess greater information-processing capacity, research resources, and monitoring incentives than individual investors and are generally less affected by speculative biases [17]. They prefer firms with transparent disclosure and lower environmental and gov-

ernance risk [2, 6]. Their trading and monitoring can improve managerial discipline, while their research helps incorporate firm-specific information into prices [16]. These characteristics imply two links: high ESG scores attract institutional ownership, and institutional ownership improves the pricing of ESG information and stock excess returns.

Following prior research, the institutional investor shareholding ratio (INST) is used as the mediator [25].

Table 10 confirms partial mediation. ESG significantly

increases INST at the 5% level, and INST is positively associated with the Sharpe ratio. When INST enters the baseline model, ESG remains significant and INST is significant at 1%, indicating that institutional ownership transmits part, but not all, of the ESG effect. The Sobel statistic is

2.181 ($p = 0.029$). The indirect effect is 0.0002, equal to 1.25% of the total and direct effects. Although quantitatively small, the channel is statistically meaningful and consistent with institutional investors improving information production and price efficiency.

Table 10 Mediating Effect of Institutional Investor Holdings

Variable	(1) Sharpe	(2) INST	(3) Sharpe	(4) Sharpe
ESG	0.017** (2.01)	0.009** (2.16)		0.016** (2.19)
INST			0.046** (2.22)	0.035*** (3.04)
	Mediating variable: institutional investor holdings	Mediating variable: institutional investor holdings	Mediating variable: institutional investor holdings	Mediating variable: institutional investor holdings
Sobel test	2.181** valid mechanism - positive transmission	2.181** valid mechanism - positive transmission	2.181** valid mechanism - positive transmission	2.181** valid mechanism - positive transmission
Control variable	YES	YES	YES	YES
Individual fixed effect	YES	YES	YES	YES
Time fixed effect	YES	YES	YES	YES
N	8618	8711	8597	8618
R2	0.821	0.746	0.822	0.821

7 Conclusions and Policy Implications

Using Chinese A-share data from 2011 to 2019, this study examines whether Bloomberg ESG scores improve risk-adjusted stock returns and how ESG information is transmitted to the market. Unlike studies that focus only on raw returns or firm value, the analysis uses the Sharpe ratio to capture the joint effects of return and risk. The results yield four main conclusions.

First, ESG scores significantly increase the Sharpe ratio. The result remains robust to alternative dependent and explanatory variables, winsorization, additional controls, lag structures, and instrumental-variable estimation. This consistency suggests that the positive relationship is not driven by a single measurement choice or a small group of extreme observations.

However, social programs consume current resources; their benefits may emerge only in the long run, and managers may use selective disclosure to pursue private reputational benefits. The information-asymmetry channel produces a masking effect, whereas analyst coverage and investor confidence are partial mediators. Together, the tests show that ESG affects stock performance not only through

corporate fundamentals but also through the way information reaches and influences investors.

Third, the positive effect is stronger for non-state-owned firms, heavily polluting firms, and firms in highly market-oriented regions. ESG signals are therefore more valuable when they convey greater incremental information, when underlying environmental exposure is high, and when market and legal institutions support credible disclosure and efficient pricing.

Fourth, environmental and governance scores drive the aggregate effect, with governance exerting the largest influence. Institutional ownership also partially mediates the ESG-return relationship. These findings indicate that the content of ESG information and the identity of the investors processing it both matter for market outcomes.

These findings have several implications.

Regulators should develop a more consistent ESG disclosure and scoring framework, strengthen disclosure supervision, and improve enforcement and incentive mechanisms. A gradual move toward comparable and decision-useful disclosure can reduce rating divergence and greenwashing. Better legal and market institutions will further increase the credibility and pricing efficiency of ESG information.

Firms should integrate ESG into strategy and operations rather than treat it as a reporting exercise. They should improve disclosure quality, explain the financial materiality of ESG risks and opportunities, and avoid both selective

reporting and greenwashing. Credible communication should show not only that firms act responsibly but also how those practices affect risk, efficiency, innovation, and long-term performance.

Investors should incorporate material ESG information into portfolio decisions and make greater use of professional analysis. Institutional investors can improve monitoring, information production, and market discipline, while individual investors can use ESG ratings and analyst research to reduce information-processing costs. Attention should be directed to the reliability and materiality of ESG indicators rather than to headline scores alone.

Financial institutions should expand ESG research, analyst capacity, and investment products. More rigorous ESG analysis can support responsible capital allocation and the stable development of China's capital market. Future product design should distinguish among the E, S, and G dimensions and account for differences across ownership types, industries, and institutional environments.

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