The Impact of ESG Investment Intensity on Mutual Funds' Performance

Maoli Xiong *, Liu Yucan

School of Economics and Management, Nanjing University of Science and Technology, Nanjing, China

* Corresponding Author Email: maoli_xiong@163.com

Abstract. Employing a two-way fixed-effects specification on a 2017–2021 panel of Chinese equity-oriented mutual funds, we examine whether ESG intensity influences CAPM Alpha. Huazheng ESG ratings serve as the key explanatory variable. ESG scores are positively and significantly related to one-month and six-month alphas, but the association attenuates at the twelve-month horizon. High-ESG funds exhibit a mid-term reversal followed by long-run outperformance, whereas low-ESG funds earn short-lived, risk-driven gains that subsequently erode. Fund size, age and volatility are additional, material determinants of excess returns.

Keywords: Fund ESG Investment Level; Fund Performance; CAPM Model; Fund Alpha.

1. Introduction

In recent years, Environmental, Social, and Governance (ESG) investing has rapidly emerged as a significant trend in global financial markets. Eccles et al. (2014) demonstrated that companies with strong ESG performance tend to achieve more stable long-term financial results, primarily due to enhanced risk management capabilities and sustainable operational models. Friede et al. (2015) further confirmed through a meta-analysis of over 2,000 empirical studies that approximately 90% of research shows a non-negative correlation between ESG factors and corporate financial performance. However, Alves et al. (2025) found that ESG investing has not systematically impacted investment returns.

In the Chinese market, Li (2021) identified that high ESG-rated companies can obtain additional returns, while He et al. (2025) observed an anomaly where low ESG-scored enterprises generated 1.4% excess returns. Li et al. (2024) noted that ESG investment significantly improves short-term fund performance, and Zhang et al. (2021) verified the scale and value effects of fund social responsibility. Wang et al. (2025) and Li (2025) respectively validated the risk premium characteristics of ESG investment strategies through multi-factor models.

Regarding mechanisms, Gompers and Metrick (2001) suggested institutional investors' sustained buying may drive up short-term prices of ESG stocks, while Fama's (1970) efficient market hypothesis argues against persistent excess returns in the long run. Khan et al. (2016) proposed the "ESG risk premium" theory, whereas Barberis and Huang (2008) explained the return volatility of low ESG stocks from a behavioral finance perspective.

Based on existing research, this paper investigates how fund ESG investment levels affect performance across short- (1-month), medium- (6-month) and long-term (12-month) horizons. Focusing on equity-oriented funds where ESG factors are primarily reflected in stock selection, we examine: (1) whether higher ESG investment improves CAPM alpha; (2) how ESG impacts vary across time horizons; (3) performance differences between high- and low-ESG stock holdings; and (4) potential moderating effects of fund size. Our multi-period analysis provides new insights into ESG's time-varying performance effects in China's fund market.

2. Research Design and Methodology

2.1. Hypotheses

H1: A fund's ESG investment level is positively correlated with both short-term (1-month) and medium-term (6-month) CAPM excess returns.

H2: The positive impact of a fund's ESG investment level on long-term (12-month) CAPM excess returns weakens, although the high-ESG group still maintains relatively higher returns.

H3: Funds with different ESG levels exhibit heterogeneous effects on excess returns: the high-ESG group demonstrates stronger long-term return stability, while the low-ESG group may generate higher short-term returns but with greater volatility.

2.2. Sample of selection

Adopting the screening methodology developed by Hong and Kacperczyk (2009) for excluding funds with low holding proportions, this study analyzes Chinese equity and partial equity funds from 2017-2021. After excluding funds with low stock allocations, we obtained 15,475 observations. Using semiannual Huazheng ESG ratings (June/December) and matching financial data from RESSET, we: (1) Excluded funds with missing financial or ESG data; (2) Employed 1-year rolling windows.

2.3. Variable

2.3.1. Dependent Variable-AR

When receiving the paper, we assume that the corresponding authors grant us the copyright to use the paper for the book or journal in question.

When receiving the paper, we assume that the corresponding authors grant us the copyright to use the paper for the book or journal in question. When receiving the paper, we assume that the corresponding authors grant us the copyright to use.

$$r_i - r_f = \hat{\alpha} + \hat{\beta}\left(r_m - r_f\right) + \varepsilon \tag{1}$$

$$AR = (r_i - r_f) - \hat{\beta}\left(r_m - r_f\right) + \hat{\alpha} \tag{2}$$

Where r_f is Risk-free rate, r_m is Expected market return (proxied by CSI 300 returns), r_i is Fund i's actual return. We estimate CAPM parameters (β and α) using 12-month rolling windows.

2.3.2. Independent Variable

(1) ESG: Fund-level ESG investment measure, calculated as the market-value-weighted average of Huazheng ESG scores for all holdings, updated semiannually.

$$ESG_i = \sum_{j=1}^{n} ESG_{i,j} \times \frac{V_{i,j}}{GV_i} \tag{3}$$

The ESG score of stock j held by fund i is denoted as $ESG_{i,j}$, its market capitalization as $V_{i,j}$, the fund's net asset value as GV_i.

(2) ESG_centered:

$$ESG_{centered} = ESG_i - mean(ESG_i) \tag{4}$$

(3) ESG_group: Using the median ESG score of all funds as the cutoff point, funds are divided into:

High ESG investment level group (ESG_High, where ESG_group=1)

Low ESG investment level group (ESG_Low, where ESG_group=0)

2.3.3. Control Variable

(1) Size: Fund size, measured as the natural logarithm of the fund's net asset value (NAV) at the end of the period.

(2) Age: Fund age (in months), calculated as:

$$Age = \ln\left(\frac{Current\ Date - Fund\ Inception\ Date}{30} + 1\right) \quad (5)$$

(3) Vol: Fund volatility, defined as the standard deviation of daily returns of all stocks held by the fund during the month.

(4) Flow: Fund flow, calculated as:

$$Flow = \frac{TNA_{i,t} - TNA_{i,t-1} \times (1 + R_{i,t-1})}{TNA_{i,t-1}} \quad (6)$$

Where $TNA_{i,t}$ is Total Net Assets of fund i at time t, $R_{i,t}$ is Return of fund i in period t, $R_{i,t}$ is NAV growth rate.

(5) Beta: Risk coefficient, measured as the beta parameter estimated from the CAPM regression.

(6) InsHold: (%), Institutional Holding Percentage.

2.4. Model Specifiction

We implement a two-way fixed effects model that controls both [time and individual] fixed effects.

$$AR_{i,t+h} = \alpha + \beta ESG_{i,t} + X_{i,t} + \tau_i + \delta_t + \varepsilon_{i,t} \quad (7)$$

Where h∈ {1,6, 12}

The key explanatory variable is $ESG_{i,t}$, measuring the fund's ESG investment level. $X_{i,t}$denotes the same control variables as in the baseline regression, while τ_i and δ_t represent fund and semiannual fixed effects.

To examine ESG heterogeneity, we interact ESG_group with ESG_centered.

$$ESG\_interacted_{i,t} = ESG\_centered_{i,t} * ESG\_group_{i,t} \quad (8)$$

$$AR_{i,t+h} = \alpha + \beta_1 ESG\_centered_{i,t} * \beta_2 ESG_{interacted_{i,t}} + ESG\_group_{i,t} \quad (9)$$

3. Empirical Results

3.1. Descriptive Statistics of Sample

Full-period descriptive statistics (2017M6-2022M12): Following the CAPM framework, we estimate Alpha (abnormal return) and Beta (market risk exposure) through rolling 12-month regressions on subsequent one-month realized returns.

Table 1. Descriptive statistics.

Variable	Mean	SD	Min	Max	Median
Beta	0.62	0.41	-1.82	8.37	0.66
AR	1.40	5.57	-47.28	43.91	0.76
ESG	4.82	0.42	0.31	6.75	4.84
InsHold	0.39	0.39	0.00	1.00	0.24
Flow	0.97	0.61	-4.87	4.29	1.00
Vol	0.88	0.53	0.00	16.17	0.90
Age	1.61	0.28	0.78	2.40	1.65

3.2. Full-Sample Regression Results Analysis

Using the complete longitudinal panel dataset across the entire sample period, we perform fixed-effects regression and present the coefficient estimates in Table 2.

Table 2. Regression Results of Fund ESG Scores on Excess Returns.

	(1) AR	(2) AR	(3) AR	(4) AR	(5) AR	(6) AR
ESG	0.64***	0.76***	0.489***	0.35***	0.39***	0.31**
	(0.14)	(0.14)	(0.124)	(0.13)	(0.12)	(0.13)
Size		-0.25*		-0.43***		-0.47***
		(0.13)		(0.12)		(0.12)
Age	-	-2.74***		-0.7/**		-1.69***
		(0.62)		(0.36)		(0.57)
Vol		1.77***		-1.13***		-0.58***
		(0.16)		(0.15)		(0.15)
Flow		0.75***		0.21***		-0.26**
		(0.072)		(0.066)		(0.066)
InsHold		0.35		0.169		0.30
		(0.24)		(0.22)		(0.22)
Beta		0.41**		1.09***		0.58***
		(0.16)		(0.15)		(0.145)
Constant	-1.72**	1.53	-0.87	4.71***	-0.21	7.17***
	(0.66)	(1.57)	(0.60)	(1.24)	(0.60)	(1.44)
Half-Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Fundcode FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	13,029	13,029	13,071	13,071	12,989	12,989
R-squared	0.435	0.449	0.526	0.531	0.539	0.542

Table 2 presents three main findings: First, ESG scores show significant positive correlations with fund excess returns across various time horizons, with stronger effects in shorter periods. Second, both fund size and age exhibit negative associations with future performance, supporting the "size curse" hypothesis. Third, risk-return relationships vary temporally - volatility shows contrasting short vs long-term effects, while market beta's positive impact emerges only in longer windows.

Table 3. Interactive Effects Between ESG Groupings and Scores on Excess Returns

	(1) AR	(2) AR	(3) AR	(4) AR
ESG_interacted	-3.59***	-3.23***	-1.28***	-1.34***
	(0.38)	(0.38)	(0.34)	(0.34)
ESG_group	0.28*	0.33**	-0.079	-0.093
	(0.15)	(0.14)	(0.13)	(0.13)
ESG_centered	1.70***	1.71***	0.91***	0.87***
	(0.20)	(0.20)	(0.18)	(0.18)
Control Variables	No	Yes	No	Yes
Constant	1.84***	7.43***	1.90***	8.43***
	(0.09)	(1.41)	(0.08)	(1.28)
Half-Year FE	Yes	Yes	Yes	Yes
Fund FE	Yes	Yes	Yes	Yes
Observations	13,076	13,076	13,028	13,028
R-squared	0.431	0.442	0.53	0.532

The regression analysis reveals three key findings: First, the interaction term between ESG grouping and scores shows significantly negative coefficients in both short- and long-term models, indicating that improving ESG scores within high-ESG groups significantly reduces excess returns. Second, high-ESG groups demonstrate significantly positive excess returns in the short run, which turn insignificantly negative in the long term. Third, ESG score improvement in low-ESG groups consistently generates significantly positive returns, though the effect diminishes over time. These

results suggest diminishing marginal returns to ESG improvement for high-ESG groups, while low-ESG groups maintain persistent benefits from ESG enhancement.

3.3. Subsample Regression Results Analysis

Using the median fund ESG score as the cutoff point, we classify funds into ESG_High and ESG_Low groups and conduct fund fixed-effects regressions separately for each group, with results presented in Table 4.

Table 4. Heterogeneous Effects of ESG Investment: Grouped Regression Results.

	ESG_High	ESG_ low	ESG_High	ESG_ low	ESG_High	ESG_low
	(1)	(2)	(3)	(4)		
	AR	AR	AR	AR	AR	AR
ESG	-0.65**	2.165***	-2.031***	-0.64*	0.60*	1.418***
	(0.29)	(0.35)	(0.35)	(0.36)	(0.35)	(0.32)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes
Constant	-0.12	-21.74***	19.02***	-3.55	12.04***	4.50*
	(1.91)	(2.69)	(2.29)	(2.74)	(2.33)	(2.48)
Fund FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	6,646	6,647	5,946	5,946	6,626	6,627
R-squared	0.33	0.227	0.364	0.285	0.311	0.232

The low-ESG group shows positive short-term and long-term excess returns but negative medium-term returns, with stronger long-term effects. The high-ESG group has negative short- and medium-term returns but positive long-term gains, reflecting sustainability benefits. Positive betas support the high-risk, high-return theory.

High-ESG funds exhibit significantly positive long-term excess returns, supporting the "ESG risk premium" theory proposed by Khan et al. (2016)—high-ESG firms achieve long-term returns by reducing systemic risk. In contrast, the short-term gains of low-ESG funds may reflect a "lottery-type stock" effect, indicating investors' irrational demand for high-risk assets.

4. Summary

This study examines the impact of fund ESG investment levels on CAPM excess returns by analyzing Chinese equity and equity-oriented funds from 2017 to 2021, utilizing Hua Zheng ESG rating data and employing a two-way fixed effects model. Grouped regressions are further conducted to explore performance differences among funds with varying ESG levels.

The empirical results demonstrate that fund ESG investment levels significantly affect excess returns. In the short-to-medium term (1-6 months), ESG investments show a significantly positive correlation with excess returns, while the effect diminishes over the long term (12 months), though high-ESG funds maintain relative advantages. Additionally, fund size, age, and volatility significantly influence performance: larger and older funds generate lower excess returns, while high-volatility funds deliver higher short-term returns but underperform in medium-to-long horizons.

Future ESG investment research should focus on four key directions: (1) analyzing the economic cycle stability of ESG premium using long-term data based on Pedersen et al.'s (2021) ESG five-factor model; (2) systematically examining the differential impacts of various exogenous shocks on ESG performance by adopting Ling et al.'s (2023) natural experiment approach; (3) conducting in-depth analysis of industry heterogeneity's moderating effects on ESG performance, building on Xiao's (2024) findings regarding polluting industries; and (4) exploring the performance differences and underlying mechanisms of funds under different ESG rating systems, following Chengcheng Liu et al.'s (2025) research framework.

References

[1] Eccles R G, Ioannou I, Serafeim G, "The Impact of Corporate Sustainability on Organizational Processes and Performance," Management Science, vol.60, no.11, pp.2835-2857, 2014.

[2] Friede G, Busch T, Bassen A, "ESG and Financial Performance: Aggregated Evidence from More than 2000 Empirical Studies," Journal of Sustainable Finance & Investment, vol.5, no.4, pp.210-233, 2015.

[3] Gompers P A, Metrick A, "Institutional Investors and Equity Prices," The Quarterly Journal of Economics, vol.116, no.1, pp.229-259, 2001.

[4] Fama E F, "Efficient Capital Markets: A Review of Theory and Empirical Work," Journal of Finance, vol.25, no.2, pp.383-417, 1970.

[5] Khan M, Serafeim G, Yoon A, "Corporate Sustainability: First Evidence on Materiality," The Accounting Review, vol.91, no.6, pp.1697-1724, 2016.

[6] Barberis N, Huang M, "Stocks as Lotteries: The Implications of Probability Weighting for Security Prices," American Economic Review, vol.98, no.5, pp.2066-2100, 2008.

[7] Liu C C, Wu Q H, Lin Y E, "ESG ratings and firm performance: The moderating role of ESG rating disagreement," Borsa Istanbul Review, vol.25, no.4, pp.816-823, 2025.

[8] Alves R, Kruger P, van Dijk M, "Drawing up the bill: Are ESG ratings related to stock returns around the world?," Journal of Corporate Finance, vol.93, pp.102768, 2025.

[9] Hong H, Kacperczyk M, "The Price of Sin: The Effects of Social Norms on Markets," Journal of Financial Economics, vol.93, no.1, pp.15-36, 2009.

[10] Pedersen L H, Fitzgibbons S, Pomorski L, "Responsible Investing: The ESG-Efficient Frontier," Journal of Financial Economics, vol.142, no.2, pp.572-597, 2021.

[11] J. Li, "Research on ESG Risk Premium and Excess Returns in China's A-Share Market," Securities Market Herald, no.6, pp.24-33, 2021. (In Chinese)

[12] He, H. Y. Du, J. Hao, "'Green' but Not 'Red': The ESG Investment Anomaly in China's Stock Market," Journal of Management Sciences in China, vol.28, no.7, pp.75-95, 2025. (In Chinese)

[13] Z. J. Li, "Does ESG Risk Premium Exist in China's A-Share Market?," Financial Theory and Practice, no.4, pp.97-107, 2025. (In Chinese)

[14] Y. H. Xiao, "Research on the Influence Path of ESG Ratings on Stock Excess Returns," International Business Accounting, no.5, pp.28-37, 2024. (In Chinese)

[15] X. M. Wang, S. J. Xing, H. Y. Shi, "Performance Evaluation and Implications of ESG Funds Based on Multi-Factor Model," Economic Forum, no.2, pp.144-152, 2025. (In Chinese)

[16] C. Zhang, S. S. Zhu, Y. Wu et al., "Research on Socially Responsible Investment Behavior and Performance Based on Fund Holdings," Chinese Journal of Management, vol.18, no.12, pp.1840-1850, 2021. (In Chinese)

[17] Ling, X. R. Huang, L. L. Xie et al., "The Impact of ESG Investment on Fund Performance Under Sudden Event Shocks: Theory and Evidence," Systems Engineering - Theory & Practice, vol.43, no.5, pp.1300-1319, 2023. (In Chinese)

[18] X. Q. Li, R. Zhao, J. Wang, "Does ESG Investment Improve Fund Performance?," Nankai Economic Studies, no.6, pp.185-203, 2024. (In Chinese)