The Impact of ESG Information Disclosure Quality on Investor Decision-making: An Analysis Based on Behavioral Finance Theory

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Abstract. Driven by the deep penetration of global sustainable development concepts and the significant enhancement of investors' responsibility awareness, ESG information disclosure has gradually become a key determinant in the capital market resource allocation mechanism. It is noteworthy that the heterogeneous characteristics of current ESG information disclosure quality are remarkably prominent. Coupled with the continuous impact of information asymmetry, it substantially interferes with the effectiveness of investors' decision-making behavior. Existing research lacks a systematic exploration of the transmission mechanism of investors' psychological biases from the perspective of behavioral finance theory. This study constructs an "information quality - cognitive bias - decision behavior" transmission model based on behavioral finance theory. It is found that ESG information disclosure quality adjusts investors' cognitive biases through completeness and timeliness, drives decision behavior through emotional accounts and social preference mechanisms, and demonstrates significant quantitative characteristics of behavioral biases in market empiricism. Meanwhile, it points out the challenges of existing research in terms of standard systems, technical applications, and theoretical integration, and proposes breakthrough paths of intelligent disclosure technology optimization, cognitive training intervention, and policy framework design, providing support for deepening ESG investment cognition and improving the disclosure system.

1 Introduction

As the global economic development paradigm transforms toward sustainable development, the ESG concept has evolved from a marginal concept to a core dimension of enterprise value assessment. As of 2024, the scale of China's ESG-themed funds has exceeded 800 billion yuan, achieving nearly a threefold increase from 2020, reflecting the significant growth in capital market demand for non-financial information [1]. After a new energy enterprise completely disclosed its battery recycling system, the subscription multiple and issuance interest rate of its green bonds significantly outperformed the industry average, which is difficult to fully explain using the "rational person" hypothesis of traditional financial theory

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[1]. Behind this "behavioral" decision-making under the non-traditional rational economic person hypothesis is a complex process of interaction between investors' behavioral biases and ESG information.

Existing research has formed two basic consensuses: on the one hand, there are significant industry differences in the completeness and comparability of ESG information disclosure [2-3]. On the other hand, high-quality disclosure can improve enterprise valuation by reducing information asymmetry [1,4,5]. However, existing research has not constructed a complete transmission chain of "information disclosure - psychological bias - decision behavior," especially lacking in-depth investigation of investors' behavioral characteristics such as bounded rationality and loss aversion. This study will focus on how the quality of ESG information disclosure affects investors' decision-making through cognitive biases and emotional mechanisms in behavioral finance theory.

This study constructs a three-dimensional analysis framework including influence mechanisms, market empiricism, and future paths based on behavioral finance theory. Theoretically, it systematically integrates core theories of behavioral finance such as Prospect Theory and Mental Accounting Theory for the first time to analyze the decision-making influence path of ESG information disclosure quality; practically, it provides a scientific basis for enterprises to optimize disclosure strategies and regulatory authorities to improve system design through cross-validation of typical cases and quantitative data. The innovative value of the study lies in breaking through the limitations of the traditional financial perspective, incorporating investors' irrational characteristics into the ESG decision-making analysis framework, and filling the application gap of behavioral finance theory in the field of sustainable investment.

2 The irrational characteristics of decision-making from the perspective of behavioral finance

Behavioral finance theory subverts the "rational person" hypothesis of traditional finance, revealing that investors' decision-making is dominated by both cognitive limitations and emotional factors. Prospect Theory proposed by Kahneman and Tversky shows that individuals are significantly more sensitive to losses than gains, which is manifested in ESG investment as negative events causing more drastic stock price fluctuations than positive events, confirming investors' "loss aversion" psychological characteristics [6,7]. The "emotional premium" phenomenon in ESG investment further highlights the explanatory power of behavioral finance. Studies have found that an increase in the disclosure of enterprises' environmental protection investments will significantly enhance the purchase intention of investors with strong environmental awareness. This independent valuation mechanism of non-financial attributes can be explained by Thaler's "mental accounting" theory—investors classify "green investments" into independent emotional satisfaction accounts and are willing to pay a premium for environmental attributes [8].

The current ESG investment practice shows significant characteristics of "irrational exuberance": on the one hand, investors' demand for ESG information is increasing day by day; on the other hand, traditional financial theory hardly explains the abnormal fluctuations in the synchronicity between ESG ratings and stock prices [3]. The essence of this contradiction lies in that existing research mostly focuses on the "signal transmission" function of ESG information but ignores the interference of information receivers—investors' behavioral biases on decision-making. Wu Shinong et al. pointed out that most studies only focus on single cognitive biases and fail to depict the interactive influence of "emotion-cognition-social norms," resulting in limited theoretical explanatory power and practical guiding value [4].

3 The influence mechanism of ESG information disclosure quality on investor decision-making: an explanatory framework of behavioral finance

The quality of ESG information disclosure affects investors' decision-making through two paths: cognitive bias correction and emotional preference activation. The following systematically explains its mechanism of action from three dimensions: information attribute dimensions (completeness, timeliness), types of behavioral biases (herding behavior, overconfidence), and emotional driving mechanisms (environmental protection emotion, governance trust).

3.1 Cognitive bias regulation: the dual role of completeness and timeliness

Qiu Muyuan et al.'s research based on the "carbon neutrality" policy shows that enterprises that completely disclose carbon emission reduction data are more likely to attract institutional investors to increase their holdings compared to those with missing disclosures, which reflects that the completeness of high-quality ESG information can reduce investors' ambiguity aversion. This stems from the human brain's natural avoidance of information ambiguity. Standardized carbon data builds a clear "cognitive picture" by filling information gaps and improves investors' risk tolerance. For example, the case of an enterprise that obtained increased holdings from multiple international institutional investors after completely disclosing its supply chain carbon footprint data confirms this [5]. The timely disclosure of ESG information can correct investors' "hyperbolic discounting" bias. Lu Zhengfei et al.'s analysis of A-share data shows that after ESG negative events occur, enterprises that disclose rectification plans in the short term have a significantly higher cumulative abnormal return than those that delay disclosure [9]. This phenomenon is consistent with the "immediacy bias" theory in behavioral finance—investors often assign higher weights to recent information. Timely disclosure can effectively alleviate panic selling behavior by transforming "crisis signals" into "rectification actions". For example, a chemical enterprise disclosed a treatment plan within 12 hours after a pollution incident, and its stock price decline was significantly lower than the industry average, highlighting the correction value of information disclosure timeliness for cognitive biases [9].

3.2 Behavioral bias correction: directional regulation of herding effect and overconfidence

The quality of ESG information disclosure has a significant inhibitory effect on the herding behavior of institutional investors. Xiao Jun et al.'s research shows that the improvement of ESG information disclosure quality will significantly reduce the intensity of herding behavior among fund managers. High-quality information provides investors with a basis for independent decision-making and breaks the "information cascade" effect proposed by Bikhchandani et al [10,11]. For example, after the ESG rating of a consumer enterprise was upgraded in 2023, although there was a selling trend in the industry, a large proportion of institutional investors still chose to increase their holdings, demonstrating the supporting role of high-quality information for independent decision-making. The multi-dimensional disclosure of ESG information can effectively reduce investors' overconfidence bias. Liu Eping confirmed through eye movement experiments that when ESG ratings and financial data are disclosed simultaneously, investors' "overconfidence index" significantly decreases. This is because investors are often affected by the representativeness heuristic bias and judge enterprise value based on a small number of characteristics such as profit growth rate, while

multi-dimensional information disclosure forces investors to comprehensively consider ESG risks, significantly reducing decision-making error rates [12].

3.3 Emotional and social preference drive: explanations of mental accounting and reciprocity theories

The "mental accounting" theory in behavioral finance can reasonably explain the decision-making influence of environmental protection investment disclosure. Wu Chaopeng et al.'s research found that an increase in the disclosure level of enterprises' environmental protection investments will enhance the purchase intention of investors with strong environmental awareness, indicating that such investors classify "green investments" into independent emotional satisfaction accounts. During the "dual-carbon" policy window period, the risk tolerance of this group for enterprises with high environmental protection disclosures is significantly higher than that of ordinary investors, forming a significant environmental protection emotional premium [8]. Research based on blockchain evidence storage data shows that enterprises with high governance transparency will significantly increase investors' trust index, which is in line with the "reciprocity theory"—investors regard enterprises' transparent disclosure as a "goodwill signal" and respond with long-term shareholding, confirming the positive correlation between governance transparency and trust premium [13,14].

4 Market empiricism: quantitative evidence and typical cases of behavioral biases

Market empiricism provides quantitative verification for the theoretical mechanism from both positive and negative aspects. The return gain effect of ESG rating upgrades and the market punishment mechanism for "greenwashing" behavior respectively show investors' positive response to high-quality disclosure and strong negative feedback to information distortion, constituting an empirical mirror image of behavioral biases.

Fang Junxiong's analysis of A-share data from 2015 to 2020 shows that ESG rating upgrades are positively correlated with enterprises' annual abnormal returns, and in markets dominated by individual investors, high-rated enterprises are more likely to attract individual investors to increase their holdings [3]. This finding is consistent with the international research conclusions of Hartzmark and Sussman, jointly confirming the attraction of ESG ratings to investors' attention and the resulting capital inflow and stock price increase effects [15]. In addition, Lü Changjiang et al. found through third-party verification experiments that after "greenwashing" enterprises were exposed, the average decline in stock prices far exceeded the market reaction to ordinary negative events [5]. This phenomenon is in line with the "trust theory" in behavioral finance—investors regard "greenwashing" as a betrayal of trust and implement punishment through selling behavior. It is worth noting that this punishment has the characteristic of "overreaction": even if enterprises subsequently improve their disclosure quality, it still takes a long time for stock prices to recover to pre-event levels [5]. Dyck et al.'s research on enterprise fraud behavior also shows that investors' negative reactions are persistent after the exposure of dishonest behavior, which forms a cross-market confirmation with domestic research [16].

5 Existing problems and future trends: the deepening application of behavioral finance

5.1 Core challenges: contradiction analysis and bottleneck breakthrough

The integration of ESG information disclosure and behavioral finance theory faces three major structural contradictions, which are essentially manifestations of the lag in the upgrading of the information ecosystem behind the evolution of investors' behavior. The integration of ESG information disclosure and behavioral finance theory faces three major structural contradictions: fragmented standards, insufficient technical applications, and lack of theoretical integration.

At the standard level, the fragmentation of disclosure standards has become the primary obstacle interfering with investors' rational decision-making. Lu Zhengfei et al.'s research shows that many listed companies have the problem of missing industry indicators, and the overlap of carbon disclosure indicators between industries such as photovoltaics and chemicals is low. This situation makes investors face serious "information overload". According to Miller's "7±2 rule", the limitation of human short-term memory capacity leads to a sharp increase in decision-making error rates when the number of information dimensions exceeds a certain amount, while the fragmented index system leads to high cross-industry comparison deviation rates, together with numerous global disclosure frameworks, constituting the reality of standard confusion [9,17].

At the technical level, the insufficient application of trusted technologies such as blockchain amplifies investors' availability bias. Cheng Ping et al.'s survey shows that only a small proportion of enterprises use blockchain to store ESG data as evidence, and most still rely on manual verification, resulting in investors making decisions based on easily accessible information rather than the most reliable information. This technical gap makes investors pay more attention to indicators with high media exposure such as carbon emissions while ignoring hidden key information such as governance structures. PwC's global survey confirms that ESG data without technical endorsement will significantly increase the probability of misjudging "greenwashing" enterprises, especially in the energy industry, reflecting the interactive deterioration effect between technical absence and cognitive biases [18,19].

At the theoretical level, existing research has insufficient integration of the interactive effects of "emotion-cognition-social norms", leading to limited explanatory power. Wu Shinong et al. pointed out that most studies only focus on single cognitive biases (such as herding behavior) and ignore the complex interactions of multiple factors in ESG decision-making [4]. For example, environmental emotional resonance may strengthen the representativeness heuristic bias, making investors pay excessive attention to green technologies while ignoring financial risks. Kahneman and Fredrick's dual-system theory shows that the interaction between the intuitive system and the rational system is particularly significant in ESG decision-making, but the current theoretical model has not effectively characterized such effects [20]. Cambridge University's research further shows that in emerging market environments, the influence of social norms on ESG decision-making is significantly higher than cognitive factors, highlighting the urgency of theoretical integration [21].

5.2 Future paths oriented by behavioral finance: three-dimensional breakthrough and practical innovation

To break through the existing bottlenecks based on behavioral finance theory, it is necessary to construct a collaborative solution of technology empowerment, cognitive intervention, and policy design. In the field of intelligent disclosure technology, standards such as XBRL can alleviate investors' limited attention bias by improving information processing efficiency. Based on the pilot data of the Shanghai Stock Exchange, Wang Ying et al. predict that XBRL

can significantly improve the processing efficiency of ESG information, greatly shortening the time for investors to screen information [17]. According to Sims' "rational inattention" theory, the improvement of efficiency will make investors focus more on key indicators, thereby reducing decision-making error rates [17]. The International Financial Reporting Standards Foundation's research shows that enterprises' adoption of intelligent disclosure technology can improve the market reaction speed of ESG information and enhance the stability of institutional investors' shareholdings, confirming the correction effect of technology on behavioral biases [22].

At the cognitive training intervention level, ESG cognitive training realizes bias correction by enhancing investors' metacognitive abilities, with its theoretical basis rooted in Thaler and Sunstein's nudge theory [23]. Li Xindan et al.'s pilot project at the Shenzhen Stock Exchange shows that after individual investors undergo a certain period of ESG cognitive training, their ability to identify "greenwashing" is significantly improved, and the influence of cognitive biases such as anchoring effects and loss aversion is also reduced [20]. The Dutch Central Bank project further confirms that training courses combining behavioral finance principles can improve the ESG decision-making quality of retail investors and correct biases arising from overconfidence [24].

The linkage design of policies and behavior needs to introduce frame effect and anchoring adjustment theories. Zhang Bing et al. proposed that future research should combine the "dual-carbon" policy to analyze how the policy expression framework (such as "carbon peak" vs "carbon neutrality") affects investors' interpretation of ESG information through the anchoring effect [25]. For example, defining an industry as "high-carbon" in policies may form an anchor, making investors more stringent about enterprises' ESG improvement measures. The European Commission's report shows that using the expression "climate-neutral" instead of "emission reduction" can increase public support for enterprises' ESG measures, providing an optimization idea for policy formulation from the perspective of behavioral finance [21].

6 Conclusion

This study systematically expounds the influence mechanism of ESG information disclosure quality on investors' decision-making based on behavioral finance theory, forming a complete research loop through theoretical modeling, mechanism analysis, empirical testing, and path design. The core conclusions of the study are as follows: ESG information disclosure quality regulates cognitive biases through the two dimensions of completeness and timeliness, improves decision-making rationality by correcting herding behavior and overconfidence, drives behavioral decisions under the non-traditional rational economic person hypothesis by activating emotional accounts and social preferences, and these effects show significant quantitative characteristics in market empiricism. For enterprises, they should attach importance to the behavioral finance effects of ESG information disclosure, improve the completeness and timeliness of disclosure, and avoid trust crises caused by "greenwashing" behavior; For investors, they need to be aware of their own behavioral biases and improve decision-making quality through cognitive training; For regulatory authorities, they should promote the standardization of ESG disclosure and the intelligent application of technologies, and construct a policy framework that takes into account behavioral laws.

Reference

1. B. Zhou, ESG performance, investor attention, and enterprise information disclosure quality, Finance Econ. (4), (2022)

2. J. Fang, ESG ratings and stock price synchronicity, Manag. World **36**(11), 144–158 (2020)
3. M. Qiu, et al., ESG ratings and enterprise financing costs under the carbon neutrality goal, Financ. Res. (2), (2024)
4. S. Wu, et al., Research on investors' ESG decision-making biases from the perspective of behavioral finance, Econ. Res. J. **54**(11), 127–141 (2019)
5. C. Lü, et al., Does ESG "greenwashing" behavior affect investors' decision-making?—Experimental evidence based on third-party verification, Nankai Manag. Rev. **25**(4), 223–234 (2022)
6. D. Kahneman, A. Tversky, Prospect theory: An analysis of decision under risk, Econometrica **47**(2), 263–291 (1979)
7. J. Zhou, Research on the motivation, effect, and strategy of ESG practice of Chinese insurance enterprises. Chengdu: Southwest Univ. Financ. Econ., (2024)
8. C. Wu, et al., Enterprise environmental protection investment disclosure and investors' purchase intention—Empirical evidence from the new energy industry, Chin. Ind. Econ. (11), 175–193 (2021)
9. Z. Lu, et al., Sensitivity analysis of the market reaction to the timeliness of ESG disclosure, Audit Res. (5), 38–46 (2022)
10. J. Xiao, et al., ESG information disclosure and herding behavior of fund managers, Financ. Res. (10), 168–185 (2020)
11. S. Bikhchandani, D. Hirshleifer, I. Welch, A theory of fads, fashion, custom, and cultural change as informational cascades, J. Polit. Econ. **100**(5), 992–1026 (1992)
12. E. Liu, ESG information presentation mode and investors' cognitive bias, Acta Psychol. Sin. (7), (2022)
13. W. Si, Research on ESG governance information disclosure and investor trust based on blockchain evidence storage, Friends Account. (14), 100–105 (2023)
14. G. A. Miller, The magical number seven, plus or minus two: Some limits on our capacity for processing information, Psychol. Rev. **63**(2), 81–97 (1956)
15. S. M. Hartzmark, A. Sussman, Eliciting expectations. SSRN,2024-04-01[2024-11-07].https://ssrn.com/abstract=4780506,DOI:10.2139/ssrn.4780506.
16. A. Dyck, et al., The costs of corporate fraud: Evidence from investor reactions. Journal of Financial Economics, 2023, **147**(2): 456-478.
17. Y. Wang, et al., Research on the application effect of XBRL standard in ESG information disclosure, Shanghai Financ. (7), 89–98 (2023)
18. P. Cheng, et al., Research on the application of blockchain technology in ESG information disclosure, Friends Account. (1), 1–7 (2023)
19. PwC, Global ESG fraud survey. London: PricewaterhouseCoopers, (2024)
20. X. Li, et al., The impact of ESG cognitive training on the decision-making quality of individual investors, Financ. Forum **28**(4), 3–14 (2023)
21. European Commission, Policy framing effects in sustainable finance. Brussels: European Commission, (2024)
22. IFRS Foundation, Research on the application of intelligent disclosure technology in ESG information disclosure. London: IFRS Foundation, (2024)
23. R. H. Thaler, C. R. Sunstein, Nudge: Improving decisions about health, wealth, and happiness. New Haven: Yale Univ. Press, (2008)

24. Dutch Central Bank, Research on the correction of behavioral biases in ESG investment decision-making. Amsterdam: Dutch Central Bank, (2023)
25. B. Zhang, et al., Research on ESG investment decision-making behavior under the dual-carbon policy framework, Financ. Res. (5), 1–15 (2024)