The Impact of ESG Performance on Private Placement Discounts

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Abstract. Against the backdrop of frequent global external risks and deepening sustainable development, ESG factors increasingly influence capital markets. Existing research on ESG performance mainly focuses on its economic consequences, such as impacts on stock returns and corporate financing, while studies on private placement discount have centered on monitoring compensation, risk compensation, and information asymmetry. However, how ESG performance affects private placement discount in seasoned equity offerings remains understudied. This study expands ESG research boundaries and enriches private placement pricing theories. Using 2010–2023 A-share private placement data, we find ESG performance negatively correlates with discount rates, acting through mitigating information asymmetry and reducing operational risks. Further analysis reveals that the negative impact of ESG performance on the discount rate is more prominent in firms with high economic policy uncertainty, those in non-high-tech industries, and those with high media attention.

Keywords: ESG Performance; Private Placement; Information Asymmetry; Operational Risk.

1. Introduction

At the end of the 20th century and the beginning of the 21st century, the process of globalization accelerated, bringing about increasingly severe problems such as environmental deterioration, social inequality, and corporate governance failure. Against this background, in 2004, the United Nations Global Compact (UNGC) released the landmark report Who Cares Wins, in which the concept of ESG was first put forward. The ESG concept covers three major dimensions: Environment, Social, and Governance. It is an indicator system used to measure the sustainable - development performance of enterprises or organizations. This system can guide enterprises to effectively fulfill their social responsibilities while creating economic benefits, and it is also helpful for investors to identify and control risks and obtain long - term and stable investment returns.

General Secretary Xi Jinping first proposed the new development philosophy of “innovation, coordination, greenness, openness, and sharing” at the Fifth Plenary Session of the Eighteenth Central Committee of the Communist Party of China. And at the Twentieth National Congress of the Communist Party of China, he re - emphasized the necessity of fully implementing the new development philosophy, aiming to promote high - quality development and build a new development pattern. At the 75th Session of the United Nations General Assembly, General Secretary Xi Jinping, on behalf of China, officially made a “carbon peaking and carbon neutrality” commitment to the world. Under the guidance of the new development philosophy, in order to achieve the “carbon peaking and carbon neutrality” commitment, the Chinese government has successively introduced a series of policies and regulations. The Guiding Opinions on Building a Green Financial System in 2016 established the top - level design of China's green financial system. In 2018, the China Securities Regulatory Commission (CSRC) released the revised Code of Corporate Governance for Listed Companies, which for the first time clearly required listed companies to disclose environmental, social, and governance (ESG) information, marking the official establishment of the ESG information disclosure framework. In 2024, the People's Bank of China and other four departments issued the Opinions on Giving Play to the Role of Green Finance to Serve the Construction of a Beautiful China, specifying the improvement of green financial product services, the optimization of resource

allocation and supply, the expansion of new business forms and models, so as to help the green transformation of the real economy and promote the construction of ecological civilization and the achievement of the “carbon peaking and carbon neutrality” goals. With the orderly promotion and implementation of policies, the importance of ESG in the capital market has been increasing, and it has quickly transformed from a concept advocacy to a core consideration in the production, operation, investment and financing processes of enterprises. At the same time, as a key force in the capital market, external investors pay more and more attention to the ESG performance of enterprises, which is a core indicator, when conducting enterprise value assessment and investment decision - making.

Funds, as an important support and core link for enterprises' financing, investment, and business activities, lay the foundation for the survival and development of enterprises. When the self - owned funds of listed companies cannot meet the needs of business development, listed companies need to turn to the capital market and raise the required funds through refinancing. There are various refinancing methods for listed companies, including private placement, public offering, rights issue, preferred stock, and convertible corporate bonds. Among them, private placement is an equity refinancing activity in which a company issues shares to specific objects in a non - public way. China's private placement financing policy has gone through four stages of evolution: system start - up, rapid development, policy tightening, and re - relaxation. Before 1998, rights issue was the only way for listed companies to conduct equity refinancing, and it was only open to existing shareholders. After 1998, the regulatory authorities began to allow listed companies to publicly issue additional shares to the society. The promulgation of the Administrative Measures on the Issuance of Securities by Listed Companies in 2006 paved the way for the standardized development of private placement, and it was gradually favored by listed companies. In 2014, the CSRC announced the Interim Administrative Measures on the Issuance of Securities by GEM - listed Companies. The implementation of this new regulation has undoubtedly provided a huge breakthrough for the financing needs of small and medium - sized listed companies on the GEM, and has led to a leap - forward growth in the number of private placements and the financing scale. In 2017, the CSRC announced the Decision on Amending the Detailed Rules for the Non - public Issuance of Stocks by Listed Companies, which for the first time made major policy adjustments to the non - public issuance of stocks, imposing restrictions on enterprises' refinancing from many aspects such as pricing methods, financing scale, and financing interval. The introduction of the new refinancing regulations in 2020 relaxed the issuance conditions and optimized the non - public system arrangements.

Compared with other financing methods such as public offering and rights issue, private placement has lower requirements for the company's financial situation and information disclosure, as well as the advantages of low financing cost, high issuance success rate, simple and efficient issuance procedures, and easy approval by the regulatory authorities. Therefore, after more than a decade of development, China's equity refinancing market has gradually formed a pattern dominated by private placement. According to Wind data, from 2020 to 2024, the total amount of funds raised through A - share financing (including private placement, public offering, rights issue, and convertible bond issuance) reached 1,132.371 billion yuan, 1,231.946 billion yuan, 1,058.028 billion yuan, 735.972 billion yuan, and 223.119 billion yuan respectively, of which the total amount of funds raised through private placement was 830.977 billion yuan, 908.225 billion yuan, 722.924 billion yuan, 578.951 billion yuan, and 170.652 billion yuan respectively. Private placement has stably accounted for about 70% of China's equity refinancing market in the past five years.

In the private placement market, the price anomaly of highly discounted offerings has been well-documented in academic research as a prevalent phenomenon [1-3]. In the United States, the discount rate for private placements typically ranges from 11.3% to 20%, which is significantly higher than the discount rate for rights offerings [4-6]. In China, according to statistics from Wind, there were a total of 5,697 private placement events between 2006 and 2023, with the average discount rate for these private placements reaching 20.36%.

Existing studies suggest that excessive discount levels will lead to equity dilution for existing shareholders, thereby impairing their interests—particularly those of minority shareholders [7, 8].

Meanwhile, overly large discounts can also hinder the efficient flow of capital, enabling some low-quality enterprises to engage in excessive financing through high discounts, which results in capital misallocation and ultimately reduces the efficiency of resource allocation in the capital market [9]. Consequently, academia has conducted extensive research and discussions on the factors influencing private placement discounts and strategies to improve the pricing efficiency of listed companies' private placements.

Current domestic and international studies primarily focus on perspectives such as major shareholders' tunneling, information asymmetry, and investor behavior to examine the factors affecting private placement discounts. However, few studies have explored the impact of ESG (Environmental, Social, and Governance) performance on private placement discounts. A firm's ESG performance can provide non-financial information regarding its performance in environmental, social, and governance dimensions, enhance information efficiency in the capital market, influence investors' decision-making, and thereby affect the firm's financing costs [10-13].

Given that the discount rate in private placements is a specific manifestation of a firm's equity financing costs, does a firm's ESG performance also exert an impact on the market discount of private placements? Would such an impact help improve the pricing efficiency of private placements and mitigate the high discount anomaly in listed companies' private placements? To further investigate these questions, this paper will use private placement events of all A-share listed companies in China as the research sample to explore the impact of listed companies' ESG performance on private placement market discounts and its specific mechanism of action.

2. Literature References

2.1. Factors Influencing the Discount of Private Placement in the Market

Given that private placement discounts impose substantial implicit issuance costs on firms, their influencing factors have become a key focus of both academic and industrial communities. Scholarly research on the determinants of issuance discounts has explored in depth from multiple perspectives, including monitoring compensation, risk compensation, investor over-optimism, interest tunneling, and information asymmetry.

From the perspective of the monitoring compensation hypothesis, after a private placement, subscribing investors form a shared interest with the firm, and subscribing shareholders will supervise the firm’s operational decisions at all subsequent stages. Thus, the private placement discount is regarded as compensation for the monitoring costs that subscribing shareholders will incur in the future. Wruck (1989) found that against the backdrop of dispersed ownership in the U.S. capital market, the ownership concentration of listed companies significantly increases after private placements, which further leads to positive announcement effects of private placements [6]. Through further analysis, he revealed that when a firm’s ownership is relatively dispersed, the principal-agent problem between shareholders and management is more severe. However, after a private placement, the shareholding ratio of subscribing shareholders increases, ownership becomes more concentrated, and the interests of subscribing shareholders and the firm become more aligned. This motivates subscribing shareholders to engage in more active supervision, alleviating the principal-agent problem and thus generating positive market reactions. Therefore, the private placement discount serves as cost compensation for such monitoring efforts. Wu (2004) found that if the subscribers are the firm’s major shareholders, the private placement discount is larger. This is because, compared with external investment institutions, major shareholders, as internal investors, conduct more monitoring activities and thus incur higher monitoring costs [14]. Shiu and Wei (2013) reached the same conclusion using data on listed companies in Taiwan, China [15].

From the perspective of the risk compensation hypothesis, the future gains or losses of a firm are randomly uncertain. This uncertainty refers to the degree of deviation between actual and expected outcomes: the greater the deviation, the higher the uncertainty and risk (Liu et al., 2013) [16]. The higher the firm’s risk, the greater the investment risk borne by subscribers in the private placement,

and the private placement discount compensates for the specific risks assumed by subscribers. Maynes et al. (2011), using Canadian stock market data, found that stock issuances with lock-up periods have larger discounts than those without, and the discount rate is positively correlated with the length of the lock-up period. They argued that at the time of new stock issuance, the firm's operating conditions and performance during the lock-up period are uncertain, exposing the firm to operational risks and stock price decline risks. Since subscribers' shares cannot be sold during the lock-up period, the firm's risks are transformed into investors' capital liquidity risks. Thus, the discount in private placements can be seen as compensation for the liquidity risks faced by subscribers [17]. The research model by Pástor and Veronesi (2013) showed that the higher the policy risk faced by a firm, the higher the market risk premium demanded by investors [18]. Chen et al. (2015) found a significant positive correlation between risk, marketability characteristics, and private placement discounts [19]. Yang et al. (2018) and Chan et al. (2021), using sample data from China and the U.S. respectively, consistently demonstrated that when firms conducting private placements exhibit high value uncertainty, their risks increase, and investors perceive higher investment risks, leading them to demand more risk compensation, which results in higher private placement discounts [20, 21]. Teng et al. (2022) found that high customer concentration increases firms' risk levels in multiple aspects; thus, firms with high customer concentration need to offer more risk compensation to investors in private placements, i.e., larger discounts [22].

From the perspective of the investor over-optimism hypothesis, theoretically, secondary market prices should reflect a firm's true value. However, in actual market operations, investors may exhibit irrational sentiments, leading to mispricing in the secondary market, which in turn affects the private placement discount rate. Hertzel et al. (2002) argued that investor over-optimism causes stock prices in the secondary market to be excessively inflated, deviating from the firm's intrinsic value, and the private placement discount is seen as an adjustment or correction to the overvalued transaction prices in the secondary market [4]. Krishnamurthy et al. (2005) suggested that when investors are overly optimistic about a firm's prospects, their overvaluation of the firm's value after the placement is reflected in the stock price, leading to high private placement discounts [23]. Yu and Xu (2010) showed that in bull markets, investors in the secondary market generally exhibit optimistic sentiments during private placements, driving up secondary market prices and thus leading to high private placement discounts [24]. Lu and Li (2011) found that investor sentiment affects private placement discounts through market mispricing: the more optimistic the investor sentiment, the larger the discount [25].

From the perspective of the interest tunneling hypothesis, there exists a second type of principal-agent conflict between major shareholders and minority shareholders, with major shareholders tending to encroach on minority shareholders' interests. Unlike the dispersed ownership structure of U.S. listed companies, listed companies in East Asian countries have more concentrated ownership, and some companies in China even exhibit a "dominance of a single large shareholder." Thus, the problem of major shareholder tunneling is more severe in East Asian listed companies (Teng et al., 2022; Ye et al., 2023) [22, 26]. Wruck (1989) argued that private placement discounts are a means by which major shareholders transfer wealth, harm minority shareholders' interests, and expropriate listed companies by setting placement prices favorable to themselves [6]. Baek et al. (2006), using samples of Korean business groups conducting private placements, found that controlling shareholders participate in subscriptions and increase private placement discounts to facilitate interest tunneling [27]. Zhu et al. (2008), through an analysis of the private placement case of Chihong Zinc and Germanium, revealed the main methods of major shareholder tunneling in listed companies' private placements. The study found that Chihong Zinc and Germanium suppressed the benchmark price of the private placement through long-term trading halts and hiding pre-placement profits to achieve low-price issuance, while transferring company wealth through injecting low-quality assets and high dividends. These methods directly or indirectly reduced major shareholders' share purchase costs, enabling their interest tunneling [28]. Zhao et al. (2011) confirmed the widespread phenomenon in Chinese listed companies of transferring wealth to major shareholders through higher cash

dividends after private placements [29]. Wu et al. (2013), through large-sample research, also found that controlling shareholders reduce the placement price through long-term trading halts before private placements, ultimately realizing tunneling to themselves [30]. Cohen and Zarowin (2010), Li and Xu (2019), and Xu and Zhou (2019) showed that listed companies use earnings management to control private placement discounts to facilitate tunneling to major shareholders [31-33]. Huang et al. (2021) and Yu and He (2021) found that controlling shareholders of listed companies use self-media information disclosure or management earnings forecasts to suppress stock prices [34, 35]. Huang et al. (2017), Lu and Shi (2019), and Wang et al. (2022) demonstrated that some controlling shareholders of listed companies engage in timing behavior before private placements to reduce discounts, thereby achieving major shareholder tunneling [36-38].

From the perspective of the information asymmetry hypothesis, due to information asymmetry between investors and listed companies, investors need to investigate the firm's value and investment projects when subscribing to private placement shares. When a firm's value is more difficult to evaluate, investors incur higher costs to determine the firm's value, and the private placement discount compensates for such investigation costs borne by investors (Hertzel and Smith, 1993) [5]. Anderson et al. (2006), studying the New Zealand stock market, found that private investors incur higher costs in valuing small-cap companies with low market attention, leading to larger issuance discounts. Thus, they argued that higher placement discounts represent compensation for the additional risks and costs borne by private buyers [39]. Liang and Jang (2013), using samples of listed companies in Taiwan, China conducting private placements, found that private placement price discounts compensate for investors' costs in evaluating the firm [40]. Wu (2015) showed that information asymmetry increases issuance discounts in private placements, but when a firm has more institutional investors and analyst coverage, the degree of information asymmetry between investors and the firm is reduced, which in turn lowers the private placement discount rate [41]. Li et al. (2017) found that when subscribers do not include related shareholders, the private placement discount rate increases with the degree of information asymmetry [42]. Karpavičius and Suchard (2018) found that institutional investors possess more information about listed companies, which is reflected in stock prices and trading volumes. Thus, for firms with higher institutional ownership, stock pricing efficiency is higher, investors' information collection costs are lower, and issuance discounts are smaller [43].

2.2. The Impact of ESG Performance on Capital Market Performance

Currently, academic circles have not reached a consensus on the impact of ESG performance on stock returns. The primary reasons lie in the considerable discrepancies between ESG ratings provided by different institutions and variations among short-term samples in specific capital markets [44]. Based on data from U.S. listed companies, Pástor et al. (2022) measured the "greenness" of stocks using the environmental dimension rating within ESG ratings and found that companies with higher environmental ratings tend to achieve higher future stock returns [45]. Luo (2022), utilizing data from UK listed companies spanning 2003 to 2020, revealed that firms with lower ESG scores can obtain higher excess stock returns, and this effect is more pronounced among listed companies with high stock liquidity [46]. Shanaev and Ghimire (2022) investigated the impact of 748 ESG rating changes on stock returns of U.S. companies from 2016 to 2021. Their results indicated that rating upgrades lead to moderate positive excess returns, while downgrades result in significant negative excess returns. Moreover, compared to initially low-rated companies, the stock prices of initially high-rated companies respond significantly more strongly to rating changes [47]. Alves et al. (2025) conducted the most comprehensive analysis to date on the relationship between ESG ratings and stock returns, using data from over 16,000 listed companies across 48 countries/regions from 2001 to 2020, combined with ESG ratings from 7 rating agencies. They found little evidence of a significant correlation between ESG ratings and the stock returns of listed companies [44].

Li Jin (2021) through empirical research found that in China's A-share listed companies, ESG has a risk premium effect: companies with ESG ratings disclose more information, have stronger risk

aversion capabilities, and face lower ESG risks. Therefore, compared to companies without ESG ratings, they achieve higher stock returns. Additionally, among companies with ESG ratings, there is a significant negative correlation between ESG ratings and stock returns [48]. Based on the risk expectation compensation theory, Shi Yongdong and Wang Haomiao (2023) found that better ESG performance of Chinese listed companies reduces operational uncertainty and risks, thereby lowering the expected return required by investors, which in turn results in a significant negative correlation between ESG performance and stock returns [49].

Stock liquidity refers to the ease with which investors can execute stock transactions at the lowest cost, with minimal price impact, and at the fastest speed. Tang and Zhang (2020) found that firms with higher ESG ratings have more robust corporate governance mechanisms and demonstrate excellent performance in areas such as environmental protection and social responsibility, which aligns with the principles of sustainable development. Consequently, such firms are more likely to gain investors' favor, thereby enhancing investors' interest in trading their stocks and contributing to improved stock liquidity [50]. Based on data from the Japanese stock market during the COVID-19 pandemic, Liu et al. (2023) revealed that strong ESG performance can enhance a company's social image, foster investors' trust in the company, and strengthen investors' demand for stocks with high ESG scores during crises. This, in turn, increases the company's stock price and turnover rate, enhances stock market stability, and improves the company's stock liquidity [51]. Using data from U.S. listed companies spanning 2006 to 2020, Liu et al. (2023) conducted an empirical study and found that increased ESG-related information reduces information asymmetry between investors and managers, thereby improving stock liquidity [52]. Li Xiaoyan et al. (2023) found that the ESG performance of listed companies has a significant positive impact on stock liquidity, with corporate operational risks and positive market expectations playing a partial mediating role in this relationship [53]. Zhang et al. (2024) discovered that ESG ratings further enhance the stock liquidity of Chinese listed companies by increasing market attention and corporate transparency. Moreover, the positive impact of ESG ratings on stock liquidity is more pronounced when environmental monitoring is stricter, CSR disclosure levels are lower, and corporate governance standards are weaker [54]. Xu Sheng et al. (2024) found a significant positive correlation between excellent corporate ESG performance and stock liquidity, with investor sentiment and information transparency serving as key mechanisms underlying this relationship [55].

The impact of ESG performance on a company’s stock price manifests in multiple dimensions, and academic research currently focuses primarily on stock price crash risk, stock return volatility, and stock pricing efficiency. Regarding stock price crash risk, Kim et al. (2014) measured corporate social responsibility performance using ESG ratings from MSCI and found that such performance significantly mitigates stock price crash risk. This risk-mitigating effect is more pronounced when corporate governance efficiency is low or institutional ownership levels are low [56]. Chebbi (2024) further revealed that the three sub-dimensions of environmental, social, and governance (ESG) performance each exert a significant negative impact on stock price crash risk, with this effect being more prominent during the COVID-19 pandemic [57]. Weng Zhoujie and Lai Zheng (2024) demonstrated that excellent ESG performance can significantly reduce a firm’s stock price crash risk, and this effect is more evident in non-state-owned enterprises and during public health emergencies and other unexpected events [58]. Li Huiyun et al. (2024) conducted an empirical study and found that risk-oriented ESG ratings from SynTao Green Finance, MingSheng, and Wind exhibit a significant negative correlation with stock price crash risk [59].

In terms of stock return volatility, Sassen et al. (2016) found that higher ESG ratings can significantly reduce stock return volatility, thereby enhancing a company’s risk resilience in the stock market [60]. Ye Yingying and Wang Xiaolin (2024) identified a significant negative correlation between corporate ESG performance and stock return volatility, with information asymmetry and long-term institutional ownership playing a partial mediating role. This impact is more significant in private enterprises and firms with low shareholder goal conflicts [61].

Regarding stock pricing efficiency, Barka et al. (2023) used data from French listed companies spanning 2002 to 2021 and found that ESG activities enhance corporate reputation and investor recognition, thereby endowing firms with high ESG ratings with higher market valuations. Specifically, ESG performance exacerbates misvaluation for currently overvalued companies while driving the market value of undervalued companies toward their intrinsic value [62]. However, some scholars have drawn opposing conclusions. Wan Guochao et al. (2023) found that strong ESG performance significantly reduces information asymmetry and financing constraints faced by firms, thereby lowering the level of stock mispricing and improving pricing efficiency [63]. Based on data from China's stock market, Wang et al. (2024) discovered that ESG information disclosure exerts a signaling effect to convey firms' future performance to investors and creditors, while also playing a regulatory role in curbing speculative behaviors such as internal stock price manipulation. Through these two effects, ESG disclosure further alleviates mispricing in the capital market. Further analysis revealed that environmental dimension disclosure inhibits overestimation of market value, while social dimension disclosure suppresses underestimation. In contrast, corporate governance disclosure has no impact on valuation biases in either undervalued or overvalued samples [64].

The impact of ESG performance on corporate financing is mainly reflected in two aspects: financing constraints and financing costs. Regarding the relationship between ESG performance and financing constraints, most domestic and foreign studies have confirmed a positive correlation between them. Cheng et al. (2014) constructed an annual comprehensive corporate social responsibility index using annual environmental, social, and corporate governance scores. Based on sample data from 49 countries or regions worldwide, they found that excellent corporate social responsibility performance can further reduce corporate financing constraints by lowering agency costs, alleviating information asymmetry between enterprises and investors, and enhancing enterprises' profit-creating potential [65]. Qian Ming et al. (2016) found that private listed companies' disclosure of social responsibility information can help them obtain financing support from the government and state-owned banks, thereby alleviating financing constraints [66]. Zhao and Xiao (2019) showed that for enterprises in the growth, maturity, and decline stages of the life cycle, corporate social responsibility practices are negatively correlated with financial constraints; however, for companies in the initial stage, corporate social responsibility practices have no significant impact on financial constraints [67]. Li Zhibin et al. (2022) found that ESG information disclosure has a significant negative impact on corporate financing constraints, and positive media reports have a negative regulatory effect on the relationship between them [68]. Based on signaling theory and stakeholder theory, Fang Xianming and Hu Ding (2023) found that good ESG performance can help enterprises win the trust of related stakeholders, thereby obtaining external financing support from investors, creditors, and suppliers, and reducing financing constraints faced in the innovation process [69].

Regarding the impact of ESG performance on corporate financing costs, scholars have mainly divided financing costs into equity financing costs and debt financing costs to further explore the impact of ESG performance. Most studies believe that corporate ESG performance has a significant negative impact on both equity financing costs and debt financing costs. Ghoul et al. (2011) used a sample of U.S. listed companies from 1992 to 2007 and found that companies with higher corporate social responsibility scores have significantly lower equity costs [10]. Ng and Rezaee (2015) found a significant negative correlation between ESG performance and equity costs [11]. Zhou Hong et al. (2016) found that the level of corporate social responsibility fulfillment significantly reduces corporate bond credit spreads, with information asymmetry playing a partial mediating role between them [70]. Raimo et al. (2021) found that ESG information disclosure can reduce information asymmetry between enterprises and creditors on the one hand, and help lending institutions assess borrowers' default risks on the other hand; through these two paths, ESG information disclosure can further reduce corporate debt financing costs [12]. Apergis et al. (2022) and Barth et al. (2022) measured debt financing costs by bond credit spreads, and their results both showed that ESG performance has a significant negative impact on bond credit spreads [71, 72]. Wang Yiqiu and Xie

Meng (2022) showed that ESG information disclosure can significantly reduce enterprises' equity financing costs and debt financing costs, with a greater negative effect on equity financing costs; further analysis found that information effect and reputation effect are important impact paths between them [73]. However, some studies have drawn different conclusions. Gigante et al. (2022) found that ESG scores have a positive impact on debt financing costs, but this impact is not significant [74]. Liu Bo and Lu Jiarui (2024) found that ESG information disclosure increases short-term operating pressure, transmits this negative signal externally, and raises the risk of information greenwashing, ultimately leading to an increase in corporate debt financing costs [75]. Ji Yucheng et al. (2024) found that under the condition of endogenizing traditional value investors' information acquisition, when information acquisition is an interior solution, there is a non-monotonic relationship between the quality of ESG disclosure and equity capital costs, indicating that improving the quality of ESG disclosure does not always lead to a decrease in corporate equity capital costs [13]. Amarna et al. (2024) used a sample of European listed companies from 2010 to 2019 and found that ESG information disclosure has a significant positive impact on equity financing costs, and real earnings management has a positive regulatory effect on the relationship between them [76].

Some scholars have also conducted research on the impact of ESG performance on the market discount level of specific financing events. Feng et al. (2018) found that the higher the level of social responsibility fulfillment by stock issuers, the more likely they are to provide more transparent financial reports, thereby alleviating information asymmetry between internal and external equity investors. Since the level of discount reflects the degree of information asymmetry, there is a significant negative correlation between the social responsibility fulfillment level of stock issuers and the issuance discount in seasoned equity offerings [77]. Baker et al. (2021), using data from 7,446 IPO events across 36 countries or regions, found that countries with higher ESG government ratings have lower IPO underpricing, and this effect is more pronounced when financial information disclosure is more transparent, responsibility standards are stricter, and shareholder rights are stronger [78]. Ho et al. (2024), taking seasoned equity offering events from 25 countries or regions as samples and approaching from a reverse perspective, found that ESG negative events increase investors' uncertainty about the company's future performance by raising corporate reputation risks and regulatory risks, thereby increasing the cost of seasoned equity offerings. Specifically, this manifests as companies facing higher issuance discounts when conducting seasoned equity offerings [79].

2.3. Hypothesis development

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In capital markets, information asymmetry is a prevalent phenomenon that significantly affects investors' decisions, thereby influencing firms' financing costs and market performance. In private placements, information asymmetry primarily manifests as information gaps between investors and insiders regarding the firm's true value, future prospects, and internal control quality.

Such information asymmetry compels investors to invest time and capital in investigating various aspects of the firm before subscribing to private placement shares, aiming to accurately assess the firm's true value and future prospects. The greater the degree of information asymmetry between external investors and insiders, the higher the information collection costs for external investors (Hertzel & Smith, 1993; Anderson, 2006) [5, 39]. Furthermore, information asymmetry may trigger issues of large shareholders' interest expropriation and managers' moral hazard in private placements. Specifically, on one hand, before the completion of private placement transactions, as insiders, managers and large shareholders can directly or indirectly participate in the firm's operational decisions and possess superior information about the firm's true value and future prospects. To maximize their own interests, when large shareholders participate in private placements, they and managers may collude to manipulate the issuance price through long-term trading halts or timing of issuance, facilitating large shareholders' interest tunneling (Wu et al., 2013; Huang et al., 2017; Lu &

Shi, 2019) [30, 36, 38]. However, these practices often harm other external investors in the private placement and existing minority shareholders (Zhu et al., 2008) [28]. On the other hand, after the completion of private placement transactions, the firm's discretionary cash flow increases significantly. Managers control the firm's operations, capital allocation, and specific business data, while investors cannot directly access such information, making managers prone to moral hazard—i.e., acting or making decisions that harm investors' interests for personal gain, such as misappropriation of raised funds, changes in fund usage, or over-investment (Chu et al., 2017; Liu et al., 2019; Qin et al., 2020; Cai et al., 2023) [80-83]. There may even be cases where management colludes with large shareholders to distribute high cash dividends to transfer corporate wealth, thereby harming other investors' interests (Cui et al., 2017) [84]. These two issues arising from information asymmetry force external investors to attach greater importance to pre-placement due diligence, prompting them to collect more detailed information to evaluate the firm's true value, internal control level, trustworthiness, and the probability of such violations by large shareholders and managers. This, in turn, increases external investors' information collection costs as they strive to make more rational investment decisions to avoid losses.

To compensate investors for their information search costs, the issuance price of private placements includes a certain discount. Thus, the greater the information asymmetry between investors and insiders, the larger the issuance discount in private placements—meaning a significant positive correlation exists between the degree of information asymmetry and the discount rate (Anderson, 2006; Wu, 2015; Li et al., 2017; Karpavičius & Suchard, 2018) [39, 41-43].

Corporate ESG performance is closely linked to information disclosure. First, from the perspective of information content, ESG performance enriches the dimensions of information transmitted by firms to the market, providing external investors with incremental non-financial information. Traditional financial information primarily focuses on presenting a firm's operating results and financial status over specific past periods but inadequately reveals its future prospects or sustainable development capabilities. As a comprehensive evaluation indicator, ESG performance encompasses multi-dimensional strategic practices and quantitative outcomes in environmental sustainability, fulfillment of social responsibilities, and optimization of corporate governance structures. In the environmental dimension, information such as carbon emission data and investment in environmental protection measures disclosed by firms allows external investors to assess their ability to cope with climate change risks and development potential amid green transition trends. In the social dimension, information on employee welfare policies and community relationship maintenance demonstrates the firm's fulfillment of social responsibilities, helping external investors evaluate its social reputation and sustainable development capabilities. In the governance dimension, information on transparent decision-making processes and effective risk management mechanisms provides a basis for external investors to judge the firm's management level and internal control quality. Such incremental non-financial information can effectively improve corporate information transparency (Van Duuren et al., 2016; Li et al., 2022) [85, 86], reduce external investors' information investigation costs during private placement financing and biases in firm value judgment due to information gaps (Wang & Xie, 2022) [73], alleviate information asymmetry between firms and external investors, lower the difficulty of obtaining equity financing (Cheng et al., 2014; Samet & Jarboui, 2017; Xie & Lü, 2022) [65, 87], and help firms secure equity financing at a relatively lower cost of capital (Ghoul et al., 2011; Ng & Rezaee, 2015) [10, 11]. Ultimately, this enables firms to raise funds at a lower issuance discount in private placements. On the other hand, strong ESG performance is more likely to attract attention from external monitors, further enhancing corporate information transparency (Wang & Yang, 2022) [88]. This increases the likelihood of large shareholders' tunneling and managers' moral hazard being detected by minority shareholders and external monitors, inhibiting such violations (Huang et al., 2022; Li et al., 2025) [89, 90], improving external investors' trust in the firm, reducing their information collection costs, and thereby lowering the private placement discount rate.

Second, from the perspective of information quality, better ESG performance is associated with higher quality of disclosed financial information. According to signaling theory, signal consistency

is the key bridge connecting "signal sending" and "signal receiving." When signals transmitted by senders across different dimensions are mutually reinforcing and non-conflicting, receivers are more likely to trust their authenticity, thereby reducing information asymmetry. When firms invest in ESG to send positive signals to the outside world, accumulate reputational capital, and shape a responsible external image, their investment in non-financial signals objectively requires a matching improvement in the quality of financial signals to form a consistent signal system, thereby enhancing the credibility of the overall signal (Fang & Hu, 2023) [69]. Moreover, the process through which firms enhance investors' trust in their information quality and accumulate reputational capital via ESG practices is gradual. However, long-accumulated trust and reputation can be severely damaged in a short time when firms face major negative events. Thus, firms with excellent ESG performance strive to avoid improper behaviors (Christensen, 2016) [91]. Firms with strong ESG performance typically commit to high ethical standards and improving the transparency of financial information, resulting in more readable and transparent financial reports (Soliman & Ben-Amar, 2022) [92]. Additionally, these firms are less likely to manipulate profits through earnings management, leading to higher quality financial reports and a lower probability of financial restatements (Kim et al., 2012; Rezaee & Tuo, 2019) [93, 94]. Consequently, when listed firms raise funds through private placements, excellent ESG performance can improve the quality of their disclosed financial information, enhance external investors' trust in such information, alleviate information asymmetry, reduce investors' information collection costs, and lower the stock issuance discount rate.

Risk reflects certain characteristics of the issuing firm's stock returns and directly affects the valuation of private placement shares (Chen et al., 2015) [19]. In private placements, the level of risk borne by investors and the degree of information asymmetry are key variables determining the issuance price (Yu et al., 2013; Ho et al., 2024) [79, 95]. Accordingly, firms with relatively high operational risks often need to offer larger issuance discounts to compensate investors for the risks they bear when conducting private placements (Hertzel & Smith, 1993; Chen et al., 2015; Chan et al., 2021) [5, 19, 20].

Corporate ESG performance is inherently linked to risk levels. From the environmental dimension, against the backdrop of the Chinese government's promotion of green and low-carbon development, high-pollution and high-energy-consumption firms often face high environmental risks. Environmental pollution accidents not only cause severe ecological damage but also expose firms to legal disputes, huge fines, and reputational damage. Implementing environmental protection strategies and increasing environmental investment can prevent environmental negative events, help firms gain government support, and thereby reduce operational risks (Bai et al., 2019; Tan et al., 2022) [96, 97]. In the social dimension, proactive social responsibility actions—such as charitable donations, poverty alleviation, and improving employee welfare—can send positive signals to the market, help firms gain a good reputation, enhance stakeholders' trust, improve market competitiveness and brand value, and ultimately enable firms to achieve higher and more stable profits, reducing operational risks (Reber et al., 2022; Jiang & Yao, 2024; Liu & Song, 2025) [98-100]. The governance dimension is the core of corporate risk prevention. Strong ESG performance can improve internal control levels, strengthen internal supervision and management of financial and operational activities, avoid earnings management and irregular operations (Kim et al., 2012) [93], reduce agency costs, and thereby lower operational risks (Eccles et al., 2014; Reber et al., 2022) [98, 101].

Furthermore, based on signaling theory, strong ESG performance helps firms build reputational capital, which can provide insurance-like protection. When firms face negative events, such reputational capital can reduce losses and lower the probability of financial distress (Lins et al., 2017; Bissoondoyal-Bheenick et al., 2023; Jiang & Yao, 2024) [100, 102, 103]. In summary, in private placements, external investors perceive firms with strong ESG performance as having lower operational risks, stable profits, and sustainable development capabilities, and are willing to subscribe to their shares at a relatively higher cost. In contrast, for firms with poor ESG performance, investors perceive higher operational risks and demand higher risk premiums to compensate for potential losses, leading firms to incur higher financing costs in private placements, manifested as larger discounts.

Based on the above analysis, this paper proposes the following hypothesis:

H: The better a firm's ESG performance, the lower the market discount rate of its private placement.

3. Data and sample

This paper selects successful private placement events of all A-share listed companies as research samples. Due to the time constraints of ESG data, the sample period of this paper is set from 2010 to 2023. This paper uses Huazheng ESG rating data to measure the ESG performance of listed companies. Both Huazheng ESG rating data and private placement-related data are sourced from the Wind database. Company basic information and other relevant characteristic data are obtained from the CSMAR database and CNRDS database.

With reference to previous relevant literature, this paper processes the samples as follows: (1) To avoid the impact of repeated seasoned equity offerings on stock prices, for companies with two or more placements in the same year, only the first placement sample is retained; (2) Samples from the financial and insurance industry are excluded; (3) Samples labeled as ST or *ST are excluded; (4) Samples with missing data are excluded; (5) To avoid the influence of outliers, continuous variables are winsorized at the 1% and 99% levels. The initial sample of private placements collected in this paper from 2010 to 2023 totals 5,302, and 3,955 samples are finally obtained after the above processing.

This paper draws on the studies by Beak et al. (2006), Chen et al. (2015), Teng Fei et al. (2022), and Zhang Yun et al. (2024) [9, 19, 22, 27], and measures the market discount rate of private placements (DIS) by the degree of deviation between the closing price on the placement date and the actual offering price, which is specifically defined as follows:

$$DIS = \frac{P_1 - P_0}{P_0} \tag{1}$$

Drawing on the studies by Fang Xianming and Hu Ding (2023) as well as Ye Yingying and Wang Xiaolin (2024) [61, 69], this paper uses Huazheng ESG ratings to measure corporate ESG performance, with the 9 grades from C to AAA assigned values of 1 to 9 in sequence. Meanwhile, to mitigate endogeneity issues caused by reverse causality, the explanatory variable in this paper adopts a one-period lag, i.e., the company's ESG performance at the end of the year prior to the private placement (ESG).

Drawing on the research findings of Chen et al. (2015), Teng Fei et al. (2022), Cai Ning et al. (2023), and Zhang Yun et al. (2024) [9, 19, 22, 80], the control variables selected in this paper are divided into two dimensions: firm characteristics and placement characteristics. The control variables under the firm characteristics dimension include firm size (Size), profitability (ROE), asset-liability ratio (Lev), book-to-market ratio (BTM), cash holdings (Cash), board size (Board), proportion of independent directors (Ind), equity balance degree (DEB), ownership nature (SOE), duality of chairman and general manager (Dual), and institutional shareholding ratio (Ins). The control variables under the placement characteristics dimension include whether major shareholders participate in subscription (Major), scale of raised funds (Funds), and liquidity of placed stocks (Liq). All control variables in the firm characteristics dimension adopt a one-period lag, i.e., the values at the end of the year prior to the private placement, to mitigate endogeneity issues caused by reverse causality. The measurement methods of variables are shown in Table 1.

Table 1. Variable definition.

Variables	Definitions
DIS	(Closing price on the placement date - Offering price) / Closing price on the placement date
ESG	The company's ESG performance at the end of the year prior to the private placement.
Size	The natural logarithm of total assets at the end of the year prior to the private placement.
ROE	The return on equity at the end of the year prior to the private placement, calculated as: net profit / net assets.

Lev	The asset-liability ratio at the end of the year prior to the private placement, calculated as: total liabilities / total assets.
BTM	The book-to-market ratio at the end of the year prior to the private placement, calculated as: total assets / total market value.
Cash	The cash holdings at the end of the year prior to the private placement, calculated as: (monetary fund's + trading financial assets) / total assets.
Board	The natural logarithm of the number of board members at the end of the year prior to the private placement.
Ind	The number of independent directors divided by the total number of board members at the end of the year prior to the private placement.
DEB	The equity balance degree at the end of the year prior to the private placement, calculated as: the shareholding ratio of the 2nd to 5th largest shareholders / the shareholding ratio of the largest shareholder.
SOE	The nature of property rights at the end of the year prior to the private placement, measured as 1 if the enterprise is a state-owned enterprise, and 0 otherwise.
Dual	The situation of duality of chairman and general manager at the end of the year prior to the private placement, measured as 1 when the chairman also serves as the general manager, and 0 otherwise.
Ins	The institutional shareholding ratio at the end of the year prior to the private placement.
Major	It is assigned a value of 1 when major shareholders participate in the subscription of privately placed shares, and 0 otherwise.
Funds	The natural logarithm of the actual raised funds.
Liq	It is assigned a value of 1 when the lock-up period is 3 years, and 0 otherwise.
Year	Dummy variable for the year in which the private placement event occurs.
Industry	Industry dummy variables defined based on the China Securities Regulatory Commission's industry classification.

To examine the impact of a firm's ESG performance on the market discount rate of private placements, this paper constructs the following OLS model:

$$DIS = \beta_0 + \beta_1 ESG + \beta_2 Control + \sum Year + \sum Industry + \varepsilon \quad (2)$$

To mitigate the endogeneity issue arising from reverse causality, both the explanatory variables and the firm characteristic-related control variables in Model (2) of this paper adopt the values as of the end of the year prior to the private placement. The dependent variable DIS represents the market discount rate of the successfully completed private placements by the firm. The explanatory variable ESG denotes the firm's ESG performance in the year prior to the successful completion of the private placement. Control includes both firm characteristic-related control variables and private placement characteristic-related control variables, while ε stands for the random error term. Additionally, Model (2) controls for year fixed effects and industry fixed effects, with clustering performed at the firm level.

If the coefficient β1 of ESG in the regression results is significantly negative, it indicates that the aforementioned hypothesis holds, i.e., the better a firm's ESG performance, the lower the market discount rate of its private placement; otherwise, the aforementioned hypothesis does not hold.

4. Empirical analysis

4.1. Descriptive statistical analysis

Table2 presents the results of descriptive statistics for the main variables. Regarding the dependent variable, 75% of the samples have a market discount rate of private placements greater than 8%, with the average market discount rate of the samples being 18.1% and the maximum reaching 89.3%. This indicates that there is generally a relatively high issuance discount in private placement events of A-share listed companies in China. In terms of the explanatory variable, the mean value of firms' ESG performance is 4.084, and the median is 4.000, suggesting that on average, the ESG performance of listed companies that have successfully conducted private placements is at a moderately low level. The descriptive statistical results of other variables indicate that their value distributions are all within a reasonable range.

Table 2. Descriptive statistical analysis.

Variables	N	Mean	Min	P25	Median	P75	Max	Std
DIS	3955	0.181	-1.535	0.080	0.153	0.256	0.893	0.212
ESG	3955	4.084	1.000	4.000	4.000	5.000	8.000	0.979
Size	3955	22.170	18.270	21.270	21.960	22.860	27.590	1.265
ROE	3955	0.061	-10.990	0.036	0.078	0.123	0.850	0.269
Lev	3955	0.474	0.020	0.327	0.477	0.622	1.280	0.198
BTM	3955	0.555	0.037	0.365	0.539	0.725	1.332	0.241
Cash	3955	0.168	0.002	0.088	0.139	0.213	0.931	0.117
Board	3955	2.124	1.386	1.946	2.197	2.197	2.890	0.194
Ind	3955	0.377	0.333	0.333	0.364	0.429	0.714	0.055
DEB	3955	0.740	0.006	0.257	0.570	1.048	3.892	0.627
SOE	3955	0.323	0.000	0.000	0.000	1.000	1.000	0.468
Dual	3955	0.297	0.000	0.000	0.000	1.000	1.000	0.457
Ins	3955	0.428	0.000	0.219	0.439	0.629	0.964	0.247
Major	3955	0.319	0.000	0.000	0.000	1.000	1.000	0.466
Funds	3955	20.580	16.120	19.860	20.500	21.270	25.270	1.133
Liq	3955	0.271	0.000	0.000	0.000	1.000	1.000	0.444

4.2. Correlation analysis

Table 3 reports the results of correlation tests and multicollinearity tests among the variables in Model (2). As shown in the table, the explanatory variable ESG performance (ESG) is significantly negatively correlated with the dependent variable market discount rate (DIS) at the 1% significance level, which preliminarily verifies the research hypothesis of this paper. Among other control variables, firm size (Size), profitability (ROE), asset-liability ratio (Lev), book-to-market ratio (BTM), cash holdings (Cash), board size (Board), equity balance degree (DEB), nature of property rights (SOE), institutional shareholding ratio (Ins), whether major shareholders participate in subscription (Major), and liquidity of placed shares (Liq) all have significant correlations with the dependent variable market discount rate (DIS). This indicates that the selection of control variables in this paper is highly reasonable.

Meanwhile, the absolute values of the correlation coefficients between all variables do not exceed 0.6, and the variance inflation factors (VIF) of each variable do not exceed 3, so there is no multicollinearity in the model.

***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

Table 3. Correlation analysis.

	DIS	ESG	Size	ROE	Lev	BTM	Cash	Board	Ind	DEB	SOE	Dual	Ins	Major	Funds	Liq
DIS	1															
ESG	-0.054***	1														
Size	-0.154***	0.159***	1													
ROE	-0.094***	0.124***	0.073***	1												
Lev	-0.028*	-0.056***	0.518***	-0.166***	1											
BTM	-0.120***	0.059***	0.569***	-0.105***	0.429***	1										
Cash	0.028*	0.096***	-0.195***	0.136***	-0.349***	-0.211***	1									
Board	-0.045***	-0.005	0.248***	0.013	0.175***	0.160***	-0.069***	1								
Ind	0.019	0.095***	0.001	-0.012	-0.029*	-0.027*	0.025	-0.543***	1							
DEB	0.029*	0.033**	-0.098***	0.010	-0.148***	-0.105***	0.043***	0	-0.016	1						
SOE	-0.083***	0.032**	0.334***	-0.079***	0.314***	0.292***	-0.104***	0.294***	-0.073***	-0.275***	1					
Dual	0.025	-0.015	-0.163***	0.035**	-0.129***	-0.135***	0.070***	-0.192***	0.126***	0.049***	-0.305***	1				
Ins	-0.086***	0.037**	0.408***	0.120***	0.227***	0.143***	-0.032**	0.235***	-0.068***	-0.253***	0.411***	-0.182***	1			
Major	0.086***	0.013	0.119***	-0.048***	0.146***	0.135***	-0.083***	0.117***	-0.042***	-0.078***	0.238***	-0.105***	0.080***	1		
Funds	0.01	0.072***	0.583***	0.090***	0.271***	0.156***	-0.093***	0.162***	0.001	-0.098***	0.244***	-0.120***	0.328***	0.098***	1	
Liq	0.221***	0.007	0.034**	-0.063***	0.067***	0.038**	-0.044***	0.032**	0.003	-0.055***	0.136***	-0.078***	0.029*	0.286***	-0.011	1
VIF		1.08	2.98	1.12	1.66	1.74	1.17	1.67	1.48	1.14	1.57	1.13	1.47	1.16	1.66	1.10

4.3. Regression analysis

Column (1) in Table 4 presents the results of the univariate test with only year and industry fixed effects controlled, while Column (2) shows the regression results with additional control variables included on the basis of controlling for year and industry fixed effects. The results in both Column (1) and Column (2) indicate that a firm's ESG performance (ESG) has a significantly negative impact on the market discount rate of private placements (DIS) at the 1% significance level. Under the specification of Column (2), each one-level increase in a firm's ESG performance leads to an 0.8% decrease in the market discount rate of its private placement. Overall, the regression results in Table 4 verify the research hypothesis of this paper, namely: the better a firm's ESG performance, the lower the market discount rate of its private placement. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses in the table are t-values.

Table 4. Regression analysis.

Variables	(1) DIS	(2) DIS
ESG	-0.014***	-0.008***
	(-4.58)	(-2.68)
Size		-0.038***
		(-8.53)
ROE		-0.078***
		(-3.10)
Lev		0.064***
		(3.30)
BTM		-0.015
		(-0.85)
Cash		0.043
		(1.42)
Board		0.026
		(1.35)
Ind		0.117*
		(1.94)
DEB		0.008*
		(1.88)
SOE		-0.029***
		(-3.89)
Dual		-0.004
		(-0.58)
Ins		-0.008
		(-0.62)
Major		0.021***
		(3.05)
Funds		0.033***
		(8.47)
Liq		0.097***
		(12.52)
Constant	0.284***	0.275***
	(10.25)	(3.31)
Year/ Industry	YES	YES
R^2	0.181	0.270
Observations	3955	3955

5. Robustness check

5.1. Instrumental variable method

First, a reverse causality relationship may exist between ESG performance and the market discount rate of private placements. A lower issuance discount implies lower financing costs and pressure for the company, as well as higher investor recognition of the company's long-term value creation capabilities. Such companies may be more capable and willing to implement ESG initiatives, thereby achieving better ESG performance. Second, the research conclusions of this paper may suffer from sample self-selection bias. Companies with better ESG performance may already have better reputations, fundamentals, and lower financial risks. They are more willing to disclose financial information to the public, which reduces the risk premium demanded by external investors during private placements and lowers their information-gathering costs, ultimately leading to smaller discount compensation. Third, the research results may be subject to sample selection bias. Since this paper focuses on private placement events of listed companies, those companies that did not conduct private placements during the study period are excluded from the sample.

In the baseline regression, the explanatory variables and firm characteristic control variables are all lagged by one period, which alleviates the reverse causality issue to some extent. To further address the endogeneity problems mentioned above, this paper constructs instrumental variables. Following the approach of Fang and Hu (2023) and Ye and Wang (2024), this paper selects the natural logarithm of the market value of "ESG-related" fund holdings plus one (FV) and the natural logarithm of the number of non-governmental organizations (NGOs) per 10,000 people in each province, municipality, or autonomous region (NGO) as instrumental variables [61, 69].

First, ESG-themed mutual funds can influence corporate governance by "voting with their feet," i.e., selling their shares in companies, thereby promoting the adoption of ESG practices (Dimson et al., 2015) [105]. Therefore, the market value of ESG-related fund holdings satisfies the relevance requirement. On the other hand, the establishment, size, shareholding quantity, and changes in ESG-related funds are determined by fund companies and fund managers, independent of market factors, ensuring exogeneity. These funds primarily enhance corporate ESG performance through private engagement with corporate executives rather than direct interference in daily operations, thus satisfying the exclusion restriction. Second, NGOs aim to reduce negative externalities and pressure companies to act more responsibly. Companies in regions with more NGOs face greater pressure to improve their ESG performance (Ye and Wang, 2024) [61]. Therefore, the number of NGOs per 10,000 people satisfies the relevance requirement. Additionally, the number of NGOs is exogenous and does not directly affect the market discount rate of private placements, thus meeting the exclusion restriction. Since the explanatory variables in this paper are lagged by one period, these instrumental variables are also lagged by one period.

Table 5. Instrumental variable method.

Variables	First stage ESG	Second stage DIS
NGO	0.162***	
	(2.85)	
FV	0.012***	
	(5.92)	
ESG		-0.041**
		(-2.11)
Size	0.197***	-0.025***
	(5.96)	(-3.92)
ROE	0.126	-0.022**
	(1.14)	(-2.28)
Lev	-0.905***	0.013
	(-7.31)	(0.54)
BTM	0.284***	0.011

	(2.59)	(0.85)
Cash	0.397**	0.057**
	(2.53)	(2.37)
Board	0.189	0.018
	(1.53)	(1.24)
Ind	2.135***	0.126**
	(5.49)	(2.05)
DEB	0.026	0.008**
	(0.85)	(2.21)
SOE	0.107**	-0.021***
	(2.09)	(-3.47)
Dual	-0.050	-0.008
	(-1.13)	(-1.52)
Ins	-0.141	-0.004
	(-1.62)	(-0.43)
Major	0.057	0.019***
	(1.55)	(3.49)
Funds	-0.020	0.021***
	(-1.06)	(8.04)
Liq	0.035	0.089***
	(0.91)	(15.12)
Constant	-0.839	0.360***
	(-1.17)	(4.24)
Year/ Industry	YES	YES
R^2	0.126	0.232
Kleibergen-Paap rk LM	44.831[0.000]	
Kleibergen-Paap rk Wald F	22.511	
Weak ID test(10%)	19.93	
Hansen J statistic	0.297[0.586]	
Endogeneity test	2.987[0.084]	
Observations	3522	3522

Table 5 presents the results of the instrumental variable regression. The p-value of the Durbin-Wu-Hausman test (Endogeneity test) is 0.084, less than 0.1, indicating the presence of endogeneity in the explanatory variables. The first-stage regression results show that both the market value of ESG-related fund holdings (FV) and the number of NGOs per 10,000 people (NGO) are significantly and positively correlated with corporate ESG performance (ESG) at the 1% level. The second-stage regression results indicate that corporate ESG performance negatively affects the market discount rate of private placements (DIS) at the 5% significance level. Meanwhile, the Kleibergen-Paap rk LM statistic is 44.831, significant at the 1% level, suggesting no under-identification of instrumental variables; the Kleibergen-Paap rk Wald F statistic is 22.511, exceeding the critical value of 19.93 at the 10% level, indicating no weak instrument problem; the Hansen J statistic is 0.297 with a p-value of 0.586, greater than 0.1, suggesting no over-identification problem. In summary, after controlling for potential endogeneity, the conclusion that better ESG performance leads to a lower market discount rate for private placements remains valid. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses in the table are t-values.

5.2. Heckman two-stage method

Since listed companies that did not conduct private placements in the current year have been excluded from the research sample of this paper, the Heckman two-stage model is further employed to mitigate the impact of this sample selection bias on the research conclusions. In the first-stage selection equation, this paper specifies a dummy variable indicating whether a company conducts a private placement in the current year (PP_dum) as the dependent variable, and takes the ESG

performance (ESG) from the baseline regression, control variables related to firm characteristics, and three exclusion restriction variables as explanatory variables.

According to the provisions of the Measures for the Administration of Securities Issuance by Listed Companies (CSRC Order No. 206), a listed company shall not issue shares to specific targets under any of the following circumstances: ① its financial accounting report for the most recent year has received a qualified opinion, adverse opinion, or disclaimer of opinion in the audit report; ② its current directors, supervisors, or senior managers have been subject to administrative penalties by the China Securities Regulatory Commission (including criticism, warning, fine, confiscation of illegal gains, and order to close down) in the most recent three years, or have been publicly condemned by the stock exchange in the most recent year; ③ the listed company or its current directors, supervisors, or senior managers are under criminal investigation by judicial authorities or under investigation by the China Securities Regulatory Commission for alleged violations of laws or regulations. Therefore, this paper selects the following three variables as exclusion restriction variables in the first-stage selection equation, with their definitions as follows: whether the financial annual report has obtained a non-standard unqualified opinion (MAO), whether there are major litigation or arbitration cases (Lawsuit), and whether the company has been subject to administrative penalties by the China Securities Regulatory Commission or public condemnation by stock exchanges (Vio). Given that the explanatory variables in this paper are lagged by one period, these three exclusion restriction variables are also lagged by one period. The three exclusion restriction variables only affect whether a company conducts a private placement in the current year (PP_dum), i.e., they only influence whether the dependent variable market discount rate (DIS) takes a value rather than its magnitude, thus satisfying the requirements of relevance and exogeneity.

The regression results in Column (1) of Table 6 show that, in the first stage, all three exclusion restriction variables are negatively correlated with whether a company conducts a private placement in the current year (PP_dum) at the 1% significance level, indicating that the exclusion restriction variables are correlated with the dependent variable of the first stage. In the second stage, the Inverse Mills Ratio (IMR) estimated from the first stage is introduced as an additional control variable to the original set of control variables in the baseline regression. The regression results in Column (2) of Table 6 show that the Inverse Mills Ratio (IMR) is positively correlated with the market discount rate (DIS) at the 5% significance level, which indicates that there is indeed a sample selection bias in Model (2); corporate ESG performance (ESG) is negatively correlated with the market discount rate (DIS) at the 5% significance level, suggesting that the conclusion of this paper remains valid after controlling for sample selection bias. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses in the table are t-values.

Table 6. Heckman two-stage method.

Variables	(1) PP_dum	(2) DIS
MAO	-1.276***	
	(-4.56)	
Lawsuit	-0.067***	
	(-2.88)	
Vio	-0.311***	
	(-6.07)	
ESG	0.009	-0.007**
	(0.88)	(-2.21)
Size	0.001	-0.036***
	(0.10)	(-8.24)
ROE	0.769***	-0.014
	(8.52)	(-0.34)
Lev	1.274***	0.161***
	(19.10)	(2.91)
BTM	-0.847***	-0.082**

	(-15.46)	(-2.11)
Cash	-1.216***	-0.070
	(-13.96)	(-1.21)
Board	0.011	0.034*
	(0.17)	(1.70)
Ind	0.156	0.169**
	(0.70)	(2.51)
DEB	-0.001	0.007
	(-0.06)	(1.40)
SOE	-0.117***	-0.040***
	(-4.52)	(-4.22)
Dual	0.040*	-0.002
	(1.77)	(-0.25)
Ins	-0.192***	-0.026
	(-4.02)	(-1.59)
Major		0.027***
		(3.92)
Funds		0.031***
		(9.01)
Liq		0.105***
		(14.77)
IMR		0.104**
		(2.04)
Constant	-1.182***	0.059
	(-4.08)	(0.46)
Year/ Industry	YES	YES
R^2		0.280
Observations	34207	3545

The regression results in Column (1) of Table 6 show that, in the first stage, all three exclusion restriction variables are negatively correlated with whether a company conducts a private placement in the current year (PP_dum) at the 1% significance level, indicating that the exclusion restriction variables are correlated with the dependent variable of the first stage. In the second stage, the Inverse Mills Ratio (IMR) estimated from the first stage is introduced as an additional control variable to the original set of control variables in the baseline regression. The regression results in Column (2) of Table 6 show that the Inverse Mills Ratio (IMR) is positively correlated with the market discount rate (DIS) at the 5% significance level, which indicates that there is indeed a sample selection bias in Model (2); corporate ESG performance (ESG) is negatively correlated with the market discount rate (DIS) at the 5% significance level, suggesting that the conclusion of this paper remains valid after controlling for sample selection bias. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses in the table are t-values.

5.3. Replacement of explanatory variables

Since various ESG rating agencies adopt inconsistent evaluation criteria in their assessment processes, different agencies may have divergent ESG ratings for the same company, which could lead to differences in research conclusions based on ESG ratings from different agencies. To reduce the impact of rating errors on the research conclusions, drawing on the studies by Lei et al. (2023) and Ye and Wang (2024), this paper remeasures firms' ESG performance using Hexun ESG scores (HX_ESG) and Wind ESG ratings (Wind_ESG) [61, 106]. Wind ESG ratings are divided into seven levels from CCC to AAA, and this paper assigns values from 1 to 7 in ascending order of the ratings. The regression results in Table 7 show that Hexun ESG scores (HX_ESG) have a significantly negative impact on the market discount rate (DIS) at the 5% significance level, and Wind ESG ratings (Wind_ESG) have a significantly negative impact on the market discount rate (DIS) at the 10% significance level. This is consistent with the results of the baseline regression, indicating that the

research conclusions of this paper are robust. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses in the table are t-values.

Table 7. Replacement of explanatory variables.

Variables	(1) DIS	(2) DIS
HX_ESG	-0.017**	
	(-2.44)	
Wind_ESG		-0.008*
		(-1.82)
Size	-0.041***	-0.017***
	(-7.79)	(-2.68)
ROE	-0.067	-0.019*
	(-1.24)	(-1.79)
Lev	0.071***	0.027
	(3.06)	(1.05)
BTM	-0.021	-0.022
	(-1.00)	(-0.99)
Cash	0.081**	-0.053
	(2.20)	(-1.57)
Board	0.026	0.056**
	(1.14)	(1.97)
Ind	0.117	0.044
	(1.62)	(0.52)
DEB	0.012**	0.000
	(2.30)	(0.06)
SOE	-0.030***	-0.043***
	(-3.37)	(-3.69)
Dual	-0.008	0.007
	(-1.08)	(0.86)
Ins	-0.005	0.003
	(-0.36)	(0.19)
Major	0.013	0.061***
	(1.63)	(5.55)
Funds	0.035***	0.007
	(8.18)	(1.18)
Liq	0.089***	0.084***
	(10.41)	(5.64)
Constant	0.199*	0.201*
	(1.95)	(1.87)
Year/ Industry	YES	YES
R^2	0.283	0.173
Observations	3118	1573

5.4. Replacement of dependent variables

Drawing on the studies by Cai et al. (2023) and Zhang et al. (2024), this paper calculates the deviation degrees between the actual issuance price and the closing price one day before the private placement, the closing price one day before the listing announcement date, and the closing price ten days after the listing announcement date, respectively, to replace the original dependent variable. The variable names are DIS_1, DIS_2, and DIS_3 [9, 80]. As shown in Table 8, the regression results after replacing the dependent variable are basically consistent with the original baseline regression results, indicating that the research conclusions of this paper are robust. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses in the table are t-values.

Table 8. Regression analysis.

Variables	(1) DIS_1	(2) DIS_2	(3) DIS_3
ESG	-0.007**	-0.009**	-0.009*
	(-2.34)	(-2.58)	(-1.74)
Size	-0.039***	-0.037***	-0.029***
	(-8.37)	(-7.11)	(-4.10)
ROE	-0.073***	-0.109***	-0.164***
	(-2.86)	(-3.54)	(-4.39)
Lev	0.058***	0.058**	0.057*
	(2.82)	(2.53)	(1.77)
BTM	-0.031*	-0.041**	-0.074***
	(-1.65)	(-2.01)	(-2.66)
Cash	0.045	0.037	0.059
	(1.43)	(1.06)	(1.20)
Board	0.025	0.046**	0.024
	(1.19)	(2.03)	(0.75)
Ind	0.079	0.122*	0.156
	(1.24)	(1.65)	(1.61)
DEB	0.009*	0.007	0.008
	(1.75)	(1.32)	(1.06)
SOE	-0.030***	-0.023***	-0.020*
	(-3.85)	(-2.62)	(-1.72)
Dual	-0.001	0.004	0.002
	(-0.19)	(0.54)	(0.19)
Ins	0.003	-0.015	-0.033
	(0.22)	(-0.97)	(-1.54)
Major	0.008	0.011	0.024**
	(1.15)	(1.39)	(2.14)
Funds	0.037***	0.037***	0.029***
	(9.25)	(8.07)	(4.58)
Liq	0.102***	0.094***	0.093***
	(12.46)	(10.08)	(7.19)
Constant	0.210**	0.124	0.191
	(2.43)	(1.28)	(1.42)
Year/ Industry	YES	YES	YES
R^2	0.262	0.255	0.267
Observations	3955	3484	2018

6. Mechanisms check

6.1. Information transparency

As pointed out in the hypothesis discussion section earlier, due to the existence of information asymmetry, external investors need to invest time, human resources, and funds to investigate various aspects of the company when subscribing to privately placed shares. A higher degree of information asymmetry will increase investors' information collection costs, thereby leading to a higher issuance discount in private placements. However, good ESG performance can improve the company's information transparency, alleviate the problem of information asymmetry, and thus reduce the issuance discount of the company's private placements. Therefore, this paper argues that information transparency plays an intermediary role in the impact of corporate ESG performance on the market discount rate of private placements.

Drawing on the practices of Xin Qingquan et al. (2014) and Xu Shoufu and Yao Yutong (2021) [107, 108], this paper constructs the company's information transparency (Trans) index using the

average of the sample percentile ranks of five indicators: earnings quality, number of analysts following, accuracy of analysts' earnings forecasts, information disclosure evaluation results of the Shenzhen Stock Exchange and Shanghai Stock Exchange, and whether audited by the Big Four international accounting firms. This index is a positive indicator, and the larger its value, the higher the company's information transparency. Since the explanatory variables in this paper are lagged by one period, the variable of information transparency (Trans) also uses a lagged one-period term, that is, the information transparency of the previous year of the private placement. Based on this, this paper further constructs Models (3) and (4) on the basis of Model (2) to test the mediating role of information transparency.

$$Trans = \beta_0 + \beta_1 ESG + \beta_2 Control + \sum Year + \sum Industry + \varepsilon \tag{3}$$

$$DIS = \beta_0 + \beta_1 ESG + \beta_2 Trans + \beta_3 Control + \sum Year + \sum Industry + \varepsilon \tag{4}$$

The regression results are shown in Table 9. In Column (1), ESG performance (ESG) positively affects information transparency (Trans) at the 1% significance level, which indicates that good ESG performance can significantly improve the company's information transparency and alleviate the information asymmetry between the inside and outside of the company. In Column (2), information transparency (Trans) negatively affects the market discount rate (DIS) at the 1% significance level, and ESG performance (ESG) negatively affects the market discount rate (DIS) at the 5% significance level. This indicates that information transparency (Trans) plays a partial mediating role in the impact of ESG performance (ESG) on the market discount rate of private placements (DIS). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses in the table are t-values.

Table 9. Mechanisms check-Information transparency.

Variables	(1) DIS	(2) DIS
ESG	0.020***	-0.007**
	(8.42)	(-2.26)
Trans		-0.058***
		(-2.78)
Size	0.084***	-0.034***
	(23.67)	(-6.94)
ROE	0.364***	-0.056**
	(16.59)	(-2.17)
Lev	-0.119***	0.057***
	(-7.30)	(2.92)
BTM	-0.247***	-0.029
	(-18.18)	(-1.60)
Cash	0.015	0.044
	(0.66)	(1.46)
Board	0.028	0.027
	(1.64)	(1.43)
Ind	-0.000	0.117*
	(-0.00)	(1.94)
DEB	0.009**	0.009**
	(2.31)	(2.00)
SOE	-0.003	-0.029***
	(-0.44)	(-3.91)
Dual	0.002	-0.003
	(0.44)	(-0.56)
Ins	0.046***	-0.005
	(3.90)	(-0.41)

Major	0.004	0.021***
	(0.74)	(3.09)
Funds	-0.002	0.033***
	(-0.63)	(8.47)
Liq	-0.010**	0.097***
	(-2.07)	(12.42)
Constant	-1.437***	0.192**
	(-18.64)	(2.13)
Year/ Industry	YES	YES
R^2	0.418	0.272
Observations	3955	3955

6.2. Operational risk

As pointed out in the hypothesis discussion section earlier, in private placements, the level of risk borne by investors is one of the key variables determining the issuance discount. Companies with relatively higher operational risks need to offer a higher issuance discount to compensate investors for the higher risks they bear when raising funds through private placements. Excellent ESG performance can reduce the probability of negative environmental events for the company, enhance its market competitiveness, brand image, and internal control quality. These positive effects help reduce the company's operational risks, thereby lowering the risk premium required by investors and ultimately reducing the issuance discount level during the company's private placements. Therefore, this paper argues that operational risk plays an intermediary role in the impact of corporate ESG performance on the market discount rate of private placements.

Drawing on the approaches of Li Jianjun and Han Xun (2019), as well as Sun Guangguo and Chen Siyang (2022) [109, 110], this paper measures the company's operational risk (Risk) using earnings volatility, specifically the three-year rolling standard deviation of return on assets adjusted by industry and annual means. The specific calculation formula is as follows:

$$Risk_{it} = \sqrt{\frac{1}{T-1}\sum_{t=1}^{T}\left(Adj\_\mathrm{ROA}_{it} - \frac{1}{T}\sum_{t=1}^{T} Adj\_\mathrm{ROA}_{it}\right)^2} \mid \mathrm{T=3} \tag{5}$$

$$Adj\_\mathrm{ROA}_{it} = \frac{EBIT_{it}}{ASSET_{it}} - \frac{1}{X}\sum_{k=1}^{X}\frac{EBIT_{it}}{ASSET_{it}} \tag{6}$$

Where EBIT is earnings before interest and taxes, ASSET is total assets at the end of the period, and Risk is operational risk. This is a positive indicator, with a larger value indicating higher operational risk of the company. Since the explanatory variables in this paper are lagged by one period, the variable of operational risk (Risk) also uses a lagged one-period term, i.e., the operational risk of the year prior to the private placement. Based on this, this paper further constructs Models (7) and (8) on the basis of Model (2) to test the mediating role of operational risk.

$$Risk = \beta_0 + \beta_1 ESG + \beta_2 Control + \sum Year + \sum Industry + \varepsilon \tag{7}$$

$$DIS = \beta_0 + \beta_1 ESG + \beta_2 Risk + \beta_3 Control + \sum Year + \sum Industry + \varepsilon \tag{8}$$

The regression results are shown in Table 10. In Column (1), ESG performance (ESG) negatively affects operational risk (Risk) at the 5% significance level, indicating that good ESG performance can significantly reduce the company's operational risk. In Column (2), operational risk (Risk) positively affects the market discount rate (DIS) at the 10% significance level, and ESG performance (ESG) negatively affects the market discount rate (DIS) at the 1% significance level. This indicates that operational risk (Risk) plays a partial mediating role in the impact of ESG performance (ESG) on the market discount rate of private placements (DIS). *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses in the table are t-values.

Table 10. Mechanisms check-Operational risk.

Variables	(1) DIS	(2) DIS
ESG	-0.002**	-0.008***
	(-2.06)	(-2.64)
Risk		0.050*
		(1.80)
Size	0.004	-0.039***
	(1.05)	(-8.57)
ROE	-0.067***	-0.074***
	(-4.83)	(-2.96)
Lev	0.008	0.064***
	(0.97)	(3.28)
BTM	-0.029***	-0.013
	(-3.48)	(-0.76)
Cash	-0.016	0.044
	(-1.39)	(1.45)
Board	-0.026	0.027
	(-1.20)	(1.41)
Ind	-0.009	0.117*
	(-0.15)	(1.95)
DEB	0.003	0.008*
	(1.38)	(1.85)
SOE	-0.002	-0.029***
	(-0.80)	(-3.88)
Dual	-0.002	-0.003
	(-0.83)	(-0.56)
Ins	-0.013*	-0.007
	(-1.86)	(-0.57)
Major	-0.003	0.021***
	(-1.29)	(3.08)
Funds	0.002	0.033***
	(1.35)	(8.45)
Liq	-0.002	0.097***
	(-0.86)	(12.53)
Constant	0.027	0.273***
	(0.81)	(3.30)
Year/ Industry	YES	YES
R^2	0.077	0.271
Observations	3955	3955

7. Supplementary analysis

7.1. Heterogeneity of economic policy uncertainty

In an environment with macroeconomic policy uncertainty, listed companies are more likely to engage in earnings management to reduce potential costs arising from future policy adjustments (Chen Deqiu and Chen Yunsen, 2018) [111]. Moreover, when economic policies are frequently adjusted, companies' investment and financing strategies become unstable, leading to increased performance volatility. Meanwhile, there will be greater differentiation in investment and financing strategies within industries, which reduces the comparability of industry financial information. These factors also lower the accuracy of analysts' earnings forecasts and increase the divergence in their forecasts, thereby reducing the effectiveness of financial information in enterprise value assessment and risk prediction (Dai Zewei and Yang Bing, 2020) [112]. In an environment with high economic policy uncertainty, the overall quality and effectiveness of corporate financial information will

decrease, and external investors will be more inclined to use non-financial information such as ESG to evaluate enterprise value and identify investment risks. Therefore, in such an environment, the role of ESG performance in improving information transparency will be enhanced.

On the other hand, good ESG performance can help enterprises build reputation capital and enhance the trust of stakeholders. When external negative events impact enterprises, good ESG performance can exert an "insurance effect," reducing losses caused by such events and lowering the probability of enterprises falling into financial distress (Lins et al., 2017; Bissoondoyal-Bheenick et al., 2023) [102, 103]. Therefore, when facing the negative impact of economic policy uncertainty, good ESG performance, combined with the "insurance effect," will play a stronger role in risk resistance. In addition, good ESG performance helps enterprises establish and maintain good relationships with the government, enabling them to obtain government support during economic policy uncertainty, alleviating resource constraints in coping with uncertainty, and thus more effectively resisting risk shocks brought by economic policy uncertainty (Bai et al., 2019; Tan Jinsong et al., 2022) [96, 97].

Table 11. Heterogeneity of economic policy uncertainty.

Variables	(1) Low economic policy uncertainty	(2) High economic policy uncertainty
ESG	0.006	-0.012***
	(0.80)	(-3.46)
Size	-0.060***	-0.031***
	(-6.89)	(-5.54)
ROE	-0.023	-0.014
	(-0.92)	(-1.30)
Lev	0.142***	0.052**
	(3.11)	(2.35)
BTM	-0.046	-0.015
	(-1.15)	(-0.71)
Cash	0.043	0.012
	(0.56)	(0.36)
Board	-0.012	0.041*
	(-0.30)	(1.70)
Ind	0.130	0.132*
	(0.97)	(1.77)
DEB	0.029**	0.004
	(2.46)	(0.78)
SOE	-0.033**	-0.020**
	(-2.14)	(-1.97)
Dual	-0.001	-0.004
	(-0.06)	(-0.52)
Ins	-0.021	-0.002
	(-0.72)	(-0.12)
Major	0.001	0.030***
	(0.05)	(3.45)
Funds	0.050***	0.024***
	(6.08)	(5.08)
Liq	0.124***	0.074***
	(8.09)	(7.08)
Constant	0.397**	0.191**
	(2.03)	(2.02)
Year/ Industry	YES	YES
R^2	0.341	0.173
Observations	1153	2802
P-value for inter-group coefficient difference	0.007	

This paper uses the China Economic Policy Uncertainty Index calculated by Baker et al. (2016) to measure the degree of China's economic policy uncertainty [113]. The arithmetic average of the monthly indices in the year prior to the private placement is taken as the proxy variable for economic policy uncertainty, and grouping is conducted according to the median. The regression results, as shown in Table 11, indicate that the negative impact of corporate ESG performance on the market discount of private placements is only significant in the group with high economic policy uncertainty, suggesting that in an environment with high economic policy uncertainty, the negative impact of ESG performance on the market discount of private placements is stronger.*, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses are t-values; the P-value for inter-group coefficient difference is obtained based on the Bootstrap-based Fisher's combination test with the number of samplings set to 1000.

7.2. Heterogeneity in high-tech industries

In contrast to high-tech industries, which are centered on explicit factors such as technical patents, R&D pipelines, and R&D investments, value creation in non-high-tech industries—including traditional manufacturing, retail, and services—relies more on implicit factors such as supply chain stability, labor management, and compliance with operations. Since enterprises in non-high-tech industries lack "hard signals" like technical patents and R&D investments, their ESG performance becomes a key alternative signal for conveying enterprise quality. High-quality ESG practices, by enhancing the disclosure of environmental and social responsibility information, make up for the limitations of traditional financial reports, reduce the degree of information asymmetry between investors and enterprises, and thereby lower investors' information collection costs and evaluation difficulties.

On the other hand, non-high-tech industries face more prominent traditional operational risks such as environmental compliance risks, supply chain risks, and reputation risks. ESG performance can more effectively reduce the risk premium required by investors through substantive risk management. In contrast, high-tech industries are mainly exposed to non-traditional operational risks such as technological R&D failures, intellectual property disputes, and fluctuations in market demand, where the role of ESG may be relatively limited. Specifically, in the environmental dimension, traditional manufacturing and energy enterprises need to comply with strict regulations. By implementing ESG practices such as adopting environmental protection strategies and increasing environmental investment, enterprises can avoid negative environmental events, prevent sudden penalties, and reduce the risk of violating environmental policies (Bai et al., 2019; Tan Jinsong et al., 2022) [96, 97]. In the social dimension, active social responsibility actions help enterprises gain a good reputation, enhance the trust of stakeholders such as suppliers and customers, thereby strengthening supply chain resilience and reducing operational volatility (Reber et al., 2022; Jiang Yichi and Yao Shu, 2024; Liu and Song, 2025) [98-100]. In the governance dimension, good ESG performance can improve the level of internal control in enterprises, strengthen the supervision and management of internal activities, avoid issues such as earnings management and irregular operations (Kim et al., 2012) [93], reduce agency costs, and thus lower operational risks (Eccles et al., 2014) [101].

Table 12. Heterogeneity in high-tech industries.

Variables	(1) Non-high-tech industries	(2) High-tech industries
ESG	-0.017***	-0.000
	(-3.53)	(-0.05)
Size	-0.042***	-0.039***
	(-5.50)	(-6.70)
ROE	-0.024*	-0.021
	(-1.85)	(-0.85)
Lev	0.031	0.104***
	(0.93)	(4.08)

BTM	-0.024	-0.016
	(-0.71)	(-0.75)
Cash	-0.121*	0.102***
	(-1.75)	(2.73)
Board	-0.008	0.042*
	(-0.23)	(1.68)
Ind	0.093	0.171**
	(0.91)	(2.10)
DEB	-0.002	0.013**
	(-0.23)	(2.44)
SOE	-0.017	-0.035***
	(-1.32)	(-3.36)
Dual	0.003	-0.007
	(0.23)	(-0.83)
Ins	0.053**	-0.041**
	(2.28)	(-2.41)
Major	-0.000	0.034***
	(-0.01)	(3.65)
Funds	0.036***	0.029***
	(5.30)	(5.90)
Liq	0.086***	0.097***
	(7.08)	(8.46)
Constant	0.432***	0.294**
	(3.19)	(2.43)
Year/ Industry	YES	YES
R^2	0.279	0.271
Observations	1452	2503
P-value for inter-group coefficient difference	0.005	

Following the approach of Yang Xingzhe and Zhou Xiangyi (2020) [114], this paper defines high-tech industries based on the 2012 Classification Guidelines for Listed Companies issued by the China Securities Regulatory Commission, including industries with codes C25–C29, C31–C32, C34–C41, I63–I65, and M73. The regression results, as shown in Table 12, indicate that the negative impact of corporate ESG performance on the market discount of private placements is only significant in the non-high-tech industry group, suggesting that the negative impact of ESG performance on the market discount of private placements is stronger in non-high-tech industries. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses are t-values; the P-value for inter-group coefficient difference is obtained based on the Bootstrap-based Fisher's combination test with the number of samplings set to 1000.

7.3. Heterogeneity of media attention

The media serves as a crucial channel for enterprises to transmit information externally. Enterprises with high media attention are typically under the spotlight of public opinion, and their ESG-related behaviors are more likely to be captured, reported, and interpreted by the media, thereby being quickly conveyed to stakeholders such as investors, creditors, and regulatory authorities. Furthermore, the professional interpretations and in-depth reports by the media can break down information barriers, transform complex ESG data into content easily understandable by the public, verify the authenticity of ESG data, and thus improve the efficiency of external entities' understanding of the actual situation of enterprises and force enterprises to enhance the authenticity of ESG information. Therefore, media attention can amplify the effect of ESG performance on improving corporate information transparency.

On the other hand, high media attention means that negative events of enterprises may quickly trigger public opinion crises, leading to chain reactions such as stock price fluctuations, customer loss,

and regulatory penalties, which significantly increase the operational risks of enterprises. This may force enterprises to improve their own ESG performance, thereby utilizing the "insurance effect" of ESG performance to enhance their risk resistance when facing negative events. In addition, the supervisory effect of the media can effectively restrain the opportunistic behaviors of management, urge them to integrate ESG goals with long-term strategies, reduce self-interested transactions and short-sighted behaviors, and thus lower agency costs and operational risks (Lu Dong et al., 2015) [115]. Therefore, media attention can amplify the effect of ESG performance on mitigating corporate operational risks (Jiang Yichi and Yao Shujie, 2024) [100].

Table 13. Heterogeneity of media attention.

Variables	(1) Low media attention	(2) High media attention
ESG	-0.002	-0.012***
	(-0.45)	(-3.01)
Size	-0.039***	-0.035***
	(-4.65)	(-6.02)
ROE	-0.088**	-0.065**
	(-2.20)	(-2.06)
Lev	0.031	0.089***
	(1.08)	(3.39)
BTM	0.005	-0.048**
	(0.18)	(-2.10)
Cash	0.020	0.053
	(0.44)	(1.28)
Board	0.022	0.019
	(0.69)	(0.80)
Ind	0.011	0.178**
	(0.11)	(2.29)
DEB	0.002	0.014**
	(0.30)	(2.31)
SOE	-0.042***	-0.016
	(-3.91)	(-1.57)
Dual	-0.001	-0.004
	(-0.10)	(-0.47)
Ins	-0.001	-0.012
	(-0.06)	(-0.72)
Major	0.010	0.027***
	(1.04)	(2.87)
Funds	0.034***	0.031***
	(5.83)	(6.11)
Liq	0.103***	0.092***
	(9.02)	(8.80)
Constant	0.259	0.284***
	(1.59)	(2.59)
Year/ Industry	YES	YES
R^2	0.313	0.257
Observations	1679	2276
P-value for inter-group coefficient difference	0.045	

Based on this, this paper argues that media attention can amplify the effect of ESG performance on improving corporate information transparency and mitigating corporate operational risks, thereby amplifying the negative impact of ESG performance on the market discount rate of corporate private placements. Drawing on the approach of Liu Yiwen et al. (2023) [116], this paper measures the media attention of a company by the sum of the number of media report headlines in the quantitative statistics of financial news in newspapers and periodicals and the number of media report headlines

in the quantitative statistics of online news in the year prior to the private placement. Further, this paper uses the industry-year median of media attention to group the samples. The regression results, as shown in Table 13, indicate that the negative impact of corporate ESG performance on the market discount of private placements is only significant in enterprises with high media attention, suggesting that the negative impact of ESG performance on the market discount of private placements is stronger in enterprises with high media attention. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively; the data in parentheses are t-values; the P-value for inter-group coefficient difference is obtained based on the Bootstrap-based Fisher's combination test with the number of samplings set to 1000.

8. Summary

With the continuous emergence of external risk events such as public health crises, military conflicts, trade frictions, and global climate change, the concept of sustainable development has gradually become the focus of public attention and an important consideration for capital market participants in making investment decisions and conducting business operations. In particular, the proposal of the national "dual-carbon" goals and the advancement of ecological civilization construction have significantly increased the weight of ESG factors in investment and enterprise operations, with investors increasingly favoring enterprises with excellent ESG performance. In the capital market, private placement serves as an important financing tool for listed companies, which can play a role in resource allocation, provide investors with opportunities to invest in potential companies, and promote the effective matching of financing needs and capital supply. However, the high discount phenomenon in the private placement market has long been controversial. Against this backdrop, supported by the information asymmetry theory, risk compensation theory, and signal transmission theory, this paper selects all successful private placement events of A-share listed companies from 2010 to 2023 as research samples to study the impact of listed companies' ESG performance on their private placement market discount rates, and further examines the mediating roles of information transparency and operational risk. In the further analysis section, this paper introduces economic policy uncertainty, whether it belongs to high-tech industries, and media attention for heterogeneity analysis. The main conclusions of this paper are as follows:

(1) ESG performance has a significant negative impact on the market discount of a company's private placements. On one hand, good ESG performance can alleviate information asymmetry between internal personnel and external investors, reduce the information collection costs of investors subscribing to private placements, and thereby lower the market discount of private placements. On the other hand, good ESG performance can reduce the company's operational risks, decrease the risk premium required by external investors, and thus lower the market discount of private placements.

(2) Information transparency and operational risk are the mediating mechanisms between ESG performance and the market discount of corporate private placements. From the perspective of the mediating mechanism of information transparency, ESG performance enriches the information dimensions that enterprises transmit to the market and can provide external investors with incremental non-financial information. Good ESG performance can increase the information content related to enterprises in the market, improve the quality of accounting information disclosed by companies, reduce information asymmetry between enterprises and external investors, alleviate the two types of principal-agent problems caused by information asymmetry, lower the information collection costs of external investors, and thereby reduce the market discount of private placements. From the perspective of the mediating mechanism of operational risk, companies with relatively high operational risks often need to offer a higher issuance discount to compensate investors for the higher risks they bear when raising funds through private placements. Excellent ESG performance can reduce the probability of negative environmental events of the company, enhance the company's market competitiveness and brand image, and improve the company's internal control quality. These positive effects help reduce the company's operational risks, thereby reducing the risk premium

required by investors, which ultimately manifests as a decrease in the market discount of the company's private placements.

(3) In an environment with high economic policy uncertainty, the negative impact of ESG performance on the market discount of private placements is stronger. The possible reasons for this are: when macroeconomic policy uncertainty is high, companies' investment and financing strategies are difficult to stabilize, performance volatility increases, and the utility of financial information in enterprise value assessment and risk prediction will decline significantly. At this time, the role of ESG performance in improving corporate information transparency will be strengthened; on the other hand, when facing external adverse shocks from economic policy uncertainty, the "insurance effect" of ESG performance will take effect, thereby exerting a stronger risk resistance role. In addition, good ESG performance helps enterprises obtain government support when economic policies are uncertain, thereby more effectively resisting risk shocks caused by economic policy uncertainty.

(4) In non-high-tech industries, the negative impact of ESG performance on the market discount of private placements is stronger. Compared with high-tech industries that focus on explicit factors such as technical patents and R&D investment, value creation in non-high-tech industries such as traditional manufacturing, retail, and services relies more on implicit factors such as supply chain stability, labor management, and compliance operations. Since enterprises in non-high-tech industries lack "hard signals" such as technical patents and R&D investment, their ESG performance becomes a key alternative signal for conveying enterprise quality. High-quality ESG practices can reduce the degree of information asymmetry between investors and enterprises and lower investors' information collection costs. On the other hand, non-high-tech industries face more prominent traditional operational risks such as environmental compliance risks, supply chain risks, and reputation risks, and ESG performance can more effectively reduce the risk premium required by investors through substantive risk management.

(5) In enterprises with high media attention, the negative impact of ESG performance on the market discount of private placements is stronger. The possible reasons for this are: ESG-related information of enterprises with high media attention can be more quickly transmitted to investors and other stakeholders through the media. In addition, professional interpretations and in-depth reports by the media can not only transform complex ESG data into more understandable content but also verify the authenticity of ESG data, thereby forcing enterprises to improve the authenticity of ESG information. Therefore, media attention can amplify the effect of ESG performance on improving corporate information transparency. On the other hand, high media attention means that negative events of enterprises may quickly trigger public opinion crises, significantly increasing the operational risks of enterprises, which may force enterprises to improve their own ESG performance, thereby utilizing the "insurance effect" of ESG performance to enhance their risk resistance when facing negative events. In addition, the supervisory role of the media can reduce managers' self-interested transactions and short-sighted behaviors, urging them to integrate ESG goals with long-term strategies, thereby reducing corporate agency costs and operational risks. Therefore, media attention can amplify the effect of ESG performance on mitigating corporate operational risks.

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