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ESG Performance and Corporate Competitiveness Under the SDGs: The Mediating Role of Financing Constraints

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ABSTRACT

ESG performance is an essential practical tool for promoting high-quality corporate development. This research constructs a conceptual framework of "ESG performance - financing constraints - corporate competitiveness" to analyze the relationships among these variables. Using unbalanced panel data from A-share listed companies in China between 2018 and 2022, this study empirically examines the impact of ESG performance on corporate competitiveness and the mediating role of financing constraints. The results reveal that Chinese companies can simultaneously enhance ESG performance and corporate competitiveness while pursuing the Sustainable Development Goals (SDGs) (such as SDGs 8 and 9), with financing constraints mediating factors. Furthermore, the relationship between ESG performance and competitiveness exhibits significant heterogeneity. For firms in growth and maturity stages, the positive effect of ESG performance on competitiveness is more pronounced. This study clarifies how China can harness the synergies between ESG performance, financing constraints, corporate life cycle, and competitiveness under the SDGs.

Keywords: Sustainable development; ESG performance; corporate competitiveness; financing constraints; corporate life cycle

INTRODUCTION

In the context of global economic deglobalization, Chinese enterprises face the challenge of being restricted by foreign-controlled key core technologies, which limits their product research and development, leading to a decline in market share and a severe threat to their global competitiveness (Song & Wang 2018). Core competitiveness drives a company's development (Duanmu et al. 2018). It represents a market advantage that helps companies overcome technological barriers and is an essential means of enhancing the global competitiveness of Chinese enterprises (Wang & Gao 2021). Therefore, exploring the factors that influence core competitiveness enhancement has become a crucial topic of academic discussion.

The United Nations introduced the SDGs to urge all countries to promote economic prosperity while protecting the environment and addressing various social needs. Achieving full employment, promoting inclusive, sustainable, and lasting economic growth, and ensuring decent work for everyone are the main goals of SDG 8. SDG 9 aims to foster innovation, develop inclusive and sustainable industries, and build resilient infrastructure. As a key standard for measuring corporate sustainability and an important way to achieve sustainable development, ESG closely aligns with these goals (Lu et al. 2024) and has gained increasing attention from Chinese businesses and the public. For example, this study examines how ESGP influences competitiveness by encouraging responsible business practices that promote sustainable economic growth, aligning with SDG 8. Public focus on ESGP can motivate companies to innovate and implement sustainable measures, which helps build resilient and competitive industries, thus supporting the achievement of SDG 9. Additionally, ESG provides investors with a comprehensive assessment tool, allowing them to consider a firm's E, S, and G contributions when making investment decisions (He et al. 2022). It also offers financial support to companies with strong ESG performance (ESGP) (Chen et al. 2023), forming a basis for developing core competitive advantages. However, the effect of ESGP on competitiveness has not yet been thoroughly studied in academia. A theoretical analysis of the relationship and mechanisms between them is needed, broadening the understanding of ESGP's real-world effects and offering a new perspective for enhancing competitiveness.

The current literature on the financial outcomes of ESGP has mainly focused on the impact of ESGP on firm performance, with ongoing debates regarding the nature of this relationship. On the one hand, ESGP may have negative externalities. The resources required for ESG initiatives can lead to a "crowding-out" effect, potentially impairing business operations and negatively affecting corporate performance (Atan et al. 2018; Duque & Aguilera 2021). On the other hand, ESGP benefits the accumulation of social capital (Amiraslani et al. 2023), enhances corporate reputation and risk resilience (Murè et al. 2021), and fosters innovation (Cabaleiro & Mendi 2024). As a result, ESGP and financial performance are positively correlated (Bruna et al. 2022; Chen et al. 2023). Additionally, ESGP can increase market attention (Meng et al. 2023), lower operational risks (Bax et al. 2023), promote technological innovation capabilities (Chen et al. 2023), and thereby enhance corporate value. Finally, ESGP can contribute to job creation (Li et al. 2025), drive high-quality corporate development (Yu et al. 2024), stimulate foreign direct investment activities, and strengthen a company's international competitive advantage (Cheng & Su 2024). Some scholars also argue that good ESGP helps deepen collaboration and communication among stakeholders, facilitating access to external financing for companies (Guo et al. 2024). Existing studies have shown that ESGP significantly impacts corporate performance and value. In contrast, corporate

competitiveness, as a comprehensive indicator of sustainable development capability, may be indirectly influenced by ESGP. Financing constraints are considered a particularly critical mediating pathway among various potential mechanisms. On the one hand, implementing ESG strategies typically requires sustained capital investment, and strong ESGP helps enhance a firm's credibility and transparency in capital markets (Bae et al. 2021), as well as increase investor confidence (Zhang & Lucey 2022), thereby improving access to financing and alleviating financing constraints. On the other hand, financing constraints, as an important factor affecting a firm's ability to acquire and allocate resources efficiently, when relieved, provide necessary funding to support innovation, investment, and market expansion, ultimately enhancing corporate competitiveness (Maquieira et al. 2024). Compared with other mediating variables such as corporate reputation, innovation capability, or operational efficiency, financing constraints determine a firm's capacity to obtain and effectively utilize resources. Therefore, financing constraints serve as a core link connecting ESG strategy implementation with improvements in corporate competitiveness, possessing stronger causal explanatory power and practical significance.

Based on the discussion above, we posed two primary research questions:

1. Can ESG performance improve competitiveness in general?
2. Can ESG performance improve competitiveness by alleviating financial constraints?

To address these questions, this study uses a sample of 4156 listed companies in China's A-share market, totaling 13,552 observations, to explore how ESGP affects competitiveness and investigate the mediating effect between the two. The findings suggest that improvements in ESGP correlate with enhanced competitiveness, with financial constraints serving as a potential mediating mechanism.

This study fills several important gaps in the existing literature and offers noteworthy theoretical contributions. First, although corporate competitiveness is widely regarded as a core indicator of sustainable development and has received considerable academic attention, prior research has mainly explored its drivers from perspectives such as sustainable innovation, education, and gender differences (Hermundsdottir & Aspelund 2021; Niederle 2017; Saccardo et al. 2018). However, systematic investigations into how non-financial performance, particularly ESGP, influences competitiveness remain limited (Ni et al. 2024). By incorporating ESGP as a key explanatory variable, this study broadens the understanding of the determinants of corporate competitiveness and responds to the limited attention paid to the relationship between ESG and long-term firm development in existing literature.

Second, most studies on the economic consequences of ESGP have concentrated on financial outcomes or capital market reactions (Asif et al. 2023; Chen & Xie 2022; Giese et al. 2019). These indicators are often affected by non-operational factors such as investor expectations or macroeconomic fluctuations, which may lead to inconsistent conclusions. This study adopts competitiveness as a more stable and development-oriented measure of long-term firm performance. Based on the stakeholder theory, information asymmetry theory, and signaling theory, this provides a theoretical foundation for understanding how ESGP promotes internal development and sustainable competitive advantages. It also contributes to the broader policy agenda by addressing how ESG supports progress toward the United Nations SDGs, particularly SDG 8 on productive employment and SDG 9 on industrial innovation.

Finally, although ESGP may affect corporate outcomes through multiple channels, the mediating role of financing constraints has not been adequately explored despite its theoretical significance. This study identifies and empirically tests the complete mediation mechanism linking ESGP to corporate competitiveness by alleviating financing constraints. This approach offers a novel perspective on how ESG improves resource access and enhances development capacity. The findings enrich the theoretical understanding of the ESG competitiveness relationship and provide practical implications for advancing green transformation and sustainable development in China.

This study consists of the following sections: Section 2 presents a literature review. Section 3 provides hypotheses based on the theoretical analysis. Section 4 describes the methodology. Section 5 explains the data results and offers a discussion. The final section outlines the conclusions and implications.

LITERATURE REVIEW

ESGP AND COMPETITIVENESS

In recent years, although research on ESGP has gradually increased, empirical studies focusing on its impact on corporate competitiveness remain relatively limited. Fan et al. (2025), using Chinese logistics companies as the research sample, found that ESGP significantly improves competitiveness. The mechanisms identified include promoting green technological innovation and reducing agency costs. Ni et al. (2024) further revealed that the positive effect of ESG on competitiveness primarily stems from alleviating financing constraints, enhancing corporate reputation, reducing agency conflicts, and fostering innovation. Their heterogeneity analysis also shows that factors such as firm size, financing accessibility, local government fiscal science expenditure, and managerial ownership significantly moderate this relationship.

A large body of research has examined the impact of ESGP on firm value from various perspectives. The findings suggest that ESG practices tend to generate positive value effects in most contexts, though industry-level heterogeneity

exists. Tang et al. (2024) found that firms with ESG strengths can significantly increase their value, whereas ESG weaknesses may negatively affect firm value. Lee and Isa (2022), examining Shariah-compliant companies in Malaysia, found that overall ESGP has a significant positive impact on operational and market performance, indicating that in specific institutional and cultural settings, ESG practices can effectively promote value creation. Ionescu et al. (2019), studying 73 global tourism companies, discovered that due to the industry's dependence on reputation and customer trust as well as its close ties to environmental protection, ESGP significantly elevates firm value. Conversely, Behl et al. (2022), focusing on India's energy sector, found a negative short-term relationship between ESG and firm value. While ESG investments may produce long-term benefits, they can temporarily reduce firm value due to high initial costs and regulatory pressures.

Some scholars even argue that ESGP is negatively associated with firm value. For example, studying Canadian firms, Folger et al. (2022) found that ETFs with high ESG ratings did not demonstrate superior downside protection during market crashes, indicating that strong ESGP does not necessarily lead to better financial returns or reduced losses in turbulent markets. Similarly, Duque and Aguilera (2021), analyzing 104 multinational corporations in Latin America, reported a negative association between ESG scores and financial performance. This suggests that in the Latin American context, enhancing ESGP may impose higher compliance costs or resource allocation pressures, which can suppress short-term financial outcomes.

In summary, although existing literature presents mixed conclusions regarding the economic consequences of ESG, this study aims to address these inconsistencies by introducing a corporate lifecycle perspective, competitiveness indicators, and a multi-theoretical framework. In doing so, it provides a more comprehensive and systematic explanation of how ESGP affects firms' long-term development capacity and offers new insights and empirical support for the ongoing debate.

ESGP, FINANCING CONSTRAINTS AND COMPETITIVENESS

Research on the relationship between corporate ESGP, financing constraints, and competitiveness has become increasingly rich in recent years. Bai et al. (2022) found that good ESGP not only directly alleviates financing constraints but also indirectly reduces financing pressure by attracting institutional investors and sending positive signals to the market. However, this effect is insignificant in the primary industry and mainly concentrated in the secondary and tertiary sectors. He et al. (2023) also supported the negative relationship between ESG and financing constraints, noting that proactive ESG practices help enhance corporate reputation and improve external financing environments, thereby lowering overall corporate risk. Qian (2024) further proposed that ESG initiatives not only ease financing constraints but also stimulate green innovation potential, providing momentum for improving firm value. Guo et al. (2024) incorporated national policy factors, highlighting that the Chinese government's commitment to addressing climate change plays a key role in promoting ESG investment and easing access to finance. Collectively, these studies suggest that ESG helps mitigate financing constraints and, to some extent, contributes to the enhancement of corporate competitiveness.

In the broader literature on financing constraints and firm value, Billett and Mauer (2003) pointed out that providing policy support to small and medium-sized enterprises with strong investment opportunities but limited financial resources can significantly improve excess firm value, indicating that financing constraints are a key factor limiting value realization. Carvalho (2018) also emphasized that for R&D-intensive firms, improved financing capacity enables better capture of growth opportunities, underscoring the critical role of financing constraints in resource allocation efficiency and the formation of long-term competitiveness.

However, existing literature primarily focuses on the unidirectional impact of ESG on either financing constraints or firm performance, lacking a systematic analysis of the mediating mechanism through which ESGP alleviates financing pressure and thereby enhances corporate competitiveness. In addition, the moderating role of corporate life cycle stages in this relationship remains underexplored, limiting the practical applicability of existing findings. To address these gaps, this study examines how ESGP enhances firm competitiveness by easing financing constraints and further investigates the heterogeneity of this mechanism across different corporate life cycle stages. This contributes to a deeper understanding of the practical functions and boundary conditions of ESG strategies within Chinese enterprises.

HYPOTHESES DEVELOPMENT

ESGP AND COMPETITIVENESS

Stakeholder theory suggests that there are explicit or implicit contractual relationships between a company and its stakeholders. Good ESGP helps companies meet the needs of these stakeholders, thereby boosting competitiveness (Fama 2021; Raghunandan & Rajgopal 2022). For example, a company's investment in environmental protection can earn support from environmental advocates; active involvement in poverty alleviation, fulfilling social responsibilities (Cornell & Shapiro 2021), and offering fair employee benefits can improve the company's reputation, attract more talent, and develop human capital (Talan et al. 2024). Employee training can increase workers' enthusiasm and creativity, turning individual knowledge and skills into a talent advantage for the company, thus enhancing competitiveness (Fan et al. 2025; Zheng et al. 2022). Additionally, good governance practices can prevent negative events, such as financial violations or executive misconduct, from harming the company's competitiveness (Ni et al. 2024).

The information asymmetry theory indicates that in market transactions, parties generally have unequal information levels, with one party often holding an informational advantage over the other. Stakeholders frequently rely on publicly available financial reports to understand company details, which puts them at an informational disadvantage (Lee et al. 2022; Tang et al. 2024). ESGP, as non-financial information, attracts the attention of investors, creditors, and analysts, helping to reduce information asymmetry and effectively improve competitiveness (Liu et al. 2023; Wong & Zhang 2022).

According to signaling theory, ESGP is something a company can adjust and is observable externally (He et al. 2024). Changing ESGP requires investment, and because of factors like industry, ownership structure, and company size, the cost of modifying ESGP varies among companies. This suggests that a company's ESGP meets the basic criteria of a strong signal. A robust ESGP sends positive signals to the market, gaining the trust of stakeholders and creating a competitive edge.

Furthermore, a firm's outstanding ESGP can also be viewed as a form of green differentiation strategy (Wang et al. 2024). By engaging in differentiated competition with competitors, strong ESGP helps a company attract employees and customers who are more focused on environmental protection and business ethics (Wang et al. 2023), thereby expanding its product market. The differentiation in ESGP influences a company's participation and competitiveness in the product market (Wu et al. 2024). By better meeting the needs of customers and investors, companies with strong ESGP can capture a larger market share, demonstrating the strategic effect of ESGP. Thus, we propose this research hypothesis:

H_1 ESG performance positively affects the competitiveness of companies.

THE MEDIATING ROLE OF FINANCING CONSTRAINTS

According to information asymmetry theory and signaling theory, outstanding ESGP can signal to the market that a firm is financially stable, well-funded, and dedicated to green and sustainable development. Providing sufficient financial and non-financial information to the market helps bridge the potential information gap between the company and external stakeholders (Bae et al. 2021), allowing the company to attract responsible investors in the capital market, reduce the information risk for investors, boost investor confidence, and gain trust and resource support from stakeholders (Qian 2024). For example, commercial banks may offer favorable green credit services to companies with excellent ESGP, and the company can also access resources across the supply chain. Therefore, ESGP lowers financing costs (Bai et al. 2022; Guo et al. 2024; Zhang & Lucey 2022). Additionally, reputation theory suggests that ESGP enhances a company's image and social reputation (He et al. 2023; Maquieira et al. 2024). Influenced by Confucian thought, the concept of "benevolence and righteousness" is deeply rooted in Chinese values (Ho et al. 2024). Strong ESGP indicates that the company's production processes and operations are environmentally friendly and safe, projecting a "righteous" image to society, which helps build a positive reputation. Consumers and investors tend to prefer such companies, making it easier for them to attract investments and ease financing constraints.

The financing constraints a company faces are closely related to its market performance. The degree of financing constraints can significantly affect the company's future investment decisions, further impacting its competitive advantage (Ferrando & Ruggieri 2018). For instance, financing constraints may disrupt the firm's financial chain, affecting its ability to introduce advanced equipment and expand production capacity, which in turn causes a decline in competitiveness. Additionally, when a company faces severe financing constraints, it may borrow from banks or engage in informal lending. Such debt financing forces the company to make interest payments according to contractual terms, which increases debt levels and raises financing costs (Bakhtiari et al. 2020). Research by He et al. (2021) demonstrates that reducing financing constraints can lower the company's investment costs, increase investment levels, enable the company to reach optimal investment scale, and, in turn, strengthen its competitive advantage in the product market. Moreover, financing constraints can affect cash flow sensitivity, increase corporate cash holdings, and enhance the company's risk-bearing capacity (Mateut 2018; Tang et al. 2023), all weakening competitiveness. According to the theory of predation (Bolton & Scharfstein 1990), when a company faces higher financing constraints, excessive debt negatively impacts its competitiveness in the product market. Imperfections in the financial market may lead to the company being exploited. Agency problems between the company and its creditors can trigger financing constraints. When a company faces significant financing constraints, competitors may adopt predatory pricing strategies to force the company to reduce future profits. Meanwhile, under significant debt repayment pressure, the company may cut back on investments and adopt more conservative competition strategies, reducing market share or even exiting the market. Thus, the following hypothesis is proposed:

H_2 ESG performance can improve competitiveness by alleviating financial constraints.

Figure 1 displays the research framework. This framework illustrates the relationship between ESGP (independent variable) and Com (dependent variable). Financial constraint serves as the mediating variable, highlighting its role in influencing the impact of ESGP on organizational Com.

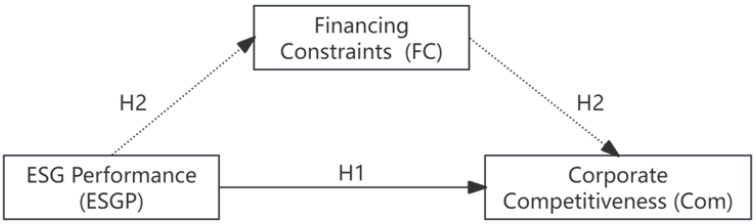

FIGURE 1. Research framework

METHODOLOGY

DATA SOURCES AND PROCESSING

The sample for this study comprises Chinese A-share listed companies from 2018 to 2022. Other variables were sourced from the CSMAR database, while ESGP was obtained from the Huazheng ESG rating database. The specific data processing steps are as follows: 1) To avoid errors caused by missing data, samples with missing key variable values were excluded. 2) Companies that received special treatment (ST, *ST) and financial firms were excluded from the sample. 3) All continuous variables were winsorized at the 1% level to minimize the impact of extreme outliers. After the above screening process, the study included 13,552 observations from 4,156 companies.

VARIABLE MEASUREMENT

COMPETITIVENESS (COM)

The product market is the primary arena for corporate competition, and a company's competitive advantage in this market directly influences its position in other markets. Therefore, in this study, "competitiveness" denotes explicitly the competitive advantage within the product market. Drawing on the research of Fresard (2010), Gupta and Krishnamurti (2021), and Cheng et al. (2014), this study employs core business activity gross margin as a measure of product market competitive advantage. The gross margin from core business activities effectively reflects the firm's profitability and the market competitiveness of its products. Additionally, this metric can be used to estimate the company's "monopoly rents" in the product market. A higher gross margin indicates stronger monopoly pricing power (Chod & Lyandres 2023), making gross margin a robust indicator for assessing a firm's competitive advantage in the product market. Given that the advantage is evaluated relative to industry peers, this study compares the company's gross margin with the annual industry average to ensure relevance and comparability. Specifically, competitive advantage can be quantified using the difference between a firm's gross margin and the industry average. Larger values denote greater COM.

ESG PERFORMANCE (ESGP)

In the existing literature, many studies use ESG scores from independent rating agencies to assess ESGP. However, some scholars have developed proprietary ESG evaluation methods. Given the subjectivity and limited coverage of self-constructed ESG evaluation systems, this study adopts ESG scores from a third-party rating agency. Huazheng ESG Rating is well established, with a long, traceable history and considerable authority. It covers all Chinese A-share companies. Huazheng categorizes ESGP into nine levels ranging from C to AAA. Referring to Lin et al. (2021), this research assigns values to the nine rating categories, from 1 to 9, corresponding to the ESGP rankings.

MEDIATING VARIABLE

Financing Constraints (FC). Currently, there are three principal approaches in academic literature for measuring FC. The first involves the quantification of models (Almeida et al. 2004; Cleary 1999; Moyen 2004), but since various models have been proposed, academics have yet to agree on which most accurately captures the degree of FC. The second method applies single indicators for quantification, such as firm size (Whited 1992), dividend payout ratio (Fazzari & Petersen 1993), and interest coverage ratio (Guariglia 1999). However, single indicators have limitations, as they cannot comprehensively reflect the overall extent of FC. The third method constructs an index using multiple indicators. The most widely used measures of financing constraints in the literature include the SA index, the KZ index, and the WW index. The applicability of the SA index is constrained because ESG performance does not directly affect firm size or age, which are key components of the SA index. The KZ index includes Tobin's Q, which is highly sensitive to market fluctuations and thus subject to significant measurement error. Furthermore, it does not account for industry-specific characteristics. In contrast, the WW index addresses the limitations of the KZ index by excluding Tobin's Q and incorporating industry-level

factors, thereby improving its exogeneity. Therefore, following Livdan et al. (2009) and Li (2011), this study employs the WW index to measure corporate financing constraints, with higher index values indicating more severe constraints.

CONTROL VARIABLES

Based on previous research (Ni et al. 2024; Wanyan & Zhao, 2024; Xu et al. 2024), the control variables selected in this study include SIZE, Board, CFO, Growth, TOP1, and Age. Table 1 details the calculation methods for these variables.

TABLE 1. Variables measurement

Variable		*Measurement Methods*
Dependent Variable		
Corporate competitiveness	Com	Gross operating margin adjusted for industry annual averages
Independent Variables		
ESG performance	ESGP	Assigned 1-9 according to Huazheng ESG ratings
Mediating variable		
Financing constraints	FC	WW index
Control Variables		
Firm Size	SIZE	Ln (total assets)
Board size	Board	Ln (number of board members)
Cash flow	CFO	Net cash flows from operating activities / total assets
Firm growth	Growth	Growth rate of operating revenue
Equity concentration	TOP1	The greatest shareholder's share count / the total share capital
Age of firm listing	Age	Years of firm listing

Source: Authors' own work

MODEL SPECIFICATION

To investigate the impact of ESGP on Com, we developed the following model:

$$Com_{i,t} = \alpha_0 + \alpha_1 ESGP_{i,t} + \alpha_2 Control_{i,t} + \delta_i + \sigma_t + \varepsilon_{i,t} \quad (1)$$

Where i, t denote firms and years, respectively. ESG denotes ESG performance; Com denotes corporate competitiveness; the random variable α_0 denotes the unobservable individual heterogeneity; $\varepsilon_{i,t}$ is the perturbation term that varies with individuals and time; and δ_i and σ_t denote fixed effects for firm i and year t, respectively.

In Eqs. (2) and (3), this research explored the mediating role of FC:

$$FC_{i,t} = \beta_0 + \beta_1 ESGP_{i,t} + \beta_2 Control_{i,t} + \delta_i + \sigma_t + \varepsilon_{i,t} \quad (2)$$
$$Com_{i,t} = \gamma_0 + \gamma_1 ESGP_{i,t} + \gamma_2 FC_{i,t} + \gamma_3 Control_{i,t} + \delta_i + \sigma_t + \varepsilon_{i,t} \quad (3)$$

RESULTS

SUMMARY STATISTICS

Table 2 presents an overview of the descriptive statistics for each variable obtained through statistical software analysis. The results show that the average ESGP is 4.186, with a median value of 4. ESGP ranges from 1 to 8, indicating significant variation in the ESGP of the sample companies. The average Com is 0.279, with a variance of 0.177, suggesting limited disparity in the Com of Chinese firms. The other variables' data characteristics align with previous studies' findings (Ni et al. 2024; Wanyan & Zhao 2024).

TABLE 2. Descriptive statistics

Variable	N	Mean	P50	SD	Min	Max
Com	13552	0.279	0.249	0.177	-1.083	0.984
ESGP	13552	4.186	4	1.022	1	8
FC	13552	1.720	1.856	2.008	-12.57	11.98
SIZE	13552	22.58	22.38	1.307	20.25	26.52
Board	13552	2.106	2.197	0.194	1.609	2.639
CFO	13552	0.0500	0.0480	0.0650	-0.133	0.248
Growth	13552	0.140	0.0970	0.341	-0.568	1.818
TOP1	13552	33.11	30.63	14.46	9	73.35
Age	13552	2.237	2.398	0.832	0	3.401

Source: Authors' own work

BASELINE RESULTS

Table 3 presents the regression results for the effect of ESGP on Com. The first column shows the results controlling only for individual and time-fixed effects. The coefficient $\alpha 1$ for ESGP is 0.0053 ($P < 0.01$). In the second column, control variables are added, and the coefficient for ESGP on Com remains significantly positive, indicating that improved ESGP

enhances Com. This supports Hypothesis 1. Among the control variables, the coefficients on SIZE, CFO, and Growth are all positively associated (P < 0.01), consistent with existing literature (Giroud & Mueller 2011; Mayer et al. 2014).

TABLE 3. Baseline results

Variables	(1)	(2)
ESGP	0.0053***	0.0054***
	(4.5976)	(4.9006)
SIZE		0.0220***
		(4.0148)
Board		0.0026
		(0.2551)
CFO		0.2717***
		(12.9972)
Growth		0.0259***
		(7.5225)
TOP1		0.0002
		(0.6920)
Age		-0.0252***
		(-4.2140)
Constant	0.2789***	-0.1942
	(53.4209)	(-1.5599)
Firm	YES	YES
Year	YES	YES
Observations	13,552	13,552
Adj. R^2	0.073	0.140

Source: Authors' own work
*Note: *** p < 0.01, ** p < 0.05, * p < 0.1*

ENDOGENEITY TEST

To address potential issues of bidirectional causality and omitted variables, this study follows the approach of Wanyan and Zhao (2024). It employs both instrumental variable (IV) and propensity score matching (PSM) methods to mitigate endogeneity concerns between ESGP and Com. The results are presented in Table 4.

IV METHOD

ESGP can enhance Com, and the improvement in Com may also influence managers' decisions, leading to better ESGP. Considering the potential bidirectional causality between Com and ESGP, this study employs the IV method to address this issue. Following the approach of Aydoğmuş et al. (2022), we utilize the industry average annual ESG score as the IV (IV_ESGP) and then apply 2SLS. Firms' ESG practices are often affected by the overall ESG performance of their industry, due to factors such as peer effects, common regulatory environments, and shared pressures from industry stakeholders. As a result, there is typically a strong positive correlation between the industry-level average ESG score and a firm's individual ESG performance. Moreover, the industry-level ESG average is determined by the aggregate ESG performance of all firms within the industry and represents a macro-level industry characteristic. It is less likely to be influenced by the specific attributes of any single firm and can therefore be considered exogenous to an individual firm's competitiveness. Accordingly, the instrumental variable IV_ESGP satisfies both the relevance and exogeneity conditions and is thus a valid instrument. The first stage results, as presented in Table 4, indicate that the coefficient of IV_ESGP is significantly positive, with the F-statistic exceeding 10, thereby confirming the validity of the IV. In the second stage, the coefficient of ESGP, denoted as α1, is 0.0135 (P < 0.01), which remains consistent with the baseline regression results, suggesting that the findings are robust.

PSM

We employ the PSM method to address the issue of omitted variables by manually constructing treatment and control groups and then performing regression on the matched samples. Specifically, we categorize the samples into "good ESGP" and "poor ESGP" by median ESGP and assign values of 1 and 0, respectively. We then conduct a 1:1 nearest neighbor matching using all control variables as covariates. The PSM balance test indicates that the absolute value of the standardized difference after matching is less than 10%, demonstrating that the matching treatment is valid. Table 4 presents the regression results after PSM. The third column shows that the effect of ESGP on Com remains significantly positive (α1 = 0.0087, P < 0.05). This suggests that the results are robust after reducing sample selection bias.

TABLE 4. The results of endogenous tests

	First Stage	Second Stage	PSM
	(1)	(2)	(3)
	ESGP	Com	Com
IV_ESGP	0.9408***		
	(24.5676)		
ESGP		0.0135***	0.0087**
		(3.4923)	(2.1000)
SIZE	0.1524***	0.0134**	0.0323***

	(3.6402)	(2.5618)	(3.6796)
Board	-0.1956*	0.0074	-0.2180***
	(-1.7544)	(0.7291)	(-6.6468)
CFO	-0.1993	0.2773***	0.2481***
	(-1.3132)	(13.3689)	(6.1466)
Growth	-0.0135	0.0271***	0.0287***
	(-0.5467)	(8.1582)	(4.2859)
TOP1	-0.0035	0.0005	-0.0002
	(-1.3475)	(1.5486)	(-0.2767)
Age	-0.3221***	-0.0702***	-0.0110
	(-6.5027)	(-13.9678)	(-0.6460)
Constant	-1.9316**	0.0297	-0.3240*
	(-2.0560)	(0.2537)	(-1.6682)
F-test	1091.66		
Firm	YES	YES	YES
Year	YES	YES	YES
Observations	13,552	13,552	9446
Adj. R^2	0.179	0.114	0.148

Source: Authors' own work
*Note: *** p < 0.01, ** p < 0.05, * p < 0.1*

ROBUSTNESS TEST RESULT

This study acknowledges that the impact of ESGP on Com may be influenced by issues such as variable measurement, sample selection, and omitted variables, potentially leading to robustness concerns. To address these issues, we employed alternative methods for measuring the core variables, including random sampling and additional control variables, and conducted several robustness tests. Table 5 displays the results of these tests.

The measurement method for the independent variable has been modified. Referring to Liu et al. (2024) and Song et al. (2024), we use ESG scores from the Wind database as an alternative variable for estimation. Column (1) in Table 5 shows that α1 is 0.0046 (P < 0.01), which is comparable to the baseline regression results.

Additionally, a random sample was drawn. Following Li et al. (2009), this research randomly selected 80% of the total data to create a new sample for regression analysis. Column (2) reports that the ESGP coefficient is 0.0045 and statistically significant, confirming the robustness of the baseline results.

Finally, we include two additional control variables in the baseline regression, based on previous studies (Tsang et al. 2021; Wang et al. 2025). Specifically, we included Roa (net profit/total assets), representing firm profitability and SOE (SOEs = 1, non-SOEs = 0). The coefficient for ESGP in Column (3) is 0.0045, remaining significantly positive, thus further supporting the robustness of our results.

TABLE 5. Results on the robustness test

Variables	Substitution of the independent variable	Randomly selected sub-sample	Add control variables
	(1)	(2)	(3)
ESGP	0.0046***	0.0045***	0.0045***
	(2.8358)	(3.5183)	(4.4770)
SIZE	0.0219***	0.0228***	0.0228***
	(3.9855)	(3.5377)	(4.5967)
Board	0.0014	0.0005	-0.1019***
	(0.1407)	(0.0497)	(-6.3739)
CFO	0.2706***	0.2691***	0.1748***
	(12.9136)	(10.6936)	(9.4992)
Growth	0.0259***	0.0303***	0.0096***
	(7.5326)	(7.1835)	(3.0524)
TOP1	0.0002	-0.0002	0.0002
	(0.5303)	(-0.4590)	(0.6696)
Age	-0.0255***	-0.0277***	-0.0077
	(-4.2541)	(-4.1776)	(-1.3679)
Roa			0.3982***
			(15.9994)
Soe			-0.0166**
			(-2.0163)
Constant	-0.1917	-0.1893	-0.0765
	(-1.5365)	(-1.3049)	(-0.6763)
Firm	YES	YES	YES
Year	YES	YES	YES
Observations	13,552	10,842	13,552
Adj. R^2	0.137	0.144	0.256

Source: Authors' own work
*Note: *** p < 0.01, ** p < 0.05, * p < 0.1*

MECHANISM ANALYSIS

Following the method of Livdan et al. (2009) and Li (2011), we use the WW index as a proxy for FC to test the mediation mechanism, as shown in Table 6. Previous research has shown that ESGP can enhance a firm's Com. First, we test whether ESGP reduces the degree of FC, and then we evaluate whether alleviation of FC improves Com. Table 6 shows that β1 of ESGP in column (1) is significantly negative, indicating that improvements in ESGP alleviate FC. This result is consistent with Guo et al. (2024) and Zhang & Lucey (2022). In column (2), the coefficient of FC is -0.0111 (P < 0.01). This suggests

that FC has a mediating role between ESGP and Com. Specifically, improvements in ESGP reduce FC, which, in turn, enhances Com. Therefore, Hypothesis 2 is confirmed.

TABLE 6. The mediation mechanism analysis's result

Variables	(1)	(2)
	FC	Com
ESGP	-0.0426***	0.0050***
	(-3.4700)	(4.5463)
FC		-0.0111***
		(-9.1688)
SIZE	-0.3059***	0.0186***
	(-3.7431)	(3.4859)
Board	-0.1179	0.0013
	(-0.9730)	(0.1252)
CFO	-15.3381***	0.1019***
	(-66.3402)	(3.8590)
Growth	-0.2044***	0.0236***
	(-5.1855)	(7.0259)
TOP1	0.0093***	0.0003
	(2.9791)	(1.0275)
Age	1.5481***	-0.0081
	(15.5210)	(-1.2530)
Constant	0.0640***	0.3119***
	(11.5396)	(11.8777)
Firm	YES	YES
Year	YES	YES
Observations	13,552	13,552
Adj. R^2	0.617	0.157

Source: Authors' own work
*Note: *** p < 0.01, ** p < 0.05, * p < 0.1*

HETEROGENEITY ANALYSIS

Based on firm life cycle theory, the ESGP and Com relationship varies at different stages of the firm's life cycle (LC). Using the CFO classification methods of Dickinson (2011) and Hsu (2018), which categorize companies into three stages, growth, maturity, and decline, according to operating, investing, and financing CFO (positive for "+" and negative for "-"), companies' LC is classified accordingly. The detailed classification is provided in Table 7.

TABLE 7. Enterprise LC classification

CFO	Growth		Maturity			Decline		
	startup period	Growth period	Maturity period	Decline period1	Decline period2	Decline period	Phase out period1	phase out period2
Net operating CFO	-	+	+	-	+	+	-	-
Net investment CFO	-	-	-	-	+	+	+	-
Net financing CFO	+	+	-	-	+	-	+	-

Source: Adapted from Dickinson (2011) and Hsu (2018)

In Table 8, the first two columns list the results for the growth and maturity stages, where the ESGP coefficients are positive and statistically significant, indicating that ESGP can improve Com in both the growth and maturity stages. However, column (3) shows that the ESGP coefficient for companies in the decline stage is insignificant, suggesting that ESGP does not improve Com during this stage. This may be because, in the growth stage, strong ESGP helps companies raise funds through internal and external financing channels, offering better investment opportunities, gradually gaining market share, and enhancing Com. In the maturity stage, companies focus more on high-quality development, actively fulfilling social responsibilities, and promoting long-term sustainable growth through ESG practices. In the decline stage, companies face a lack of funding and investment opportunities, with insufficient internal R&D capabilities, which limits the value-creation effect of ESGP. Therefore, in this stage, alleviating FC through ESGP is insufficient to enhance Com. Overall, ESGP is a significant contributor to Com during the growth and maturity stages, but its effect is weaker in the decline stage.

TABLE 8. The heterogeneity test result

Variables	LC		
	(1)	(2)	(3)
	Growth	Maturity	Decline
ESGP	0.0074***	0.0041*	0.0023
	(4.7678)	(1.9419)	(0.7408)
SIZE	0.0118	0.0072	0.0290**
	(1.3935)	(0.7033)	(2.0340)
Board	-0.0027	-0.0001	-0.0043
	(-0.2174)	(-0.0101)	(-0.1188)
CFO	0.1386***	0.2633***	0.4618***
	(4.5523)	(7.1746)	(7.4902)
Growth	0.0152**	0.0225***	0.0178*
	(2.4181)	(2.7188)	(1.8995)
TOP1	0.0003	0.0006	0.0011
	(0.6431)	(1.3205)	(1.3882)

Age	-0.1029***	-0.0628***	-0.0560***
	(-11.0021)	(-6.5685)	(-4.2268)
Constant	0.2122	0.1955	-0.3052
	(1.1132)	(0.8773)	(-0.9486)
Firm	YES	YES	YES
Year	YES	YES	YES
Observations	7,038	4,638	1,876
Adj. R^2	0.080	0.115	0.223

Source: Authors' own work
*Note: *** p < 0.01, ** p < 0.05, * p < 0.1*

DISCUSSION

China continues to face serious "choke point" problems in some industries despite increased global technological competition, especially in key basic components, critical software, and other vital areas, leading to ongoing bottlenecks. As a result, the core competitiveness of Chinese companies remains under threat. At the same time, companies can achieve sustainable development and high-quality growth through implementing ESG strategies. This raises the question of whether effective ESG practices can boost competitiveness. Research on how ESGP influences competitiveness is limited (Ni et al. 2024), with existing studies mainly examining the financial impacts of ESG, such as financial performance and corporate value (Giroud & Mueller 2011; Chen & Xie 2022; Chen et al. 2023; Wong et al. 2021). Therefore, it is crucial to conduct in-depth research on this relationship and uncover its underlying mechanisms.

This study explores the relationship between corporate ESGP and competitiveness within the framework of the SDGs. The results show a significant positive correlation between the two, suggesting that stronger ESGP is linked to increased corporate competitiveness. This finding provides theoretical and practical insights into how companies can leverage ESG strategies to boost their sustainable development capabilities.

From a theoretical perspective, the results support stakeholder theory. Firms with strong ESGP tend to focus on balancing and coordinating relationships among various stakeholders, including employees, managers, shareholders, and supply chain partners. This focus improves internal governance and helps integrate and make their relational networks more efficient (Tan et al. 2024). Specifically, at the employee level, ESG practices enhance organizational identification and perceptions of fairness, which boost employee loyalty and productivity, indirectly strengthening the firm's core competitiveness. Additionally, signaling theory and information asymmetry theory suggest that ESG, as a form of non-financial information, demonstrates a company's sense of responsibility and transparency, helping to reduce information gaps between firms and investors (Baek & Kang 2024). Our findings indicate that companies with higher ESGP are more likely to attract attention and support from external capital markets, improving access to resources and strengthening their competitive advantage.

The study also finds that ESGP has a statistically significant positive impact on corporate competitiveness. Although the regression coefficient (0.0054) seems relatively small, further analysis reveals that when ESG performance increases from the 25th percentile to the 75th percentile (i.e., by one point), the corporate competitiveness index rises by roughly 0.0054. Since the full range of the competitiveness index extends from -1.083 to 0.984 (about 2.067), this change represents roughly 0.26% of the entire range. While the economic impact appears modest, its robustness after accounting for various factors indicates that continuous improvement in ESGP can meaningfully enhance long-term corporate competitiveness, especially amid growing policy and market focus on green transition and sustainable development.

In the context of the SDGs, strong ESGP directly supports the achievement of SDG 8 (Decent Work and Economic Growth) and SDG 9 (Industry, Innovation, and Infrastructure). On one side, ESG emphasizes social equity, employee rights, and environmental protection, helping to promote a stable and sustainable employment environment. On the other side, it encourages green investment and technological innovation, driving industrial upgrading and boosting firms' long-term international competitiveness (Chen et al. 2023; Long et al. 2023).

For example, BYD—a leading Chinese new energy vehicle producer—has shown strong performance across various ESG categories, including environmental management, employee well-being, and corporate social responsibility. These initiatives have boosted its brand reputation and increased its core competitiveness in the electric vehicle market. BYD's expanding global market share in the new energy vehicle sector offers clear evidence that strong ESG performance can improve a company's competitiveness.

Nevertheless, companies pursuing ESG improvements face trade-offs between resource allocation and cost control. Some firms may experience the phenomenon of "excessive ESG" investment (Kuzey et al. 2023), where efforts in environmental protection and social responsibility lead to short-term financial burdens and reduced profitability (Apergis et al. 2022). Therefore, enterprises should carefully evaluate the cost-effectiveness of ESG initiatives based on their strategic objectives and industry characteristics, aiming to balance long-term sustainability responsibilities and short-term operational targets. In turn, policymakers should consider how to design effective incentive mechanisms such as green credit programs and carbon trading markets to encourage firms to engage in appropriate and high-quality ESG investments.

Moreover, this study concludes that alleviating FC is a crucial pathway for ESGP to achieve the SDGs (Bao et al. 2024; He et al. 2023; Zhang & Lucey 2022). Reducing financing pressure helps firms adopt proactive competitive strategies, providing sustained financial support for investment projects that increase corporate value, thereby promoting long-term growth and contributing to the achievement of SDGs 8 and 9 (Kara et al. 2021). Specifically, ESGP, as an

additional source of information, helps lessen information asymmetry between companies and investors. It enhances transparency, boosts investor trust and attention (Wang et al. 2023), and thus reduces FC. This is supported by information asymmetry theory and signaling theory. China's green credit policies have rapidly advanced in recent years; firms with strong ESGP can access financial support, while industries with high pollution, high energy use, or violations of environmental regulations face credit restrictions or even credit withdrawal (Wen et al. 2021). Therefore, proactive ESGP helps reduce FC. This conclusion aligns with previous research (Guo et al. 2024; Zhang & Lucey 2022). Lowering financing pressure leads to higher investment levels, and with financial backing, companies can increase their R&D spending, capture market share (Billett & Mauer 2003), and improve their competitiveness. According to the theory of predation, firms with higher debt ratios are more vulnerable to being squeezed out of the market due to predatory pricing behavior. Therefore, the market share of firms facing FC is closely linked to their ability to secure financing.

Finally, this study conducted heterogeneity tests based on corporate LC. The results showed that the positive effects of ESGP were more significant on competitiveness in the growth and maturity stages. Based on corporate life cycle theory, firms in the growth phase undergo rapid expansion and have a high proportion of financing activities, requiring substantial capital to support scaling and quality improvements. However, business risks are higher during this phase, and the market has lower recognition of the company's competitiveness, making it less likely that investors will choose the company as an investment target. Good ESGP signals that the company not only has a sound governance structure but also demonstrates environmental responsibility and social commitment (Giese et al. 2019), which attracts external investors and public attention. This helps achieve synergistic economic and social growth (Starks 2023). Therefore, during the growth phase, companies driven by strong financing demand are more inclined to use ESGP to alleviate FC, increase market share, and enhance competitiveness. In the maturity stage, a company's development tends to stabilize across various aspects, with the key issue being how to maintain technological leadership and market position over the long term. Companies in maturity already have a stable and favorable reputation and image among investors and the public. They also have a foundation of prior ESG investment and information disclosure. The benefits of increasing ESG disclosures far outweigh the costs (Hu et al. 2025). As a result, mature companies are capable of creating more social value, fulfilling greater environmental and social responsibilities, increasing ESG investments, and demonstrating stronger ESGP, which further strengthens the company’s image and helps establish long-term stable cooperation with external capital providers, thus gaining a sustained competitive advantage. In the decline stage, companies experience a decline in operational efficiency and financial health, which reduces their ability to attract financing and investment, potentially leading to liquidity problems. Therefore, the primary goal during this phase is to address survival issues (Hu et al. 2025). If companies in decline increase ESG investments, the associated costs may not be offset by returns, resulting in operational risks and even raising the likelihood of market exit.

The findings of this study indicate that ESG performance significantly enhances corporate competitiveness, with a more pronounced effect during the growth and maturity stages of a firm's life cycle. Based on this, several policy and managerial implications are proposed. First, improving ESG disclosure and evaluation systems is essential to enhance market transparency and facilitate capital market support for firms with strong ESG performance, thereby effectively alleviating financing constraints. Second, governments and financial institutions should formulate differentiated green financial policies tailored to firms at various development stages, guiding resources toward enterprises with sustainable growth potential. Finally, corporate management should systematically integrate ESG strategies into corporate governance and daily operations, strengthen stakeholder relationship management and internal control mechanisms, thereby achieving sustained improvements in competitiveness.

CONCLUSION

This research investigated the impact of ESGP on competitiveness using a sample of A-share listed companies in China from 2018 to 2022. The study also considers the mediating role of FC and empirically tests how ESGP influences competitiveness. The findings are as follows: 1) Good ESGP can enhance competitiveness, and after a robustness test, the conclusion remains the same. 2) ESGP enhances competitiveness by alleviating FC. 3) For companies in the growth and maturity stages, the positive effects of ESGP on competitiveness are more pronounced.

This study suggests several implications: First, accelerating the improvement of the ESG evaluation system. Relevant institutions should establish a unified ESG evaluation system, making ESGP comparable across companies, which will help enterprises disclose high-quality ESG information and promote sustainable development. Furthermore, companies should pay attention to and actively implement ESG principles, taking responsibility for ESG issues to improve their ESG performance. For instance, companies should cultivate environmental awareness, actively engage in environmental protection, energy conservation, and pollution reduction initiatives, and prioritize green technology research and development to enhance environmental performance. Additionally, companies should take social responsibility seriously, establish strong relationships with customers, suppliers, and employees, and create social value to improve social performance. Companies should also strengthen internal governance capabilities by establishing rational organizational structures, enhancing internal control mechanisms, and increasing information transparency to improve governance performance. Second, considering the differences in constraints and potential benefits faced by various industries in implementing ESG practices, policy formulation should be more targeted. Traditional manufacturing industries may face

higher environmental compliance costs, but have significant potential for green transformation. In contrast, the service sector relies more on improving social responsibility and governance mechanisms to enhance competitiveness. Therefore, the government should develop differentiated support policies based on industry characteristics to promote the optimal allocation of resources and maximize the benefits of ESG practices across sectors. Finally, ESGP can improve competitiveness by transmitting positive signals to the market and alleviating FC, underscoring investors' important role in helping companies gain a competitive advantage through improved ESGP. Therefore, governments should ensure that investors, as capital providers to companies, fulfill their responsibilities in ESG matters. Investors should be required to incorporate ESG factors into their management processes, reduce funding to companies with significant ESG risks, and regulate the flow of funds. The government should implement and clarify investors' responsibilities in the ESG domain, specifying the scope of ESG risks and the particular obligations they need to bear.

However, this study has several limitations. First, it confirms the mediating role of FC. Future research could explore the mediating effects of other external mechanisms, such as media exposure and corporate reputation. Additionally, this study examines how ESGP affects competitiveness differently across various LC stages of companies. Future studies could investigate the heterogeneity of this effect based on ownership structure and corporate pollution levels.

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