ESG INVESTMENT, GOVERNANCE, AND CORPORATE CULTURE IN SUSTAINABLE GROWTH: PANEL EVIDENCE FROM HUAZHENG ESG RATINGS OF SHANGHAI AND SHENZHEN A-SHARE LISTED FIRMS

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Abstract

Purpose: Although Environmental, Social, and Governance (ESG) engagement is widely promoted, its ability to enhance firms' long-term growth depends on internal institutional and cultural conditions. This study examines whether ESG investment promotes the corporate Sustainable Growth Rate (SGR) and investigates whether governance structure and corporate culture strengthen this relationship.

Study Design/Methodology/Approach: This study uses secondary panel data on 346 A-share firms listed on the Shanghai and Shenzhen Stock Exchanges from 2017 to 2023 (1,664 firm-year observations) and applies fixed-effects regression models. ESG performance is measured using Huazheng ESG ratings. Corporate governance structure (GS_Index) and corporate culture (OCR) are constructed via Principal Component Analysis (PCA). Firm and year fixed effects are included to control for unobserved firm-level heterogeneity and common temporal shocks. Firm fixed effects inherently control for time-invariant industry heterogeneity.

Findings: ESG investment is positively associated with SGR ($\beta = 0.0560$, $p < 0.01$). Governance quality significantly strengthens the ESG-SGR relationship (ESG x GS: $\beta = 0.0912$, $p < 0.05$), and an innovation- and sustainability-oriented culture also amplifies ESG's growth effect (ESG x OCR: $\beta = 0.1366$, $p < 0.05$). Additional analyses indicate that the ESG-growth association is more pronounced among resource-intensive and heavy-polluting firms.

Originality/Value: The findings suggest that ESG investment appears to enhance growth, but its effectiveness depends on strong governance mechanisms and a supportive corporate culture, with implications for investors and policymakers seeking to realize the value of green capital in emerging markets.

Keywords: ESG investment, Sustainable Growth Rate (SGR), Corporate Governance, Corporate Culture, A-share Firms Listed, China

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Introduction

"Dual Carbon", referring to carbon peaking and carbon neutrality, represents China's strategic objective for achieving high-quality and sustainable development (de Boer & Fan, 2022). Under the policy framework of the "Dual Carbon" goals, the integration of Environmental, Social, and Governance (ESG) standards into corporate strategy compels firms to shift from extensive expansion models toward high-quality and intensive growth. In this context, ESG is no longer a peripheral consideration; rather, driven by the urgency of climate change and the global demand for sustainable development, it has gradually evolved into a central determinant of capital allocation. However, a critical debate persists within the academic literature: Does ESG investment genuinely promote corporate growth, or does it merely impose additional costs that erode shareholder value? (Fang & Guo, 2025; Wang et al., 2025; Liu, 2025).

While a growing body of literature investigates this nexus, empirical results remain inconclusive. Proponents argue that ESG practices reduce cost of capital and enhance risk management (Bolton & Kacperczyk, 2021; Pankratz et al., 2019; Gillan et al., 2021), while skeptics suggest that such investments exacerbate agency problems and divert resources from core operations (Berg et al., 2022; Raghunandan & Rajgopal, 2022; Kacperczyk & Peydró, 2022). It is posited that this lack of consensus stems largely from a methodological limitation: the reliance on retrospective, static accounting metrics. Most existing studies assess ESG outcomes using Return on Assets (ROA) or Tobin's Q. While useful, these indicators often fail to capture the long-term potential and financial viability required for genuine sustainability. They measure the past extraction of value rather than the future limit of value creation constrained by the firm's internal ecosystem. To address these limitations, this study shifts the focal variable from short-term profitability to the corporate Sustainable Growth Rate (SGR). Rather than being treated as a derivative of accounting ratios, SGR is conceptualized in this study as a proxy for a firm's Intrinsic Sustainable Capacity (Fonseka et al., 2019). Conceptually, SGR is aligned with the fundamental principle of sustainability defined by the Brundtland Commission (World Commission on Environment and Development [WCED], 1987): "meeting the needs of the present without compromising the ability of future generations to meet their own needs". Applied to the corporate context, SGR represents the maximum rate of development a firm can achieve while maintaining a harmonious equilibrium between its operating efficiency (ESG implementation), resource consumption (capital usage), and governance stability (dividend/reinvestment policy).

This study examines whether ESG performance is positively associated with the Sustainable Growth Rate (SGR) of Chinese A-share listed firms and whether this relationship is strengthened by corporate governance quality and an innovation- and sustainability-oriented corporate culture. Using panel data from firms listed on the Shanghai and Shenzhen Stock Exchanges (SZSE), the study evaluates both the direct effect of ESG performance on SGR and the moderating roles of governance and culture. In doing so, it seeks to clarify the internal organizational conditions under which ESG engagement can be translated into firms' long-term sustainable growth capacity.

Objective

To examine the effects of ESG performance, corporate governance, and corporate culture on firms' Sustainable Growth Rate (SGR).

Literature Review

Theoretical Background

ESG and Firm Performance Debate

The debate on whether Environmental, Social, and Governance (ESG) investment leads to better corporate performance has been an extensive topic in academia. From the stakeholder perspective, an increase in ESG activities, will improve the company's image and reduce exposure to regulatory risks, thus, it will deepen the relationships with investors and customers, and together will lower the company's cost of capital and increase its value (Bolton & Kacperczyk, 2021; Gillan et al., 2021). Empirical evidence suggests that ESG activities may be associated with greater corporate efficiency and stronger financial performance, although the magnitude and direction of these relationships can differ across firms and individual ESG dimensions (Xie et al., 2019). ESG engagement may also strengthen risk management by improving stakeholder relationships, information transparency, and firms' preparedness for environmental and regulatory risks (Gillan et al., 2021). In contrast, others argue that investing in ESG may lead to higher compliance costs, increased agency problems, or management's distraction from the main revenue-generating activities (Berg et al., 2022; Raghunandan & Rajgopal, 2022). From this point of view, ESG efforts tend to please shareholders than real value-generating activities. The discrepancy of results in the literature may be due to how company performance is measured. A significant numbers of papers take short-term accounting figures, such as Return on Assets (ROA) or market-based indicators like Tobin's Q, into consideration. These measures, however, may only offer limited information on a company's ability to grow and sustain its business over time, thus not reflecting its full value. For this reason, there is a need for a performance measure that is more in line with the sustainability concept and is forward-looking.

Sustainable Growth Rate as a Forward-Looking Measure

The Sustainable Growth Rate (SGR) was first defined by Higgins (1977) and then by Van Horne (2002). It indicates the highest rate of growth a firm can maintain without changing its capital structure. SGR reflects the balancing act between profitability, reinvestment policy, operational efficiency, and financial discipline, unlike static profitability measures. Recently, some researches have indicated that SGR can be the link between corporate social responsibility and firm value (Gómez-Bezares et al., 2016). In short, it is a firm's internal strength for growth through resource accumulation that is not dependent on borrowing from outside sources. Therefore, SGR is conceptually in line with the sustainability principle of the Brundtland Commission (WCED, 1987), which highlights intertemporal harmony and long-term viability. Taking this into consideration, the authors of this paper view SGR as one indicator of a firm's

intrinsic sustainable capacity (Fonseka et al., 2019). They give SGR the meaning of a rate of growth that can be supported without the firm draining its financial strength or risking its strategic stability in the long run, instead of merely representing accounting figures.

Resource-Based View and Internal Institutional Architecture

The Resource-Based View provides the principal theoretical foundation for explaining how ESG engagement may contribute to firms' sustainable growth (Penrose, 1995; Barney, 1991). Penrose (1995) argues that the growth of a firm is constrained not only by external market opportunities but also by its internal managerial capacity to coordinate, organize, and deploy resources effectively. From this perspective, firms grow when they possess the organizational capabilities necessary to transform available resources into productive and strategically valuable outcomes (Barney, 1991).

ESG engagement can be understood as a strategic organizational resource that contributes to intangible assets such as corporate reputation, stakeholder trust, organizational learning, legitimacy, and access to capital (Hart, 1995; Branco & Rodrigues, 2006; Surroca et al., 2010). However, the possession of ESG-related resources does not automatically generate sustainable growth. Their value depends on the internal institutional architecture through which they are allocated, coordinated, and implemented (Barney, 1991; Surroca et al., 2010).

Corporate governance provides the monitoring, accountability, transparency, and strategic alignment required to ensure that ESG-related resources are used consistently with long-term organizational goals (Aguilera et al., 2006; Eccles et al., 2014). Corporate culture, meanwhile, shapes how ESG principles are interpreted, internalized, and incorporated into daily organizational practices (Eccles et al., 2014; Li et al., 2021). Governance quality and corporate culture therefore represent important organizational capabilities that determine whether ESG engagement can be converted into improvements in sustainable growth.

Accordingly, this study proposes that the growth effect of ESG performance is contingent upon the alignment between external ESG engagement and firms' internal governance and cultural conditions (Barney, 1991; Eccles et al., 2014). This resource-based perspective provides the theoretical justification for examining corporate governance quality and corporate culture as moderators of the relationship between ESG performance and SGR.

Sampling Context of China A-Share Firms: SSE and SZSE

In addition to the general ESG-performance debate, the institutional context of the research sample requires further critical consideration. This study focuses on China A-share listed firms from both the Shanghai Stock Exchange (SSE) and the Shenzhen Stock Exchange (SZSE). Although both exchanges are central components of China's domestic capital market, they are not fully homogeneous. The SSE has traditionally been associated with larger, more mature, and blue-chip enterprises, particularly firms in finance, energy, infrastructure, and other capital-intensive industries (Shanghai Stock Exchange, 2023; Shanghai Stock Exchange, n.d.). In contrast, the SZSE has played a stronger role in supporting

manufacturing firms, private enterprises, small- and medium-sized enterprises, and growth-oriented technology companies, particularly through its ChiNext market (Shenzhen Stock Exchange, 2021; Hong Kong Exchanges and Clearing Limited, n.d.). These differences imply that ESG investment, governance quality, corporate culture, and sustainable growth may not operate identically across all A-share firms. Larger SSE-listed firms may face stronger regulatory visibility and public ESG pressure, whereas SZSE-listed firms may display greater innovation orientation, market flexibility, and growth uncertainty. Therefore, using both SSE and SZSE A-share firms improves the representativeness of the sample, but it also requires careful empirical control for firm size, industry characteristics, ownership structure, and exchange-related heterogeneity. This sampling logic supports the present study's conceptual framework by recognizing that ESG effects on sustainable growth are embedded in China's segmented capital-market structure rather than occurring in a uniform institutional environment.

Research Hypotheses and Conceptual Framework

H1: ESG investment is positively associated with firms' Sustainable Growth Rate (SGR).

H2: Corporate governance quality positively moderates the relationship between ESG investment and SGR, such that the relationship is stronger in firms with higher governance quality.

H3: Corporate culture positively moderates the relationship between ESG investment and SGR, such that the relationship is stronger in firms with a stronger (innovation- and sustainability-oriented) culture.

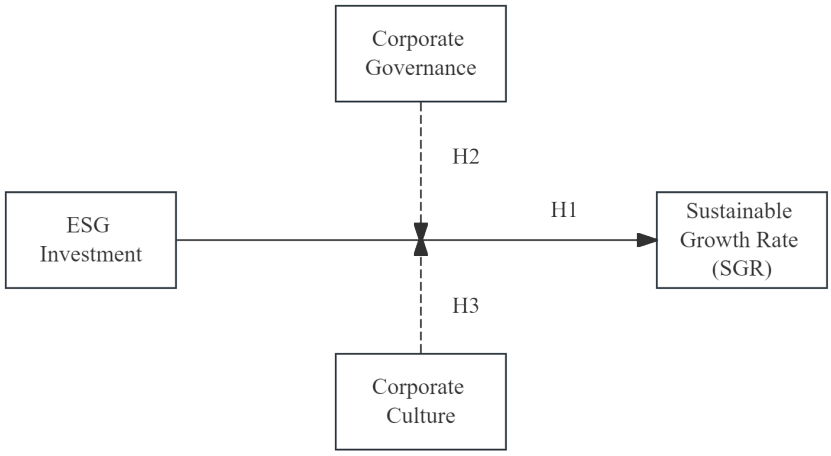


Figure 1 Conceptual Framework

The proposed framework positions ESG investment as the primary explanatory variable influencing corporate sustainability performance. In this study, corporate sustainability performance is represented by firms' Sustainable Growth Rate (SGR), which reflects the extent to which a firm can maintain long-term growth without excessive dependence on external financing or an unstable capital structure. This measurement choice is appropriate because ESG investment is expected to improve firms' resource efficiency, reputation, stakeholder trust, and access to finance, all of which may enhance the firm's capacity for stable and sustainable growth.

Beyond the direct effect, the framework introduces two key contingent mechanisms. First, corporate governance structures are expected to strengthen the translation of ESG investments into sustainability outcomes by improving accountability, transparency, and strategic alignment. Firms with stronger governance structures are more likely to allocate ESG-related resources efficiently and prevent symbolic or superficial ESG practices. Second, corporate culture is theorized to function both as a mediating mechanism and as a contextual moderator, shaping how ESG initiatives are implemented and internalized within organizational processes. Furthermore, the framework recognizes that ESG investment is not homogeneous; environmental, social, and governance components may exert differentiated impacts on corresponding sustainability dimensions.

Methodology

Sample Selection and Data Sources

1. Timeframe Rationale

This study used an unbalanced panel of China A-share firms listed on the Shanghai Stock Exchange and Shenzhen Stock Exchange from 2017 to 2023. Listed firms were selected because they were subject to relatively strict disclosure requirements and public scrutiny, making their financial, governance, and ESG information more accessible and comparable.

The study period was selected because ESG disclosure and sustainable-development practices became increasingly institutionalized in China during this period. The timeframe also covered major regulatory and market developments, including the strengthening of ESG awareness in China's capital market, the COVID-19 shock and subsequent recovery, and the policy environment following China's 2020 carbon-peaking and carbon-neutrality commitments (de Boer & Fan, 2022). Therefore, the 2017-2023 period provided an appropriate setting for examining the relationship between ESG performance and corporate sustainable growth.

2. Sample Screening Process

The study sample was constructed through the following screening process:

1) China A-share firms listed on the Shanghai and Shenzhen Stock Exchanges between 2017 and 2023 were initially considered.

2) Firms designated as ST or *ST were excluded because their abnormal financial conditions could distort the estimation results.

3) Financial firms were excluded because their balance-sheet structures, leverage mechanisms, capital requirements, and regulatory environments differed substantially from those of non-financial firms. In particular, high leverage has a different economic meaning for financial institutions than for industrial and commercial firms, which may reduce the comparability of capital-structure and sustainable-growth measures across the two groups (Fama & French, 1992).

4) Firm-year observations with missing values for the dependent variable, principal explanatory variable, moderators, or control variables were removed.

5) Observations with sufficient financial, governance, corporate-culture, and ESG-rating information were retained.

3. Data Sources

Financial, governance, ownership, executive, and other firm-level data were obtained primarily from the China Stock Market and Accounting Research Database (CSMAR Data Technology Co., Ltd., 2024). ESG performance was measured using the Huazheng ESG Rating (Shanghai Sino-Securities Index Information Service Co., Ltd., 2024), which provides broad coverage of China's A-share market and reflects the domestic regulatory, disclosure, and industry environment.

Patent information used to measure innovation orientation was obtained from firm-level patent records. Corporate annual reports and sustainability reports were used to obtain textual information related to sustainability orientation. Other components of the corporate-culture index, including charitable donations, capital expenditure, and employee compensation, were obtained from CSMAR and firms' published reports.

The final sample consisted of 346 firms and 1,664 firm-year observations. Because some firms did not have complete valid observations for all seven years, the dataset was treated as an unbalanced panel.

Variable Measurement

1. Dependent Variable

The dependent variable was the Sustainable Growth Rate (SGR). SGR represented the maximum rate at which a firm could grow while maintaining its existing financial structure and avoiding excessive dependence on external financing.

Following Higgins (1977), SGR was calculated as follows:

$$SGR = [(NP/S) \times (S/A) \times (1 + D/E) \times b] / [1 - (NP/S) \times (S/A) \times (1 + D/E) \times b] \quad (1)$$

where (NP/S) denotes the net profit margin, (S/A) denotes total asset turnover, (D/E) denotes the debt-to-equity ratio, and (b) denotes the earnings-retention ratio.

The measure combined profitability, operational efficiency, financial leverage, and reinvestment capacity into a single indicator of sustainable corporate growth.

2. Independent Variable

The independent variable was ESG performance, measured by ESG_SCORE. The study used the Huazheng ESG Rating as a proxy for firms' ESG engagement and implementation.

Direct ESG expenditure was not used because firms did not consistently disclose comparable ESG-investment amounts. The Huazheng rating was therefore adopted as a standardized measure of firm-level environmental, social, and governance performance. A higher ESG_SCORE indicated stronger ESG performance.

3. Moderating Variables

Corporate Governance Quality

Corporate governance quality was measured using GS_Index, a composite index constructed through Principal Component Analysis (PCA). The index incorporated the following dimensions:

1) board diversity;

2) executive incentives;

3) shareholder engagement; and

4) corporate transparency.

Board diversity captured the composition and inclusiveness of the board. Executive incentives reflected the alignment between managerial and organizational interests. Shareholder engagement represented investor participation in corporate decision-making, while transparency reflected the degree of external monitoring and disclosure.

The underlying indicators were standardized before PCA. The first principal component was retained as GS_Index, with higher values representing stronger corporate governance quality.

Corporate Culture

Corporate culture was measured using OCR, a PCA-based composite index representing an innovation- and sustainability-oriented organizational culture. The index included:

1) innovation orientation, measured by the natural logarithm of patent applications plus one;

2) sustainability orientation, measured by the proportion of sustainability-related words in annual reports;

3) stakeholder engagement, measured by charitable donations relative to revenue;

4) long-term strategic orientation, measured by capital-expenditure intensity; and

5) employee engagement, measured by employee compensation and benefits relative to revenue.

The indicators were standardized before PCA, and the first principal component was retained as OCR. Higher OCR values indicated a stronger innovation- and sustainability-oriented corporate culture.

4. Control Variables

The regression models included a set of firm-level control variables to reduce omitted-variable bias.

Firm size (Size): was measured as the natural logarithm of total assets.

Firm age (FirmAge): captured the length of a firm's operating or listing history.

Leverage (Lev): was measured as the ratio of total liabilities to total assets.

Profitability (ROA): was measured as return on assets.

Ownership type (SOE): was measured using a dummy variable equal to one for state-owned enterprises and zero otherwise.

CEO characteristics (CEO): captured relevant managerial characteristics, including age, tenure, education, or the composite executive measure used in the dataset.

Market competition (CR4): represented the degree of industry concentration or competitive intensity.

Strategic alliance participation (SA): was measured using a dummy variable indicating whether the firm participated in relevant strategic alliances.

Year fixed effects were included to control for macroeconomic and policy changes over time. Firm fixed effects were included to control for unobserved time-invariant firm characteristics.

1) Data Preprocessing

All continuous variables were winsorized at the 1st and 99th percentiles to reduce the influence of extreme observations.

The underlying indicators used to construct GS_Index and OCR were standardized before PCA because they were measured using different units and scales. The first principal component was retained for each index because it captured the largest proportion of common variation across the corresponding indicators.

Observations with missing values in the principal variables were removed before estimation. The interaction terms ESG × GS and ESG × OCR were constructed to test the moderating effects of corporate governance quality and corporate culture, respectively.

2) Econometric Model Specification

The empirical strategy uses panel regressions with firm, year, and industry fixed effects. The baseline model tests the direct ESG–SGR relationship:

$$SGR_{it} = \alpha_0 + \beta_1 ESG_{it} + \beta_2 X_{it} + \eta_i + \lambda_t + \delta_j + \varepsilon_{it} \quad (2)$$

To test moderation by governance structure (H2), the interaction term is added:

$$SGR_{it} = \alpha_0 + \beta_1 ESG_{it} + \beta_2 GS_{it} + \beta_3 (GS_{it} \times ESG_{it}) + \beta_4 X_{it} + \eta_i + \lambda_t + \delta_j + \varepsilon_{it} \quad (3)$$

To test moderation by corporate culture (H3), the culture interaction term is included:

$$SGR_{it} = \alpha_0 + \beta_1 ESG_{it} + \beta_2 OCR_{it} + \beta_3 (OCR_{it} \times ESG_{it}) + \beta_4 X_{it} + \eta_i + \lambda_t + \delta_j + \varepsilon_{it} \quad (4)$$

X_{it} denotes a vector of control variables, including firm size (log assets), leverage, profitability (ROA), firm age, and ownership type (SOE), consistent with prior ESG-performance studies. In the regression models, i denotes firm-level observations, t denotes year-level observations, and j denotes industries.

Table 1 Variable, Measurement and Data Source

Variable	Measurement	Data Source
Sustainable Growth Rate (SGR)	Calculated following Higgins (1977), reflecting the maximum growth rate sustainable without altering capital structure.	Financial data from CSMAR (China Stock Market & Accounting Research Database) (CSMAR Data Technology Co., Ltd., 2024)
ESG Investment / Performance (ESG)	Annual ESG rating score representing firm-level ESG performance.	Huazheng ESG Rating Database (Shanghai Sino-Securities Index Information Service Co., Ltd., 2024); supplementary validation from CSI ESG Ratings (China Securities Index Co., Ltd., 2024)

Table 1 Variable, Measurement and Data Source (Cont.)

Variable	Measurement	Data Source
Corporate Governance Quality (GS)	Governance Structure Index constructed via PCA using board diversity, executive incentives, shareholder engagement, and transparency indicators.	Governance indicators from CSMAR (CSMAR Data Technology Co., Ltd., 2024) and firms' annual reports (this study)
Corporate Culture (Innovation & Sustainability Orientation) (OCR)	PCA-based composite index including innovation (patents), sustainability orientation (textual analysis of reports), stakeholder engagement, long-term strategy, and employee engagement.	Patent & financial data from CSMAR (CSMAR Data Technology Co., Ltd., 2024); textual data from corporate annual/sustainability reports
ESG × Governance (ESG × GS)	Interaction term testing governance moderation effect.	Constructed variable
ESG × Culture (ESG × OCR)	Interaction term testing culture moderation effect.	Constructed variable

Results

Tables 2-5 report the Descriptive Statistics, Variance Inflation Factor (VIF) Test, Baseline Regression Results for H1, and Moderating Effects for H2 and H3, respectively, while the results of the robustness checks, endogeneity tests, and heterogeneity analyses are described in the text.

Table 2 Descriptive Statistics

VarName	Obs	Mean	SD	Min	Median	Max
SGR	1664	48.4173	17.2961	-5.7879	48.3404	100.9174
ESG	1664	74.4363	4.9352	51.5800	74.4700	90.4000
GS	1664	0.1563	0.3785	-0.8062	0.1312	1.3114
OCR	1664	0.1584	0.2314	-0.4924	0.1455	0.9720
Size	1664	23.3583	1.0991	20.3352	23.1956	27.2986
FirmAge	1664	3.0666	0.2560	2.0794	3.0910	3.7612
CEO	1664	1.0763	2.0767	-5.2650	1.0684	7.7282
SOE	1664	0.3618	0.4807	0.0000	0.0000	1.0000
Lev	1664	0.4448	0.1836	0.0143	0.4567	1.9391
ROA	1664	0.0499	0.0831	-1.5834	0.0453	0.5415
CR4	1664	0.2058	0.2492	0.0225	0.0948	1.0000
SA	1664	0.1550	0.3621	0.0000	0.0000	1.0000

Table 2 presents the descriptive statistics of the model variables, including the sample size, mean, standard deviation, and the maximum and minimum values. Table 2 shows that the average Sustainable

Growth Rate (SGR) is 48.42; the maximum and minimum values are 100.92 and -5.79, respectively, with a standard deviation of 17.30. This indicates a significant disparity in the sustainable growth capabilities among China's listed enterprises, revealing uneven development across the sample. The mean value of ESG performance reaches 74.44, suggesting the overall performance is relatively good. However, the scores range from a low of 51.58 to a high of 90.40, indicating that while some firms excel, there is still a notable gap between leaders and laggards, which is consistent with the actual situation that high-quality ESG development in China is still evolving. Regarding control variables, the firm size (Size) ranges from 20.34 to 27.30, reflecting a diverse sample in terms of asset scale. The leverage ratio (Lev) has a mean of 0.44, with values ranging from 0.01 to 1.94, demonstrating distinct differences in capital structure strategies among the sampled firms.

Table 3 Variance Inflation Factor Test

Variable	VIF	1/VIF
Lev	1.69	0.592
Size	1.52	0.657
ROA	1.34	0.746
SOE	1.20	0.831
FirmAge	1.11	0.898
ESG	1.11	0.901
CEO	1.09	0.919
SA	1.03	0.973
CR4	1.01	0.994
Mean VIF	1.23	-

Remarks: VIF denotes the Variance Inflation Factor. Values below 5 are commonly interpreted as indicating that serious multicollinearity is unlikely, although the threshold should be considered together with the theoretical relationships among the variables (Hair et al., 2019).

Table 3 reports the VIF test for the explanatory and control variables. Because leverage and ROA are conceptually related to components used in constructing SGR, the test was conducted to determine whether their inclusion generated problematic linear dependence among the regressors. All VIF values were below the commonly applied threshold of 5 (Hair et al., 2019), with a mean VIF of 1.23. However, the low VIF values address multicollinearity only among the explanatory variables. They do not resolve the separate mechanical-overlap concern arising from the mathematical construction of SGR; this issue is therefore examined through an additional sensitivity analysis excluding Lev and ROA.

Table 4 Baseline Regression Results

Variables	(1) SGR	(2) SGR
ESG	0.0508***	0.0560***
	(3.09)	(3.40)
Size		-0.5038**
		(-2.33)
FirmAge		2.8350
		(1.14)
CEO		2.3783***
		(4.76)
SOE		-0.0451
		(-0.10)
Lev		-0.1934
		(-0.23)
ROA		0.4972
		(0.48)
CR4		-0.2221
		(-0.98)
SA		0.4670*
		(1.96)
_cons	44.6389***	44.8142***
	(36.52)	(5.62)
Firm FE	YES	YES
Year FE	YES	YES
Industry FE	YES	YES
Observations	1,664	1,664
R^2	0.989	0.989

Remarks: The dependent variable is Sustainable Growth Rate (SGR). The reported (R^2) should be interpreted cautiously because ROA and leverage are conceptually and mathematically related to components used in constructing SGR. Sensitivity models excluding these controls are reported to assess whether the principal findings depend on this mechanical overlap. Firm and year fixed effects are included. (t)-statistics are reported in parentheses. * ($p < 0.10$), ** ($p < 0.05$), and *** ($p < 0.01$).

Table 4 presents the baseline regression results examining the direct relationship between ESG and Sustainable Growth Rate (SGR). Column (1) shows that ESG is positively and significantly associated with SGR ($\beta = 0.0508$, $p < 0.01$), indicating that firms with higher ESG performance tend to exhibit stronger sustainable growth. After including firm-level control variables in Column (2), the coefficient of ESG remains positive and statistically significant ($\beta = 0.0560$, $p < 0.01$), demonstrating the robustness of the main effect and supporting H1. Among the control variables, firm size is negatively related to SGR, CEO characteristics show a positive and significant effect, and strategic alliance participation (SA) is weakly positive, while the other control variables are statistically insignificant. Firm, year, and industry fixed effects are included in all specifications, which helps reduce the influence of unobserved firm-level, temporal, and industry-level heterogeneity. Because ROA and leverage are closely related to components

used in constructing SGR, their inclusion and the resulting high model fit are discussed cautiously in the Discussion section and further examined through sensitivity specifications.

Table 5 Moderating Effects

Variables	**(1) SGR**	**(2) SGR**
ESG	0.0435**	0.0166
	-2.51	-0.77
GS	-6.8795**	
	(-2.30)	
ESG × GS	0.0912**	
	-2.25	
OCR		-9.4194**
		(-2.04)
ESG × OCR		0.1366**
		-2.24
Size	-0.4487**	-0.5587**
	(-2.01)	(-2.55)
FirmAge	2.5322	2.8879
	-1.01	-1.16
CEO	2.3411***	2.3202***
	-4.60	-4.64
SOE	-0.0174	-0.0271
	(-0.04)	(-0.06)
Lev	-0.2229	-0.0503
	(-0.26)	(-0.06)
ROA	0.4239	0.5310
	-0.41	-0.51
CR4	-0.2285	-0.2008
	(-1.00)	(-0.88)
SA	0.4676*	0.4893**
	-1.96	-2.05
Constant	45.4217***	48.6356***
	-5.69	-5.98
Firm FE	YES	YES
Year FE	YES	YES
Industry FE	YES	YES
Observations	1,664	1,664
R^2	0.989	0.989

Remarks: The dependent variable is Sustainable Growth Rate (SGR). t-statistics are reported in parentheses. Firm, year, and industry fixed effects are included. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 5 reports the moderating effects of corporate governance quality (GS) and corporate culture (OCR) on the ESG–SGR relationship. In Column (1), the interaction term ESG × GS is positive and significant ($\beta = 0.0912$, $p < 0.05$), indicating that higher governance quality strengthens the positive impact of ESG on sustainable growth, thereby supporting H2. In Column (2), the interaction term ESG × OCR is also positive and significant ($\beta = 0.1366$, $p < 0.05$), suggesting that a stronger innovation- and sustainability-oriented corporate culture enhances the effectiveness of ESG in promoting SGR, supporting H3. Although the direct coefficients of GS and OCR are negative, the positive interaction effects imply that governance quality and corporate culture function as reinforcing mechanisms that amplify the marginal effect of ESG investment on sustainable growth.

In summary, the empirical results support all proposed hypotheses: ESG investment is positively associated with firms' Sustainable Growth Rate (H1), and this positive relationship is significantly strengthened by higher corporate governance quality (H2) and a stronger innovation- and sustainability-oriented corporate culture (H3).

Additional Analyses

The results remain robust when alternative ESG and sustainable growth measures are employed, with the ESG coefficient remaining positive and statistically significant ($p < 0.05$). Endogeneity concerns are addressed by incorporating industry-year fixed effects and an instrumental-variable approach, under which the ESG effect continues to be positive and significant. Heterogeneity analyses further show that the ESG–SGR relationship is stronger and statistically significant in resource- and pollution-intensive firms, suggesting that ESG effectiveness varies across firm contexts.

Discussion

This study provides empirical evidence that ESG performance is positively associated with firms' Sustainable Growth Rate (SGR) in the context of China's "Dual Carbon" strategy. The baseline results and subsequent robustness analyses indicate that firms with stronger ESG performance tend to exhibit greater sustainable growth capacity. This finding contrasts with the shareholder-centered position commonly associated with Friedman (1970), who argued that corporate executives should prioritize shareholder interests while operating within the legal and competitive rules of the market. The present findings suggest that ESG engagement need not function exclusively as a cost burden; rather, it may be associated with firms' long-term growth capacity when supported by appropriate governance and organizational conditions.

A methodological issue concerns the inclusion of ROA and leverage as control variables because SGR is mathematically derived from profitability and capital-structure components. ROA is closely related to the combined effects of net profit margin and asset turnover, while leverage corresponds to the financing component embedded in the SGR calculation. These variables were retained because profitability and capital structure may independently affect firms' ESG performance and growth capacity,

and excluding them from the baseline model could leave important firm-level financial differences uncontrolled. Nevertheless, their mechanical relationship with SGR may contribute to the unusually high (R^2) of 0.989. The model fit should therefore be interpreted cautiously and should not be taken to mean that the specification explains nearly all dimensions of corporate sustainable growth.

Consistent with Bolton and Kacperczyk (2021), the results suggest that ESG integration may facilitate a transition from extensive expansion toward more intensive and higher-quality development by improving resource allocation, risk management, and access to finance. This interpretation is also consistent with the growing use of non-financial information by investors when assessing firms' long-term risks and development prospects (Berg et al., 2022; Christensen et al., 2022). Nevertheless, the evidence should be interpreted as association-based rather than purely causal because ESG choices may remain correlated with unobserved managerial quality, strategic orientation, and forward-looking organizational capabilities, even after fixed effects and control variables are included (Berg et al., 2022).

A central contribution of this study lies in clarifying the organizational conditions through which ESG performance may be translated into sustainable growth. The conversion of ESG-related resources into growth outcomes is not automatic but depends on firms' internal institutional architecture. Drawing on the Resource-Based View, ESG-related capabilities can be regarded as strategic resources whose value depends on the organizational mechanisms through which they are coordinated and deployed (Barney, 1991). Strong governance structures may improve accountability, monitoring, transparency, and strategic alignment, while a supportive corporate culture may facilitate the internalization of ESG principles in organizational routines and decision-making processes.

The positive interaction effects of corporate governance and corporate culture suggest that ESG performance generates stronger growth-related outcomes when firms possess the institutional capacity to implement ESG commitments effectively. Without these internal conditions, ESG engagement may fail to produce substantive organizational improvements. This finding also highlights the potential risk of symbolic ESG practices: when governance and culture are weak, firms may emphasize ESG disclosure without achieving corresponding changes in operational practices or long-term growth capacity. This interpretation may help explain the mixed ESG-performance findings reported in previous research (Berg et al., 2022).

The heterogeneity analysis further indicates that the relationship between ESG performance and SGR differs across industries. The stronger association observed among resource-intensive and heavy-polluting firms is consistent with the argument that ESG engagement may be especially valuable when firms face greater environmental exposure, regulatory scrutiny, and carbon-related financial risks. Bolton and Kacperczyk (2021) show that investors price exposure to carbon emissions, suggesting that firms with greater environmental risks may obtain larger marginal benefits from credible improvements in ESG performance. Such improvements may reduce perceived risk, strengthen organizational legitimacy, and facilitate access to financial resources.

By contrast, the statistically insignificant relationship observed in the utilities sector may reflect the distinctive operating and regulatory characteristics of that industry. Regulated pricing, public-service obligations, and relatively limited market competition may weaken the extent to which ESG signals are translated into measurable growth outcomes (Boubakri et al., 2021). This interpretation should, however, be treated cautiously because an insignificant coefficient does not by itself establish the underlying mechanism. More broadly, the heterogeneity findings suggest that the ESG–SGR relationship is conditioned by differences in regulatory exposure, market pressure, and industry structure. Caution is therefore required when generalizing the benefits of ESG performance across industries (Gillan et al., 2021; Krueger et al., 2020).

The additional analyses also address concerns related to potential endogeneity and differences in ESG measurement. The inclusion of industry-by-year fixed effects controls for common time-varying shocks experienced by firms within the same industry, including changes in regulation, market conditions, and environmental-policy pressure. The continued positive ESG coefficient after incorporating these controls suggests that the main association is not explained solely by aggregate industry trends. However, this specification cannot eliminate all sources of endogeneity or measurement error.

Overall, the findings indicate that ESG performance is associated with stronger sustainable growth capacity under China's "Dual Carbon" policy environment, particularly when firms possess effective governance mechanisms and a supportive organizational culture. ESG engagement should therefore be understood not simply as a compliance activity but as a potential strategic capability whose value depends on the institutional conditions under which it is implemented. Given the known disagreement among ESG-rating providers, future research could compare ratings from multiple sources and employ quasi-exogenous policy changes, natural experiments, or event-study designs to strengthen causal identification.

Conclusions

Essentially, the research examines whether ESG investing is the "Green Engine" for Sustainable Growth Rate (SGR) in Chinese listed firms, and if the effectiveness of ESG investment depends on the internal organizational conditions. From the panel data of A-share firms, the findings confirmed that ESG performance is not only positively but also significantly related to sustainable growth, thus ESG participation is one way of value creation at the very long term and not merely a compliance cost. Moreover, this positive association can be explained to a great extent by the presence of a higher quality of corporate governance and a stronger innovation- and sustainability-oriented corporate culture, which implies that ESG resources yield higher returns when internal institutional foundations are strong. More insights show that the impact of ESG on growth is larger in resource-intensive and heavily polluting industries, thereby underscoring the contextual differences in the effectiveness of ESG. In sum, the results imply that sustainable growth in emerging market contexts is a matter of the external green capital

investment being in harmony with the internal governance capacity and the cultural commitment to long-term development.

Recommendations

Limitation and Future Research

ESG investment decisions may still co-move with unobservable factors beyond those captured in this study, despite the inclusion of firm, year, and industry fixed effects as well as an instrumental-variable approach. As such, it remains difficult to fully eliminate potential endogeneity concerns. Therefore, causal inference is inherently constrained. Future research could employ an event-study to better isolate exogenous variation in ESG engagement and strengthen causal identification.

References

Aguilera, R. V., Williams, C. A., Conley, J. M., & Rupp, D. E. (2006). Corporate governance and social responsibility: A comparative analysis of the UK and the US. *Corporate Governance: An International Review, 14*(3), 147-158. https://doi.org/10.1111/j.1467-8683.2006.00495.x

Barney, J. (1991). Firm resources and sustained competitive advantage. *Journal of Management, 17*(1), 99-120. https://doi.org/10.1177/014920639101700108

Berg, F., Kölbel, J. F., & Rigobon, R. (2022). Aggregate confusion: The divergence of ESG ratings. *Review of Finance, 26*(6), 1315-1344. https://doi.org/10.1093/rof/rfac033

Bolton, P., & Kacperczyk, M. (2021). Do investors care about carbon risk? *Journal of Financial Economics, 142*(2), 517-549. https://doi.org/10.1016/j.jfineco.2021.05.008

Boubakri, N., El Ghoul, S., Guedhami, O., & Wang, H. (2021). Corporate social responsibility in emerging market economies: Determinants, consequences, and future research directions. *Emerging Markets Review, 46*, 100758. https://doi.org/10.1016/j.ememar.2020.100758

Branco, M. C., & Rodrigues, L. L. (2006). Corporate social responsibility and resource-based perspectives. *Journal of Business Ethics, 69*(2), 111-132. https://doi.org/10.1007/s10551-006-9071-z

China Securities Index Co., Ltd. (2024). *CSI ESG ratings and sustainability indices*. China Securities Index. https://www.csindex.com.cn/en

Christensen, H. B., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: Economic analysis and literature review. *Review of Accounting Studies, 26*, 1176-1248. https://doi.org/10.1007/s11142-021-09609-5

CSMAR Data Technology Co., Ltd. (2024). *CSMAR: China Stock Market & Accounting Research Database*. CSMAR. https://www.csmar.com/en/

de Boer, D., & Fan, D. (2022, March 11). *Impressive progress in China's 1 +N policy framework*. China Council for International Cooperation on Environment and Development (CCICED). https://cciced.eco/climate-governance/how-is-progress-in-chinas-1n-policy-framework/

Eccles, R. G., Ioannou, I., & Serafeim, G. (2014). The impact of corporate sustainability on organizational processes and performance. *Management Science, 60*(11), 2835-2857. https://doi.org/10.1287/mnsc.2014.1984

Fama, E. F., & French, K. R. (1992). The cross-section of expected stock returns. *The Journal of Finance, 47*(2), 427-465. https://doi.org/10.1111/j.1540-6261.1992.tb04398.x

Fang, L., & Guo, X. (2025). From responsibility to value: ESG and long-term corporate value. *PLos One, 20*(4), e0322018. https://doi.org/10.1371/journal.pone.0322018

Fonseka, M., Rajapakse, T., & Richardson, G. (2019). The effect of environmental information disclosure and energy product type on the cost of debt: Evidence from energy firms in China. *Pacific-Basin Finance Journal, 54*, 159-182. https://doi.org/10.1016/j.pacfin.2018.05.001

Friedman, M. (1970, September 13). *The social responsibility of business is to increase its profits*. The New York Times Magazine. https://www.nytimes.com/1970/09/13/archives/a-friedman-doctrine-the-social-responsibility-of-business-is-to.html

Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance, 66*, 101889. https://doi.org/10.1016/j.jcorpfin.2021.101889

Gómez-Bezares, F., Przychodzen, W., & Przychodzen, J. (2016). Corporate sustainability and shareholder wealth—Evidence from British companies and Lessons from the crisis. *Sustainability, 8*(3), 276. https://doi.org/10.3390/su8030276

Hair, J. F., Black, W. C., Babin, B. J., & Anderson, R. E. (2019). *Multivariate data analysis* (8th ed.). Cengage. https://eli.johogo.com/Class/CCU/SEM/_Multivariate%20Data%20Analysis_Hair.pdf

Hart, S. L. (1995). A natural-resource-based view of the firm. *Academy of Management Review, 20*(4), 986-1014. https://doi.org/10.5465/amr.1995.9512280033

Higgins, R. C. (1977). How much growth can a firm afford? *Financial Management, 6*(3), 7-16. https://www.jstor.org/stable/3665251

Hong Kong Exchanges and Clearing Limited. (n.d.). *Shenzhen Stock Exchange (SZSE) ChiNext Market overview*. HKEX. https://www.hkex.com.hk/Mutual-Market/Stock-Connect/Getting-Started/Information-Booklet-and-FAQ/ChiNext-Market-Overview?sc_lang=en

Kacperczyk, M. T., & Peydró, J. -L. (2022). *Carbon emissions and the bank-lending channel* (European Corporate Governance Institute – Finance Working Paper No. 991/2024). SSRN. https://doi.org/10.2139/ssrn.3915486

Krueger, P., Sautner, Z., & Starks, L. T. (2020). The importance of climate risks for institutional investors. *The Review of Financial Studies, 33*(3), 1067-1111. https://doi.org/10.1093/rfs/hhz137

Li, K., Mai, F., Shen, R., & Yan, X. (2021). Measuring corporate culture using machine learning. *The Review of Financial Studies, 34*(7), 3265-3315. https://doi.org/10.1093/rfs/hhaa079

Liu, M. (2025). A literature review of study on the impact of ESG performance on corporate investment efficiency. *Frontiers of International Accounting, 14*(3), 636-642. https://doi.org/10.12677/fia.2025.143073

Pankratz, N. M. C., Bauer, R., & Derwall, J. (2019). *Climate change, firm performance, and investor surprises*. SSRN. https://doi.org/10.2139/ssrn.3443146

Penrose, E. T. (1995). *The theory of the growth of the firm* (3rd ed.). Oxford University Press. https://doi.org/10.1093/0198289774.001.0001

Raghunandan, A., & Rajgopal, S. (2022). Do ESG funds make stakeholder-friendly investments? *Review of Accounting Studies, 27*, 822-863. https://doi.org/10.1007/s11142-022-09693-1

Shanghai Sino-Securities Index Information Service Co., Ltd. (2024). *Huazheng ESG Rating Database* [Database]. https://idmt.chindices.com

Shanghai Stock Exchange. (2023). *Premium blue-chip market*. https://english.sse.com.cn/markets/equities/highlights/bluechipmarket/

Shanghai Stock Exchange. (n.d.). *Equities overview*. https://english.sse.com.cn/markets/equities/overview/

Shenzhen Stock Exchange. (2021). *Shenzhen Stock Exchange fact book 2021*. https://docs.static.szse.cn/www/market/periodical/year/W020230915392901751127.pdf

Surroca, J., Tribó, J. A., & Waddock, S. (2010). Corporate responsibility and financial performance: The role of intangible resources. *Strategic Management Journal, 31*(5), 463-490. https://doi.org/10.1002/smj.820

Van Horne, J. C. (2002). *Financial management and policy* (12th ed.). Prentice Hall. https://www.gsb.stanford.edu/faculty-research/books/financial-management-policy-12th-edition

Wang, X., Xie, H., Li, J., & Liu, X. (2025). The effect of ESG performance on value creation of strategic alliances. *Research in International Business and Finance, 79*, 103093. https://doi.org/10.1016/j.ribaf.2025.103093

World Commission on Environment and Development [WCED]. (1987). *Our common future* (A/42/427). United Nations. https://digitallibrary.un.org/record/139811/files/A_42_427-EN.pdf

Xie, J., Nozawa, W., Yagi, M., Fujii, H., & Managi, S. (2019). Do Environmental, Social, and Governance activities improve corporate financial performance? *Business Strategy and the Environment, 28*(2), 286-300. https://doi.org/10.1002/bse.2224



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