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ESG Performance as a Moderator: Alleviating Corporate Financing Constraints under Economic Policy Uncertainty

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Abstract: In the context of increasing global economic complexity and rising productivity, persistent financing constraints continue to pose critical impediments to corporate growth trajectories. This study empirically examines the relationship between economic policy uncertainty (EPU) and corporate financing constraints using the data of China's A-share non-financial listed entities from2014 to 2023. By leveraging financial data and employing a two-way fixed effects model, this study investigates how fluctuations in EPU affect the corporate funding accessibility while assessing the potential moderating function of ESG performance metrics. Robustness checks incorporating alternative variable measurements and temporal specifications substantiate our empirical findings. The analysis reveals that heightened economic policy uncertainty significantly amplifies financing constraints, exacerbating capital acquisition challenges for operational expansion and strategic investments. Conversely, companies with superior ESG performance were found to experience less severe impacts from such uncertainty, effectively buffering the adverse effects of EPU. This paper contributes an innovative perspective on the intersection of economic policy uncertainty, ESG practices, and corporate financing challenges, offering empirical evidence that reinforces the moderating influence of ESG performance. The results provide valuable guidance for businesses aiming to reduce financing constraints and present actionable policy recommendations for governments, financial institutions, and investors, highlighting the importance of supporting sustainable economic growth through enhanced ESG practices.

Keywords: Economic Policy Uncertainty, ESG Performance, Financing Constraints, Two-way Fixed Effects Model

1. Introduction

Amid significant shifts in the global economic landscape and the rapid rise of new productivity drivers, financing constraints have emerged as a critical barrier to corporate development. The growth of new productivity heavily relies on companies' ability to integrate technological innovation, resource allocation, and strategic planning. However, high adjustment costs and unstable financing sources severely hinder innovation activities [1]. Studies show that financing constraints diminish total factor productivity, reduce market flexibility, and cut investment in fixed assets and innovation, thereby eroding both competitiveness and growth potential [2]. To mitigate these constraints, companies often accumulate internal cash, with firms facing greater financing challenges being more

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sensitive to macroeconomic uncertainty [3]. In the absence of external oversight, this behavior can lead to over-investment, causing resource misallocation [4].

Globally, the international landscape is increasingly volatile, with geopolitical tensions, changing trade rules, and macroeconomic uncertainty creating an unstable environment for businesses. In China, firms face a challenging phase of industrial restructuring, transformation, and upgrading while navigating evolving policies and emerging technologies. These factors amplify economic policy uncertainty, leading to greater investor risk aversion. Consequently, bond assessments become more cautious, risk premiums rise to offset potential losses, and corporate debt financing costs increase. For equity financing, policy uncertainty affects stock return volatility by influencing investor expectations and stock price movements [5]. Furthermore, economic policy uncertainty raises the likelihood of corporate bankruptcies, prompting investors to demand higher returns on equity financing, significantly increasing the cost of equity capital [6].

Existing literature generally endorses the idea that the disclosure of ESG information, together with improvements in corporate governance, can ease financing constraints and lower financing costs [7-9]. In the context of economic uncertainty, enhancing ESG performance presents a new strategy for companies to ease their financial constraints. By adopting the green development concept and promoting their social image, companies can improve corporate governance through their commitment to key resources and social responsibility [10]. Actively disclosing ESG information also reduces the information asymmetry between firms and external stakeholders, which in turn helps alleviate financial pressures [11].

This paper empirically analyzes the impact of rising economic policy uncertainty on financial constraints using the data of non-financial A-share listed companies in China (2014-2023), and investigates whether enhancing ESG performance can alleviate these constraints under such uncertainty. To overcome the endogeneity problem, this paper adopts a two-way fixed effects model. To conduct the robustness tests, this paper changes the measurement of explanatory and explained variables and narrows the time window. The findings indicate that increased economic policy uncertainty significantly raises financial constraints, while improvements in ESG performance effectively mitigate the rise in financial constraints driven by this uncertainty. This paper introduces the following innovations compared to existing research:

(1) Existing research primarily examines economic policy uncertainty or corporate ESG performance as key factors influencing corporate financing constraints. However, Few studies examine whether the behavior of firms in improving their ESG performance moderates financing constraints within the context of economic policy uncertainty. This paper systematically investigates how improvements in ESG performance can moderate corporate financing constraints in the context of economic policy uncertainty, analyzing the interactive mechanisms between the three factors and providing a fresh perspective for future research.

(2) The academic literature lacks consensus on the impact of economic policy uncertainty and corporate efforts to enhance ESG performance on financing constraints. This paper offers a thorough review of both positive and negative viewpoints from a theoretical perspective. It then investigates these perspectives by examining the moderating effect, confirming that improvements in ESG performance notably reduce the influence of heightened economic policy uncertainty on financing constraints.

(3) This paper provides empirical evidence that improving ESG performance helps firms overcome financing constraints amid economic uncertainty, driving new forms of productivity. It offers insights for governments in policy design, for financial institutions in investment decisions, and for investors in portfolio adjustments, ultimately supporting the sustainable, high-quality development of firms, industries, and the broader economy in the era of new productivity.

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This paper has several limitations. First, the theoretical model is simplified and does not fully account for other factors influencing financing constraints. Second, since ESG performance is measured using rating data, the potential nonlinear effects of economic policy uncertainty or ESG performance on financing constraints are not explored empirically. Finally, while factors like firm size and corporate governance are considered, the role of heterogeneity in corporate culture and innovation in the mechanism is insufficiently addressed, though these factors may significantly impact the effectiveness of ESG strategies and financing decisions.

2. Theoretical analysis and research hypotheses

2.1. Economic policy uncertainty and corporate financing constraints

Currently, limited research has directly explored the relationship between financial constraints, economic policy uncertainty and ESG performance, with most studies focusing primarily on their individual interactions. The following section aims to examine the logical relationships among these variables through an extensive literature review and propose relevant research hypotheses.

Economic policy uncertainty typically encompasses three key dimensions: the unpredictability of policy expectations, uncertainty in policy implementation, and the potential for shifts in government policy [12]. Fazzari defined financial constraints as the challenges firms face in securing external financing due to factors such as information asymmetry and transaction costs. The impact of economic policy uncertainty on corporate financing constraints has long been a focal point of academic inquiry. However, most existing studies either treat financial constraints as an intermediary variable in analyzing the effects of economic policy uncertainty on other factors or investigate its influence on corporate debt or equity financing. Few studies have directly addressed the broader impact of economic policy uncertainty on firms' overall financial constraints. Thus, the following review synthesizes the existing literature on the mechanisms through which economic policy uncertainty affects corporate financing and presents hypotheses based on these insights.

Regarding debt financing, uncertainty tends to increase agency costs and exacerbate information asymmetry. In response to adverse shocks, firms may default and enter debt restructuring with creditors, thereby making it more difficult and costly to obtain external financing in uncertain environments [13]. According to the "self-insurance" motivation theory, banks may bolster capital reserves to mitigate potential credit losses in times of heightened uncertainty, leading to reduced credit supply as a result[14]. Using quarterly data from US commercial banks between 1984 and 2010, Valencia (2017) found that increasing uncertainty is associated with a decrease in the availability of bank credit [14]. In China, where the financial system remains underdeveloped, many firms rely heavily on creditor financing. Due to the risk-averse behavior of banks, rising economic policy uncertainty drives up the cost of bank loans, with banks tending to favor lower-risk lending options [15]. This phenomenon is particularly pronounced for private and small- and medium-sized enterprises [16].

In terms of equity financing, drawing on investor sentiment theory, when investor sentiment is low, the sensitivity of equity issuance to cash flow becomes more negative. This results in higher equity financing costs and greater difficulty in raising capital through equity [17]. Additionally, due to an uncertain policy environment, enterprises may face increased risks, which can undermine the predictability of their future cash flows. Simultaneously, the growing information asymmetry makes it harder to assess the company's future performance, leading managers to attribute business failures to economic policy uncertainty. Domestic research also indicates that rising economic policy uncertainty contributes to a reduction in corporate equity financing levels and an increase in equity financing costs [18].

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The impact of economic policy uncertainty on corporate access to commercial credit financing remains a subject of ongoing academic debate. The following section aims to examine the logical relationships among these variables through an extensive literature review and propose relevant research hypotheses [19], but also exacerbates information asymmetry between firms and external stakeholders [20], making companies more likely to reduce their reliance on commercial credit. A research further confirmed that economic policy uncertainty intensifies corporate financing constraints by diminishing the supply of commercial credit and shortening the duration of credit lines [21]. Based on this analysis, the following hypotheses is proposed in this paper:

H1a: The higher the economic policy uncertainty is, the higher the corporate financing constraints are.

Uncertainty exacerbates corporate financing constraints, making it difficult for firms to secure sufficient external capital to support their investment activities [22]. Consequently, firms are often compelled to reduce investment and increase cash holdings in the face of economic policy uncertainty, thereby maintaining liquidity to mitigate financing challenges.

According to real options theory, rational decision-makers face a trade-off between current and future investments. As economic policy uncertainty rises, the value of "waiting" increases, leading firms to scale back their current fixed asset investments [23,24]. Driven by a desire to avoid uncertainty, managers tend to adopt conservative strategies, boosting cash reserves and curbing investment to manage operational pressures arising from policy unpredictability [25]. Similarly, firms constrained by financing limitations, reduce their investment scale and are more inclined to hold cash as a buffer against potential liquidity shortfalls [26]. Using the data of China's A-share non-financial listed firms from 2007 to 2017, it is found that increased economic policy uncertainty inhibits fixed asset investment, reduces leverage, and raises cash holdings, with these effects being more pronounced in firms with greater financing constraints [27]. Based on the above insights, the following hypotheses is proposed in this paper:

H1b: The higher the economic policy uncertainty is, the lower the corporate financing constraints are.

2.2. ESG performance and corporate financing constraints

ESG is an evaluation framework that assesses a company’s performance across three key dimensions: the environment, social responsibility, and governance. This framework offers investors a more holistic and multidimensional view, enabling them to better evaluate the value and long-term potential of a company. ESG has also become a crucial indicator of a company's commitment to sustainable development. In recent years, the influence of ESG performance on corporate financing constraints has received growing attention. The prevailing view is that strong ESG performance alleviates constraints in both debt and equity financing, while potentially inhibiting internal financing [28]. The mechanisms through which improved ESG performance reduces financing constraints include equity financing, commercial credit, and financial credit [29].

The rationale behind this is that ESG evaluations reflect a company's non-financial performance. Positive ESG performance helps reduce information asymmetry, which in turn alleviates financing pressures [30]. In an experiment, it was found that corporate social responsibility initiatives can significantly enhance investors’ perceptions of a company, garnering their emotional support and positively influencing their investment decisions [31].

A strong ESG performance is a signal of corporate social responsibility and well-positioned for sustainable growth. Investors view firms with strong ESG practices as more capable of managing environmental and social risks, offering a stable operational base and strong prospects for future growth. As a result, these companies attract greater investment, leading to lower equity financing costs and easing financing constraints [32]. An evidence from China shows that the disclosure of

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social responsibility reports can significantly reduce equity capital costs[33], and Chinese investors are able to discern differences in corporate governance levels, suggesting that improvements in governance help reduce equity financing costs[9].

From the perspective of commercial credit, strong ESG performance indicates substantial investment in environmental protection, social responsibility, and governance, which enhances a company's market competitiveness and product quality. In an environment marked by economic policy uncertainty, suppliers are more likely to extend business credit to low-risk, competitive companies[34]. Additionally, companies with strong ESG performance are more resilient to risks and better able to uphold their reputations, which in turn enhances their access to commercial credit[35].

In terms of financial credit, firms with higher ESG ratings are often viewed as having strong operational capabilities and sustainable growth potential, which enhances their financial creditworthiness. Regarding credit risk, good ESG performance can mitigate operational risks through mechanisms such as reputation insurance and information monitoring[36]. As a result, financial institutions are more willing to extend loans to these companies, and may even offer more favorable loan terms, such as lower interest rates and higher credit limits[37].

From the perspective of ESG disclosure as a means to mitigate information asymmetry, in equity financing, disclosing ESG performance enables investors to gain a more comprehensive understanding of a firm's situation, thereby reducing the information gap between firms and investors. This, in turn, allows investors to more accurately assess the firm's value and risks, which lowers the difficulty of equity financing and alleviates financing constraints. In the context of trade credit, ESG disclosure helps reduce the information asymmetry between firms and suppliers, facilitating access to additional commercial credit[35]. Regarding financial credit, the assessment of ESG performance is typically based on disclosed information. Improving the quality of this disclosure reduces the information asymmetry between firms and creditors, which lowers the risk premium demanded by creditors, thereby easing financing constraints[8]. Based on the above analysis, the following hypotheses is proposed:

H2a: Improving ESG performance can alleviate corporate financing constraints under economic policy uncertainty.

However, some foreign scholars hold differing views regarding whether ESG performance can alleviate corporate financing constraints, suggesting instead that enhancing ESG performance may increase corporate costs and financial burdens[8]. ESG disclosure demands additional investments from companies, such as technical expertise, advertising and marketing efforts, and organizational planning and management, all of which directly raise operational costs, particularly for small and medium-sized enterprises[38]. Consequently, in response to operational pressures exacerbated by economic policy uncertainty, and drawing from the theory of impression management and managerial opportunism, company management may seek to improve market evaluations by enhancing ESG performance. This, however, could potentially worsen capital shortages and further intensify financing constraints.

A study found that investors' responses to corporate ESG information are influenced by the quality of the information provided[39]. However, due to the lack of a standardized framework for ESG disclosure content and evaluation metrics, much of the ESG information disclosed by companies tends to be qualitative, with a noticeable lack of quantitative indicators. These factors make it difficult for investors to fully recognize and value a company's ESG performance. An analysis using data from the U.S. capital markets argued that the market response to the release of sustainability reports was not significant[37]. Similarly, there's no significant yield difference between green bonds and other comparable non-green bonds issued by the same entity[40], indicating that issuing green bonds did not necessarily reduce financing costs. A research further noted that Chinese investors primarily focus on whether a company has published a social responsibility report, with little regard for its

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quality, which has no significant effect on reducing the cost of equity capital[33]. Based on the above evidence, the following hypothesis is proposed:

H2b: Improving ESG performance cannot alleviate corporate financing constraints under economic policy uncertainty.

3. Research design and research data

3.1. Sample selection and data sources

This paper selects the financial data of A-share listed companies from 2014 to 2023 as the research sample, and excludes the samples of ST, PT and financial industry. In terms of economic policy uncertainty, this paper utilizes the China Economic Policy Uncertainty index introduced by Baker. Corporate financial data are from CSMAR database.

3.2. Model construction and variable definition

To study the impact of rising economic policy uncertainty on the level of corporate financing constraints (H1a and H1b), this paper establishes the following empirical models:

$$constrain_{i,t} = \alpha ln(EPU_{i,t}) + \beta ESG_{i,t} + \rho X_{i,t} + \mu_i + \mu_t + \varepsilon_{i,t} \quad (1)$$

Let i denote the firm and t the year. The explained variable, constrain, captures the degree of corporate financial constraints, represented by the absolute value of the SA index in the baseline regression. Since a higher absolute value of the SA index signifies greater financial constraints for Chinese firms[1], to facilitate interpretation, we use the absolute value of the SA index in this study.

Economic Policy Uncertainty (EPU) serves as the primary explanatory variable. A significantly positive coefficient for EPU implies that greater economic policy uncertainty worsens corporate financing constraints (H1a), whereas a significantly negative coefficient suggests it alleviates these constraints (H1b).

ESG is another key explanatory variable, with performance measured by third-party ratings widely recognized in both industry and academia[41]. This study utilizes ESG ratings from China Securities Co., Ltd. as a proxy for ESG performance.

$X_{i,t}$ is a set of control variables—such as firm size (Size), profitability (ROA), growth (Growth), financial leverage (Lev), and net cash flow (CF)—is included to account for other factors affecting corporate financing constraints, as detailed in Table 1.

Firm fixed effects μ_i is incorporated to capture time-invariant individual heterogeneity and mitigate omitted variable bias. Time fixed effects control for unobserved temporal factors that may influence the dependent variable, addressing potential endogeneity. $\varepsilon_{i,t}$ is the unobserved residual term.

Table 1: Variable definitions

	Variable names	Variable symbol	Variable definition
Explained variable	Level of financing constraints	constrain	The SA index is taken in absolute value
Explanatory variables	ESG performance	ESG	China Securities ESG Index rating
	Economic policy uncertainty	ln (EPU)	EPU takes the natural logarithm
Control variables	corporate size	size	Natural logarithm of total assets
	Debt-to-asset ratio	lev	Total liabilities/total assets

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Table 1: (continued)

Company performance	roa	Net profit/total assets
Growth	groth	Operating revenue growth rate
Level of corporate governance	ic	Corporate Governance Index in the DIB database
Net cash flow	cf	Net cash flow generated from operating activities/total assets

To test the moderating effect of improved ESG performance on the relationship between rising economic policy uncertainty and corporate financing constraints (H2a and H2b), this paper constructs the following empirical model:

$$constrain_{i,t} = \alpha ln(EPU_{i,t}) + \beta ESG_{i,t} + \gamma ln(EPU_{i,t}) \times ESG_{i,t} + \rho X_{i,t} + \mu_i + \mu_t + \varepsilon_{i,t} \quad (2)$$

Model (2) adds the interaction term of economic policy uncertainty and corporate ESG performance $EPU_{i,t} \times ESG_{i,t}$, and by comparing the coefficient β and $\beta + \gamma$, this paper can identify the moderating effect of improving corporate ESG performance.

4. Analysis of empirical results

4.1. Descriptive statistics and correlation analysis

The EPU index is available on a monthly basis, and this study calculates the annual index by taking the arithmetic average of the monthly values. The ESG rating is categorized into nine levels (AAA to C), and the ESG rating of companies is assigned values ranging from 1 to 9[42], with higher values indicating a higher rating. To mitigate the impact of outliers, the study truncates the samples of continuous variables at the top and bottom 1%.

Table 2 further reports the mean, standard deviation, minimum, and maximum values for each variable, noting that the variations for most variables are relatively small.

Table 3 displays the pairwise correlations among all variables in this study, with all correlation coefficients below 0.4. Pearson's correlation coefficients are presented in the bottom left corner, while Spearman's correlations are shown in the top right corner of the table.

Table 2: Descriptive statistics

VarName	Obs	Mean	SD	Min	Max
constrain	36141	3.874	0.278	1.455	5.835
ln(EPU)	37762	6.160	0.530	4.817	6.674
ESG	20984	4.086	1.133	1.000	8.000
size	37762	12.879	1.444	5.731	19.487
lev	37762	0.423	1.025	0.006	178.345
roa	37491	0.040	0.157	-16.112	12.211
growth	37473	0.380	12.199	-1.309	1878.372
state	36144	0.301	0.459	0.000	1.000
ic	32424	615.023	160.142	0.000	941.310
cf	37761	0.050	0.082	-1.938	2.222

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Table 3: Correlation statistics

	constrain	ln(EPU)	ESG	size	lev	roa	growth	state	ic	cf
constrain	1	0.344***	-0.067***	0.007	0.028***	-0.069***	-0.095***	0.081***	-0.116***	-0.021***
ln(EPU)	0.322***	1	0.033***	0.164***	0.043***	-0.067***	-0.114***	-0.029***	-0.036***	0.066***
ESG	-0.085***	0.038***	1	0.292***	-0.030***	0.216***	0.063***	0.110***	0.298***	0.115***
size	-0.178***	0.174***	0.321***	1	0.463***	0.071***	0.072***	0.297***	0.237***	0.118***
lev	-0.008	0.037***	-0.047***	0.428***	1	-0.354***	-0.002	0.234***	-0.012*	-0.133***
roa	-0.034***	-0.063***	0.154***	0.090***	-0.251***	1	0.342***	-0.068***	0.393***	0.426***
growth	-0.020***	-0.013*	-0.009	0.029***	0.021***	0.011	1	-0.042***	0.325***	0.081***
state	0.038***	-0.030***	0.116***	0.301***	0.230***	-0.011	-0.006	1	0.099***	-0.004
ic	-0.093***	-0.031***	0.313***	0.221***	-0.103***	0.237***	0.001	0.055***	1	0.181***
cf	-0.023***	0.047***	0.096***	0.109***	-0.135***	0.282***	-0.009	-0.018**	0.129***	1

4.2. Baseline result

Table 4 presents the benchmark regression results analyzing the impact of economic policy uncertainty (EPU) on corporate financing constraints, along with the moderating effect of corporate ESG performance on this relationship. This study controls for both corporate-level and time-level variables, employs a Two-way Fixed Effects Model for the regression, and clusters standard errors at the individual level to mitigate potential endogeneity issues. Furthermore, to prevent multicollinearity, the study first centralizes the transaction multiplier term and the ESG variable before reintroducing them into the model.

Column (1) of Table 3 presents results using only the core variables: ln(EPU) and the ESG index. The coefficient for economic policy uncertainty ln(EPU) is 0.205, statistically significant at the 1% level. In column (3), after controlling for additional variables, the coefficient of ln(EPU) is 0.21, indicating that increased economic policy uncertainty raises corporate financing constraints, with the effect remaining significant at the 1% level, supporting Hypothesis H1a. Additionally, corporate ESG performance is found to significantly alleviate financing constraints.

Columns (2) and (4) display results with the interaction term between EPU and ESG performance. The coefficient for this interaction term is -0.011, significant at the 1% level, showing that stronger ESG performance reduces the impact of EPU on financing constraints, thus supporting Hypothesis H2a. Additionally, with the interaction terms centralized, the ESG coefficient suggests that, at the average level of EPU, ESG performance significantly reduces financing constraints, with this effect also statistically significant at the 1% level.

Table 4: Benchmark regression results

	(1)	(2)	(3)	(4)
	constrain	constrain	constrain	constrain
ln(EPU)	0.205***	0.206***	0.210***	0.210***
	(0.002)	(0.002)	(0.002)	(0.002)
ESG	-0.003***	-0.003***	-0.002***	-0.003***
	(0.001)	(0.001)	(0.001)	(0.001)
ln(EPU)×ESG		-0.013***		-0.011***
		(0.002)		(0.001)
size			-0.014*	-0.013*
			(0.006)	(0.006)
lev			0.001	0.002
			(0.012)	(0.011)
roa			0.010	0.010
			(0.009)	(0.008)
growth			0.000***	0.000***

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Table 4: (continued)

			(0.000)	(0.000)
state			-0.019***	-0.017***
			(0.004)	(0.004)
ic			-0.000	-0.000
			(0.000)	(0.000)
cf			-0.007	-0.010
			(0.012)	(0.011)
_cons	2.774***	2.774***	2.935***	2.921***
	(0.011)	(0.011)	(0.065)	(0.065)
Variable of control	Not controlled	Not controlled	Controlled	Controlled
Firm FE	YES	YES	YES	YES
Time FE	YES	YES	YES	YES
N	20984	20984	20930	20930
Adj.R^2	0.807	0.811	0.833	0.837

Standard errors in parentheses
* p < 0.05,** p < 0.01,*** p < 0.001

5. The robustness test

This paper conducts robustness tests by changing the measurement methods of explanatory variables and explained variables and narrowing the time window.

5.1. Changing the measurement of explanatory variable

Bloomberg ESG index is used in the robustness test as an indicator to measure the ESG performance of corporate[18,43]. Bloomberg annually evaluates companies based on their ESG information disclosure, scoring them on their ESG reporting. This evaluation method has been widely recognized and endorsed by the academic community[18].

The regression results in columns (1) and (2) of Table 5 show that the conclusions still hold after replacing the explanatory variable esg with the Bloomberg ESG index.

Table 5: Robustness test

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	abs_sa	abs_sa	abs_sa	abs_sa	KZ	KZ
lnepu	0.2120 * * *	0.2132 * * *	0.100***	0.100***	1.2057 * * *	1.2328 * * *
	(38.4858)	(38.3792)	(0.002)	(0.002)	(12.7433)	(13.0186)
esgbb	0.0012 * * *	0.0013 * * *	-0.003***	-0.004***	0.0171 * *	0.0204 * *
	(5.9137)	(6.1487)	(0.001)	(0.001)	(-1.9860)	(-2.2847)
lnepu_esg				-0.007***		
				(0.001)		
lnepu_esgbb		0.0026 * * *				0.0171 *
		(-9.0554)				(-1.7149)
Variable of control	Controlled	Controlled	Controlled	Controlled	Controlled	Controlled
Firm FE	YES	YES	YES	YES	YES	YES
Time FE	YES	YES	YES	YES	YES	YES
Observations	8,706	8,706	12559	12559	4,082	4,082
Adj.R2	0.792	0.797	0.768	0.772	0.024	0.025

Robust t-statistics in parentheses
*** p<0.01, ** p<0.05, * p<0.1

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5.2. Narrowing the time window

In order to eliminate the impact of the COVID-19 epidemic on the macro economy and corporate financing constraints, this paper excludes the data for 2020 and beyond. Columns (3) and (4) of Table 5 display that the conclusion is still significant.

5.3. Changing the measurement of explained variable

The KZ index measures the extent of financing constraints faced by firms. It is derived from a regression analysis of five factors—net operating cash flow, cash holdings, cash dividends, debt level, and growth—which act as proxies for financial constraints. Since its introduction, the KZ index has been extensively used in financial constraints research.

In this paper, the KZ index is used, in place of the SA index, to assess the financing constraint levels of corporations in the robustness test. Additionally, ESG performance is measured using the Bloomberg ESG index, and samples after 2020 are excluded. Columns (5) and (6) of Table 5 display that despite these adjustments, the conclusions remain consistent.

6. Conclusions and suggestions

This paper investigates the moderating effect of improvements in corporate ESG performance on the relationship between economic policy uncertainty (EPU) and corporate financing constraints. The analysis begins with a theoretical framework, followed by empirical testing using a two-way fixed effects model. The study utilizes data from A-share non-financial listed companies for the period from 2014 to 2023. Three key hypotheses are tested:

(1) Economic policy uncertainty significantly raises corporate financing constraints.

(2) Improvement in corporate ESG performance reduces financing constraints.

(3) Corporate ESG performance improvement significantly moderates the impact of economic policy uncertainty on financing constraints, alleviating the negative effects of increased uncertainty.

Based on these findings, the following policy recommendations are proposed:

(1) Government Policy: China's economic policy uncertainty stems largely from ongoing restructuring and industrial upgrades. Policymakers should account for corporate adaptation cycles, engage in forward-looking planning, and conduct thorough market research when crafting and adjusting policies.

(2) Financial Institutions: Evidence shows that enhanced ESG performance improves corporate financial performance[44,45]. Financial institutions should develop specialized financing platforms, promote green credit, and align financing solutions with corporate ESG performance and operational needs, thus easing financing difficulties for firms with strong social values.

(3) Corporate Strategy: Companies should integrate ESG principles into their strategic planning and daily operations, covering areas such as green product development, energy efficiency, employee welfare, and community engagement.

(4) Foster a culture of Socially Responsible Investment (SRI): Companies should improve ESG disclosure, enhancing transparency and showcasing their efforts to investors, financial institutions, and the public. Additionally, society should promote SRI through educational campaigns and industry events to raise investor awareness of ESG factors. Research shows that a strong SRI culture increases attention to firms' ESG performance, which, in turn, influences their cost of capital and access to financing[32]. Utilizing financial media and industry seminars to spread ESG knowledge encourages investors to prioritize sustainability, incentivizing firms to improve ESG practices and ease financing constraints.

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