

The Impact of Corporate ESG Performance on Resilience Enhancement Capability - Evidence Based on Chinese A-share Listed Companies

Yinuo Wang

*Institute of Finance, Tianjin University of Finance and Economics, Tianjin, China
2779072755@qq.com*

Abstract: In a global environment full of uncertainty, resilience has emerged as a crucial topic within corporate organizational governance and strategic formulation. Using a sample of Chinese A-share listed companies from 2009 to 2023, this paper constructs a bidirectional fixed-effects empirical model to consider the impact of corporate ESG performance on resilience enhancement capability. The empirical results show that: the positive effect of corporate ESG performance on the resilience enhancement ability is significant, the better the corporate ESG performance, the stronger the corporate resilience, and it is more significant in non-state-owned enterprises as well as those located in the central and western areas. Mechanism analysis finds that ESG performance helps firms build organizational resilience mainly through three channels: improving innovation capability, alleviating financing constraints and improving corporate risk-taking capability. In view of this, enterprises should take the initiative to form a long-term mechanism to enhance ESG and resilience linkage, the government should formulate differentiated policies and enhance the oversight of corporate ESG reporting, and investors should take ESG performance as an important consideration to support the sustainable development of enterprises.

Keywords: ESG performance, corporate resilience, innovation capability, financing constraints, corporate risk-taking capability

1. Introduction

The United Nations Global Compact put forward the concept of ESG in 2004, covering the three dimensions of Environment, Society and Governance, which is a tangible embodiment of corporate sustainability and has become a core standard for global investment and management. Among them: the environmental dimension focuses on challenges such as climate change and resource depletion to promote green transformation and reduce ecological risks; the social dimension emphasizes corporate social obligations, including safeguarding employee entitlements and fostering community collaborative development to enhance the resilience of the enterprise against pressure; and the governance dimension enhances the quality of decision-making and controls risks through a transparent and efficient governance structure. Therefore, ESG not only mirrors a firm's capacity for sustainable growth, but also serves as a crucial measure of its enduring value and social commitment. As the basic unit of the national economy, the sustenance and expansion of businesses are inextricably linked to the progression of the national economy. At present, the corporate landscape is marked by

Volatility, Uncertainty, Complexity and Ambiguity, which can be encapsulated by the acronym VUCA. The frequent occurrence of "black swan" and "gray rhinoceros" events, such as the COVID-19, geopolitical conflicts and climate change, pose a serious challenge to the sustenance and evolution of business entities. In this context, how to promote the sustainable, healthy and stable development of enterprises has become a hot topic of common concern in the academic community. As a result, corporate resilience - the capacity of an enterprise to endure disruptions, acclimate to alterations, and swiftly rebound. - is at the heart of sustainable business development. The report of the 20th Party Congress emphasized that improving business resilience is the key to achieving high-quality economic transformation and upgrading. Resilience not only helps companies overcome crises such as supply chain disruptions and shrinking market demand, but also captures new opportunities in adversity and reshapes competitive advantages. Most of the extant studies are founded on the dynamic capability theory, which constructs organizational resilience indicators in terms of both the rebound dimension and the backlash dimension. Rebound resilience refers to the capacity of an entity to revert to its initial condition or operation after withstanding challenges and setbacks; backlash resilience refers to the ability of an organization to not only recover from challenges or adversity, but also achieve growth and development beyond its previous state. Corporate resilience is affected by multiple elements, mainly including internal factors and external environmental factors, the former including corporate strategy, leader and employee attributes, internal institutions and organizational relationships, etc.; the latter involves the relationship between stakeholders, policies and systems, geographic location and so on. Therefore, corporate resilience is not only an important capability for internal governance and the implementation of long-term development strategies, but also a link between the organization and the external environment. Since the core concept of ESG to advance sustainability fits with the long-term oriented concept of corporate resilience, resilience can also serve as an effective entry point to test the long-term robustness of a company. So, can ESG influence corporate resilience? This study focuses on the urgent need to enhance the exploration of the underlying influence pathways of ESG performance on firm resilience. The existing literature has dual limitations: firstly, there is still a lack of systematic research on the correlation between ESG and corporate resilience; Secondly, the analysis of relevant regulatory mechanisms has not yet established a clear theoretical framework. Therefore, under the escalating volatility in the global economic landscape and the profound integration of the sustainable development ethos, clarifying the mechanism of ESG on corporate resilience is crucial to enhancing corporate sustainable development capability. Based on the above research background, this paper selects the panel data of China's A-share listed companies from 2009 to 2023, and introduces three variables, namely, innovation capability, financing constraints, and corporate risk-taking capability, to explore the impact of corporate ESG performance on resilience enhancement ability. The regression results show that corporate ESG performance can contribute to corporate resilience through three paths: enhancing innovation capability, alleviating financing constraints and enhancing corporate risk-taking capability. This effect is more significant when the firm's property rights are non-state-owned and geographically located in the central and western parts of the country.

2. Literature review

Existing research on the economic consequences of ESG performance focuses on three main areas: corporate investment and financing, performance and innovation. The first is the study of ESG performance and corporate investment and financing. Portfolios with high ESG ratings play a larger role and perform better during financial crises [1]. Good ESG performance can improve the efficiency of corporate investment by reducing agency costs and increasing the availability of financing [2]. Meanwhile good ESG performance [3] and improved quality of ESG disclosure [4] can effectively alleviate firms' financing constraints. The second is the study of ESG performance and firm

performance. Friede [5] finds that as ESG ratings increase, firms' financial performance shows a stable or gradual improvement. Li Qian [6] found that ESG performance can have a positive impact on the operating performance of circulation enterprises by easing corporate capital constraints and fostering technological innovation. The third is the study of ESG performance and corporate innovation. Xie Haijuan and Sun Jiajia [7] believe that enterprise ESG performance has a dual driving effect on the sustainability of innovation input and innovation output. Zhang Shushan and Chen Kaixuan [8] found that ESG performance of enterprises can significantly improve the level of digital technology innovation.

Current research on corporate resilience focuses on the factors that influence it. First, internal factors: highly resilient employees [9], effective leadership [10][11] and good internal organizational relations [12] are the cornerstone of developing enterprise resilience. Second, external factors: under the framework of stakeholder theory, the active fulfillment of social responsibility by enterprises contributes to the integration between enterprises and stakeholders, which promotes the enhancement of corporate resilience [13]. In addition, innovation driven [14], brand value [15] and digital economy development [16] also significantly enhance the overall development resilience of enterprises.

Liu Jianqiu and Xu Yulu [17] found that ESG affects corporate resilience through four paths: product market competitive advantage, financing cost, corporate reputation and risk resistance. Lai Yan, Wen Meiqi [18] pointed out that among the three components of ESG, the performance of corporate governance dimension has the most substantial impact on improving corporate resilience, and digital transformation and financing constraints have positive and negative controlling effects on the relationship between ESG performance and corporate resilience, respectively. Mo Yalin and Ni Hao [19] believe that ESG performance mainly enhances resilience through three channels: improving innovation ability, alleviating financing constraints and reducing agency costs, and media attention plays a positive role in promoting it.

3. Data definition

3.1. Explanatory variable

Referring to the research of most scholars, the CSI ESG rating data, which has more comprehensive measurement dimensions, is used to measure the ESG performance of explanatory variables. The CSI ESG rating system is constructed based on global predominant approaches and empirical insights, combined with China's specific national context and the unique attributes of its equity market. The ratings are divided into nine grades, from the lowest C to the highest AAA, assigned values from 1 to 9, with higher values reflecting superior corporate ESG performance.

3.2. Explained variable

This paper draws on Li Xiaoxiang and Kong Mengqing [20] to construct organizational resilience indicators in terms of both the rebound dimension and the backlash dimension. Referring to the practices of Stan, Li Shaolin [21], Zhang Jichang et al. [22], rebound resilience is comprehensively measured using four indicators: quick ratio of sample enterprises, accumulated redundant resources, non accumulated redundant resources, and return on equity; Backlash resilience refers to the growth ability of a company, which is measured by the annual increment ratio of aggregate assets, operating income, and net profit, following the approach of Zhou Ping and Lin Nan [23], Guo Xiaochuan et al. [24]. This article standardizes the data of the above indicators, and then takes the average value to obtain the comprehensive value of organizational resilience, which is represented by Resilience. Namely:

$$\text{Resilience} = \frac{z_Quick\ Ratio + z_Aslack + z_Uaslack + z_ROE + z_INAT + z_INOPREV + z_INNI}{7} \quad (1)$$

3.3. Control variable

In order to explain the relationship between the main variables more objectively and with reference to the existing studies, this paper takes other relevant factors affecting corporate resilience, such as Size, TOP1, TBQ, Shrcr, and Cash flow as the control variables, and the definitions of each variable are depicted in Table 1.

Table 1: Definition and description of control variables

Variable Symbol	Variable Name	Variable Description
Size	Firm size	Total assets in logarithms
TOP1	The largest shareholder's equity proportion	Number of shares held by the largest shareholder/total number of shares
TBQ	Tobin's Q	(Market valuation of circulating shares + quantity of non-circulating shares × net asset value per unit + recorded value of obligations)/Aggregate assets
Shrcr	Shareholding concentration	Equity holdings of the top ten shareholders/total shares
Cash flow	Cash flow ratio	Percentage of cash assets

3.4. Mechanism variable

3.4.1. Innovation capability

This article refers to the research of Quan Xiaofeng and Yin Hongying[25], and utilizes the natural logarithm of a firm's patent application quantity (Patent) as a key indicator of its innovative capacity.

3.4.2. Financing constraints

This article refers to the approach of Ju Xiaosheng et al. [26] and chooses the KZ index to evaluate financing constraints. The larger the KZ value, the greater the financing constraints of the enterprise.

3.4.3. Corporate risk-taking capability

Commonly used measures in the existing literature include volatility of surplus [27][28], volatility of stock returns [29], and asset liability ratio, etc. Due to the high volatility of the Chinese stock market and other reasons, the degree of surplus volatility is extensively employed to gauge the risk-taking level of enterprises in China. This article also draws on the research of John et al. [30] and uses the standard deviation of the annual industry average adjusted return on assets (ROA) of a company during the observation period from t-2 to t+2 years to measure it, with higher surplus volatility indicating higher levels of risk-taking.

4. Empirical results

Model definition: This study examines the influence of corporate ESG performance on the capacity for enhancing resilience. To validate this hypothesis, the research employs a bidirectional fixed-effects empirical framework, which estimates the causal relationship while accounting for both individual fixed effects and time fixed effects:

$$\text{Resilience}_{it} = \alpha_0 + \alpha_1 * \text{ESG}_{it} + \gamma_i + \delta_t + X_{it} + \varepsilon_{it} \quad (2)$$

Among them, ESG is the explanatory variable, Resilience_{it} is the explained variable, X_{it} is the control variable, γ_i and δ_t represent individual and time fixed effects, respectively, which can effectively solve the problem of data omission over time and individuals and effectively alleviate endogeneity. The specific definitions are as follows:

4.1. Descriptive statistics

Based on the relevant data of China's A-share listed companies from 2009 to 2023, descriptive statistics of ESG performance, corporate resilience, and control variables are conducted, and the results are shown in Table 2. The mean value of Resilience is -0.0109, and the standard deviation is 0.1407, indicating that there are some differences in the resilience of enterprises, but overall the resilience score is more centralized and slightly beneath the neutral threshold. The mean ESG value is 4.1126, the standard deviation is 0.9567, the minimum value is 1.25, and the maximum value is 6, indicating that the ESG level of Chinese enterprises still needs to be improved, and there are big differences in the ESG performance of different enterprises. The distributions of the other control variables are within reasonable limits and are generally consistent with existing studies.

Table 2: Descriptive statistics

Variable	Obs	Mean	Std. dev.	Min	Max
Resilience	47454	-0.0109	0.1407	-0.1430	0.7816
ESG	47529	4.1126	0.9567	1.2500	6
Size	47493	22.1189	1.5456	11.2757	31.3695
TOP1	47446	33.7208	15.1038	0.2863	89.9910
TBQ	46710	2.5196	69.2416	0.6085	14810.3100
Shrcr	47446	53.2090	15.8959	0.8109	99.2300
Cash flow	47444	16.9299	13.8832	-96.6530	100
Patent	47446	2.7447	1.8344	0	9.7269
KZ	40994	0.7559	0.0314	0.6000	0.9110
Risk taking	43810	0.0226	0.0400	0	0.9383

4.2. Main regression results

The regression analysis results examining the impact of ESG performance on corporate resilience are presented in Table 3. The significant positive ESG regression coefficient illustrates that the ESG performance of a company has a positive effect on its resilience enhancement capability. The superior the ESG performance of a firm, the more robust its resilience. There is a high degree of inherent compatibility between the two, that is, actively fulfilling ESG responsibilities is a feasible mechanism to enhance corporate resilience. It is not only an excellent risk management strategy that can help companies effectively manage risks, enhance risk resistance capabilities, and reduce the negative impact of risk events on production, operation, and management; At the same time, it is also a sustainable development strategy that can help companies quickly recover to pre crisis levels after being impacted by external crises, ensuring the sustainability of production and operation. Overall, ESG is an organic combination of risk management and sustainable development, which significantly strengthens the resilience of companies and improves their “immunity” and ability to cope with crises.

Table 3: Main regression results

Variable	Resilience
ESG	0.0019*** (0.0007)
Size	-0.0097*** (0.0016)
TOP1	-0.0002** (0.0001)
TBQ	-0.0000* (5.87e-06)
Shrcr	0.0010*** (0.0001)
Cash flow	0.0029*** (0.0001)
N	46322
adj.R ²	0.5852

4.3. Heterogeneity results

4.3.1. Heterogeneity analysis of property rights nature

The social responsibility, policy support, operational capability, and access to resources of enterprises with different property rights differ considerably. Therefore, from the nature of property rights, the total sample is bifurcated into two sub-samples in this research, namely state-owned firms and non-state-owned firms. The Table 4 shows that good ESG performance has an enhancement effect on the corporate resilience of both state-owned and non-state-owned enterprises, and the enhancement is more pronounced in non-state-owned enterprises. It could be attributed to the circumstance that non-state-owned enterprises are typically less favored than state-owned enterprises regarding resource procurement and policy endorsement. However, strong ESG performance can bolster market trust, improve corporate reputation, assist non-state-owned enterprises in securing greater external financial support., alleviate financing constraints, and thus improve their resilience. Additionally, non-state-owned enterprises typically rely more on innovation to enhance their competitiveness. ESG practices can promote internal governance optimization, drive green innovation and technological upgrading, thereby enhancing the innovation efficiency and sustainable development capabilities of enterprises. Meanwhile, non-state-owned enterprises typically have greater upward mobility, stronger organizational flexibility and market adaptability. By integrating ESG concepts into their corporate strategies, these enterprises can respond more quickly to external environmental changes, optimize resource allocation, and enhance their resilience.

Table 4: Heterogeneity of property rights

Variable	State-owned enterprises	Non-state-owned enterprises
ESG	0.0043*** (0.0008)	0.0112*** (0.0009)
Size	-0.0069*** (0.0007)	-0.0213*** (0.0007)
TOP1	-0.0004*** (0.0001)	-0.0004*** (0.0001)

Table 4: (continued)

TBQ	0.0053*** (0.0014)	-0.0000*** (5.04e-06)
Shrcr	0.0006*** (0.0001)	0.0007*** (0.0001)
Cash flow	0.0033*** (0.0001)	0.0040*** (0.0001)
N	16356	29945
adj.R ²	0.2236	0.2256

4.3.2. Analysis of geographic heterogeneity

Enterprises in different geographic locations have significant differences in natural disaster risks, resource endowments, infrastructure levels, and market competitiveness. Therefore, from the geographical location, this study categorizes the overall sample into three distinct sub-samples: east, central and west. The empirical results are shown in Table 5, which shows that good ESG performance has an enhancing effect on the resilience of firms in the east, central and west, and the enhancing effect is more obvious for firms located in the west and central. This may be due to the fact that enterprises in the central and western regions may face more natural and market risks such as natural disasters and resource shortages. Good ESG performance can help firms identify and respond to these risks in advance, and enhance their risk-resistant capabilities by strengthening environmental governance and social duty performance. Concurrently, the central and western areas are often given more support and resources in national policies to enhance coordinated regional economic development. The government gives more attention and policy support to companies practicing ESG concepts, such as tax incentives and special subsidies, which helps companies translate ESG practices into actual resilience enhancement.

Table 5: Results of geographic location heterogeneity

Variable	East firms	Central firms	West firms
ESG	0.0010 (0.0008)	0.0029** (0.0014)	0.0051*** (0.0019)
Size	-0.0040* (0.0023)	-0.0102*** (0.0025)	-0.0214*** (0.0043)
TOP1	-0.0002 (0.0001)	-0.0004 (0.0002)	-0.0004* (0.0002)
TBQ	0.0011 (0.0007)	0.0021* (0.0012)	-0.0000** (7.45e-06)
Shrcr	0.0009*** (0.0001)	0.0010*** (0.0002)	0.0012*** (0.0002)
Cash flow	0.0030*** (0.0001)	0.0025*** (0.0002)	0.0030*** (0.0003)
N	32796	7331	5942
adj.R ²	0.5912	0.5882	0.5572

4.4. Mechanism verification

Based on the previous theoretical investigation, ESG performance can influence firm resilience through innovation capability, financing constraints and corporate risk-taking capability. Column (1)

of Table 6 shows the test of the impact mechanism of innovation capability, and the results found that the influence of ESG performance on companies' innovative capacity is notably positive, suggesting that ESG performance can enhance companies' innovative capacity and thus enhance firms' resilience. The data in Column 2 of Table 6 reveal that ESG performance has a negative effect on financing constraints at the 1% significance level, suggesting that ESG performance can improve firm resilience by alleviating financing constraints and thus increasing firm resilience. The findings presented in column (3) of Table 6 reveal that the favorable influence of ESG performance on firms' risk-taking capacity is statistically significant at the 1% significance level. This suggests that ESG performance has the potential to enhance corporate resilience by increasing corporate risk-taking capability.

Table 6: Mechanism verification results

Variable	Patent	KZ	Risk taking
ESG	0.0877*** (0.0067)	-0.0019*** (0.0001)	0.0032*** (0.0003)
Size	0.3458*** (0.0121)	0.0005 (0.0003)	-0.0086*** (0.0005)
TOP1	-0.0019* (0.0010)	0.0001*** (0.0000)	0.0001*** (0.0000)
TBQ	0.0002*** (0.0001)	0.0006** (0.0003)	-0.0007*** (0.0002)
Shrcr	0.0045*** (0.0008)	-0.0004*** (0.0000)	0.0003*** (0.0000)
Cash flow	-0.0012** (0.0005)	-0.0013*** (0.0000)	0.0003*** (0.0000)
N	46336	40645	43194
adj.R ²	0.7821	0.7065	0.3683

5. Conclusion and recommendation

Based on the data of China's A-share listed companies from 2009 to 2023, a bidirectional fixed-effects empirical model is constructed to consider the impact and mechanism of corporate ESG performance on resilience enhancement capability. The findings indicate that: initially, the ESG metrics of publicly traded firms exert a pronounced positive influence on corporate resilience. Moreover, this beneficial impact is more pronounced among non-state-owned entities and within companies situated in the central and western areas. Second, ESG performance affects corporate resilience mainly through three channels: innovation capability, financing constraints and corporate risk-taking capability.

Given the conclusions previously discussed, it is recommended:

First, enterprises should incorporate ESG into their overall strategic planning and clarify their objectives and action paths in environmental, social and governance aspects. It also establishes a specialized management team responsible for overseeing and promoting the implementation of ESG objectives, and publishes regular ESG reports to disclose the company's performance in environmental, social and governance aspects to enhance transparency and credibility. Enterprises also need to focus on good ESG performance through the three ways to enhance corporate resilience by improving innovation capability, alleviating financing constraints, and enhancing corporate risk-taking capability, and promote the formation of ESG and resilience linkage to enhance the long-term mechanism.

Second, the government should formulate differentiated policies to prompt firms to enhance their ESG performance, especially by increasing resource allocation and policy backing for private firms

and businesses in the central and western regions, so as to narrow the regional gap and promote the overall improvement of enterprises' ESG performance nationwide. Simultaneously, it is necessary to strengthen the supervision of corporate ESG information disclosure, promote the true and accurate disclosure of ESG information by enterprises, and guide enterprises to fulfill their social responsibilities.

Third, investors should take ESG performance as an important consideration when choosing investment targets and prioritize companies with good ESG performance. They should also identify the constructive influence of ESG performance on corporate resilience and long-term development, and establish a long-term investment philosophy to support sustainable corporate development.

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