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Do Chinese Firms' ESG Activities Mitigate Stock Price Crash Risk?

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ABSTRACT

We investigate the impact of firms' Environmental, Social and Governance (ESG) activities on stock price crash risk during crises. We use the US–China trade war as a negative external shock and find that higher levels of ESG activities in Chinese firms help mitigate the crash risk. ESG activities help firms gain more resilience as a strategic tool for managing investor expectations by providing more information transparency and improving corporate governance. Further analysis shows that the mitigation effects are more pronounced for privately owned firms than their state-owned counterparts and for firms challenged by higher market competition than those facing lower competition.

JEL Classification: F13, F14, G14, G30

1 | Introduction

In the process of global economic integration, trade frictions have become a key factor influencing business operations and market stability. The US–China trade war, a significant series of trade conflicts in recent years, has greatly affected global financial markets. The market uncertainty caused by trade friction has increased, posing multiple challenges to businesses, such as tariff adjustments, supply chain disruptions and fluctuations in market demand. These challenges affect day-to-day business operations and may intensify stock price volatility and raise the risk of stock price crashes. The paper aims to investigate how firms can reduce the negative impacts of crises through their efforts.

The trade conflicts between the United States and China during 2018–2020 worsened, creating a less friendly environment between the two top economic players. The first phase of the US–China trade confrontation officially kicked off on 6 July 2018. Then, the US government announced that it would impose tariffs on imports from China, particularly on solar panels, steel and aluminium. At the same time, China retaliated with tariffs on $3 billion worth of US imports. Soon, the two countries levied tariffs on approximately $34 billion of each other's goods. The back-and-forth between the two nations peaked in late 2019, and the US imposed tariffs of 15%–30% on $550 billion of Chinese goods, while China retaliated with a 5%–25% tax on American goods worth $185 billion. By 2020, the United States and China had imposed significant tariffs on goods from the other country, and some studies have shown that the tariff war between the United States and China in 2018 and 2019 led to a substantial decrease in the investment rates of US-listed companies (Amiti et al. 2020).

Since President Trump took office in January 2025, the China–US trade war has rapidly escalated, profoundly impacting the global economy and financial markets. In April 2025, the United States imposed a 104% tariff on Chinese goods under the guise of "trade

reciprocity", covering high-value-added industries, such as electronics and automobiles. This marked the highest tariff imposed by the United States on a single country since 1910. In response, China promptly retaliated by imposing a 125% tariff on US goods. The intensification of the trade war has had a significant impact on the stock market. On 4 April 2025, following China's announcement of its retaliatory measures, US stocks plummeted across the board, with the Dow Jones Industrial Average falling by 5.50%, the Nasdaq Composite dropping by 5.82%, and the S&P 500 Index declining by 5.97%. Within 2 days, the market value of US stocks evaporated by approximately $48 trillion. Meanwhile, risk-averse sentiment surged, driving gold prices to record highs. The trade war has caused short-term market volatility and significantly heightened the risk of stock market crashes. The uncertainty surrounding tariff policies has led to a sharp decline in investor confidence, exacerbating market instability. Additionally, the potential for a global economic slowdown due to escalating trade tensions further threatens market stability, increasing the likelihood of prolonged market declines and systemic financial risks.

The ongoing US–China trade tensions have had a profound impact on global markets. The unexpected and abrupt rise of trade disruptions put a heavy toll on the Chinese economy. Chinese firms, like those in the United States, have been severely traumatised by direct financial confrontations in trade conflicts, and only in 2018, the first-year trade war, the Shanghai Stock Exchange Composite Index, one of the Chinese stock markets, suffered a 32% loss, from 3587 to 2441 points (Cheng et al. 2023). After the United States announced a 34% tariff hike on Chinese goods in April 2025, Chinese A-shares nosedived on the first trading day. The Shanghai Composite Index dropped by 7.34%, the Shenzhen Component Index fell by 9.66% and the ChiNext Index plummeted by 12.5%. Over 5200 stocks declined, with more than 3000 hitting the daily limit downward, marking the largest single-day drop in recent years. Inevitably, the stock volatility fluctuations in China's financial market have received much attention from all stakeholders, and the stock price crash risk of Chinese firms has become one of the most significant concerns of investors and policy regulators.

There is ongoing research that investigates the factors that either determine or have an influence on the occurrence of stock price crashes. Previous studies have focused on both internal corporate governance and external corporate social governance, pointing to information asymmetry (Jin and Myers 2006; Hutton et al. 2009), board reform (Hu et al. 2020), corporate innovation strategies (Jia 2018), institutional investors (H. An and Zhang 2013), media regulation (Z. An et al. 2020) and legal regulation (Y. Chen et al. 2018; Liu 2023), all affecting the risk of share price crash risk. However, as global sustainability continues to gain momentum in internal corporate governance, there is still little research on whether some sustainability reporting metrics, especially Environmental, Social and Governance (ESG) activities, mitigate stock price crash risk.

Existing literature related to the relationship between ESG activities and stock price crash risk is divided (Pástor et al. 2022; Hong and Kacperczyk 2009; Edmans 2011; Hoepner et al. 2024). Several studies argue that a better ESG rating could decrease the stock returns and thus increase the stock price crash risk. Hong and Kacperczyk (2009) demonstrate the significant negative influence of ESG factors on the stock returns of companies involved in "sin" industries, such as alcohol, tobacco and gaming, and provide evidence that societal norms against these industries lead to a high financial cost for investors, particularly institutions bound by these norms, who abstain from investing in sin stocks. Fernando et al. (2017) find that firms that increase their degree of greenness do not create shareholder value but are shunned by institutional investors because of the low valuation of stocks with high environmental risk exposure. Pástor et al. (2022) indicate that the "greenium" (the expected return difference between green and brown assets) is potentially negative and suggest that investors should anticipate lower returns from green stocks over the long term.

Another strand of literature finds evidence that firms with better ESG performance help create long-term value and reduce their downside risk (Edmans 2011; Hoepner et al. 2024). Bénabou and Tirole (2010) point out that the ability of firms to adapt in a crisis varies with different levels of ESG development. Edmans (2011) finds that certain socially responsible investing screens improve investment returns. Lins et al. (2017) document that firms with high ESG/CSR performed better than firms with low ESG/CSR during the 2008–2009 financial crisis and that the increase in social capital resulting from corporate social responsibility (CSR) activities worked during periods of reduced overall trust in firms. Firms with high ESG/CSR are also found to have a broader investor base and are, therefore, less risky (El Ghoul et al. 2011). Hoepner et al. (2024) find that ESG activities can benefit shareholders by reducing firms' downside risks, and the risk-reduction effects are concentrated among firms with successful ESG engagements.

So far, some existing literature has examined the relationship between ESG and stock crashes (Feng et al. 2022; Wang et al. 2023; W. Luo et al. 2024). For example, Feng et al. (2022) and W. Luo et al. (2024) explored the impact of ESG performance on stock price crash risk. However, these studies mainly investigated the relationship between ESG and crash risk under general market conditions. By introducing a specific trade friction scenario, this paper examines the mechanisms by which ESG activities mitigate crash risks introduced by particular external shocks, filling a gap in research on this topic within the context of the US–China trade war. We look at the overall impact of ESG activities on stock crash risk, how trade frictions alter corporate risk exposure and the role of ESG activities in this process.

Our paper reveals the adaptability and effectiveness of ESG in different external environments, offering more targeted management recommendations for firms facing external shocks like the US–China trade war. For policymakers, the results highlight the significance of promoting ESG adoption, as strong ESG performance can enhance companies' risk-resistance capabilities and stabilise financial markets during a crisis. For investors, the paper unveils the investment value of ESG activities in specific market conditions, aiding them in evaluating crash risks in complex external environments and making wiser investment choices.

After establishing the link between ESG development and crash risk, we further investigate the influencing mechanisms behind this link. We find that firms with a higher ESG rating can mitigate stock price crash risk during a crisis by enhancing information transparency and corporate governance. The results are robust after a series of robustness checks and

heterogeneity checks. We also reveal that the mitigation effects are heterogeneous and more pronounced for private firms than their state-owned counterparts and firms facing higher market competition. The research provides insights that during economic upheavals, ESG activities in China help companies gain more resilience by managing investor expectations and improving internal governance.

Our research contributes to the two broad strands of literature. First, we contribute to the literature on ESG. Prior literature has proposed different aspects of how ESG activities affect firms' behaviour and performance (Pedersen et al. 2021; Asimakopoulos et al. 2023). Pedersen et al. (2021) find that ESG provides information about firm fundamentals and affects investors' preferences. Asimakopoulos et al. (2023) investigate the role of ESG in a firm's debt structure and find that when companies receive ESG ratings, both the market and book leverage ratios are optimised. The level of information asymmetry is diminished, leading to better access to more internal sources of financing. Our research provides new insights into why more ESG activities exist at the firm level and their influencing mechanisms.

Second, our research contributes to the studies on factors affecting crash risk (J. B. Kim et al. 2011a, 2011b; Hutton et al. 2009; Jin and Myers 2006; Harvey and Siddique 2000). Crash risk-related literature starts from the bad news hoarding theory (Jin and Myers 2006; Hutton et al. 2009). Managers' incentive to hide bad news is the main reason for the stock price crash risk when all bad news suddenly breaks out. Harvey and Siddique (2000) find that investors seek higher expected returns for stocks with greater negative skewness as compensation for taking the crash risk. Xu et al. (2021) find the relationship between internet searching and the stock price crash risk. In our research, we contribute to the existing literature by identifying a relatively new factor that mitigates crash risk under the uncertainty and crisis faced in the context of China, where information quality and corporate governance have been a big concern.

The rest of the paper is structured as follows. Section 2 provides background information and hypothesis development. We introduce our data in Section 3. Section 4 describes the research design and main results. Section 5 reports the influencing mechanisms. Section 6 discusses the heterogeneity tests. Section 7 concludes.

2 | Institutional Background and Hypothesis Development

2.1 | US–China Trade War and ESG Regulatory Changes

Since the reform and opening up, China's economic strength has increased until 2001, when it joined the WTO as a developing country. In 2015, the Chinese government proposed "Made in China 2025". The programme aims to compete in high-tech and capital-intensive industries by targeting 10 mostly high-tech industries with promised subsidies, tax benefits, protection from competition and other preferences.

Starting in March 2018, the Trump administration began imposing higher tariffs on Chinese goods, escalating the trade tensions between the US and China. In response, China imposed retaliatory tariffs on US exports to China. The tariff trade war between the two countries continues to this day. Existing literature suggests that global tariff wars reduce welfare, unemployment and top-income inequality in every country (Dinopoulos et al. 2024). Thus, the US–China trade war has led to a significant increase in import and export tariffs for Chinese firms, which increases firms' uncertainty, which in turn may lead to a slowdown in the progress of firms' investment in capacity (Benguria et al. 2022) and stock price crash (Cheng et al. 2023).

In April 2025, the Trump administration imposed additional tariffs on Chinese goods exported to the United States, triggering significant fluctuations in China's stock market. On 7 April, the global financial market experienced a "Black Monday", and the A-share market was also hit, with the Shanghai Composite Index plummeting sharply and panic spreading across the market. Looking at the sector performance, export-dependent industries were the most severely impacted. Sectors such as home appliances, furniture and machinery, which have a high proportion of exports to the United States, saw their stock prices weaken. For instance, Jiangxin Home Furnishings, a listed company on the Shenzhen Stock Exchange, which exports nearly 90% of its products to the United States, suffered two consecutive trading limit-downs after the policy announcement.

China's firms are also renowned for poor corporate governance. The leading agency problem in China is the horizontal agency conflicts between controlling and minority shareholders arising from a highly concentrated ownership structure (Jiang and Kim 2020). Corporate governance is closely related to ESG, a company's commitment to shareholders and stakeholders, such as employees, customers, suppliers and communities. ESG aims to call on companies to incorporate environmental protection and social responsibility into their day-to-day decision-making on corporate governance through ESG ratings, guiding portfolio choices (Pedersen et al. 2021). At the same time, ESG ratings have prompted companies and stakeholders to pay more attention to environmental, social and corporate governance; investors' awareness of the financial importance of ESG factors has been increasing, and the demand from clients such as asset owners has been growing (Van Duuren et al. 2016). Pedersen et al. (2021) point out that the ESG performance of a company's stock provides the company with fundamental information and influences investor preferences.

In recent years, global regulatory bodies have increasingly emphasised ESG disclosure. The stock exchanges in China have also issued specific disclosure rules and guidelines that call for companies to fulfil their social responsibilities actively. Institutional investors in China's capital market are also paying more attention to the ESG performance of listed companies. For instance, in 2019, the Shanghai Stock Exchange issued the "Shanghai Stock Exchange Science and Technology Innovation Board Stock Listing Rules", which points out that listed companies should disclose their performance in fulfilling social responsibilities in their annual reports. In 2020, the Shenzhen Stock Exchange issued the "Assessment Measures for the Information Disclosure Work of Listed Companies", which assesses the disclosure of listed companies' performance in fulfilling their social responsibilities. It pays

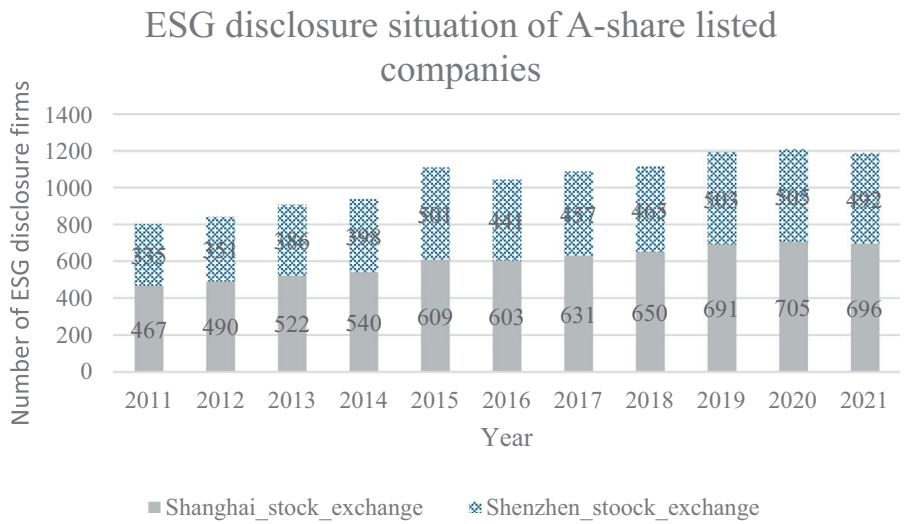

FIGURE 1 | ESG disclosure situation of A-share listed companies. ESG, Environmental, Social and Governance. [Color figure can be viewed at wileyonlinelibrary.com]

particular attention to whether the companies proactively disclose information related to ESG responsibilities.

Figure 1 shows the ESG disclosure situation of A-share listed companies from 2011 to 2020. During this period, the number of companies in China's A-share market that disclose ESG reports has generally shown an increasing trend. This indicates that investors' growing demand for high-quality ESG information calls for listed companies to strengthen their awareness of social responsibility disclosure and improve the quality of information disclosed.

As a result, to cater to the needs of governments and stakeholders, Chinese companies are forced to act in environmental protection and social responsibility either mandatorily or semimandatorily. Although a large body of literature suggests that ESG has a significant enhancing effect on firm value (Pedersen et al. 2021; Asimakopoulos et al. 2023), ESG is simultaneously a double-edged sword. To maintain and improve ESG ratings, firms have to spend a lot of energy on environmental protection and social responsibility, which are not the primary business and core competencies. Therefore, companies cannot focus on improving their enhanced competitiveness, leading to stagnation in industry progress and social development.

2.2 | ESG Activities and Crash Risk

This paper investigates how ESG activities affect a firm's stock price crash risk during the crisis of the US–China trade war. First, firms with higher levels of ESG activities are less vulnerable during economic recessions. In the context of the US–China trade war, firms are affected in many ways, including increased export costs due to higher tariffs, loss of customer orders due to supply chain disruptions, some firms receiving stricter market access restrictions and exchange rate risks. Companies are also affected by stakeholders. Under such circumstances, ESG information disclosure is essential in creating a competitive advantage for sustainable corporate performance (Gillan et al. 2021). Edmans (2011) states that although some intangible assets created by ESG actions can be mispriced in the short term, in the long term, when intangible assets are correctly priced, company stock returns increase, and ESG is able to create long-term value. Albuquerque et al. (2019) indicate that CSR positively impacts corporate value and substantially reduces firms' systematic risk. Furthermore, Lins et al. (2017) found that high-CSR companies achieved better stock returns during economic recessions. In addition, companies that take positive action on ESG could also reduce their downside risk (Hoepner et al. 2024).

Second, investors will not only focus on the company's financial situation and assess its ability to create value but also consider the company in these nonfinancial and ethical aspects (Hartzmark and Sussman 2019). Reputable companies gain the trust of stakeholders and society, which is a basis for business (Brenkert 1998), and that it is an important strategic decision for companies to build up their reputational capital (Hillman and Keim 2001; Choi and Wang 2009; Zhu and Wang 2024), and as the concept of sustainable investment continues to development, high-quality ESG disclosures also indicate to stakeholders that companies are concerned with long-term value creation and trust building (Deng et al. 2013; Dhaliwal et al. 2011). Lins et al. (2017) find that high-CSR firms exhibit significantly higher crisis-period returns, particularly when headquartered in regions associated with higher levels of social trust. Ng and Rezaee (2020) found that the correlation between ESG sustainability performance factors and share price informativeness is stronger when the economy performs weakly and firms perform poorly financially. Investors tend to pay more attention to ESG performance factors.

Higher ESG ratings reflect a firm's long-term growth value and emphasis on trust building, as well as the degree of information transparency of the firm, which reduces the risk of a share price collapse by reducing the hoarding of bad news. Therefore, under the US–China trade war, high ESG ratings help firms to maintain a good reputation and social impact, suggesting to investors the company's sustainable development prospects and long-term development value, which will gain more investor support to solve the company's financial crisis, and thus mitigate the risk of stock price collapse. Based on the above analysis, the research proposes the first hypothesis.

H1. *Firms with higher levels of ESG activities are more resilient and have a lower chance of crash risk during the US–China trade war.*

Shareholder theory considers ESG a powerful intangible asset that helps promote managers' self-discipline (Gao et al. 2014). Managers with good self-discipline will foster a corporate culture with high ethical standards and, consequently, a high level of transparency in corporate governance (Gelb and Strawser 2001; Hoi et al. 2013). Information asymmetry occurs when there is a disparity in knowledge between entrepreneurs and investors (Farag and Johan 2022). For most listed companies, improving ESG performance outweighs the costs. Firms will potentially affect firm value by reducing investors' information asymmetry and agency costs, as Asimakopoulos et al. (2023) point out that, when firms obtain ESG ratings, it makes obtaining more internal sources of financing easier by reducing the information asymmetry and the valuable information conveyed to lenders. Therefore, in the case of the US–China trade war, highly rated ESG firms will promote their information transparency level to suggest to investors that the firms still have more optimistic business conditions, which will push investors to continue to invest, obtain more funds for production and stabilise the share price.

Under the backdrop of the US–China trade war, firms with higher levels of ESG activities can enhance internal governance to mitigate the risk of stock price crashes. Corporate governance is a crucial mechanism for solving agency problems arising from separating ownership and control (John and Senbet 1998; Ma and Shleifer 2025). From an internal governance perspective, ESG practices optimise corporate governance structures, clarify the roles and responsibilities of boards of directors, supervisory boards and management, and strengthen internal oversight and checks. This prevents excessive concentration of power and decision-making errors, enabling companies to respond swiftly and effectively to trade war challenges. Besides, improving internal governance of enterprises can help alleviate the agency problem of stakeholders and decision-makers in financial disclosure, reduce the possibility of hiding bad news, thereby enhancing the credibility and transparency of corporate governance and reducing the risk of stock price collapse (Jin and Myers 2006; Hutton et al. 2009).

Externally, ESG activities also play a significant role in mitigating stock price crash risks. Stakeholder engagement is critical to strengthening a firm's environmental policy and sustainability (Lokuwaduge and Heenetigala 2017). Companies with strong ESG practices demonstrate a high sense of social responsibility and environmental awareness, earning the trust and support of stakeholders. This trust fosters closer collaboration among stakeholders during the trade war, helping companies navigate challenges and stabilise operations (Deng et al. 2013; Dhaliwal et al. 2011; Lins et al. 2017). ESG efforts also attract long-term institutional investors, optimising shareholder structures and enhancing corporate governance oversight. This strengthens the company's resilience to external shocks and reduces the probability of stock price crashes. Hence,

H2. *Firms' ESG activities mitigate the risk of stock price crashes by improving information transparency and corporate governance during the US–China trade war.*

3 | Sample and Data

The research sample consists of 11,075 firm-year observations of listed firms in China, spanning from 2011 to 2021. The variables are from the China Stock Market & Accounting Research (CSMAR) database. The research excludes the following firms from the sample: (1) Special Treatment and Particular Transfer companies (Xu et al. 2021), (2) financial companies (e.g., Banks, insurance firms and security firms) due to heavily regulated and differences between their return-generating processes and those of other firms and (3) companies with missing values. The continuous variables are winsorised at the 1% and 99% levels. Detailed definitions of the variables used in our analysis are provided in the appendix.

3.1 | Stock Price Crash Risk

Our study employs two prevalent methodologies for assessing the risk of stock price crashes. These methods are based on the company's weekly stock returns derived from the residuals of the market model equation. Focusing on the company-specific returns, our crash risk indicators reflect company-unique factors rather than being affected by broader market movements (Hutton et al. 2009; J. B. Kim et al. 2011a, 2011b; Jin and Myers 2006). The detailed method is stated below. First, we defined the market return as in Equation (1).

$$R_{n,t} = \frac{\sum_n w_{n,t} r_{n,t}}{\sum_n w_{n,t}}, \tag{1}$$

where $r_{n,t}$ is the return on stock n in week t, and $w_{n,t}$ is the weight for stock n at week t. In our paper, $r_{n,t}$ represents the individual stock return rate without considering cash dividends. Then, we use the following equation to define the firm-specific weekly returns.

$$r_{i,t} = \alpha + \beta_{1,i} r_{\mathrm{m},t-2} + \beta_{2,i} r_{\mathrm{m},t-1} + \beta_{3,i} r_{\mathrm{m},t} + \beta_{4,i} r_{\mathrm{m},t+1} + \beta_{5,i} r_{\mathrm{m},t+2} + \epsilon_{i,t}, \tag{2}$$

where $r_{i,t}$ is the return on stock i in week t, and $r_{\mathrm{m},t}$ is the average return of all A-share stocks weighted by market value in week t; to enable trading that is not synchronised, we include both the leading and lagging terms of the market index return in the equations (Scholes and Williams 1977; Dimson1979). Hence, the firm-specific weekly return for stock i and week t is $\ln(1 + \epsilon_{i,t})$.

The first measurement is negative coefficient of skewness (NCSKEW) (J. Chen et al. 2001), which is the negative conditional skewness of firm-specific weekly returns. A higher value of NCSKEW represents a higher stock price crash risk. To calculate NCSKEW, we calculate the third moment of a firm's weekly returns over a year, taking the negative of that value, and then dividing it by the cube of the standard deviation of those same weekly returns. This process is repeated for each firm in each year, resulting in an equation for NCSKEW for each stock i in year t:

$$\mathrm{NCSKEW}_{i,t} = -\left[n(n-1)^{\frac{3}{2}} \sum w_{i,t}^3\right] \Big/ \left[(n-1)(n-1)\left(\sum w_{i,t}^2\right)^{\frac{3}{2}}\right]. \tag{3}$$

TABLE 1 | Descriptive statistics.

Variable	Observations	Mean	SD	Minimum	Maximum
ESG	11,076	28.204	8.994	6.198	68.917
NCSKE	11,076	−0.348	0.737	−5.250	4.034
DUVOL	11,076	−0.243	0.484	−2.327	2.348
CRASH	11,076	0.078	0.267	0.000	1.000
Big4	11,065	0.125	0.331	0.000	1.000
ROA	11,076	0.029	0.033	−0.064	0.142
Leverage	10,787	2.212	3.125	0.133	23.628
Firm age	11,076	1.270	0.146	0.778	1.531
Sales growth	11,073	0.417	1.672	−0.231	14.025
Board size	11,076	9.001	1.846	5.000	15.000
Male ratio (%)	11,076	83.119	10.398	53.850	100.000
Firm size	11,076	9.979	0.551	8.837	11.503

Note: This table reports the number of observations, mean, standard deviation, minimum and maximum for the variables in the baseline regression model. All continuous variables are winsorized at the 1% and 99% levels. The remaining tables in the paper are the same.
Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; NCSKEW, negative coefficient of skewness; ROA, return on asset.

The second measurement is down-to-up volatility or DUVOL. A higher value of DUVOL represents a higher stock price crash risk. This metric is designed to capture the disparity in volatility between a firm's negative and positive weekly returns. The calculation of a firm's Downside Uncertainty (DUVOL) for a given fiscal year starts by identifying weeks with returns that fall below the average and comparing them with weeks where returns exceed the average. We then tally the count of weeks with positive returns, denoted as n_u. Subsequently, we compute the standard deviations for each subset of weeks separately. The final step involves taking the natural logarithm of the ratio between the standard deviation of the weeks with negative returns and that of the weeks with positive returns. By applying the following formula, we obtain the value of DUVOL:

$$\mathrm{DUVOL}_{i,t} = \log\left\{\frac{\left[(n_u - 1)\sum_{\mathrm{DOWN}} w_{i,t}^2\right]}{\left[(n_d - 1)\sum_{\mathrm{UP}} w_{i,t}^2\right]}\right\}. \quad (4)$$

3.2 | ESG Rating

The research uses ESG ratings to proxy firms' ESG-related activities from the Huazheng database. The Huazheng ESG rating system is based on the core connotation and development experience of ESG at the firm level, combined with the actual situation of the domestic market, and constructs a three-level indicator system from top to bottom. The Huazheng Index calculates the ESG levels of listed companies and bond issuers every quarter and gives them a nine-tier rating of "AAA-C" accordingly. The Huazheng ESG rating covers all A-shares and is currently the longest traceable ESG rating system in the Chinese market.[1] This scoring standard is open, transparent and covers a wide range. It evaluates companies' environmental performance, social responsibility performance and corporate governance based on their disclosed CSR reports, financial statements and online information. Both the comprehensive scores and individual scores range from 0.1 to 100, with higher scores indicating better performance.

3.3 | Descriptive Statistics

Table 1 shows the descriptive statistics for the main regression model variables, including the stock price crash risk measurements (NCSKEW, DUVOL and Crash), ESG, and the control variables. Our research provides the observations, the average value, the standard deviation, the minimum value and the maximum value for each variable.

The means of NCSKEW and DUVOL are −0.348 and −0.243, respectively, while the standard deviations are 0.727 and 0.484, respectively, indicating that the stock price crash risk varies across firms. These values are similar to the estimates in Yu et al. (2023). Following previous literature (J. Chen et al. 2001; Y. Kim et al. 2014; Dumitrescu and Zakriya 2021; Xu et al. 2021), we control for firm financial-related variables in our regression model, including return on asset (ROA), firm size, firm age, leverage and sales growth. We also control for board size and male ratio. The distributions of these variables are within a reasonable range.

4 | Research Design and Main Results

4.1 | Research Design

In our paper, we follow Arnold et al. (2022) and Jens (2017) and conduct a Difference in Difference in Difference (DDD) approach to examine whether the ESG performance of the firm could mitigate the negative impact of the US–China trade war on the stock price crash risk. The paper selects 2018 as the starting date of the US–China trade war. In March 2018, the United States released the results of its Section 301 investigation into China and announced the implementation of tariff

TABLE 2 | Baseline regression results.

Variables	(1) NCSKEW	(2) DUVOL	(3) NCSKEW	(4) DUVOL
Treat * Post * ESG	−0.076**	−0.057**	−0.081**	−0.054**
	(0.034)	(0.023)	(0.035)	(0.024)
ROA			1.229***	0.745***
			(0.262)	(0.169)
Leverage			−0.003	−0.000
			(0.003)	(0.002)
Firm age			−0.222***	−0.145***
			(0.064)	(0.040)
Sales growth			0.001	0.000
			(0.004)	(0.003)
Board size			−0.006	−0.004
			(0.004)	(0.003)
Male ratio			−0.002**	−0.001***
			(0.001)	(0.001)
Firm size			−0.011	−0.022**
			(0.017)	(0.011)
Observations	11,076	11,076	10,784	10,784
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
R^2	0.105	0.102	0.146	0.135

Note: This table reports DDD regression results. The dependent variables are NCSKEW and DUVOL. Year and industry fixed effects are included. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses. R^2 values are given in the table.
Abbreviations: DDD, Difference in Difference in Difference; DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FE, fixed effects; NCSKEW, negative coefficient of skewness; ROA, return on asset.
*, ** and *** represents statistical significance at the 10%, 5% and 1% levels, respectively.

sanctions. In response, China promptly retaliated. In June of the same year, the US imposed additional tariffs on Chinese goods. On the same day, China retaliated with equally scaled and forceful taxation measures, officially escalating the trade friction between the two nations into a full-scale trade war. The DDD model is an extension of the Difference in Difference, which identifies causal effects by comparing the pre–post policy differences between treatment and control groups. In this study, the treatment group comprises industries affected by the US–China trade war, with others as the control group. A third dimension, ESG performance, is introduced to examine its role in mitigating the trade war's impact on stock price crashes. Specifically, we estimate the following DDD regression model:

$$\text{Crash risk}_{i,t} = \alpha + \beta_1 \text{Treat}_i * \text{Post}_t * \text{ESG\_dummy}_{i,t} + \beta_2 \text{Controls}_{i,t} + \delta_t + \gamma_i + \epsilon_{i,t}, \quad (5)$$

where i denotes firm and t denotes years. Crash $\text{risk}_{i,t}$ is the stock price crash risk measurement. In our model, we use NCSKEW and DUVOL following the existing literature. $\text{Treat}_i * \text{Post}_t * \text{ESG}_{i,t}$ is our key explanatory variable, Treat_i takes the value of one if the industry of the firm belongs to the US tariff lists on Chinese goods (Benguria et al. 2022), and zero otherwise. Post_t takes the value of 1 if the Year is after the start year of the US–China trade war, namely the year 2018. To investigate the effect of the ESG rating on the stock price crash risk during the crisis further, we separate the ESG rating into two groups. $\text{ESG\_dummy}_{i,t}$ takes the value of one if the ESG rating is above the median grouped by industry and year. $\text{Controls}_{i,t}$ is the control variable set. We control financial-related variables for firms in our regression model, including ROA, firm size, firm age, leverage and sales growth. We also control for board size and male ratio. The regression model also controls for industry and year-fixed effects.

4.2 | Baseline Regression Results

We conduct the DDD regression model to find the association and causality of how firms with higher levels of ESG rating mitigate the negative effect of stock price crash risk. We estimate the OLS regression coefficients. We focus on β_1, which captures the difference among firms affected by the US–China trade war in 2018 and also has a higher level of ESG rating.

Table 2 shows the baseline regression results of the regressions. Columns (1) and (2) show the regression results without control variables, and Columns (3) and (4) report the regression results with the control variables. In Columns (1) and (3), the

dependent variable is NCSKEW, and DUVOL is used in Columns (2) and (4). We control for industry and year-fixed effects in all regressions. The coefficients for $\text{Treat}_i * \text{Post}_t * \text{ESG}_{i,t}$ in these four columns are all significantly negative at 5% level. The coefficients in Columns (2) and (4) are −0.057 and −0.054, respectively. The results indicate a robust negative relationship between higher levels of ESG rating and stock price crash risk under the US–China trade war. It indicates that during the US–China trade war, high-ESG firms impacted by tariffs experienced a decline in NCSKEW and DUVOL by 0.081 and 0.054 standard deviation units, respectively, while controlling for other factors. Firms with better ESG performance often demonstrate stronger risk management and operational resilience. Diversified supply chains and business operations reduce disruptions and help them adapt to the uncertainty of trade wars. Those with good ESG practices tend to enjoy better financial health and a long-term orientation, focusing on sustainable rather than short-term growth, which leads to more stable financial performance. Our results validate Hypothesis 1, which is that firms with higher levels of ESG rating have a negative relationship with stock price crash risk during the outbreak of the US–China trade war.

4.3 | Parallel Trend Test

To validate our baseline results, the paper conducted several validation tests. First, we use a parallel trend test to assess whether our results may be driven by concurrent changes unrelated to the US–China trade war. In our dynamic DDD model, the research replaces the event indicator with indicator variables that track the effect of the crisis of the US–China trade war before and after its outbreak. Specifically, we include the year indicator variables Year (−3) to Year (−1) and Year (1) to Year (3), each of which equals 1 for the indicated year. The research excludes Year (−1) due to a collinearity issue. Figure 2 reports our results. The left-hand side figure represents the parallel trend test for NCSKEW (Graph (i)), and the right-hand side figure represents the parallel trend test for DUVOL (Graph (ii)). In Figure 2, the white circle represents the estimated coefficient, and the dashed line indicates the 95% confidence interval. As shown in the figure, neither graph shows a significant difference before the year 2018. Hence, our DDD model does not violate the prior requirements of the parallel trend test. In addition, after the year 2018, significant differences in coefficient estimates exist, indicating that the US–China trade war has a continuous influence on stock price crash risk.

4.4 | Robustness Checks

In this section, the paper conducts several robustness checks on the baseline regression results. First, in our main regression, we use the ESG rating to separate firms into two groups. To further validate that the results are robust, we use the component of the ESG rating, which is the *E* (Environmental) score, to rerun the main regression. The results are shown in Columns (1) and (2) in Panel A of Table 3. The coefficients of the interaction term are still statistically significant and negative at a 1% level after we use *E* to separate the groups. This indicates that during the US–China trade war, high *E* score firms impacted by tariffs experienced a decline in NCSKEW and DUVOL by 0.099 and 0.067 standard deviation units, respectively. This result indicates that our main regression result is robust when using alternative explanatory variables.

Second, the study adds a province-fixed effect in the main regression to check the robustness of the main result. This is because different provinces' natures could also influence such relationships. The model mitigates possible omitted variable bias by adding the province-fixed effect. The results are in Columns (3) and (4) in Panel A of Table 3. This indicates that during the US–China trade war, high-ESG firms impacted by tariffs experienced a decline in NCSKEW and DUVOL by 0.078 and 0.050 standard deviation units, respectively, after controlling for province-fixed effects. The coefficients of the interaction

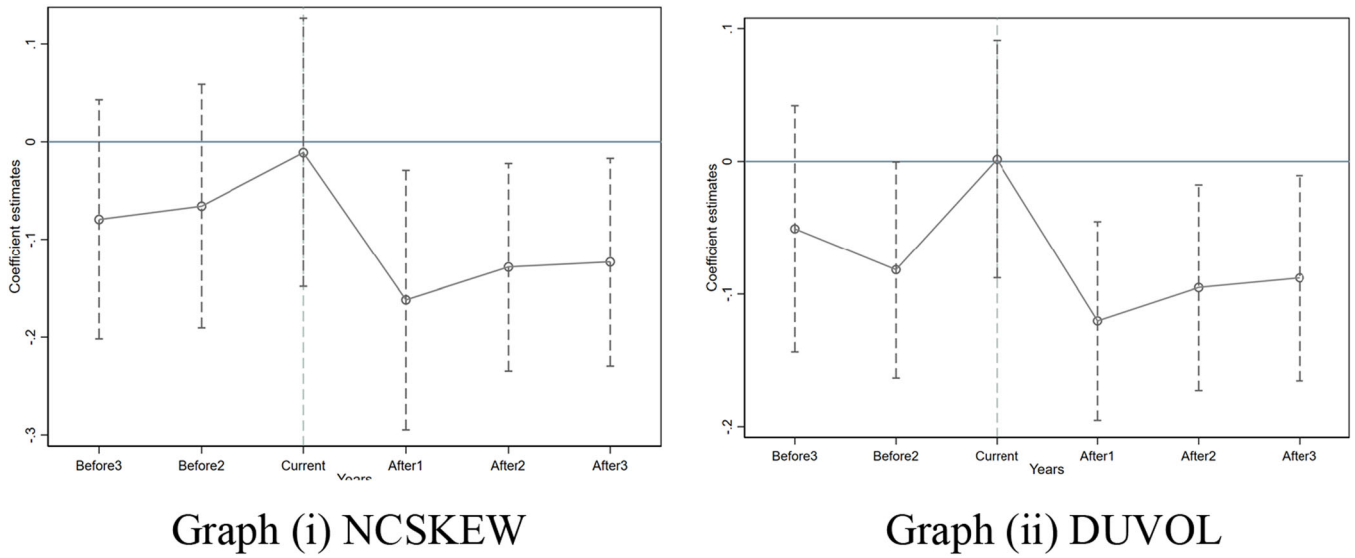

FIGURE 2 | Parallel trend test. Graph (i) NCSKEW and Graph (ii) DUVOL. DUVOL, down-to-up volatility; NCSKEW, negative coefficient of skewness. [Color figure can be viewed at wileyonlinelibrary.com]

TABLE 3 | Robustness checks.

Panel A				
Variables	**(1) NCSKEW**	**(2) DUVOL**	**(3) NCSKEW**	**(4) DUVOL**
Treat * Post * *E*	−0.099***	−0.067***		
	(0.036)	(0.023)		
Treat * Post * ESG			−0.078**	−0.050**
			(0.036)	(0.024)
Observations	10,784	10,784	10,784	10,784
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Province FE	No	No	Yes	Yes
Control	Yes	Yes	Yes	Yes
R^2	0.147	0.135	0.169	0.156

Panel B					
Variables	**(1) NCSKEW**	**(2) DUVOL**	**(3) CRASH**	**(4) NCSKEW**	**(5) DUVOL**
Treat * Post * ESG	−0.082**	−0.053**	−0.025**	−0.065**	−0.045**
	(0.040)	(0.026)	(0.012)	(0.033)	(0.023)
Observations	9612	9612	10,532	10,769	10,769
Year FE	Yes	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes	Yes
Control	Yes	Yes	Yes	Yes	Yes
R^2	0.067	0.066	0.048	0.051	0.053

Note: This table reports the robustness check of the main regression results. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses. R^2 values are given in the table.
Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FE, fixed effects; NCSKEW, negative coefficient of skewness.
*, ** and *** represents statistical significance at the 10%, 5% and 1% levels, respectively.

term are still statistically significant and negative at the 5% level, which indicates a robust result of our main finding.

Third, we exclude the observations in the year 2020 to conduct a further robustness check. The outbreak of Covid-19 at the end of 2019 caused a severe impact on the firms' performance. It may also be a cause of crash risk in 2020. Hence, the paper excludes the sample in 2020 to test the crisis caused by the China–US trade war. The results are shown in Columns (1) and (2) of Panel B of Table 3. This indicates that during the US–China trade war, high-ESG firms impacted by tariffs experienced a decline in NCSKEW and DUVOL by 0.082 and 0.053 standard deviation units, respectively, after excluding the observations in the year 2020. The coefficient of the interaction term is still statistically significant and negative at the 5% level when we exclude observations in 2020, indicating a robust result for our main finding.

Fourth, a single definition for the dependent variable may cause incidental results. Our main regression uses NCSKEW and DUVOL as the stock price crash risk measurements. We further use alternative measurements of crash risk to validate the main regression's result. Specifically, we followed Hutton et al. (2009) and Dumitrescu and Zakriya (2021); we use CRASH, which is defined as whether the event of a stock's price falling below 5% of its mean value in any given year. The result is shown in Column (3) in Panel B of Table 3. The coefficient of the interaction term is still statistically significant and negative at the 5% level when we used the alternative dependent variable, CRASH, indicating a robust result to our main finding.

In addition, to further alleviate omitted variable bias concerns, the paper further controls for firm-level fixed effects to validate the main regression's result. The result is shown in Columns (4) and (5) in Panel B of Table 3. The coefficient of the interaction term remains statistically significant and negative at the 5% level when we further control for the firm-level fixed effect; the results indicate a robust confirmation of our main finding.

4.5 | Endogeneity

Our analysis so far suggests a negative relationship between ESG rating and stock price crash risk during the crisis of the US–China trade war. However, it has been shown that endogeneity is a concern in corporate finance studies and can lead to biased and inconsistent parameter estimators (Wintoki et al. 2012). In our study, we address the issue of a possible

TABLE 4 | Lagged dependent variables regression.

Variables	(1) L.NCSKEW	(2) L.DUVOL
Treat * Post * ESG	−0.080**	−0.062***
	(0.032)	(0.021)
Observations	11,114	11,114
Year FE	Yes	Yes
Industry FE	Yes	Yes
Control	Yes	Yes
R^2	0.149	0.130

Note: This table reports the lagged dependent variables regression. Year and industry fixed effects are included. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses. R^2 values are given in the table.
Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FE, fixed effects; NCSKEW, negative coefficient of skewness.
*, ** and *** represents statistical significance at the 10%, 5% and 1% levels, respectively.

endogenous relationship between ESG ratings and the risk of stock price crashes. This endogeneity could stem from unobservable firm-specific factors influencing the ESG ratings and the crash likelihood. To address these concerns, we have implemented a series of tests. First, we utilise a 1-year lag of the stock price crash risk to counteract the issues of simultaneity or reverse causality. Additionally, we employ the instrumental variables method to estimate our model. The findings of the lagged effects on the dependent variables are presented in Table 4. The results indicate that the coefficients of the interaction terms are statistically significant and exhibit a negative correlation with the lagged dependent variables. These outcomes help to alleviate the concerns regarding simultaneity or reverse causality in our primary regression analysis.

We further used instrumental variables and two-stage least squares (2SLS) regression to control for endogeneity. The instrumental variables should be correlated with the explanatory variables without impacting the dependent variables directly. Following Z. An et al. (2020) and Yu et al. (2023), we choose the mean of ESG rating among listed firms in the same province and year (ESG_Area) as the instrumental variable. First, the average ESG rating at the provincial level indicates the extent to which ESG principles are embraced in that area. In the case of the environment, for instance, different provinces have different levels of economic growth, natural endowments and geographical location, and therefore different levels of regional environmental governance, which will not have an impact on the stock price crash risk for specific companies (Yu et al. 2023).

Second, regional ESG norms are more on the macro level, reflecting the overall ESG situations in a province, while the crash risk is a microlevel phenomenon related to the specific characteristics and performance of individual companies. Third, the formation of crash risk involves a variety of factors, such as company financial health, market conditions and investor psychology, which are not directly influenced by regional ESG norms. Meanwhile, existing research shows that there is a correlation between the average ESG ratings of provinces and the individual ESG ratings of firms within those provinces (Yu et al. 2023; Sun et al. 2025), thus meeting the criteria necessary for an instrumental variable.

The results of the 2SLS regression are shown in Table 5. As we can see from Table 5, the coefficients of the instrumental variables are significantly positive at the 1% level in Columns (1) and (3), and the coefficients of the interaction term in Columns (2) and (4) are significantly negative as expected. In addition, the paper employs the Cragg–Donald Wald F statistic to evaluate whether the instrumental variable is weak. The calculated Cragg–Donald Wald F statistic for our results is 187.588, which surpasses the 10% critical value of the Stock–Yogo weak instrument test. This indicates that the instrumental variable utilised in our analysis is sufficiently strong and does not suffer from the issue of being a weak instrument.

5 | Mechanisms

In this section, we investigate how firms with higher ESG ratings mitigate the risk of a stock price crash during the US–China trade war. First, as proposed in the hypothesis development section, although the US–China trade war increases the uncertainty of the stock price and hurts the influenced firm's reputation, firms with a higher level of ESG rating could mitigate the effect and mitigate the stock price crash risk. Shareholder theory considers ESG a powerful intangible asset that helps promote managers' self-discipline (Gao et al. 2014). Managers with good self-discipline will foster a corporate culture with high ethical standards and, consequently, a high level of transparency in corporate governance (Gelb and Strawser 2001; Hoi et al. 2013). In addition, when the firm has built a good social reputation through social responsibility activities, an intangible reputational asset is obtained. Therefore, a manager's misconduct is costlier, and the losses faced by violations being audited are higher. As a result, managers will be more self-disciplined to maintain the corporate reputation built through high-quality ESG performance. Moreover, Y. Kim et al. (2012) find that firms with excellent ESG performance are less likely to have earnings manipulation, which increases the information transparency of firms. Improving information transparency leads to lower stock price crash risk (Jin and Myers 2006; Hutton et al. 2009).

To verify this conjecture, we first use DSCORE to measure the firm's information transparency (Muslu et al. 2019; Zhang et al. 2021). DSCORE is measured by aggregating the decile ranks into a composite measure of CSR disclosure score; a higher level of DSCORE represents more information transparency of the firm. The result is shown in Panel A of Table 6. As we can see from the results in Panel A of Table 6, Columns (1) and (3) estimate the effect of the interaction term on the information transparency variable. The coefficient is positively significant at the 1% level, which first indicates that firms with a higher level of ESG rating promote information transparency during the US–China trade war. Columns (2) and (4) estimate the effect of information transparency on NCSKEW and DUVOL, respectively. The coefficients of DSCORE are −0.050 and −0.024 and are statistically significant, indicating that when the firm has better information transparency, it will lower the stock price crash risk. The result verifies our second hypothesis.

TABLE 5 | Two-stage least squares regression.

Variables	(1) Treat * Post * ESG	(2) NCSKEW	(3) Treat * Post * ESG	(4) DUVOL
ESG_Area	0.009***		0.009***	
	(0.001)		(0.001)	
Treat * Post * ESG		−0.531**		−0.461***
		(0.263)		(0.174)
Observations	10,784	10,784	10,784	10,784
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Control	Yes	Yes	Yes	Yes

Note: This table reports the regression results of the two-stage least squares. Year and industry fixed effects are included. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses.
Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FE, fixed effects; NCSKEW, negative coefficient of skewness.
*, ** and *** represents statistical significance at the 10%, 5% and 1% levels, respectively.

TABLE 6 | Mechanism test for information transparency.

Panel A

Variables	(1) DSCORE	(2) NCSKEW	(3) DSCORE	(4) DUVOL
Treat * Post * ESG	0.153***	−0.081*	0.152***	−0.051
	(0.040)	(0.049)	(0.040)	(0.032)
DSCORE		−0.050***		−0.024**
		(0.017)		(0.011)
Observations	5077	5077	5077	5077
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Control	Yes	Yes	Yes	Yes
R^2	0.182	0.068	0.183	0.066

Panel B

Variables	(1) Tone	(2) NCSKEW	(3) Tone	(4) DUVOL
Treat * Post * ESG	0.002***	−0.079**	0.002***	−0.062***
	(0.000)	(0.033)	(0.000)	(0.023)
Tone		−1.608**		−1.451***
		(0.756)		(0.524)
Observations	10,604	10,604	10,604	10,604
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Control	Yes	Yes	Yes	Yes
R^2	0.242	0.064	0.242	0.063

Note: This table reports the mechanism test for information transparency. Year and industry fixed effects are included. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses.
Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FE, fixed effects; NCSKEW, negative coefficient of skewness.
*, ** and *** represents statistical significance at the 10%, 5% and 1% levels, respectively.

In addition, we further use the tone of the annual report as an alternative measurement of transparency. Specifically, based on the financial sentiment dictionary from Loughran and McDonald (2011), we translated it into Chinese. If an English word has multiple Chinese correspondences, we keep all to maximally cover the tone-related words in Chinese annual reports. The paper then calculates the total number of positive and negative words. We follow Davis et al. (2012, 2015) and

TABLE 7 | Mechanism test for internal and external corporate governance.

Panel A				
Internal governance Variables	**(1) NCSKEW High governance**	**(2) NCSKEW Low governance**	**(3) DUVOL High governance**	**(4) DUVOL Low governance**
Treat * Post * ESG	−0.034	−0.128**	−0.040	−0.076**
	(0.043)	(0.053)	(0.015)	(0.036)
Observations	4756	6317	4756	6317
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Control	Yes	Yes	Yes	Yes
R^2	0.072	0.068	0.072	0.068
Panel B				
External governance Variables	**(1) NCSKEW High governance**	**(2) NCSKEW Low governance**	**(3) DUVOL High governance**	**(4) DUVOL Low governance**
Treat * Post * ESG	−0.068	−0.112**	−0.049	−0.065**
	(0.041)	(0.055)	(0.030)	(0.032)
Observations	5518	5558	5518	5558
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Control	Yes	Yes	Yes	Yes
R^2	0.076	0.071	0.075	0.069

Note: This table reports the mechanism test results for internal and external corporate governance. Year and industry fixed effects are included. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses.
Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FE, fixed effects; NCSKEW, negative coefficient of skewness.
*, ** and *** represents statistical significance at the 10%, 5% and 1% levels, respectively.

Huang et al. (2014), and we compute the net tone as the difference between the number of positive words and the number of negative words, divided by the total number of words in the annual report to gauge its tone.

The results are shown in Panel B of Table 6. As we can see from the table. Columns (1) and (3) estimate the effect of the interaction term on the transparency variable. The coefficient is positively significant at the 1% level, which first indicates that firms with a higher level of ESG rating promote transparency during the US–China trade war. Columns (2) and (4) estimate the effect of transparency on NCSKEW and DUVOL, respectively. The coefficients of tone are −1.608 and −1.451 and are statistically significant, indicating that when the firm has better transparency, it will lower the stock price crash risk. The result verifies our second hypothesis.

Second, as stated in the hypothesis development section, we propose that firms with higher ESG ratings mitigate the stock price crash risk by having a better corporate governance level in the context of the US–China trade war. Good ESG practices indicate that a company performs better in environmental protection, social responsibility and corporate governance. Under the crisis of the US–China trade war, firms that suffered from the tariff will suffer additional costs. In such cases, firms with higher ESG ratings are likelier to promote managers' self-regulation. Particularly, strengthening corporate governance, including improving the transparency of decision-making, reinforcing risk management and ensuring the board of directors' independence, helps to build a more robust corporate structure. It reduces the issues of insider control and information asymmetry, thereby protecting the company from abnormal stock price fluctuations during market volatility and external shocks.

We follow Bhagat and Bolton (2008) and Bhagat and Bolton (2019) and use the shareholding ratio of the manager as a proxy for internal governance. We split the data into two groups based on the median of the shareholding ratio of the manager. The higher ratio represents a better firm governance level. The result is shown in Panel A of Table 7. As we can see from the results in Panel A of Table 7, Columns (2) and (4) report the results for the group with lower internal corporate governance levels. The results show that the interaction term is significantly negative at the 5% level, indicating that it reduces the risk of stock price crashes. Columns (1) and (3) report the results for the group with higher internal corporate governance levels. The results show that the interaction term is not significant. These findings suggest that under the backdrop of the China–US trade war, ESG is more effective in samples with low internal corporate governance levels. It can reduce the risk of stock price crashes by improving the internal governance levels of these companies. In companies with already high governance levels, the impact of ESG is limited.

We also follow Erkens et al. (2012) and Chemmanur et al. (2021) to measure external corporate governance by using the proportion of institutional investors' share ownership. The result is shown in Panel B of Table 7. Columns (2) and (4)

TABLE 8 | Heterogeneity results for types of ownership.

Variables	(1) SOE NCSKEW	(2) POE NCSKEW	(3) SOE DUVOL	(4) POE DUVOL
Treat * Post * ESG	0.099	−0.109***	0.040	−0.074***
	(0.102)	(0.038)	(0.070)	(0.025)
Observations	1574	8958	1574	8958
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Control	Yes	Yes	Yes	Yes
R^2	0.148	0.141	0.152	0.140

Note: This table reports the heterogeneity regression result for the type of ownership. Year and industry fixed effects are included. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses.
Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FE, fixed effects; NCSKEW, negative coefficient of skewness; POE, privately owned enterprise; SOE, state-owned enterprise.
*, ** and *** represents statistical significance at the 10%, 5% and 1% levels, respectively.

report the results for the group with lower external corporate governance levels. Columns (1) and (3) report the results for the group with higher external corporate governance levels. The results are similar to Panel A of Table 7. These findings also suggest that under the backdrop of the China–US trade war, ESG is more effective in samples with low external corporate governance levels. It can reduce the risk of stock price crashes by improving the external governance levels of these companies. In companies with already high external governance levels, the impact of ESG is limited.

The results support our hypothesis and show that ESG is a key force in improving companies' corporate governance. It can effectively fix corporate governance flaws, thus enhancing governance and strengthening companies' long-term stability and sustainable development, which in turn reduces stock price crash risk.

6 | Heterogeneity

6.1 | Ownership

In China, some listed firms are state-owned enterprises (SOEs). This characteristic stands out among Chinese listed firms. Due to their unique ownership structure, SOEs have a distinct role to play. The primary objectives of most SOEs are to promote national interests, maintain economic growth and ensure social stability rather than solely focusing on maximising profits (Yu et al. 2023). As a result, SOEs often take on social responsibilities and are assigned political and social goals by the government.

We propose a hypothesis that the influence of ESG development varies depending on the ownership type of the firm. In contrast to privately owned enterprises (POEs), SOEs are subject to stricter government regulations regarding their environmental and social responsibilities. This stringent regulation might reduce the mitigating effect of ESG rating on the risk of stock price crashes in SOEs. In addition, politically connected firms usually hesitate to be transparent (Leuz and Oberholzer-Gee 2006). This makes it more difficult for investors to uncover negative information related to state-controlled listed firms. Consequently, they may need to expend more effort and resources to do so. However, it is possible that in non-SOEs, where there may be less stringent guidelines, the impact of ESG rating could be more evident in reducing stock price crash risk in the background of the US–China trade war.

The research divided our sample into SOE groups and POE groups according to the type of ownership. Table 8 reports the results. Columns (1) and (3) report the results for the SOE group, and Columns (2) and (4) report the results for the non-SOE group. As we can see from Columns (1) and (3), the coefficient is positive and insignificant, while the coefficients are negatively significant at a 1% level for the POE group. The result meets our expectations.

6.2 | Market Competition

The intensity of competition in the product market exacerbates the motivation for managers to conceal bad information (Li and Zhan 2019). Bad news disclosure may reduce executive compensation and job termination (Kothari et al. 2009; Nagar 1999). Industry competition aggravates career concerns and uncertainty, eroding firm profitability and increasing CEO turnover rates (DeFond and Park 1999). During the US–China trade war crisis, when the level of market competition is high, the market pressure on companies increases, which may increase investors' uncertainty about the company's future profitability, thereby increasing the risk of a stock price crash. Firms with higher levels of ESG rating tend to adopt a long-term perspective, which helps them maintain strategic focus in the face of short-term market pressures (Hoepner et al. 2024). Therefore, we propose that the impact of ESG activities could be more evident in reducing stock price crash risk in firms with higher levels of industry competition during the US–China trade war.

Market competition is commonly measured by industry concentration. Following DeFond and Park (1999) and Roberts (1999), the research uses the Herfindahl-Hirschman Index (HHI) to measure market competition. It is calculated as the sum of squares of the market shares of the 50 largest firms in an industry and ranges from near 0 (perfect competition) to 1.0 (monopoly). High HHI indicates low competition, while low HHI indicates high competition. We divide the sample into two

TABLE 9 | Heterogeneity results for market competition.

Variables	Market competition		Market competition	
	(1) Low NCSKEW	(2) High NCSKEW	(3) Low DUVOL	(4) High DUVOL
Treat * Post * ESG	−0.044	−0.091**	−0.044	−0.060**
	(0.054)	(0.044)	(0.039)	(0.030)
Observations	5904	5169	5904	5169
Year FE	Yes	Yes	Yes	Yes
Industry FE	Yes	Yes	Yes	Yes
Control	Yes	Yes	Yes	Yes
R^2	0.095	0.120	0.073	0.118

Note: This table reports the heterogeneity regression result for market competition. Year and industry fixed effects are included. Heteroscedasticity-consistent standard errors are clustered at the firm level. Robust standard errors are used and reported in parentheses.
Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FE, fixed effects; NCSKEW, negative coefficient of skewness.
*, ** and *** represents statistical significance at the 10%, 5% and 1% levels, respectively.

groups based on the median of the HHI. The results are reported in Table 9. Columns (1) and (3) report the results for the lower market competition group, and Columns (2) and (4) report the results for the higher market competition group. As indicated by Columns (2) and (4), the coefficients are statistically significant and negative for the group of firms facing higher levels of market competition. In contrast, the coefficients are not significant for those challenged by the lower market competition level. The results confirm our contemplation.

7 | Conclusion

This study examines the relationship between firms' ESG activities and stock price crash risk during the US–China trade war and the possible influencing mechanisms behind the link. Higher levels of ESG activities help mitigate the stock price crash risk. Influencing mechanisms of ESG on crash risk include improving information transparency and corporate governance. Further analysis shows that the mitigation effects are heterogeneous and more pronounced for private firms than their state-owned counterparts and firms facing higher market competition than those challenged by lower competition.

Our research provides insights and implications into times of economic turmoil. From the perspective of firms, actively participating in ESG activities can make them more resilient in the face of external shocks, thereby helping them maintain a competitive advantage in the market. To better respond to crises, firms must optimise internal resource allocation and further improve their corporate governance structure to enhance their stability.

From investors' perspectives, incorporating ESG factors into the investment decision-making process can enable them to evaluate a company's value and risk status more comprehensively. Especially during periods of economic turbulence, companies with higher ESG scores often demonstrate stronger risk resistance and more stable market performance. This indicates that if investors can pay attention to the ESG level of companies and select companies with outstanding ESG performance for investment, they are more likely to obtain stable returns and reduce portfolio volatility.

Government departments can introduce relevant policies, such as encouraging companies to disclose ESG information, to guide companies to pay more attention to ESG practices and, therefore, enhance the overall stability and risk resistance of the market.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data are collected from the CSMAR and are available upon request.

Endnotes

[1] https://www.chindices.com/service.html.

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Appendix

See Table A1.

TABLE A1 | Variable description.

Variable	Definition
NCSKEW	The normalised negative third moment of FSWR in a given year
DUVOL	The logarithmic transformation of the ratio of the SDs of down weeks to the SDs of up weeks in a given year
ESG_dummy	A dummy variable of ESG rating, defined as 1 if the rating is above the median group by year and industry, 0 otherwise
ROA	Return to total asset
Firm size	Firm size variable is defined as the total asset of the firm.
Leverage	Leverage of a firm is defined as total debt divided by total asset amount
Male ratio	The ratio of male staff to the total number of staff
Firm age	The natural log of the current year minus the start year of the firm
Sales growth	The growth rate of sales of the previous year
Board size	The number of board members of the firm

Abbreviations: DUVOL, down-to-up volatility; ESG, Environmental, Social and Governance; FSWR, flexible steel wire rope; NCSKEW, negative coefficient of skewness; ROA, return on asset.