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How ESG Disclosure Affects the Stock Price Crash Risk

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Abstract: This study delves into the relationship between ESG (environmental, social, and governance) factors and the possibility of a stock market collapse. While ESG factors have become a pivotal consideration in assessing a company's sustainable and ethical business practices, the dynamics between ESG scores and the stock market collapse risk remain underexplored. Drawing upon a comprehensive dataset from 2009-2020, our research offers an enriched understanding of these factors' interplay. Initial findings suggest a correlation between higher ESG scores and reduced stock price collapse risk. The paper contributes to the broader discourse in three keyways. Firstly, it expands the understanding of ESG's economic consequences, emphasizing its potential protective role against significant stock price downturns. Secondly, by incorporating the perspective of sustainable business practices, the research contributes to the existing literature on the factors that determine of stock price collapse risk. Finally, it underscores the practical implications of promoting ESG in mitigating financial risks, informing both corporate strategies and regulatory frameworks.

Keywords: ESG, sustainable development, stock price crash risk

1. Introduction

Environmental, Social, and Governance (ESG) factors are gaining significant status in the business sector, with studies by Friede and others highlighting their influence on corporate operations and their perceived impact on a firm's long-term sustainability [1]. In a rapidly evolving global market, ESG factors have become vital in assessing a company's ethical and sustainable business practices. The growing relevance of ESG factors is reflected in the broader socio-economic context, with increasing awareness and regulatory focus on sustainable business practices.

Existing literature, such as John Goodell and others has begun exploring the interplay between ESG and stock price crash risk [2]. However, these studies generally lack a detailed understanding and methodology of how ESG ratings might influence stock price crash risk. Addressing this research gap, this study aims to provide a comprehensive analysis of the relationship between stock price collapse risk index and ESG index from 2009-2020, suggesting a notable correlation between these variables, indicating that higher ESG scores may help mitigate stock price collapse risk. This study offers three key contributions. First, it enriches the economic research on the effects of ESG, focusing on the dimension of stock price crashes. This novel angle provides valuable insights into the potential protective role of ESG against drastic stock price downfalls. Second, this research expands our comprehension of the factors affecting the stock price collapse index, emphasizing the role of

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sustainable business practices. Lastly, the study bears significant practical implications. While implementing ESG initiatives might entail substantial costs, the potential to improve ESG ratings and subsequently decrease the stock price collapse risk presents a compelling argument. These insights also offer guidance to financial regulators, suggesting that promoting ESG could aid in mitigating financial risks and facilitating their regulatory duties.

The rest of the paper is structured as follows: Section 2 delves into the theoretical background and presents a literature review, Section 3 outlines the methodology used for the study, Section 4 presents the data and empirical findings, Section 5 concludes the study and offers potential avenues for future research.

2. Literature Review

2.1. Consequence of ESG Disclosure

The intricate relationship between ESG disclosure and corporate financial performance (CFP) has garnered substantial attention, with a wealth of empirical studies conducted since the 1970s [1]. These investigations have predominantly uncovered that ESG factors and CFP are positively correlated. In fact, approximately 90% of the 2,200 individual studies observed a non-negative relationship between ESG and CFP, with the majority reporting favorable outcomes.

This positive association transcends various contexts, encompassing portfolio studies, diverse geographies, and burgeoning sectors of assets for ESG investing, including corporate debt, green real estate, and emerging markets. Delving deeper into the significance of ESG considerations, their influence extends to credit rating decisions, with corporate governance emerging as a particularly crucial aspect [3].

The importance of ESG factors in financial markets is further underscored by their impact on stock returns and credit default swap spreads surrounding rating announcements. This demonstrates the critical role ESG considerations play in shaping the perceptions and decisions of both equity and debt investors, as they seek to navigate the complex landscape of corporate performance.

2.2. Literature on Stock Price Collapse

It is also worthwhile to investigate the concept of stock price collapse, including its causation and modeling. The extensive literature on stock price collapse risk delves into a plethora of determinants, meticulously organized into quintessential categories: financial reporting and company disclosures, executive incentives and traits, financing transactions, governance mechanisms, and informal organizational structures [4].

The efficacy of internal control mechanisms is a crucial factor in mitigating the risk of an upcoming stock market collapse. These systems include control environment robustness, risk evaluation, control operations, communication and knowledge sharing, and surveillance. This inverse relationship between internal control and crash probability is accentuated by corporations with inadequate governance structures and constrained capacity to address to extreme negative events [5].

In addition, financial reporting transparency serves as an indispensable factor in determining stock price crashes. Empirical studies substantiate that firms manifesting lower transparency, as denoted by earnings management, grapple with heightened crash risk due to the paucity of company-specific information disclosure [6]. Lastly, the composition of the board of directors (BOD) exerts a considerable impact on stock price crash risk. Scholarly research corroborates that BODs comprising independent and expert directors are adept at precluding stock price crashes, regardless of board size [7].

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2.3. Literature on the Connection Between ESG Disclosure and the Risk of Stock Price Collapse

The intricate interplay between ESG ratings and stock price collapse risk has been meticulously examined, with empirical evidence revealing a negative correlation, particularly within Chinese firms [2]. This relationship considers both stakeholder-oriented and agency theory-based perspectives, with the latter proving to be more congruent with the observed outcomes. Consequently, superior ESG performance is posited to foster enhanced transparency and subsequently curtail crash risk.

In a similar vein, corporate social responsibility (CSR) performance has been identified as a key factor in mitigating future stock price crash risk [8]. The ameliorating influence of CSR is especially pronounced in firms grappling with suboptimal corporate governance structures or diminished institutional ownership. This accentuates the vital role CSR plays in risk management, particularly when traditional governance mechanisms falter in their efficacy.

2.4. Hypothesis Development

Considering the Comprehensive Literature Review on ESG Disclosure, Stock Price Crash Risk, and the Interplay Between These Factors, We Delve into the Development of Our Research Hypothesis.

First, ESG disclosure has been found to have a positive association with corporate financial performance [1], plays a pivotal role in credit rating decisions, and influences stock returns and credit default swap spreads [3]. These findings imply that ESG factors are closely connected to investors' decision-making processes and possess the capacity to alleviate stock price crash risk.

Furthermore, the literature review underscores the significance of financial reporting transparency and corporate governance in affecting stock price crash risk [4]. When firms display low transparency, as evidenced by earnings management, they confront a heightened risk of stock price collapse due to insufficient firm-specific disclosures [6]. A robust ESG disclosure framework can augment transparency, bridge the information gap between firms and investors, and stimulate superior corporate governance practices.

Moreover, the literature review reveals that CSR performance, which shares a close relationship with ESG disclosure, plays a crucial function in mitigating the risk of share price crash, particularly in companies grappling with weak corporate governance or meager levels of institutional ownership [8]. This observation supports the notion that ESG disclosure can serve as an effective risk management instrument when traditional governance mechanisms falter, providing an incentive to increase management efforts within the company in order to obtain a higher rating, thereby reducing operational risk. The negative association between control mechanisms and risk of crash becomes stronger when corporations are encumbered by subpar governance structures and a restricted capacity to manage extreme negative events [5]. Consequently, ESG disclosure assumes even greater importance in these circumstances to curtail the risk of stock price collapse. Based on the above discussion, this paper puts forth the following hypothesis:

Hypothesis 1: ESG disclosure is inversely related to stock price crash risk because it bolsters transparency, diminishes information asymmetry risk, and fosters enhanced internal corporate governance, ultimately decreasing a company's operational risk.

3. Research Design

3.1. Sample and Data

We will collect panel data from publicly traded companies in various industries and regions for this research. The sample period is from 2009 to 2020. Our initial sample covers all Chinese publicly traded companies. The precise number of firms in the final sample will be determined after the data

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cleaning process. I exclude financial firms and special treated (ST) firms. After applying the exclusion criteria, the final sample will consist of 31163 firm-year observations.

The data obtained from various databases. Specifically, financial and corporate governance data will be obtained from the CSMAR database, while ESG data will be sourced from the Wind database. We will address outliers for all continuous variables, trimming extreme values to reduce their impact on the analysis. All continuous variables are winsorized at the top (bottom) 1% level.

3.2. Model Specification

This paper employs a multiple regression analysis to look at the effects of ESG disclosure on the probability of stock price collapse:

$$\text{Crash} = b0 + b1 * \text{ESG} + bi * \text{Controls} + \text{Industry Fixed Effects} + \text{Year Fixed Effects} + \varepsilon i \quad (1)$$

This paper uses a slightly modified version of Jin and Wu's methodology for evaluating the possibility of stock price collapse [9]. Specifically, this paper uses NCSKEW to proxy for crash risk. As for key independent variable, this study uses the ESG ratings. We hypothesize that the coefficient of ESG (b1) will be negative, indicating a negative correlation in ESG disclosure and the risk of a stock price crash. In addition, this study controls for firm size, leverage as a measure of debt-to-asset ratio in company, measure of a company's tangible assets, measure of the amount of cash a company generates from its regular business operations, the percentage of independent directors upon the company's board as well as the size of the board of directors.

We will perform descriptive statistics and correlation analysis to understand the relationships between variables. We will then run the regression model to evaluate the hypothesis and estimate the coefficients. Robustness checks, including alternative measures of ESG disclosure and stock price crash risk, will be conducted to ensure the validity of the results. The detail of the variables used in the model can be seen in Table 1 below.

Table 1: Variable definition.

Variable Type	Variable Name	Variable Value Description
Explained Variables	*ESG*	This variable represents a firm's disclosure regarding its environmental, social, and governance practices.
Explanatory Variables	*NCSKEW*	The risk of a stock price collapse.
Control Variables	*Size*	Measures the size of the firm.
	PPE	Measure of a company's tangible assets.
	Cfo	Measure of the amount of cash a company generates from its regular business operations.
	Lev	Measure of a company's leverage.
	Indep	the percentage of independent directors upon the company's board.

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Table 1: (continued).

	Board	the size of the company's board of directors.

4. Empirical Results

The average value of NCSKEW_ Mdeq is -0.417 with a standard deviation of 0.742. The 25th and 75th of NCSKEW_ Mdeq are -0.818 and -0.026. respectively. We have three more measures of stock price collapse risk: NCSKEW_Mdos, NCSKEW_Mdtl, and NCSKEW_Cmdeq. The mean values for these variables are -0.325, -0.336, and -0.413 with standard deviations of 0.726, 0.725, and 0.74, respectively. The values at the 25th percentile for these measures are -0.724, -0.733, and -0.816, while the values at the 75th percentile are 0.103, 0.091, and 0.024, respectively. The ESG variable has a mean value of 6.473 with a standard deviation of 1.129. The 25th and 75th percentiles of this variable are 6 and 7, respectively.

For the control variables, the mean value of the variable Size stands at 22.196. The variable PPE has an average value of 0.213. The average value of Cfo is 0.044. The mean value of Lev is 0.445. The average value of Indep is 0.38. Lastly, the Board variable has a mean value of 2.292. Collectively, the statistics of control variables in Table 2 are consistent with prior literature.

Table 2: Variable Summary.

Variable	N	Mean	SD	p25	p50	p75
NCSKEW_Mdeq	31163	-0.417	0.742	-0.818	-0.377	0.026
NCSKEW_Mdos	31163	-0.325	0.726	-0.724	-0.293	0.103
NCSKEW_Mdtl	31163	-0.336	0.725	-0.733	-0.302	0.091
NCSKEW_Cmdeq	31163	-0.413	0.74	-0.816	-0.371	0.024
ESG	31163	6.473	1.129	6	6	7
Size	31163	22.196	1.436	21.195	21.975	22.932
PPE	31163	0.213	0.166	0.082	0.179	0.307
Cfo	31163	0.044	0.074	0.005	0.044	0.087
Lev	31163	0.445	0.22	0.27	0.435	0.606
Indep	31163	0.38	0.071	0.333	0.364	0.429
Board	31163	2.292	0.257	2.197	2.303	2.485

Table 3 presents the baseline regression results. Columns (1), (2), (3), (4) use as the dependent variable. In column (1), the coefficient of ESG is -0.0201 and is significantly negative at the 1% level (t-value = -3.48). In column (2), (3), and (4), the coefficients of ESG are -0.0223, -0.0245, -0.0144, and their significant level is negatively at 1% (t-value = -3.96), 1% (t-value = -4.34), and 10% (t-

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value = -2.49), respectively. The significance and magnitude of control variables are largely consistent with prior literature. The other detailed information is presented in Table 3. In summary, the results in Table 3 suggests that ESG reporting help reduce stock price collapse risk.

Table 3: Regression Results.

	(1)	(2)	(3)	(4)	
	NCSKEW_Mdeq	NCSKEW_Mdos	NCSKEW_Mdtl	NCSKEW_Cmdeq	
ESG	-0.0201***	-0.0223***	-0.0245***	-0.0144*	
	(-3.48)	(-3.96)	(-4.34)	(-2.49)	
Size	0.0189	-0.00172	0.00459	0.0131	
	(1.92)	(-0.18)	(0.48)	(1.33)	
PPE	-0.106	-0.0674	-0.0544	-0.107	
	(-1.86)	(-1.22)	(-0.98)	(-1.89)	
Cfo	-0.0847	-0.102	-0.0990	-0.106	
	(-1.19)	(-1.48)	(-1.43)	(-1.49)	
Lev	0.00909	0.0675	0.0760	-0.0314	
	(0.23)	(1.74)	(1.96)	(-0.79)	
Indep	-0.00251	-0.0315	-0.0222	-0.00687	
	(-0.03)	(-0.43)	(-0.30)	(-0.09)	
Board	0.00672	0.0234	0.0227	0.0123	
	(0.28)	(1.01)	(0.98)	(0.52)	
Constant	-0.700**	-0.195	-0.341	-0.595**	
	(-3.17)	(-0.91)	(-1.59)	(-2.71)	
N	30926	30926	30926	30926	
R^2	0.1820	0.1852	0.1830	0.1820	

Note: *, ** and *** indicate significance at the 10%, 5% and 1% levels (two-tailed), respectively. Refer to Table 1 for the variable definition and measurement.

5. Conclusion

The significance of ESG compliance has grown into a fundamental issue in corporate strategy and investor decision-making in the context of growing global attention to sustainable business practices.

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ESG standards offer a framework for evaluating a company's commitment to sustainable operations, social responsibility, and robust governance practices. By adhering to these standards, companies demonstrate to investors and other stakeholders their dedication to long-term, sustainable value creation.

Using data from Chinese listed firms from 2009 to 2020, this paper investigates the impact of ESG reporting on firms' stock price crash risk. Specifically, I have found that better ESG performance can help reduce the risk of future stock price collapses. I propose that this correlation is primarily driven by enhanced information transparency provided by ESG compliance. This heightened transparency reduces the information asymmetry between a company and its stakeholders, which in turn mitigates the likelihood of a stock price crash. Additionally, increased transparency fosters improved internal governance, further reducing crash risk.

Reflecting on the contributions of this research, it first extends the understanding of ESG's economic outcomes by revealing its protective effect against stock price collapse. Secondly, the study offers new insights into what influences stock price crash risk, illuminating the role of ESG compliance. Lastly, the practical implications of this study are significant, revealing that despite the costs involved in adhering to ESG standards, the potential benefits of reduced stock price crash risk make a compelling case for ESG adoption.

The broader perspective of this research could offer substantial implications for financial regulation. By underscoring the benefits of ESG compliance, it aids financial regulators in formulating guidelines that promote sustainable practices while concurrently mitigating financial risks. Despite the insights provided by this study, I acknowledge that this is a complex area requiring further exploration. Future research could use cross-country data to examine the effect of ESG compliance on stock price crash risk across diverse economic contexts.

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