GOLDEN RATIO OF AUDITING RESEARCH
VOLUME 6, ISSUE. 1 (2026)
Website: https://goldenratio.id/index.php/grar

GOLDEN RATIO
ISSN [Online]: 2776-6780

AUDITING | RESEARCH ARTICLE

ESG Performance and Its Role in Mitigating Stock Price Crash Risk: Evidence from Indonesian Listed Companies

Isnaini Nuzula Agustin[1], Julia Ananda Caesaria[2], Hery Haryanto[3]

[1,2,3] Department of Management, Faculty of Business and Management, Universitas Internasional Batam, Batam, Indonesia. Email: Isnaini.nuzula@uib.ac.id[1], 2241024.julia@uib.edu[2], hery@uib.ac.id[3]

ARTICLE HISTORY

Received: October 29, 2025
Revised: November 15, 2025
Accepted: November 25, 2025

DOI
https://doi.org/10.52970/grar.v6i1.1820

ABSTRACT
This study examines the extent to which ESG performance influences stock price crash risk (SPCR) among companies listed on the Indonesia Stock Exchange (IDX). Using ESG Score data from the Refinitiv database, this study analyzes 232 firm-year observations from 2018 to 2023. SPCR is measured using Negative Skewness (NSKEWNESS), an indicator capturing the asymmetry of return distributions that reflects the buildup of hidden bad news and Down-to-Up Volatility (DUVOL), which captures downside volatility relative to upside movements. Regression results show that the aggregate ESG Score significantly reduces SPCR when measured with NSKEWNESS, indicating that firms with stronger ESG engagement are less likely to experience extreme negative price declines. When decomposed, the Environmental and Social components significantly mitigate SPCR, while Governance exhibits a negative but insignificant effect. However, none of the ESG components significantly influence DUVOL, suggesting that ESG practices may be more effective in addressing long-term crash risk rather than short-term price volatility. These findings highlight the role of ESG in promoting market resilience and underscore the importance of transparent and comprehensive sustainability reporting for corporate managers, investors, and regulators.

Keywords: Environment, ESG, Social, Governance, Stock Price Crash Risk.
JEL Code: G14, G32, G34, M14, Q56

I. Introduction

In recent decades, Environmental, Social, and Governance (ESG) has taken center stage in the business and investment world. More companies are disclosing ESG information in their annual reports, to improve transparency and increase investor interest (Syntao Green Finance, 2020) Investors are increasingly paying attention to companies' ESG performance to reduce investment risks, including the risk of a drastic decline in stock prices, or defined as Stock Price Crash Risk (Luo, 2023; Ma, 2024; Murata et al., 2021). Recent research also highlights that ESG factors have become a central analytical tool for investors, as these indicators help assess both long-term opportunities and potential risks in financial markets (Ameliana & Nanda, 2024). This is due to the increasing realization that poor ESG performance can lead to instability in a company's operations, which might result in decreased market confidence and a stock price crisis (Fiorillo et al., 2024; Luo, 2023). In addition, firms with weak ESG initiatives tend to have higher SPCRs due to information asymmetry and risky decision-making (Pereira da Silva, 2022; Sang et al., 2024).

ISSN [Online]: 2776-6780

Prior studies generally document that firms with strong ESG performance tend to exhibit lower Stock Price Crash Risk because sustainable practices improve transparency and reduce information asymmetry (Zhou et al., 2022). However, the effectiveness of ESG in improving the quality of firm disclosure remains a matter of debate. The information obfuscation hypothesis posits that poorly performing firms may employ ESG disclosure as a means of concealing negative information rather than enhancing transparency (Liu et al., 2022). In such cases, ESG becomes a symbolic tool rather than a substantive measure of sustainability, raising questions about whether ESG truly improves information environments or merely distracts investors (Trotta et al., 2024). Lack of transparency in financial information often leads to stock price crash risk (SPCR) caused by the accumulation of hidden bad news. According to the bad news hoarding hypothesis proposed by Jin & Myers (2006), company management may delay the disclosure of negative information to maintain short-term stock price stability. However, when the accumulated negative information is finally revealed, the market reacts with a mass panic that causes a drastic fall in stock prices or even a stock market crash. A vivid example of this phenomenon is the financial statement manipulation scandals that occurred with Kangmei Pharmaceutical (2019) and Kangdexin in China, which resulted in plummeting stock prices and significantly reduced investor confidence (Li et al., 2023; Xu et al., 2022).

The SPCR phenomenon also occurred in various other countries, including Indonesia, where the shares of several companies experienced a drastic decline due to a lack of information transparency (Hmouda et al., 2024). For example, PT Bukalapak.com Tbk. (BUKA) Shares have decreased 69.65% since the initial public offering (IPO) until March 2022 due to loss-making financial reports (Kusnandar, 2022). The same thing happened to PT MNC Vision Networks Tbk (IPTV), which experienced a 52.38% decline in one month due to high-interest debt of IDR 2 trillion (Pintarsaham.id, 2021). This fall in share price shows that non-transparent financial information can have a significant impact on capital market stability (Abdou et al., 2024). Thus, the ESG Score is believed to help stakeholders better understand the environmental, social, and governance aspects of companies, and contribute to the transparency of information in the capital market in supporting the green economy and low-carbon economic system (Liu et al., 2022). In addition to individual cases, the phenomenon of falling stock prices is also reflected in broader market trends. Since October 2024, the Jakarta Composite Index (JCI) has shown a significant decline, reflecting weakened investor sentiment due to a combination of global and domestic factors, including geopolitical uncertainty, inflation, and concerns over companies' resilience to environmental and social risks. (CNBC Indonesia, 2024; Kompas, 2024; Liputan6, 2024; GoodStats, 2024). This decline in the JCI reflects the systemic potential of Stock Price Crash Risk (SPCR) in Indonesia, making it important for investors and regulators to identify early indicators that can predict this risk.

Although prior studies explore ESG's general influence on SPCR, limited research distinguishes the specific contributions of each ESG component (Environmental, Social, Governance) (Li, 2024). Furthermore, within the Indonesian context, most studies rely on ESG disclosure, which may reflect compliance-driven narratives rather than actual performance, leading to potential misinformation bias (Giantari, 2024). This creates a research gap regarding whether ESG performance, as measured using standardized ESG Scores, can mitigate SPCR more effectively than narrative disclosure. Taking into account the existing research gap, this study seeks to fill the research gap with several key contributions. First, this study not only looks at the relationship of ESG Score to SPCR in aggregate, but also analyzes the impact of each ESG component (Environmental, Social, Governance) separately on stock price crash risk. Second, there is also a void of research in the Indonesian context, especially those that discuss the relationship between ESG and stock price crash risk. Research conducted in Indonesia is still relatively limited and mostly only uses the ESG Disclosure approach (Giantari, 2024). In fact, this approach has a fundamental weakness, namely the potential for misinformation. Many companies only add words relevant to sustainability solely to fulfill regulatory demands, such as reporting to the Financial Services Authority, without actually reflecting actual sustainability performance. Although various studies have addressed the impact of ESG disclosure on firm performance and capital markets, the results still show inconsistencies. Some studies suggest that ESG disclosure can increase

ISSN [Online]: 2776-6780

information transparency and reduce the risk of stock price crashes by increasing credibility and investor confidence (Fiordelisi et al., 2023; Ge et al., 2023; Lee et al., 2022).

II. Literature Review and Hypothesis Development

2.1. Stock Price Crash Risk (SPCR) and Theoretical Framework

Stock Price Crash Risk (SPCR) refers to the possibility of a firm experiencing an extreme and rapid decline in its stock price within a short period. This risk can occur due to negative information that is held back and only disclosed to the market in large quantities suddenly (Jin & Myers, 2006; Silva, 2022). SPCR measurement in this study uses two main indicators, namely Negative Skewness (NSKEWNESS) and Down-to-Up Volatility (DUVOL). To explain the relationship between ESG and SPCR, this study incorporates three theoretical foundations: Stakeholder Theory, Agency Theory, and the Efficient Market Hypothesis (EMH). Stakeholder Theory posits that firms must manage the interests of all stakeholders, including employees, customers, communities, and regulators. Strong ESG practices can reduce stakeholder conflicts, enhance legitimacy, and support long-term stability, thereby lowering Stock Price Crash Risk.

In addition, Agency theory explains the relationship between company owners (principals) and management (agents), which is often filled with conflicts of interest due to asymmetric information. In the context of ESG, good disclosure can reduce this conflict by providing more transparent and accountable information, thereby reducing the risk of information manipulation that can trigger the risk of falling stock prices (Itan et al., 2024). By adopting strong ESG practices, companies can build trust with investors and reduce agency risk. Meanwhile, the Efficient Market Hypothesis states that stock prices reflect all information available in the market (Fama, 1970). However, in practice, information asymmetry and delays in ESG disclosure lead to deviations from market efficiency. Proper and accurate ESG can improve market efficiency by reducing information uncertainty and minimizing negative surprises that could lead to stock price crashes (Zhang & Ding, 2023).

2.2. Environmental, Social, and Governance (ESG) And Stock Price Crash Risk

ESG Score is an indicator used to assess the performance of a company in three main aspects, namely Environment, Social, and Governance. ESG score is an important factor in the assessment of corporate sustainability and has been widely used in research related to investment and financial risk (Murata & Hamori, 2021). ESG Score serves as a transparency tool that allows investors to assess a company's commitment to sustainable and ethical business practices, which in turn can affect the company's financial risks, including the risk of falling stock prices (Silva, 2022). In line with this view, recent findings suggest that the integration of ESG metrics into financial decision-making reflects a broader shift toward long-term market resilience, where sustainable practices help firms reduce vulnerability to extreme downside risks (Junaedi, 2024).

According to Kim and Li (2021), the ESG concept reflects the company's efforts in fulfilling social and environmental responsibilities, as well as applying ethical principles in business management. Meanwhile, Baier and Kunter (2020) added that the three main pillars of ESG, namely environmental, social, and governance, are an important basis for corporate social accountability practices and support the long-term sustainability of business activities. By applying ESG principles, companies not only build a good reputation but also increase investor confidence and competitiveness in a market that increasingly demands social responsibility and sustainability. Previous research has examined the relationship between ESG performance and overall firm performance. The results show that companies with high ESG scores often have stronger financial results, as ESG practices can lower costs and improve operational efficiency, especially in high-risk sectors (Chen et al., 2024; Zhou et al., 2022).

In addition, ESG performance is also associated with better stock returns, as companies committed to ESG tend to attract investor interest and can achieve higher market valuations (Li et al., 2022; Xu et al., 2022).

ISSN [Online]: 2776-6780

ESG performance has long been regarded as one way for companies to maintain financial stability. Research conducted by Li et al. (2022) shows that companies with high ESG scores tend to be more financially stable and have lower stock price crash risk. In addition, Zhou et al. (2022) found that strong ESG helps increase investor confidence, which in turn reduces stock price volatility.

2.3. Environment Pillar and the Stock Price Crash Risk

Environmental aspects of ESG include a company's policy towards sustainability, energy efficiency, waste management, as well as the environmental impact of business operations. Companies with high environmental scores are generally more transparent in managing environmental impacts and committed to sustainable business practices (Xu et al., 2022). Environmental factors can also contribute to reducing financial risk by improving regulatory compliance and reducing the likelihood of fines or litigation resulting from environmental violations (Huang et al., 2023). Yu et al. (2016), in Purnomo and Eriandani (2023), define environmental uncertainty as a situation when a company does not have competent information about its internal and external operating environment. Companies with good environmental performance are usually active in reducing their carbon footprint and carrying out environmentally friendly practices (Chandra et al., 2022). This positive image supports long-term sustainability, as environmental concerns are now an important part of overall corporate performance assessment (Sari et al., 2023). According to Akhter et al. (2023), environmental disclosures include information about energy use, emissions, waste, and other green initiatives, which are conveyed narratively, numerically, or monetarily as a form of accountability to stakeholders.

The environment includes policies on emissions reduction, energy efficiency, resource conservation, and waste management. Companies that apply sustainability principles in their operations are considered more responsible and have better resilience to external pressures (Chandra et al., 2022; Huang et al., 2023). From a market risk perspective, companies that fail to address environmental issues such as pollution or regulatory violations may face fines, product recalls, and consumer boycotts. This can lead to market instability and negative information shock. In contrast, companies that are transparent in their disclosure of environmental impacts demonstrate good intentions towards sustainability and reduce information asymmetry with investors (Fiordelisi et al., 2023; Ge et al., 2023). A positive environmental image can also attract long-term investors who are oriented towards sustainable investment, thereby reducing the potential for mass sell-offs that can trigger stock price crashes (Sari et al., 2023; Zhang & Zhao, 2023). Thus, environmental aspects in ESG have the potential to reduce stock price crash risk (SPCR) through increased transparency, regulatory compliance, and reputational risk management.

2.4. Social Pillar and the Stock Price Crash Risk

The social dimension of ESG reflects how a company interacts with its employees, customers, suppliers, and surrounding communities. Factors included in this category include human rights, labor policies, and contributions to society (Silva, 2022). Companies with high social performance can increase employee and consumer loyalty, which contributes to long-term financial stability and reduces stock price volatility (Hmouda et al., 2024; Zareie et al., 2024). Social disclosure includes non-financial information related to company activities that affect the perception of society, especially employees and consumers (Sadiq et al., 2020). This performance is realized through employee training, product safety, community relations, and social activities such as donations or philanthropic programs (Tambunan et al., 2022). Disclosure of these initiatives not only reflects corporate social responsibility but is also an important strategy to build public trust and support long-term sustainability (Adhi & Cahynowati, 2023).

Social aspects include labor policies, human rights, work safety, diversity, and social contributions to society (Silva, 2022). Companies that treat their employees fairly, maintain good relations with local communities, and demonstrate high social responsibility tend to gain greater trust from the public (Adhi & Cahynowati, 2023; Tambunan et al., 2022). Such trust acts as a buffer against negative surprises, as the public and investors will be more loyal, even in uncertain market conditions. In addition, transparent social disclosure reduces information asymmetry and helps the market assess the company's condition more accurately (Sadiq et al., 2020). According to stakeholder theory, companies that are able to maintain relationships with stakeholders will experience fewer conflicts and external pressures, which have an impact on stock price stability (Zareie et al., 2024). When the perception of the company is positive, the risk of crashes due to hidden bad information can be suppressed. Therefore, social aspects in ESG play an important role in shaping

harmonious relationships between a company and its stakeholders, which in turn can lower the risk of stock price crashes.

2.5. Governance Pillar and Stock Price Crash Risk

Governance in ESG assesses transparency and accountability in the management of companies, including board structure, shareholder rights, and anti-corruption policies. Good governance can reduce the risk of financial statement manipulation and increase credibility in the eyes of investors (Murata & Hamori, 2021). Effective and transparent corporate management reduces uncertainty in the capital market and can mitigate the risk of falling stock prices (Bongiovanni & Fiandrino, 2024). Governance disclosures include various management practices, social responsibility strategies, and stakeholder participation (Chen & Yang, 2020). Strong governance is an important foundation in building investor confidence, as it shows that the company is managed fairly and efficiently. When investors feel confident that profits will be allocated wisely and not misused for management's personal interests, the value of the company in the market will be more stable and tend to increase (Daromes et al., 2023).

Governance aspects include board structure, shareholder rights, internal audit mechanisms, and anti-corruption policies. Good governance helps ensure that management decisions are made accountably and also do not harm minority shareholders (Murata & Hamori, 2021; Daromes et al., 2023). According to agency theory, SPCR risks often arise due to the accumulation of bad information hidden by management. A strong governance system can prevent such practices by creating effective monitoring and reporting channels (Chen & Yang, 2020; Itan et al., 2024). Higher transparency in financial and non-financial reporting allows the market to react to information gradually, rather than by surprise, thereby lowering the potential for crashes. In addition, firms with strong governance tend to be more attractive to institutional investors who prioritize stability and long-term risk management (Huang et al., 2023; Zhang & Zhao, 2023). Thus, effective governance can serve as a protective mechanism against stock price crashes by minimizing the risk of hidden information and increasing investor confidence.

According to the explanation above, Figure 1 depicts the research framework for this study. It can be concluded that those previous studies focused more on the influence of ESG Score, without elaborating on the impact of each aspect of Environmental (E), Social (S), and Governance (G) on SPCR.

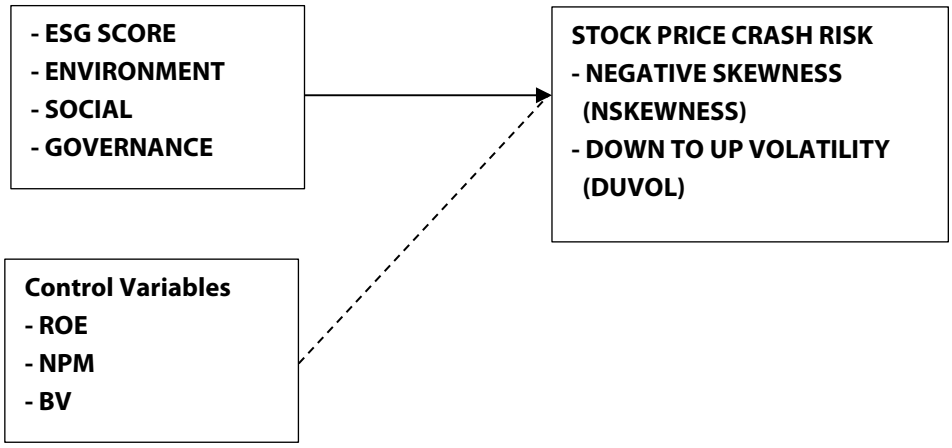

Figure 1. Conceptual Framework

The hypothesis in this research is as follows:

H1: ESG Score negatively affects Stock Price Crash Risk.
H2: The Environment Pillar negatively affects Stock Price Crash Risk.
H3: Social Pillar negatively affects Stock Price Crash Risk.
H4: Governance Pillar negatively affects Stock Price Crash Risk.

ISSN [Online]: 2776-6780

III. Research Method

The sampling technique in this study used a purposive sampling method, namely, sample selection based on certain criteria relevant to the research objectives. The sample selection criteria are companies listed on the Indonesia Stock Exchange (IDX) during the period 2018 to 2023, taken from the Refinitiv Thomson Reuters database. The year 2018 was chosen because regulations regarding sustainability reporting in Indonesia were only implemented in 2017, so information on ESG was only available in 2018. Furthermore, based on the availability of ESG scores in the database, there were 84 companies and 242 unbalanced panel observations. This scientific work was prepared using a quantitative method that utilizes secondary data in the form of ESG Score Reports, Stock Price Crash Risk Calculations, which require company stock return data related to the NSKEWNESS and DUVOL methods, and Financial Ratios consisting of Return on Equity (ROE), Net Profit Margin (NPM), and Book Value (BV) as control variables.

3.1. ESG Score

The ESG Score used in this study is sourced from the Refinitiv Thomson Reuters ESG database, which evaluates firms based on environmental, social, and governance performance indicators. Each component assesses more than 150 publicly disclosed metrics, including:

a. Environmental: emissions, energy use, waste management
b. Social: labor practices, customer responsibility, community engagementGovernance: board structure, transparency, shareholder rights

The Refinitiv ESG Score ranges from 0 to 100, where a higher value indicates stronger sustainability practices. This standardized score is widely used in empirical studies due to its comprehensive methodology and cross-country comparability.

3.2. Stock Price Crash Risk (NSKEWNESS)

Negative Skewness or NSKEWNESS is used to measure the imbalance in the distribution of stock returns over a period of time. A negative NSKEWNESS value indicates a tendency for stock prices to fall more sharply than the increase in stock prices (Xu et al., 2022). The use of NSKEWNESS in this study aims to identify patterns of falling stock prices due to financial risk factors and information hidden by management.

$$NSKEW_{j,t} = -\frac{n(n-1)^{\frac{3}{2}}\sum_{i=1}^{n} R_{i,t}^{3}}{(n-1)(n-2)(\sum_{i=1}^{n} R_{i,t}^{2})^{\frac{3}{2}}}$$

Where:
$R_{i,t}$ = firm-specific weekly stock return
n = number of weeks of observations per year

3.3. Stock Price Crash Risk (DUVOL)

Down-to-Up Volatility or DUVOL measures the downside volatility of a stock compared to the upside. If the downside volatility is greater, the stock is more susceptible to crash risk (Murata & Hamori, 2021). DUVOL is used to understand how stock price volatility dynamics affect the likelihood of a company experiencing a significant stock price crash.

$$DUVOL_{i,t} = log\left\{\frac{(n_{up}-1)\sum Down\, R_{i,t}^{2}}{(n_{d}-1)\sum Up\, R_{i,t}^{2}}\right\}$$

Where:

ISSN [Online]: 2776-6780

n_{up} = number of weeks with positive returns
n_d = number of weeks with negative returns

3.4. Control Variables

Zhang & Ding (2023) state that financial ratios serve as a tool to assess a company's financial performance and health. Financial ratios are often used by investors to determine the risks associated with their investments. Strong financial performance, measured through various financial ratios, can reduce uncertainty and minimize the possibility of stock price crashes. In the context of ESG, companies with good financial ratios are more likely to be able to invest in sustainable practices that can reduce SPCR risk. As for the Financial Ratio, many measurement tools can be used, some of which are as follows:

a. Return on Equity (ROE)

ROE measures a company's profitability based on the ratio of net income to shareholders' equity. The higher the ROE, the better the financial performance of the company, which can reduce the risk of falling share prices (Fama & French, 1992) (Li, 2024). Companies with high ROE tend to have more active ESG engagement as they have the financial capacity to invest in sustainable business practices (Itan et al., 2024).

$$ROE = \frac{Net\ Income}{Total\ Equity}$$

b. Net Profit Margin (NPM)

NPM measures the efficiency of the company in generating net income against total revenue. Companies with higher NPM tend to have a more stable financial structure and are less vulnerable to the risk of stock price crashes (Kim & Zhang, 2016) in (Liu et al., 2023). Companies with high NPM tend to be more stable and have resistance to stock price volatility. With greater profitability, companies can allocate more resources to increase ESG engagement, which ultimately reduces the risk of stock price crashes (Itan et al., 2024).

$$NPM\ (\%) = \frac{Net\ Income}{Revenue}$$

c. Book Value (BV)

BV shows the value of the company's net assets after deducting liabilities. A high BV can be an indicator of a company's financial stability and reduce stock price volatility (Penman, 1996; Dung et al., 2024). A high Book Value (BV) can be an indicator of a company's financial resilience, which allows it to be more stable in the face of market shocks and the risk of falling stock prices. Studies show that firms with strong BV are more likely to withstand market volatility, especially when ESG disclosure is used as a risk mitigation tool (Agustin et al., 2025).

$$BV = Total\ Assets - Total\ Liabilities$$

The analytical method used in this study is the Panel Regression Model to examine the effect of ESG on the risk of falling stock prices (SPCR), measured using NSKEWNESS and DUVOL. Panel regression was chosen because it is able to accommodate data consisting of many entities (companies) over a certain period of time (2018-2023), so as to capture the dynamics of time and individual characteristics of the company. The test is conducted using a robust standard error approach through the vce cluster technique at the company level, with the aim of avoiding heteroscedasticity and autocorrelation problems in panel data. With this approach, the coefficient estimation results become more reliable and unbiased.

3.5. Model Specification

Model 1a

$$NSKEWNESS_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 ROE_{it} + \beta_3 NPM_{it} + \beta_4 BV_{it} + \varepsilon_{it}$$

GOLDEN RATIO
ISSN [Online]: 2776-6780

Model 2a

$$DUVOL_{it} = \beta_0 + \beta_1 ESG_{it} + \beta_2 ROE_{it} + \beta_3 NPM_{it} + \beta_4 BV_{it} + \varepsilon_{it}$$

Model 1b

$$NSKEWNESS_{it} = \beta_0 + \beta_1 Enviroment_{it} + \beta_2 ROE_{it} + \beta_3 NPM_{it} + \beta_4 BV_{it} + \varepsilon_{it}$$

Model 2b

$$DUVOL_{it} = \beta_0 + \beta_1 Enviroment_{it} + \beta_2 ROE_{it} + \beta_3 NPM_{it} + \beta_4 BV_{it} + \varepsilon_{it}$$

Model 1c

$$NSKEWNESS_{it} = \beta_0 + \beta_1 Social_{it} + \beta_2 ROE_{it} + \beta_3 NPM_{it} + \beta_4 BV_{it} + \varepsilon_{it}$$

Model 2c

$$DUVOL_{it} = \beta_0 + \beta_1 Social_{it} + \beta_2 ROE_{it} + \beta_3 NPM_{it} + \beta_4 BV_{it} + \varepsilon_{it}$$

Model 1d

$$NSKEWNESS_{it} = \beta_0 + \beta_1 Governance_{it} + \beta_2 ROE_{it} + \beta_3 NPM_{it} + \beta_4 BV_{it} + \varepsilon_{it}$$

Model 2d

$$DUVOL_{it} = \beta_0 + \beta_1 Governance_{it} + \beta_2 ROE_{it} + \beta_3 NPM_{it} + \beta_4 BV_{it} + \varepsilon_{it}$$

IV. Results and Discussion

4.1. Analysis Result

Table 1. Descriptive Statistics

	N	Mean	Standard Deviation	Minimum	Maximum
ESG Score	232	54.516	18.902	9.865	88.861
ENVIRONMENT	232	48.882	22.971	1.876	89.080
SOCIAL	232	59.357	20.141	5.221	95.832
GOVERNANCE	232	54.176	23.179	2.977	94.013
NSKEWNESS	232	0.225	0.942	-5.102	3.869
DUVOL	232	0.052	0.022	0.016	0.134
ROE	232	0.155	0.243	-0.756	2.165
NPM	232	0.120	0.305	-3.769	0.553
BV	232	3239.037	4632.856	27.294	26865.596

Table 1 presents descriptive statistics of all variables in this study, including ESG Score and its components consisting of Environment, Social, Governance), the dependent variable, namely Stock Price Crash Risk with two measurements, namely NSKEWNESS and DUVOL, and financial control variables consisting of Return on Equity (ROE), Net Profit Margin (NPM), and Book Value (BV). Based on the descriptive results, the average value of ESGScore is 54.516 with a standard deviation of 18.902, indicating that most companies in the sample are at a moderate level of ESG implementation. Among the three components, the Social score has the highest average of 59.357, followed by Governance at 54.176, and Environment at 48.882. This shows that companies tend to be stronger in social aspects than in environment and governance. For the dependent variable, NSKEWNESS has an average value of 0.225 with a minimum value of -5.102 and a maximum of 3.869, indicating a highly asymmetric distribution of weekly stock returns in some companies. Meanwhile, DUVOL has an average of 0.052 with a relatively small deviation, reflecting the level of weekly volatility that tends to be stable in general, although it still shows the risk of falling stock prices (Jin & Myers, 2006, in Silva, 2022). Book Value shows a large variation, indicating a significant difference in firm size within the sample.

ISSN [Online]: 2776-6780

In Table 2, it is found that ESG Score has a significant negative correlation with NSKEWNESS (r = -0.152, p < 0.05), which shows that companies with higher ESG scores have lower stock price crash risk. The Social component also shows a significant negative correlation to NSKEWNESS (r = -0.211, p < 0.01), indicating that the social aspects of ESG play an important role in lowering crash risk, possibly through improving investor confidence and stakeholder relationships (Silva, 2022; Zareie et al., 2024). Environment has a negative but insignificant correlation with NSKEWNESS, while Governance shows no significant relationship.

Table 2. Pearson Correlation Analysis

	ESG SCORE	ENVIRONMENT	SOCIAL	GOVERNANCE	NSKEWNESS	DUVOL	ROE	NPM	BV
ESG SCORE	1.000								
ENVIRONMENT	0.853***	1.000							
	(0.000)								
SOCIAL	0.903***	0.730***	1.000						
	(0.000)	(0.000)							
GOVERNANCE	0.826***	0.545***	0.612***	1.000					
	(0.000)	(0.000)	(0.000)						
NSKEWNESS	-0.152**	-0.118*	-0.211***	-0.068	1.000				
	(0.021)	(0.073)	(0.001)	(0.304)					
DUVOL	-0.070	-0.142**	-0.029	-0.035	0.109*	1.000			
	(0.285)	(0.031)	(0.661)	(0.599)	(0.098)				
ROE	0.257***	0.285***	0.185***	0.213***	0.048	-0.084	1.000		
	(0.000)	(0.000)	(0.005)	(0.001)	(0.470)	(0.204)			
NPM	0.118*	0.124*	0.087	0.097	-0.063	-0.164**	0.175***	1.000	
	(0.074)	(0.060)	(0.185)	(0.140)	(0.342)	(0.012)	(0.007)		
BV	0.114*	0.221***	0.072	0.004	-0.074	-0.061	0.011	0.085	1.000
	(0.084)	(0.001)	(0.272)	(0.949)	(0.262)	(0.351)	(0.869)	(0.195)	

p-values in parentheses | * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

DUVOL, as the second proxy of Stock Price Crash risk, has no significant correlation with ESG Score and all components, except Environment, which showed a statistically significant negative correlation (r = -0.142, p < 0.05). On the other hand, ROE showed a positive correlation to ESG Score and a negative correlation to DUVOL, signaling that profitability could potentially reduce stock price volatility (Zhang & Ding, 2023).

Table 3. Pearson Correlation Analysis

Variable	(1a)	(1b)	(1c)	(1d)	(2a)	(2b)	(2c)	(2d)
	Stock Price Crash Risk (NSKEWNESS)				Stock Volatility (DUVOL)			
ESGScore	-0.008**				-0.000			
	(-2.58)				(-0.67)			
ENVIRONMENT		-0.006**				-0.000		
		(-2.51)				(-1.65)		
SOCIAL			-0.009***				-0.000	
			(-3.23)				(-0.68)	
GOVERNANCE				-0.003				0.000
				(-1.23)				(0.23)
ROE	0.693**	0.718**	0.665**	0.561**	-0.004	-0.001	-0.004	-0.006
	(2.39)	(2.42)	(2.30)	(1.99)	(-0.62)	(-0.23)	(-0.71)	(-0.88)
NPM	-0.530	-0.555	-0.526	-0.567	-0.029***	-0.029***	-0.029***	-0.030***
	(-1.24)	(-1.31)	(-1.26)	(-1.35)	(-3.51)	(-3.55)	(-3.51)	(-3.58)
BV	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
	(-1.12)	(-0.73)	(-1.17)	(-1.47)	(-0.47)	(-0.05)	(-0.52)	(-0.59)
_cons	0.358*	0.206	0.490**	0.123	0.061***	0.062***	0.061***	0.058***
	(1.73)	(1.13)	(2.27)	(0.63)	(11.51)	(13.77)	(11.78)	(12.23)

Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
r2	0.122	0.118	0.137	0.098	0.319	0.327	0.319	0.317
r2_a	0.090	0.087	0.106	0.065	0.294	0.303	0.294	0.293
N	232	232	232	232	232	232	232	232

t statistics in parentheses / $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$

The regression test results in this study examine the effect of ESG Score and each component on stock price crash risk (SPCR), which is measured by NSKEWNESS and DUVOL, which are provided in Table 3. In Model 1a, the results show that ESG Score has a significant negative effect on NSKEWNESS (β = -0.008, p < 0.05), suggesting that companies with high ESG scores are less likely to experience stock price crashes due to the accumulation of hidden bad news (Murata & Hamori, 2021). However, in the second model (2a) that uses DUVOL as an indicator, the ESG Score does not show a significant effect, indicating that ESG is not necessarily able to reduce weekly short-term volatility. When the ESG Score variable is broken down into three main components, namely Environment, Social, and Governance, the regression results show different dynamics in influencing the risk of falling stock prices. In model 1b, which examines the effect of Environment on NSKEWNESS, it is found that the coefficient of Environment is negative and statistically significant (β = -0.006, p < 0.05). This suggests that companies that are more concerned with environmental issues tend to be more stable and have less chance of experiencing stock price crashes. This finding reinforces the argument that good environmental policies can increase investor confidence and reduce information asymmetry (Zhang & Zhao, 2023; Fiorillo et al., 2024).

Meanwhile, the social component shows the strongest and most significant results on NSKEWNESS. In model 1c, the coefficient is -0.009 with a high significance level (p < 0.01). This means that companies that have good relationships with employees, communities, consumers, and other stakeholders are significantly more likely to experience lower stock price crash risk. This result supports Stakeholder Theory and is consistent with the findings of Silva (2022) and Zareie et al. (2024), which state that a strong social approach increases public trust and stakeholder loyalty, which in turn strengthens market stability and reduces stock price volatility due to information crises. As for the Governance component, model 1d shows that the direction of the coefficient is negative but not statistically significant (β = -0.003, p > 0.1). This indicates that corporate governance practices, such as board transparency, anti-corruption policies, or ownership structure, are not strong enough to drastically affect the risk of stock price declines. This may be because good governance is only a minimum standard of compliance, not a differentiating factor for investors in measuring market risk. In addition, this result may reflect gaps in the overall implementation of good corporate governance in Indonesian companies, or the lack of a direct link between governance structures and crash-inducing information patterns.

When the DUVOL indicator is used as a measure of weekly volatility risk, none of the three ESG components shows statistical significance. The Environment, Social, and Governance coefficients are all negative or close to zero, but with p-values that are above the significance threshold. This suggests that while the three ESG dimensions generally lead to reduced volatility, their strength is not enough to consistently mitigate short-term risk as measured through DUVOL. In this context, investors may value ESG as a long-term strategic risk management tool, rather than an antidote to daily or weekly price fluctuations. These results overall strengthen most of the hypotheses in the study. The significant negative effect of ESG on NSKEWNESS is in line with agency theory, which states that good ESG disclosure can reduce information asymmetry between managers and shareholders, and reduce the potential for bad news buildup that can trigger a crash (Itan et al., 2024). On the other hand, the insignificant effect of ESG on DUVOL indicates that ESG is not effective enough in reducing weekly stock price volatility, which can be more influenced by short-term external factors such as market sentiment, macroeconomic news, and geopolitics (Bongiovanni & Fiandrino, 2024). This also reflects that the Efficient Market Hypothesis (EMH) in its semi-strong form is not fully applicable, as ESG information is not directly reflected in stock prices across the board (Zhang & Ding, 2023).

This research is also in line with the results of a study by Agustin et al. (2025), which emphasizes that companies with high ESG scores tend to attract investors with a long-term orientation, who have a high sensitivity to sustainability and social issues. In volatile market conditions, these types of investors tend to hold their assets longer and are not affected by short-term fluctuations, thus stabilizing the company's share price. As a policy, regulators can use these results as a basis for tightening ESG reporting obligations, especially the Social and Environmental aspects, in order to improve market stability. Thus, these findings not only strengthen previous empirical literature but also provide evidence that ESG practices can be used as a

strategic risk mitigation tool for corporate management as well as an important consideration for investors in making investment decisions, especially in the medium to long term.

V. Conclusion

This study aims to analyze the effect of Environmental, Social, and Governance (ESG) on stock price crash risk (SPCR) by considering control variables in the form of financial ratios, namely Return on Equity (ROE), Net Profit Margin (NPM), and Book Value (BV). The results show that in aggregate, ESG Score has a significant negative effect on NSKEWNESS, which means that companies with better ESG performance tend to have a lower risk of falling stock prices. However, when ESG is decomposed into three main components, only the Social dimension is shown to significantly reduce NSKEWNESS. This suggests that social aspects such as a company's relationship with employees, customers, and communities have an important role in creating market confidence and stock price stability. Meanwhile, the Environment and Governance dimensions show a negative direction of relationship to risk, but are not statistically significant. For the DUVOL indicator, there is no significant effect of either ESG in aggregate or its individual components. This indicates that ESG may be more effective in mitigating long-term systemic risk (crashes) than short-term weekly price fluctuations. This difference in results reinforces the notion that the effectiveness of ESG depends on the time horizon and type of risk being measured.

Overall, the findings indicate that ESG, particularly its social dimension, serves as an effective strategic tool for risk mitigation and as a key consideration for investors in decision-making. This study further recommends that regulators enhance ESG reporting policies by promoting greater transparency and comprehensiveness, especially in the social and governance aspects, to ensure ESG contributes meaningfully to capital market stability in Indonesia. On the other hand, Accordingly, firms should view ESG reporting not merely as a compliance requirement but as a strategic tool to strengthen market trust and long-term valuation. Since the social aspect plays a significant role, companies may therefore prioritize social initiatives and strengthen stakeholder management as part of their risk-mitigation strategies. Enhancing workplace safety, improving labor practices, and fostering ethical customer engagement can contribute directly to reducing the likelihood of extreme negative returns. Finally, although the Environmental and Governance dimensions show negative but insignificant relationships with crash risk, their directional consistency suggests potential long-term value. Firms should continue investing in environmental compliance, sustainable operations, and strong governance structures, as these factors may contribute indirectly to stability even if their immediate statistical impact is limited.

Nonetheless, the study has limitations, including reliance on a single ESG data source (Refinitiv Thomson Reuters), which may cause data bias due to varying assessment methodologies among agencies such as Bloomberg, MSCI, and Sustainalytics. Future research is therefore encouraged to incorporate multiple ESG data sources and consider specific market conditions to obtain a more comprehensive and context-specific understanding of ESG's impact on stock price crash risk. Further, the use of panel regression models inherently assumes a linear and additive relationship between ESG performance and stock price crash risk. Future studies may address this limitation by employing nonlinear or semiparametric approaches such as quantile regression, threshold regression, or regime-switching techniques to capture more complex ESG and risk nexus and identify potential turning points or asymmetries in market responses.

References

Abdou, H. A., Elamer, A. A., Abedin, M. Z., & Ibrahim, B. A. (2024). The impact of oil and global markets on Saudi stock market predictability: A machine learning approach. Energy Economics, 132. https://doi.org/10.1016/j.eneco.2024.107416

Adhi, R. E., & Cahynowati, N. (2023). Pengaruh Environmental, Social, and Governance Disclosure Terhadap Nilai Perusahaan dengan Ukuran Perusahaan Sebagai Variabel Moderasi (Studi Empiris Perusahaan Non-Keuangan di Bursa Efek Indonesia Tahun 2019-2021). Diponegoro Journal of Accounting. http://ejournal-s1.undip.ac.id/index.php/accounting

Agustin, I. N., Safitri, D., Hesniati, H., Hesniati, H., & Robin, R. (2025). Navigating Market Volatility: ESG and Islamic Stock Performance amidst Covid-19 Stringency. ETIKONOMI, 24(1), 69–84. https://doi.org/10.15408/etk.v24i1.38475

ISSN [Online]: 2776-6780

Agustin, I.N., Suhendri, N., Wang, A., Bisnis dan Manajemen, F., & Riset Akuntansi dan Keuangan, J. (2024). ESG Performance and Indonesia Stock Return. Jurnal Riset Akuntansi Dan Keuangan. https://doi.org/10.17509/xxxx.xxx

Akhter, F., Hossain, M. R., Elrehail, H., Rehman, S. U., & Almansour, B. (2023). Environmental disclosures and corporate attributes, from the lens of legitimacy theory: a longitudinal analysis on a developing country. European Journal of Management and Business Economics, 32(3), 342–369. https://doi.org/10.1108/EJMBE-01-2021-0008

Ameliana, Y., & Nanda, S. (2024). Exploring Sustainable Finance: A Qualitative Inquiry into Responsible Investment and ESG Risk Evaluation. Golden Ratio of Finance Management, 4(1), 01–13. https://doi.org/10.52970/grfm.v4i1.429

Baier, F., & Kunter, M. (2020). Construction and validation of a test to assess (pre-service) teachers' technological pedagogical knowledge (TPK). Studies in Educational Evaluation, 67, 100936. https://doi.org/https://doi.org/10.1016/j.stueduc.2020.100936

Bongiovanni, A., & Fiandrino, S. (2024). Does firm environmental performance mitigate the market reaction to COVID-19 uncertainty? Research in International Business and Finance, 68. https://doi.org/10.1016/j.ribaf.2023.102193

Chandra, J., & Sacipto, R. (2020). Analisis Peranan Pemerintah Terhadap Praktik Greenwashing Dalam Strategi Investasi Keuangan Berkelanjutan Berbasis ESG. Journal Panorama Hukum. https://doi.org/10.21067.JPH.2.7584

Chen, H.-Y., & Yang, S. S. (2020). Do Investors exaggerate corporate ESG information? Evidence of the ESG momentum effect in the Taiwanese market. Pacific-Basin Finance Journal, 63, 101407. https://doi.org/https://doi.org/10.1016/j.pacfin.2020.101407

Chen, W., & Srinivasan, S. (2024). Going digital: implications for firm value and performance. Review of Accounting Studies, 29(2), 1619–1665. https://doi.org/10.1007/s11142-023-09753-0

CNBC Indonesia. (2024, December 30). Hancur Lebur! Kinerja IHSG 2024 Mencoreng Tradisi. CNBC Indonesia. Https://Www.Cnbcindonesia.Com/Research/20241230074930-128-599411/Hancur-Lebur-Kinerja-Ihsg-2024-Mencoreng-Tradisi.

Daromes, F. E., Holly, A., & Loeferdy, M. (2023). Analisis Aspek Materialitas Dalam Pelaporan Keberlanjutan. WACANA EKONOMI (Jurnal Ekonomi, Bisnis Dan Akuntansi), 22(1), 1–17. https://doi.org/10.22225/we.22.1.2023.1-17

Dung, N. T. P., Anh, N. T. M., Toan, P. H., Hieu, L. T., Linh, N. T., & Hang, H. T. (2024). The Impact Of Environmental, Social, And Governance Information On Individual Stock Investment Decisions. Risk Governance and Control: Financial Markets and Institutions, 14(2), 32–43. https://doi.org/10.22495/rgcv14i2p4

Fiordelisi, F., Ricci, O., & Santilli, G. (2023). Environmental engagement and stock price crash risk: Evidence from the European banking industry. International Review of Financial Analysis, 88, 102689. https://doi.org/https://doi.org/10.1016/j.irfa.2023.102689

Fiorillo, P., Meles, A., Pellegrino, L. R., & Verdoliva, V. (2024). Geopolitical risk and stock price crash risk: The mitigating role of ESG performance. International Review of Financial Analysis, 91. https://doi.org/10.1016/j.irfa.2023.102958

Ge, Y., Chen, Q., Qiu, S., & Kong, X. (2023). Environmental information disclosure and stock price crash risk: Evidence from China. Frontiers in Environmental Science, 11. https://doi.org/10.3389/fenvs.2023.1108508

Giantari, T. (2024). Menavigasi Dunia Investasi Hijau: Memilih Saham dengan ESG dan Ukuran Perusahaan. Jurnal Proaksi, 11(3), 501–516. https://doi.org/10.32534/jpk.v11i3.5835

GoodStats. (2024, December 28). Akhir 2024: IHSG Anjlok, Rupiah Melemah dan Inflasi di Ambang Target. Https://Goodstats.Id/Article/Akhir-2024-Ihsg-Anjlok-Rupiah-Melemah-Dan-Inflasi-Di-Ambang-Target-SflUu.

Hmouda, A. M. O., Orzes, G., Sauer, P. C., & Molinaro, M. (2024). Determinants of environmental, social, and governance scores: Evidence from the electric power supply chains. Journal of Cleaner Production, 471. https://doi.org/10.1016/j.jclepro.2024.143372

Huang, H., Wang, C., Wang, L., & Yarovaya, L. (2023). Corporate digital transformation and idiosyncratic risk: Based on a corporate governance perspective. Emerging Markets Review, 56. https://doi.org/10.1016/j.ememar.2023.101045

Itan, I., Ahmad, Z., Setiana, J., & Karjantoro, H. (2024). Corporate governance, tax avoidance, and earnings management: family CEO vs non-family CEO managed companies in Indonesia. Cogent Business and Management, 11(1). https://doi.org/10.1080/23311975.2024.2312972

Junaedi, J. (2024). Understanding the Role of Finance in Sustainable Development: A Qualitative Study on Environmental, Social, and Governance (ESG) Practices. Golden Ratio of Finance Management, 4(2), 113–130. https://doi.org/10.52970/grfm.v4i2.422

Kim, S., & Li, Z. (2021). Understanding the impact of ESG practices in corporate finance. Sustainability (Switzerland), 13(7). https://doi.org/10.3390/su13073746

Kompas. (2024, October 28). IHSG Anjlok 1 Persen Terbebani Penarikan Dana Asing. Https://Www.Kompas.Id/Baca/Ekonomi/2024/10/28/Ihsg-Anjlok-1-Persen-Terbebani-Penarikan-Dana-Asing.

Kusnandar, V. B. (2022). Saham Bukalapak Anjlok Hampir 70% dari Harga IPO. Https://Databoks.Katadata.Co.Id/Pasar/Statistik/9e08c472894316f/Saham-Bukalapak-Anjlok-Hampir-70-Dari-Harga-Ipo.

Lee, J. H., Cho, J. H., & Kim, B. J. (2022). ESG Performance of Multinational Companies and Stock Price Crash: Evidence from Korea. Journal of Economic Integration, 37(3), 523–539. https://doi.org/10.11130/jei.2022.37.3.523

Li, C., Huo, P., Wang, Z., Zhang, W., Liang, F., & Mardani, A. (2023). Digitalization generates equality? Enterprises' digital transformation, financing constraints, and labor share in China. Journal of Business Research, 163, 113924. https://doi.org/https://doi.org/10.1016/j.jbusres.2023.113924

Li, S., Yin, P., & Liu, S. (2022). Evaluation of ESG Ratings for Chinese Listed Companies From the Perspective of Stock Price Crash Risk. Frontiers in Environmental Science, 10. https://doi.org/10.3389/fenvs.2022.933639

Li, Y. (2024). The Impact of ESG Performance on Stock Price Crash Risk: A Study Based on the Perspective of Auditor Opinion Influence. In Business, Economics, and Management CMAM (Vol. 2024). https://doi.org/10.54097/ssbvkz18

Liputan6. (2024, October 5). IHSG Merosot 2,6% pada 30 September - 4 Oktober 2024, Ini Penyebabnya. Https://Www.Liputan6.Com/Saham/Read/5731282/Ihsg-Merosot-26-Pada-30-September-4-Oktober-2024-Ini-Penyebabnya.

Liu, J., Zhou, K., Zhang, Y., & Tang, F. (2023). The Effect of Financial Digital Transformation on Financial Performance: The Intermediary Effect of Information Symmetry and Operating Costs. Sustainability (Switzerland), 15(6). https://doi.org/10.3390/su15065059

Liu, P. H., Wang, Y., Xue, D. R., Linnenluecke, P. M., & Cai, D. C. W. (2022). Green Commitment and Stock Price Crash Risk. Finance Research Letters, 47, 102646. https://doi.org/https://doi.org/10.1016/j.frl.2021.102646

Luo, J. (2023). How ESG Disclosure Affects the Stock Price Crash Risk. Advances in Economics, Management and Political Sciences, 38(1), 208–214. https://doi.org/10.54254/2754-1169/38/20231914

Luo, Y., Tian, N., Wang, D., & Han, W. (2024). Does Digital Transformation Enhance a Firm's ESG Performance? Evidence from an Emerging Market. Emerging Markets Finance and Trade, 60(4), 825–854. https://doi.org/10.1080/1540496X.2023.2253975

Ma, J. (2024). Corporate Shared Prosperity and the Risk of Stock Price Crash. In Transactions on Social Science, Education and Humanities Research (Vol. 4). https://doi.org/10.62051/rws3ny48

Murata, R., & Hamori, S. (2021). ESG Disclosures and Stock Price Crash Risk. Journal of Risk and Financial Management, 14(2). https://doi.org/10.3390/jrfm14020070

Pereira da Silva, P. (2022). Crash risk and ESG disclosure. Borsa Istanbul Review, 22(4), 794–811. https://doi.org/10.1016/j.bir.2022.04.001

PintarSaham.Id. (2021). Mengapa Saham IPTV Anjlok Terus. Https://Old.Pintarsaham.Id/Skydrugz-Corner-Mengapa-Saham-Iptv-Anjlok-Terus/.

Purnomo, H., & Eriandani, R. (2023). The Effect of Environmental Uncertainty and Tax Avoidance: The Role of Managerial Ability. Riset Akuntansi Dan Keuangan Indonesia, 8, 1–11. https://doi.org/10.23917/reaksi.v8i1.21349

Ratna, V., Oktoviani, S., Pratiwi, A., Putri, A., & Hanifah, U. (2023). Eksistensi Environmental, Social, and Governance (ESG) dalam Portofolio Investor sebagai Manifestasi Investasi Berkelanjutan.

Sadiq, M., Singh, J., Raza, M., & Mohamad, S. (2020). The impact of environmental, social, and governance index on firm value: Evidence from Malaysia. International Journal of Energy Economics and Policy, 10(5), 555–562. https://doi.org/10.32479/ijeep.10217

Sang, Y., Loganathan, K., & Lin, L. (2024). Digital Transformation and Firm ESG Performance: The Mediating Role of Corporate Risk-Taking and the Moderating Role of Top Management Team. Sustainability (Switzerland), 16(14). https://doi.org/10.3390/su16145907

SynTao Green Finance. (2020). An Evolving Process: Analysis of China A-share ESG Ratings.

Tambunan, S. T. (2022). The Impact Of Corporate Governance On The Integrated Reporting Quality Of Indonesian Listed Firms: Moderating Role Of Csr Disclosure And Corporate Sustainability. International Journal Of Economics And Finance Studies. https://doi.org/10.34109/ijefs

Trotta, A., Rania, F., & Strano, E. (2024). Exploring the linkages between FinTech and ESG: A bibliometric perspective. Research in International Business and Finance, 69. https://doi.org/10.1016/j.ribaf.2023.102200

Xu, N., Liu, J., & Dou, H. (2022). Environmental, social, and governance information disclosure and stock price crash risk: Evidence from Chinese listed companies. Frontiers in Psychology, 13. https://doi.org/10.3389/fpsyg.2022.977369

Zareie, M., Attig, N., El Ghoul, S., & Fooladi, I. (2024). Firm digital transformation and corporate performance: The moderating effect of organizational capital. Finance Research Letters, 61. https://doi.org/10.1016/j.frl.2024.105032

Zhang, W., & Zhao, J. (2023). Digital transformation, environmental disclosure, and environmental performance: An examination based on listed companies in heavy-pollution industries in China. International Review of Economics and Finance, 87, 505–518. https://doi.org/10.1016/j.iref.2023.06.001

Zhang, Z., & Ding, Y. (2023). The impact of green financial development on stock price crash risk from the perspective of information asymmetry in Chinese listed companies. Environmental Science and Pollution Research, 30(37), 87199–87214. https://doi.org/10.1007/s11356-023-27771-y

Zhou, D., & Zhou, R. (2022). ESG performance and stock price volatility in public health crisis: Evidence from the COVID-19 pandemic. International Journal of Environmental Research and Public Health, 19(1). https://doi.org/10.3390/ijerph19010202