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Effect of ESG Score on Financial Risk in IDX ESG Companies

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ABSTRACT

This study examines the effect of Environmental, Social, and Governance (ESG) scores on financial risk and stock investment performance of issuers listed on the IDX ESG index over the period 2017 to 2023. Using a quantitative approach, this study applies panel data regression analysis to explore the relationship between ESG scores and financial risk and stock risk. The variables analyzed include ESG score, Return on Assets (ROA), leverage ratio, corporate assets, earnings per share and book value per share. The research findings show that ESG score has a significant negative effect on financial risk, which means that the higher the ESG score, the lower the financial risk faced by the company. However, its effect on stock risk is not significant. The practical implication of this study is the importance of improving the quality of ESG scores as a strategy to mitigate financial risk and increase firm value. This study makes an original contribution by focusing on Indonesia's emerging capital market and highlighting the role of governance aspects in risk management, thus enriching ESG literature in the context of emerging economies and supporting ESG policy development in Indonesia.

KEYWORDS *ESG Score, Financial Risk, Stock Risk*

INTRODUCTION

In recent years, attention to environmental, social, and governance (ESG) issues has increased significantly. ESG is not only an indicator of corporate performance but also serves as a tool to attract investment and enhance a company's reputation in the market (Barko et al., 2022; Brogi et al., 2022; Husted & de Sousa-Filho, 2019; Koroleva et al., 2020; Shaikh, 2021). Research shows that companies with good ESG performance tend to have lower financial risk and better stock performance (Shakil et al., 2019; Sinha Ray & Goel, 2023). This suggests that ESG can serve as a positive signal to investors, which in turn can influence their investment decisions.

Although many studies have been conducted to explore the relationship between ESG and financial performance, there are still gaps in the understanding of how ESG Score affects financial risk and stock risk, especially in emerging markets such as Indonesia. Previous research suggests that ESG can reduce corporate default risk by increasing investor confidence and reducing the cost of capital (Li et al., 2022; He et al., 2023). However, the mechanisms underlying this relationship still need to be further explored, especially in the context of IDX ESG-listed issuers.

This research focuses on issuers listed on the IDX ESG, which is an index that measures company performance based on ESG criteria. Using data from these companies, this study aims to analyze the effect of ESG Score on financial risk and stock risk. This is

important because IDX ESG-listed issuers are expected to have a higher commitment to sustainability practices, which may affect their financial stability and the market's perception of the risks they face.

The importance of this research lies not only in its contribution to the academic literature but also in its practical implications for investors and policymakers. By understanding how ESG Score affects financial risk and stock risk, investors can make better decisions in selecting stocks that have the potential to provide higher returns with lower risk. In addition, policymakers can formulate regulations that support ESG practices in companies, which in turn can enhance market stability and economic growth (Wang et al., 2023).

The current status of research on ESG suggests that while there is consensus that ESG has a positive impact on financial performance, there is still debate over the specific mechanisms involved. Some studies suggest that ESG can reduce the cost of capital and increase firm value, while others suggest that an excessive focus on ESG may distract from a firm's primary objective, which is maximizing shareholder value. This study aims to bridge this gap by exploring the relationship between ESG Score and financial risk and stock risk in more depth.

Recent findings show that companies with good ESG performance tend to have lower default risk and better stock performance. For example, Li et al. (2022) found that companies with high ESG scores have a lower probability of default, while research by Shakil et al. (2019) shows that good ESG performance can improve stock liquidity. However, these studies also show that the impact of ESG may vary depending on the industry context and firm characteristics, indicating the need for further analysis in different market contexts.

The uniqueness of this study lies in its in-depth focus on the effect of ESG Score on financial risk and stock risk of IDX ESG-listed issuers. While many previous studies have explored the relationship between ESG and financial performance, this research highlights the specific context of Indonesia, which is an emerging market with unique characteristics. This study also integrates variables such as Return on Assets (ROA), leverage ratio (DER), firm size, earnings per share (EPS), and Book Value Per Share (BVPS), which provides a new perspective on how these factors interact with ESG in influencing such risks. In addition, this study seeks to fill the gap in the existing literature by providing a comprehensive quantitative analysis using panel data from the period of 2017 to 2023, thus providing deeper insight into the dynamics of ESG in the Indonesian market.

The main objective of this study is to analyze the effect of ESG Score on financial risk and stock risk in issuers listed on IDX ESG. This study aims to identify whether companies with higher ESG scores have lower financial risk and better stock performance. Using a quantitative approach and panel data regression analysis, this study will explore the relationship between ESG Score and other financial performance variables, and provide practical recommendations for investors and policymakers. The results of this study are expected to contribute significantly to the understanding of the importance of ESG practices in risk mitigation and investment performance improvement in the Indonesian capital market.

***H1*: ESG Score has an influence on corporate financial risk.**

The Relationship between ESG to Risk and Financial Performance of Companies Environmental, Social, and Governance (ESG) performance has become a major focus in

corporate finance and management research. ESG reflects a company's commitment to sustainability and social responsibility, which in turn can affect its financial performance and the risks it faces. Research shows that companies with high ESG scores tend to have lower financial risks. For example, Feng et al. (2022) found that companies with good ESG performance have a lower probability of experiencing sharp stock price declines. This is due to the positive relationship between ESG performance and information transparency, which reduces uncertainty in the market (He et al., 2023).

In this context, ESG serves not only as an indicator of social and environmental performance but also as a tool to reduce financial risk. Research by Zhou et al. (2021) shows that companies with good ESG performance have better relationships with stakeholders, which can reduce the cost of capital and improve financial stability. In addition, research by Kim et al. (2014) shows that companies that have a good reputation in terms of ESG tend to have lower risks associated with management and decision making. However, although many studies show a positive relationship between ESG and financial performance, there is still debate regarding the mechanisms underlying this relationship. Some researchers argue that ESG can improve financial performance through enhanced customer loyalty and brand reputation (Capelli et al., 2023). On the other hand, there is also an argument that an excessive focus on ESG may distract companies from their primary goal of maximizing shareholder value.

***H2*: ESG Score has an influence on the risk of company shares in the capital market.**

The Relationship between ESG to Risk and Company Stock Performance
The relationship between ESG and stock investment performance has also been a widely researched topic. Research shows that companies with high ESG scores tend to have better stock performance. For example, research by Shanaev and Ghimire (2022) found that changes in ESG ratings can significantly affect stock returns. This suggests that investors are increasingly considering ESG performance in their investment decision-making.
In addition, research by Berg et al. (2021) shows that uncertainty in ESG ratings can affect investment decisions. When there are differences in ESG ratings between different rating agencies, investors may feel confused and hesitate to invest, which may increase market risk. This research suggests that uncertainty in ESG ratings may be an additional risk factor that investors need to consider (Luo et al., 2023).

On the other hand, research by Avramov et al. (2022) shows that companies with good ESG performance tend to have lower volatility in stock returns. This suggests that companies committed to sustainability and social responsibility practices may provide greater stability for investors. Thus, ESG performance can serve as an important indicator in assessing stock investment risk.

RESEARCH METHOD

This research uses a quantitative approach with a descriptive research design. The samples used in this study are companies listed on the Indonesia Stock Exchange (IDX) that have ESG scores. The data used are secondary data taken from trusted sources such as Refinitiv. The data collected include z-score values, annual ESG scores for each company, return on assets (ROA), debt-to-equity ratio (DER) as a proxy for leverage, total company assets to calculate company size, earnings per share (EPS), and book value per share (BVPS) during the period 2017 to 2023. The selection of this period is based on the availability of sufficient data for more in-depth analysis (Cooper & Schindler, 2014).

The sampling method used is purposive sampling, where the sample is selected based on certain criteria relevant to the research objectives. The criteria used in the sample selection include companies listed on the IDX outside the financial sector and those with ESG values. By using this method, it is expected to reduce bias and increase the validity of the research results (Creswell, 2014).

Variable Measurement

The variables used in this study consist of dependent, independent, and control variables. The dependent variables in this study are financial risk and company stock risk. Financial risk is obtained through the z-score value, while stock risk is obtained from the calculation of the standard deviation of the stock return rate. The independent variable is the ESG score that reflects the company's performance in environmental, social, and governance aspects. The ESG score is taken from the company's annual report and reliable ESG data sources (Fu et al., 2024; Dinh, 2023).

The control variables used in this study include ROA, total assets, and DER. ROA and total assets of the company are expected to describe the accounting financial performance, which also affects the movement of the company's stock price, while DER can provide an overview of the company's capital structure and its impact on the company's financial condition. EPS and BVPS can inform the company's profitability and valuation of outstanding shares. By considering these control variables, the analysis carried out is expected to provide more accurate and relevant results (Fafaliou et al., 2022; Gillan et al., 2021).

Research Procedures

The research procedure begins with the collection of secondary data from the previously mentioned sources. After the data is collected, the next step is to conduct descriptive analysis to provide an overview of the characteristics of the data used. This analysis includes descriptive statistics such as mean, median, and standard deviation for each variable studied.

After descriptive analysis, this study will continue with classical assumption testing, which includes multicollinearity, heteroscedasticity, and autocorrelation tests. These tests are important to ensure that the regression model used meets the assumptions required for valid analysis (Malhotra & Birks, 2007).

A panel data regression model will be used to analyze the effect of ESG Score on financial risk and stock risk. This model allows researchers to combine time series and cross-section data, thus providing a more comprehensive analysis (Dinh, 2023; Fu et al., 2024). The first model will examine the effect of ESG Score on financial risk, while the second model will examine the effect of ESG Score on stock risk. The results of this analysis are expected to provide new insights into the relationship between ESG and firm performance in the Indonesian market.

Regression Model 1:

$$Zf = \alpha + \beta ESG + \beta ROA + \beta LEV + \beta SIZE + \sum year + \varepsilon$$

where :

Zf = Financial Risk

ESG = ESG Score

ROA = *Return-on-asset* of the company

LEV = *Debt Equity Ratio of the* company

SIZE = Size or total assets of the company

Year = *year-fixed effect*

Regression Model 2:

$$Zs = \alpha + \beta ESG + \beta EPS + \beta BVPS + \sum year + \varepsilon$$

where :

Zs = Stock risk (*Standard Deviation)*

ESG = ESG Score

EPS = *Earnings Per Share*

BVPS = *Book Value Per Share*

Year = *year-fixed effect*

RESULT AND DISCUSSION

Descriptive Statistics

The description of the variables in this study was carried out through descriptive statistics which included the minimum, maximum, average, and standard deviation values of the variables studied. Descriptive statistics aim to describe the characteristics of the sample used in the study.

Table 1. Descriptive Statistics of Model 1

Variable	Statistics							
	Obs	Stdv	Min	1stQu.	Median	Mean	3rtQu.	Max
Zf	161	6.594	0.491	2.062	4.056	6.262	8.196	40.184
ESG	161	19.528	10.620	36.450	54.000	51.800	68.350	89.190
ROA	161	0.084	-0.046	0.031	0.067	0.091	0.126	0.474
LEV	161	0.988	0.001	0.071	0.351	0.672	0.760	6.399
SIZE	161	0.792	29.320	30.870	31.220	31.400	32.050	33.290

Table 2. Model 2 Descriptive Statistics

Variable	Statistics							
	Obs	Stdv	Min	1stQu.	Median	Mean	3rtQu.	Max
Zs	210	0.051	0.029	0.066	0.093	0.103	0.129	0.414
ESG	210	19.278	10.620	36.660	53.070	51.470	67.120	89.190
EPS	210	0.030	-0.077	-0.013	0.001	0.004	0.017	0.166
BVPS	210	6438.726	51.730	519.280	1518.210	3992.880	3839.270	31632.010

ESG scores in both models show a fairly wide distribution, indicating significant differences in ESG performance between issuers. The financial risk (Zf) and equity risk (Zs) variables show considerable variation in risk, which is the main focus of this study. ROA and EPS show varying profitability, while LEV and BVPS show differences in capital structure and firm value. Firm size is relatively homogeneous in Model 1, but the highly variable BVPS in Model 2 suggests significant differences in firm value.

Classical Assumption Test

Before conducting regression analysis, classical assumption testing is required to ensure that the regression results meet the properties of the *Best Linear Unbiased Estimator* (BLUE). The conditions that must be met include normal distribution of variables, the absence of perfect multicollinearity, no autocorrelation, and the fulfillment of the assumption of homoscedasticity.

Table 3. Multicollinearity Test Results

	Variables	VIF	*Tolerance*	Description
Model 1	ESG	1,078	0,928	No multicollinearity
	ROA	1,222	0,819	No multicollinearity
	LEV	1,157	0,864	No multicollinearity
	SIZE	1,158	0,863	No multicollinearity
Model 2	ESG	1,000	0,999	No multicollinearity
	EPS	1,000	0,999	No multicollinearity
	BVPS	1,000	0,999	No multicollinearity

Table 4. Heteroscedasticity Test Results

	BP	P-Value	Description
Model 1	7,9793	0,6309	No heteroscedasticity
Model 2	3,3268	0,1895	No heteroscedasticity

Table 5. Autocorrelation Test Results

	chisq	P-Value	Description
Model 1	13,141	0,069	No autocorrelation
Model 2	31,311	0,449	No autocorrelation

Table 6. Normality Test Results

	X-squared	P-Value	Description
Model 1	5,8	0,062	Normal
Model 2	2,8468	0,241	Normal

Based on the test results above, it is found that the results have met the requirements for regression analysis.

Panel Data Regression

Panel data regression can be done with three models, namely the *Common Effect* Model (CEM), *fixed effect* model (FEM) and *random effect* model (REM). Each model has its own advantages and disadvantages. Model selection depends on the assumptions used by researchers and the fulfillment of the correct statistical data processing requirements so that it can be statistically accounted for. Therefore, the first step is to choose a model from the three available.

Table 7. Chow Test Results

	F	df1	Df2	P-Value
Model 1	13,86	22	134	2×10^{-16}
Model 2	3,168	29	177	$1{,}435 \times 10^{-6}$

The *Chow* test results presented in Table 7 show that the *p-value* obtained for model 1 is 2.2×10^{-16} and for model 2 is 1.435×10^{-6}, where both values are smaller than the significance level $\alpha = 0.05$. Thus, the null hypothesis (H0) is rejected. Therefore, the model chosen for both models is the *Fixed Effect Model (FEM)*.

Table 8. Hausman Test Results

	chisq	Df	P-Value
Model 1	12,082	4	0,017
Model 2	7,957	3	0,046

Based on the *Hausman* test results presented in Table 8, the *p-value* is 0.017 for Model 1 and 0.046 for Model 2, both of which are below the 0.05 significance level. This indicates that the null hypothesis (H0) is rejected, so the most appropriate model to use is the *Fixed Effect Model* (FEM). Thus, the best panel data model used in this study is the *Fixed Effect Model* (FEM) for both models.

Regression analysis

Table 9. Regression Model Results Model 1

Variables	Coefficient (β)	Std. Error	t-statistic	p-value
ESG	-0,167	0,036	-4,656	$7{,}669 \times 10^{-6}$
ROA	46,493	6,258	7,429	$1{,}148 \times 10^{-11}$
LEV	-1,364	0,394	-3,461	0,0007
SIZE	-0,679	1,322	-0,513	0,6085

The regression coefficient illustrates how a change in each independent variable affects the value of Zf, assuming the other variables remain constant. The coefficient of -0.167 on ESG indicates that every one-unit increase in ESG tends to decrease the value of Zf by 0.167, indicating a negative relationship between corporate sustainability scores and Zf. Meanwhile, ROA has a very large positive coefficient of 46.493, indicating that a one-unit increase in profitability will significantly increase Zf.

Conversely, LEV has a negative coefficient of -1.364, which means that the higher the leverage level of a company, the lower the Zf value. This reflects that companies with higher debt levels tend to have lower Zf. Similarly, SIZE has a negative coefficient of -0.679, indicating that companies with larger sizes tend to have lower Zf.

Overall, this equation provides insight into the factors that influence Zf. The regression results show that profitability (ROA) is the most dominant factor in increasing Zf, while corporate sustainability (ESG), *leverage* (LEV), and firm size (SIZE) have a negative influence on the variable. The value of ε in this equation represents errors or other factors not included in the model, which can come from external variables or data imperfections.

Table 10. Regression model results of model 2

Variables	Coefficient (β)	Std. Error	t-statistic	p-value
ESG	$-9{,}9406 \times 10^{-5}$	$-3{,}4757 \times 10^{-4}$	-0,286	0,7752
EPS	$6{,}998 \times 10^{-1}$	$1{,}0015 \times 10^{-1}$	5,989	$1{,}148 \times 10^{-8}$
BVPS	$-6{,}521 \times 10^{-7}$	$1{,}7888 \times 10^{-6}$	-0,365	0,7159

The coefficient of -9.9406×10^{-5}on the ESG variable indicates that every one unit increase in the corporate sustainability score (ESG) will decrease the value of Zs by -9.9406×10^{-5}. This very small coefficient value indicates that the effect of ESG on Zs is relatively weak or insignificant in this model. Meanwhile, the EPS variable has a positive coefficient of 0.6998, which means that every one unit increase in EPS will increase the value of Zs by 0.6998. This suggests that corporate returns have a greater influence on Zs than ESG.

For the BVPS variable, a regression coefficient of -6.521 × 10-7 is obtained, which indicates that every one unit increase in BVPS will reduce the value of Zs by -6.521 × 10-7. Although the direction of the effect is negative, the value of this coefficient is very small, which indicates that the effect of BVPS on Zs is also relatively weak or economically insignificant. The low sensitivity of Zs to BVPS may indicate that book value per share is not the main factor affecting the Zs index in this model.

Simultaneous Significant Test (F Statistical Test)

The F test in this study was conducted to test whether the independent variables simultaneously have a significant effect on the dependent variable.

Table 11. F Test Results

	F-Statistic	df1	df2	P-Value
Model 1	31,0503	4	134	2,22 x 10^{-16}
Model 2	12,439	3	177	2,025 x 10^{-7}

The F test results show that both models are simultaneously significant, but Model 1 has a stronger influence than Model 2 in explaining variations in the respective dependent variables.

Individual Parameter Significance Test (t Statistical Test)

The t test in this study was conducted to evaluate the significance of the relationship between the independent variables and the dependent variable individually. If the probability value (*p-value*) is less than 0.05, then the test results are considered significant, which indicates the influence of the independent variable partially on the dependent variable.

Table 12. t-test results

Model	Variables	Coefficient (β)	Std. Error	t-statistic	p-value
1	ESG	-0,167	0,036	-4,656	7,669 x 10^{-6}
	ROA	46,493	6,258	7,429	1,148 x 10^{-11}
	LEV	-1,364	0,394	-3,461	0,0007
	SIZE	-0,679	1,322	-0,513	0,6085
2	ESG	-9,9406 x 10^{-5}	-3,4757 x 10^{-4}	-0,286	0,7752
	EPS	6,998 x 10^{-1}	1,0015 x 10^{-1}	5,989	1,148 x 10^{-8}
	BVPS	-6,521 x 10^{-7}	1,7888 x 10^{-6}	-0,365	0,7159

In Model 1 (Zf), the ESG variable has a coefficient of -0.1667 with a *t-statistic* value of -4.656 and *a p-value of* 7.669 x 10^{-6}, which means that this variable has a negative and significant effect on financial risk (Zf) at the 1% significance level. This suggests that the higher a company's ESG score, the lower its financial risk. The ROA variable has a coefficient of 46.493 with a *t-statistic* of 7.429 and *a p-value of* 1.148 x 10^{-11}, which is also significant at the 1% level. This means that the higher the company's profitability (ROA), the lower its financial risk. The LEV variable has a coefficient of -1.364 with a *t-statistic* of -3.461 and *a p-value* of 0.0007, which is significant at the 1% level. This result indicates that the higher the leverage or debt level in the company's capital structure, the higher the financial risk. The SIZE variable has a coefficient of -0.679 with *t-statistic* -0.513 and *p-value* 0.6085, which is not significant. This indicates that firm size does not have a significant influence on financial risk (Zf) in this model.

Meanwhile, in Model 2 (Zs), the ESG variable has a coefficient of -9.9406 x 10^{-5}, with a *t-statistic* value of -0.286 and *a p-value* of 0.7752. This value is well above the

significance level of 0.05, which indicates that the ESG variable has no significant effect on Zs in this model. Thus, the corporate sustainability (ESG) score does not statistically explain the variation in Zs value in the sample of companies analyzed. The EPS variable shows a coefficient of 6.998 x 10^{-1}, with a t-statistic of 5.989 and a *p-value* of 1.148 x 10^{-}, which is significant at the 1% level. This indicates that EPS has a positive and significant influence on Zs. This means that the higher the EPS obtained by the company, the higher the Zs value achieved, so EPS is one of the main influential factors in this model.

The BVPS variable has a coefficient of -6.521 x 10^{-7}, with a *t-statistic* of -0.365 and *a p-value* of 0.7159, which is also not statistically significant. Although the direction of the relationship shows that an increase in BVPS slightly decreases the value of Zs, the effect is not statistically significant, so BVPS cannot be considered as a determinant of Zs in this model.

The results of this study indicate that ESG scores have a significant influence on the financial risk of companies listed on IDX ESG. Empirically, companies with higher ESG scores tend to experience lower financial risk, as measured through indicators such as default risk, earnings volatility, and credit risk. This finding is consistent with the research of Fu et al. (2024) who asserted that the quality of ESG disclosures can reduce corporate financial risk by improving corporate ESG performance. It is also consistent with the findings of Li et al. (2022) that higher ESG rating significantly reduces corporate default risk and the quality of ESG disclosure significantly improves corporate financial performance. The positive effect is stronger in companies with high ESG disclosure quality (Wang et al., 2025).

As for the company's stock risk in the capital market, based on the research results obtained, ESG scores do not have a significant effect on stock risk described by the standard deviation of stock prices. This finding is also in accordance with research from Hao et al. (2025) which informs that ESG disclosure policies have not significantly reduced the risk of stock price crashes. However, in other studies, companies with higher average ESG ratings tend to have lower stock price crash risk (Luo et al., 2023)and research by Yang et al., 2025 conveyed that ESG significantly improves corporate financial performance. ESG significantly reduces corporate risk, both market risk and credit risk. The findings support the importance of focusing on material ESG issues to increase firm value and reduce risk.

CONCLUSION

The results showed that ESG Score has a significant negative effect on the financial risk of companies listed on IDX ESG. This means that the higher the ESG score owned by a company, the lower the financial risk faced. This finding indicates that effective implementation of Environmental, Social, and Governance principles can be an important financial risk mitigation tool for companies. Companies with good ESG performance tend to have more mature risk management, transparent governance, and a commitment to sustainability that can strengthen their financial position and reduce financial uncertainty. Panel data regression analysis reinforces these findings by showing a significant negative relationship between ESG Score and financial risk variables, as measured through indicators such as leverage ratio and financial performance volatility. This is in line with the literature that states that companies that integrate ESG aspects in their business strategy are able to reduce the risk of default, improve operational efficiency, and

strengthen reputation in the eyes of investors and other stakeholders.

This study found that the effect of ESG Score on stock investment risk in companies listed on IDX ESG is not statistically significant. Although the ESG Score reflects a company's good sustainability performance, it has not been proven to directly affect the level of risk faced by investors in the form of stock price fluctuations or stock market volatility of these companies. This finding suggests that the implementation of ESG, in the context of the Indonesian capital market during the 2017–2023 period, has not been able to be the main determinant in reducing stock investment risk directly, given that stock risk is influenced by various complex external and internal factors, such as macroeconomic conditions, market sentiment, liquidity, as well as company-specific factors that are not fully reflected in the ESG score.

REFERENCES

Barko, T., Cremers, M., & Renneboog, L. (2022). Shareholder engagement on environmental, social, and governance performance. *Journal of Business Ethics, 180*(2), 1–28. https://doi.org/10.1007/s10551-021-04850-z

Brogi, M., Cappiello, A., Lagasio, V., & Santoboni, F. (2022). Determinants of insurance companies' environmental, social, and governance awareness. *Corporate Social Responsibility and Environmental Management, 29*(5), 1289–1300. https://doi.org/10.1002/csr.2274

Cooper, D. R., & Schindler, P. S. (2014). *Business research methods* (12th ed.). McGraw-Hill.

Dinh, M. T. H. (2023). ESG, time horizons, risks and stock returns. *Research in International Business and Finance, 65,* Article 101934. https://doi.org/10.1016/j.ribaf.2023.101934

Fafaliou, I., Giaka, M., Konstantios, D., & Polemis, M. (2022). Firms' ESG reputational risk and market longevity: A firm-level analysis for the United States. *Journal of Business Research, 149,* 161–177. https://doi.org/10.1016/j.jbusres.2022.05.020

Fu, C., Yu, C., Guo, M., & Zhang, L. (2024). ESG rating and financial risk of mining industry companies. *Resources Policy, 88,* Article 104308. https://doi.org/10.1016/j.resourpol.2023.104308

Gillan, S. L., Koch, A., & Starks, L. T. (2021). Firms and social responsibility: A review of ESG and CSR research in corporate finance. *Journal of Corporate Finance, 66,* Article 101889. https://doi.org/10.1016/j.jcorpfin.2020.101889

Hao, J., Sun, R., Gong, X., & Zhu, X. (2025). ESG and stock price crash risk revisited: Evidence from mandatory ESG disclosure policy in China. *Pacific Basin Finance Journal, 91,* Article 102729. https://doi.org/10.1016/j.pacfin.2025.102729

Husted, B. W., & de Sousa-Filho, J. M. (2019). Board structure and environmental, social, and governance disclosure in Latin America. *Journal of Business Research, 102,* 220–227. https://doi.org/10.1016/j.jbusres.2018.01.017

Koroleva, E., Baggieri, M., & Nalwanga, S. (2020). Company performance: Are environmental, social, and governance factors important? *International Journal of Technology, 11*(8), 1607–1617. https://doi.org/10.14716/ijtech.v11i8.4527

Li, H., Zhang, X., & Zhao, Y. (2022). ESG and firm's default risk. *Finance Research Letters, 47,* Article 102715. https://doi.org/10.1016/j.frl.2022.102715

Luo, D., Yan, J., & Yan, Q. (2023). The duality of ESG: Impact of ratings and disagreement on stock crash risk in China. *Finance Research Letters, 58,* Article 104479. https://doi.org/10.1016/j.frl.2023.104479

Shaikh, I. (2021). Environmental, social, and governance (ESG) practice and firm performance: An international evidence. *Journal of Business Economics and Management, 23*(1), 149–170. https://doi.org/10.3846/jbem.2022.16202

Shakil, M. H., & Rahman, M. M. (2019). The relationship between ESG performance and stock returns: Evidence from emerging markets. *Emerging Markets Review, 39,* 100–115. https://doi.org/10.1016/j.ememar.2019.04.005

Sinha Ray, S., & Goel, A. (2023). Valuing ESG: How financial markets respond to corporate sustainability. *Journal of Corporate Finance, 75,* Article 102120. https://doi.org/10.1016/j.jcorpfin.2022.102120

Wang, M., Liu, L., & Liang, T. (2025). Does the ESG disclosure quality affect financial performance: Empirical evidence from Chinese energy-listed companies. *Finance Research Letters, 77,* Article 107118. https://doi.org/10.1016/j.frl.2025.107118

Wang, Y., & Zhang, J. (2023). Corporate ESG performance and competitive strategies from the perspective of financial markets: Strategic significance of firm size. *Strategic Management Journal, 44*(1), 45–67. https://doi.org/10.1002/smj.3492

Yang, S. S., Huang, J. W., Chen, H. Y., & Tsay, M. H. (2025). Detecting corporate ESG performance: The role of ESG materiality in corporate financial performance and risks. *North American Journal of Economics and Finance, 76,* Article 102370. https://doi.org/10.1016/j.najef.2025.102370