THE EFFECT OF ENVIRONMENTAL, SOCIAL, AND GOVERNANCE DISCLOSURE ON FINANCIAL STABILITY: THE MODERATING ROLE OF BOARD OF DIRECTORS' STEM BACKGROUND. (CASE STUDY ON MINING COMPANIES LISTED ON THE INDONESIA STOCK EXCHANGE FOR THE 2020-2024 PERIOD)

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Abstract

Environmental, Social, and Governance (ESG) data is being made public by businesses as a result of the growing significance of sustainability initiatives. But there has been no clear-cut evidence linking ESG disclosure to financial stability, especially in the mining industry. Boards of directors with STEM (science, technology, engineering, and mathematics) backgrounds can moderate the association between environmental, social, and governance disclosures and financial stability, which is the overarching goal of this study. Using data collected from 65 mining companies listed on the IDX between 2020 and 2024, this study takes a quantitative approach to understanding the industry. The data was examined using EViews 13 software and methods such as Moderated Regression Analysis (MRA) and Panel Data Regression. Financial stability is positively and significantly impacted by Social Disclosure and Governance Disclosure, but by no means by Environmental Disclosure. Furthermore, there is evidence that ESG transparency and firm financial stability are enhanced when boards of directors possess STEM competence. These results imply that mining businesses can improve their financial stability and long-term resilience by increased social and governance transparency, which is backed by STEM capabilities on the board of directors.

Keywords: ESG Disclosure, Financial Stability, Environmental Disclosure, Social Disclosure, Governance Disclosure, STEM Board of Directors

INTRODUCTION

One of the most important measures of a company's resilience to economic shocks and other hazards is its financial stability. Investors are more likely to have faith in a company and its ability to weather financial storms if it is financially stable (Chiaramonte et al., 2022). The example of PT Bumi Resources Tbk exemplifies this point; the company achieved financial stability it had not seen in a decade after fortifying its capital structure through a strategic shareholder alliance. In the wake of a more stable financial position, investor faith in BUMI rose, and the stock is no longer seen as a gamble (Kontan.co.id, 2022). The need of financial stability in ensuring business continuity has been further highlighted by a number of global economic crises, including the COVID-19 pandemic, the global financial crisis of 2008, the Asian financial crisis of 1997, and the inflationary pressures of 2022. As shown in the case of PT Sri Rejeki Isman Tbk (Sritex), which went bankrupt due to heavy debt loads and poor business performance in the face of worldwide economic pressures, a company's incapacity to keep its finances stable can result in worse operational performance or even insolvency (Kompas, 2025)

In contrast, several industries, including mining, have faced greater financial difficulties as a result of inflationary pressures, global economic instability, and volatile commodity prices in the past few years. The financial performance of mining businesses in Indonesia has taken a hit due to the decrease in coal and other mining commodity prices after a boom in 2021–2022 (PwC, 2023). The average price of coal dropped by 42% from the previous year in the first half of 2023, according to a PwC report (2023). Numerous mining companies have seen their performance decline as a result of this situation. For example, PT Timah Tbk lost 487 billion IDR, PT Bukit Asam lost 51.7% of its profit, and PT Aneka Tambang lost 19.45% of its profit (Kontan.co.id, 2023). The Altman Z-Score values of numerous mining companies listed on the Indonesia Stock Exchange over the 2020-2024 timeframe further demonstrate this deteriorating tendency. The Z-Score of PT Merdeka Copper Gold Tbk (MDKA) fell precipitously from 7.16 in 2020 to 1.25 in 2024, showing a transition from a secure financial position to the trouble zone. At the same time, PT TBS Energi Utama Tbk (TOBA) had a low and variable Z-Score, which ranged from 1.02 to 2.17 during the time, putting the company in the grey area. The most alarming pattern was observed with SQMI, whose Z-Score plummeted from 9.19 in 2021 to -1.03 in 2023 and even further fell to -2.20 in 2024, putting the firm squarely in the bankruptcy-risk zone. Z-Score values that are constantly rising and falling show that many Indonesian mining companies are still struggling with financial stability. This highlights the need to look at elements, like ESG disclosure, that might make companies more resilient financially in the face of unpredictable commodity markets. This scenario shows that sustainable business practices, the capacity to manage long-term risks, and financial performance are all elements that contribute to a company's financial stability.

Companies are being evaluated based on more than just their financial success when it comes to sustainability. This is because stakeholders are paying more attention to sustainability problems. Sustainability, ethics, and governance (ESG) reporting is a popular method. Investors, regulators, and others concerned with sustainable development are increasingly factoring environmental, social, and governance (ESG) considerations into assessments of business performance and investment decisions (Haliza & Ahmadi, 2024). According to (Romli & Abdurohim, 2024) stakeholders are able to evaluate a company's long-term value creation strategies by looking at its ESG disclosures, which cover topics such

as social responsibility, environmental consequences, and corporate governance standards. Public companies in Indonesia are obligated to disclose sustainability-related information and adhere to sustainable finance principles according to Financial Services Authority Regulation No. 51/POJK.03/2017, which emphasises the significance of ESG disclosure (OJK, 2025). In addition, ESG data is quickly becoming a major factor in financial markets, as the value of worldwide sustainable investment assets surpassed USD 30 trillion in 2022 (Global Sustainable Investment Review, 2022).

A company's financial stability shows how well it can handle economic shocks and other hazards to its health. The relationship between ESG disclosure and financial stability can be explained by Stakeholder Theory and Upper Echelons Theory. Generally, firms with excellent financial stability have lower bankruptcy risk and more access to external financing. Transparent ESG disclosure, according to Stakeholder Theory (Freeman, 1998; Gillan et al., 2021). supports long-term financial stability by increasing trust among stakeholders, bolstering business reputation, and improving access to resources. The Upper Echelons Theory, on the other hand, states that the educational backgrounds and other personal traits of top executives have an effect on the results of organisations (Hambrick & Mason, 1984). According to (Cahyono et al., 2024) directors who have backgrounds in STEM fields are more likely to have good analytical and problem-solving skills, which will help them handle risks and opportunities related to environmental, social, and governance (ESG) factors more successfully. According to (Hsieh et al., 2022) a BOD with a STEM background may amplify the beneficial effect of ESG disclosure on financial stability.

Research has shown that ESG disclosure can help strengthen companies' ability to weather storms and remain in business for the long haul. According to (Fatemi et al., 2018) companies may show how well they handle risks and opportunities related to the environment, society, and governance through ESG disclosure. According to (Zhang & Liu, 2022) responsible environmental, social, and governance (ESG) disclosure can help companies maintain financial stability in the long run by improving their reputation, building stronger relationships with stakeholders, lowering operational risk, and making it easier to access capital markets. These advantages are especially pertinent in the mining industry, where corporations encounter significant social and environmental issues that can impact stakeholder perceptions and operational sustainability (Amel-Zadeh & Serafeim, 2018).

There is still no clear proof that ESG disclosure has an effect on financial stability, despite the increasing focus on this topic. Research has shown that environmental, social, and governance (ESG) disclosure has a beneficial impact on financial stability. This is because it improves access to funding, decreases risk exposure, and boosts company reputation (Choi et al., 2024; Wu et al., 2025). However, there are studies that argue that implementing ESG principles could have the opposite effect, leading to higher operational expenses, larger investments, and temporary inefficiencies that could compromise financial stability and performance (Buallay, 2019; Hammad, 2025). These contradictory results suggest that some internal organisational traits may determine the association between ESG disclosure and financial stability, which have not been thoroughly investigated in previous research.

The Board of Directors' (BOD) educational background is one organisational element that could account for these contradictory results. The quality of strategic decisions, the effectiveness of monitoring, the capability to innovate, and the practices of risk management are all affected by the directors' competences and educational qualifications, according to the

existing literature (Hsieh et al., 2022). One study found that directors with STEM expertise were more likely to have good analytical skills, make decisions based on data, and have a better grasp of technical and operational hazards (Cahyono et al., 2024). With these skills, businesses may be able to turn their investments in sustainability into better financial returns and execute ESG activities more efficiently. However, there is a lack of research on the impact of board of directors' STEM backgrounds on the correlation between ESG disclosure and financial stability. This is particularly true in developing economies and sectors like mining that are delicate to environmental impacts.

These factors highlight a major knowledge vacuum about how STEM backgrounds on boards of directors affect the strength of the correlation between ESG disclosure and financial stability. This study adds to the existing literature by examining mining businesses registered on the Indonesia Stock Exchange. It seeks to determine if directors with STEM educational backgrounds make ESG disclosure more effective in promoting financial stability. Academics and industry professionals alike must grasp this connection because of the strategic significance of the mining sector and the dangers it faces in terms of environmental, social, and governance factors. Consequently, the purpose of this research is to look at how ESG disclosure affects financial stability and how BOD STEM background influences that effect. Consequently, the title of this research is The Effect of ESG Disclosure on Financial Stability: The Moderating Role of STEM Background among Board of Directors.

REVIEW OF LITERATURE

Stakeholder Theory

Firms, according to Stakeholder Theory (Freeman, 1998) have an obligation to take into account the needs of all stakeholders, including shareholders, workers, consumers, vendors, the state, and society at large. Financial performance is just one measure of a firm's success; the capacity to generate value for stakeholders is equally important (Mahajan et al., 2023) According to (Afifah et al., 2021) firms function as interdependent systems, and a key factor in achieving competitive advantage and long-term performance is the proper management of stakeholders. In the context of environmental, social, and governance (ESG) initiatives, this theory proposes that companies will be more successful in achieving financial stability if they act responsibly in response to stakeholder expectations (Siregar et al., 2025).

Upper Echelons Theory

According to the Upper Echelons Theory put forward by Hambrick & Mason, (1984) the traits of top executives, such as their level of education, years of experience, and cognitive values, have a significant impact on the outcomes of organisations. In this way, businesses mirror the personalities and values of their upper management, and the BOD's expertise and viewpoints inform the company's long-term strategies. Both the company's strategic direction and its reactions to stakeholder pressures are affected by board features, according to recent studies (Guangqi et al., 2024). Additionally, (Andini et al., 2024) discovered that educational background and competence boost the quality of ESG implementation and governance. According to this research, the analytical and data-driven decision-making abilities of a board of directors (BOD) with a STEM background should increase the connection between environmental, social, and governance (ESG) disclosure and financial stability (Xu et al., 2025).

Financial Stability

A company is considered financially stable if it can continue operations, pay its bills on time, and weather economic storms (Maulidi et al., 2026). When looking at the big picture, it shows how well the financial sector can weather economic storms and keep the economy moving (Allen & Wood, 2006; Schinasi, 2004). Stakeholder trust rises and the likelihood of financial difficulty falls when a company is financially stable (Chiaramonte et al., 2022). According to (Altman, 1968; Wu et al., 2025) the Altman Z-Score is a method for predicting the likelihood of bankruptcy that takes into account a number of financial parameters. There is less likelihood of default and more financial stability with a higher Z-Score.

Enviromental, Social , Governance (ESG) Disclosure

When companies disclose their sustainability efforts, they are also required to report on their environmental, social, and governance policies and procedures (Muslichah, 2020). The social component pertains to the well-being of employees, human rights, and community interactions, whereas the environmental component addresses resource utilisation, emissions, and waste management. According to (Dwi Jayanti et al., 2024; Qodary & Tambun, 2021). the governance dimension places an emphasis on openness, responsibility, and moral leadership in the business world. According to (Eddy & Romli, 2025) ESG has emerged as a critical metric for investors to evaluate risk management and wealth generation in the long run. Using ESG disclosure as a tool to lessen information asymmetry, boost legitimacy, and fortify company reputation is based on Stakeholder Theory (Wahdah & Jayanti, 2023). Using the ratio of reported items to total indicators, this study calculates ESG disclosure using GRI Standards 2021 with 117 indicators (Andini Pratiwi et al., 2025; GRI Standards, 2021)

Board of Directors (BOD) STEM

A manager's ability to make sound decisions is heavily influenced by their level of education (Putri, 2020). According to the Upper Echelons Theory, which was put forth by (Hambrick & Mason, 1984). the strategic decisions made by executives have an effect on the organization's outcomes. Better decision-making and risk management are hallmarks of boards whose members have backgrounds in STEM fields, since these directors are more likely to be analytical, problem solvers, and innovators. In addition, executives who have degrees in STEM are more likely to promote the use of environmentally friendly practices and technology inside their organisations (Cahyono et al., 2024; Rizki et al., 2024). Ramadianti & Romli, (2026) found that STEM traits can boost financial performance by making the company more eco-friendly. As a result, STEM BODs are viewed as possible moderators that can enhance the correlation between ESG disclosure and financial stability.

The Effect of Enviromental Disclosure on Financial Stability

A company's level of environmental disclosure indicates how openly it handles matters pertaining to environmental management, including waste management, energy use, and emissions. Increasing stakeholder trust, decreasing environmental and regulatory risks, and strengthening a company's legitimacy all of which contribute to financial stability can be achieved through appropriate environmental disclosure, according to Stakeholder Theory. Financial stability is associated with greater environmental disclosure, according to studies Broadstock et al.(2021), Choi et al. (2024) and Lupu et al. (2022)

H1: Environmental disclosure has a positive effect on financial stability

The Effect of Social Disclosure on Financial Stability

Social disclosure demonstrates a company's transparency in disclosing information related to employees, the community, occupational health and safety, and social responsibility. Based on Stakeholder Theory, good social disclosure can improve stakeholder

relationships, reduce operational risk, and support corporate sustainability. Research by Zheng et al. (2025) found that social disclosure positively impacts financial stability by increasing productivity and reducing social risk.

H2: Social disclosure has a positive effect on financial stability

The Effect of Governance Disclosure on Financial Stability

Governance disclosure reflects a company's openness in disclosing governance practices, such as board structure, internal control, and risk management. Based on Stakeholder Theory, transparent governance can increase investor confidence and reduce information asymmetry, thereby strengthening a company's financial stability. Alexandra et al.(2024) and Almulla et al. (2025) found that governance disclosure positively impacts financial stability.

H3: Governance disclosure has a positive effect on financial stability

BOD STEM moderates the effect of Enviromental Disclosure on Financial Stability

Directors with backgrounds in science, technology, engineering, and mathematics (STEM) are better able to assess and mitigate environmental risks, according to Upper Echelons Theory. These skills enable companies to implement environmental policies more effectively, thus enhancing the benefits of environmental disclosure on financial stability. Findings by Cahyono et al. (2024) and Xu et al. (2025) support the role of STEM BODs in enhancing the effectiveness of corporate sustainability practices.

H4: BOD STEM strengthens the relationship between enviromental disclosure and financial stability.

BOD STEM moderates the effect of Social Disclosure on Financial Stability

According to Upper Echelons Theory, BODs with STEM backgrounds possess data-driven capabilities that can enhance the effectiveness of corporate social program planning and evaluation. Therefore, social disclosure supported by STEM BODs can provide greater benefits in building relationships with stakeholders and maintaining the company's financial stability. Research by Cahyono et al. (2024) and Wu et al. (2025) supports this argument.

H5: BOD STEM strengthens the relationship between social disclosure and financial stability.

BOD STEM moderates the effect of Governance Disclosure on Financial Stability

The efficacy of corporate governance is enhanced by STEM-based BODs because of their superior skills in data-driven decision-making, risk management, and information systems. Governance transparency is able to have a bigger impact on financial stability due to these features, according to Upper Echelons Theory. Research by Hsieh et al. (2022) and Xu et al. (2025) shows that directors with technical backgrounds can improve the quality of corporate governance and control.

H6: BOD STEM strengthens the relationship between governance disclosure and financial stability.

The Influence of Environmental, Social, and Governance Disclosure on Financial Stability with BOD STEM as a Moderating Variable

Based on Stakeholder Theory, sound ESG disclosure can enhance corporate legitimacy, mitigate risk, and strengthen stakeholder relationships, thus supporting financial stability. Meanwhile, Upper Echelons Theory explains that the BOD STEM can enhance the effectiveness of ESG implementation through its analytical and technical capabilities. Therefore, environmental, social, and governance disclosures are expected to collectively influence financial stability, with BOD STEM acting as a moderating variable.

H7: Environmental, social, and governance disclosures simultaneously affect financial stability, with the STEM background of the Board of Directors acting as a moderating variable.

RESEARCH METHOD

Utilising secondary data collected from the 2020–2024 fiscal years of mining businesses traded on the Indonesia Stock Exchange (IDX), this quantitative analysis examines the industry as a whole. Thirteen different businesses contributed 65 observations for the study; the sampling method was purposive sampling with clear, predefined criteria. With BOD STEM serving as a moderating variable, this study seeks to analyse the effect of Environmental, Social, and Governance Disclosure on Financial Stability. One way to gauge financial stability is via the Altman Z-Score. At the same time, a disclosure index that follows GRI standards is used to measure Environmental Disclosure, Social Disclosure, and Governance Disclosure. Board members' STEM (Science, Technology, Engineering, and Mathematics) degrees as a percentage of the total board members constitute the BOD STEM variable.

The EViews 13 software was used for data analysis. The dataset includes both cross-sectional data (mining businesses) and time-series data (2020–2024), therefore panel data regression was used to get more accurate parameter estimates while also capturing differences among companies and across time. On top of that, Moderated Regression Analysis (MRA) is used in this study because it looks at how BOD STEM moderates the link between Financial Stability, Environmental Disclosure, Social Disclosure, and Governance Disclosure. Using MRA, one may directly test for the interaction effects between the moderating variable and the independent variables. The Chow, Hausman, and Lagrange Multiplier (LM) tests were used to choose the most suitable panel data regression model before hypothesis testing. After that, we tested our hypotheses with the t-test, the F-test, and the adjusted R-squared value. This study's regression model is constructed in the following way:

$$\mathbf{Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4Z + \beta 5(X1 \times Z) + \beta 6(X2 \times Z) + \beta 7(X3 \times Z) + \varepsilon}$$

Where Y is Financial Stability, X_1 is Environmental Disclosure, X_2 is Social Disclosure, X_3 is Governance Disclosure, and Z is BOD STEM. The variables $X_1 \times Z$, $X_2 \times Z$, and $X_3 \times Z$ each represent the interactions between Environmental Disclosure, Social Disclosure, and Governance Disclosure with BOD STEM as a moderating variable. Furthermore, β_0 indicates a constant, β_1–β_7 indicates the regression coefficient, while ε indicates the error term.

RESULTS AND DISCUSSION

Descriptive Statistical Testing

Tabel 1.
Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
EDI	65	0.0000	1.7700	0.7398	0.3882
SDI	65	0.2700	1.7700	0.7223	0.2263
GDI	65	0.1400	0.4700	0.3527	0.0868

FS	65	-2.2000	16.2100	4.3907	3.5772

Source: EViews Output (Processed Data, 2025)

Table 1 displays the range of values for the Environmental Disclosure Index (EDI), which ranges from 0.0000 to 1.7700, with an average of 0.7398 and a standard deviation of 0.3882. When the mean exceeds the standard deviation, it means that the company's environmental disclosure is moderately good. Corporate social disclosure is generally constant and homogeneous, according to the Social Disclosure Index (SDI), which has a value range of 0.2700 to 1.7700, an average of 0.7223, and a standard deviation of 0.2263. There appears to be some consistency in the level of governance disclosure among the sample organisations, as the Governance Disclosure Index (GDI) ranges from 0.1400 to 0.4700, with an average value of 0.3527 and a standard deviation of 0.0868. There was a standard deviation of 3.5772 and a mean of 4.3907 for Financial Stability (FS), which varied from -2.2000 to 16.2100. Although the sample companies' financial situations were usually steady, the large range of values shows that companies' levels of stability vary.

Classical Assumption Test

Normality Test

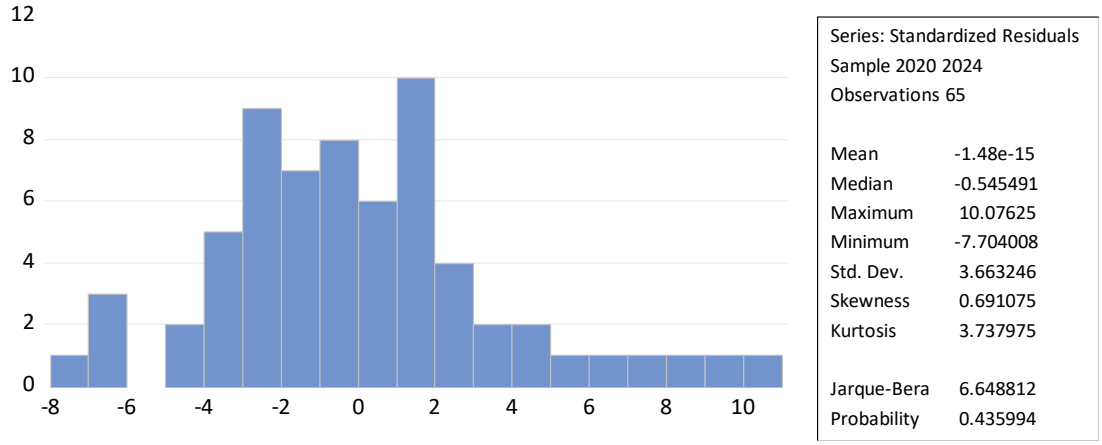

Figure 1. Normality Test

Source: EViews Output (Processed Data, 2026)

We got a probability value of 0.435 from the normalcy test that was conducted using the Jarque-Bera method. The null hypothesis (H_0) is accepted because this result is greater than the significance level of 0.05 (0.435 > 0.05). The study's residual data follows a normal distribution. According to these findings, the study model is acceptable for additional examination since it satisfies the normalcy assumption. Also, the distribution pattern of the residuals approaches a normal curve (bell-shaped curve) in the residual histogram, which proves that the residuals of the model follow a normal distribution.

Multicollinearity Test

Tabel 2.
Multicollinearity Test

Variabel	EDI	SDI	GDI
EDI	1.000000	0.480048	0.727248
SDI	0.480048	1.000000	0.716678
GDI	0.727248	0.716678	1.000000

Source: EViews Output (Processed Data, 2026)

Correlation values between independent variables range from 0.480048 to 0.727248, according to the multicollinearity test. It can be concluded that the research model does not display multicollinearity because none of the correlation values are greater than 0.80 (Ghozali, 2021), This shows that the dependent variable can be explained by the independent variables in different ways.

Heteroscedasticity Test

Tabel 3.
Heteroscedasticity Test

Variable	t-Statistic	Prob
EDI	1.048213	0.2987
SDI	-1.109978	0.2714
GDI	0.555753	0.5804

Source: EViews Output (Processed Data, 2026)

Based on the findings of the Glejser heteroscedasticity test, the probability values of EDI, SDI, and GDI are 0.2987, 0.2714, and 0.5804, respectively. All of these values are more than 0.05, hence the study model does not experience signs of heteroscedasticity. These results imply that the residual variance is constant and the assumption of homoscedasticity in the regression model has been met.

Autocorrelation Test

Tabel 4.
Durbin-Watson Autocorrelation Test

Durbin-Watson stat	1.659722

Source: EViews Output (Processed Data, 2026)

The Durbin-Watson statistic has a value of 1.659722 based on the Durbin-Watson test findings presented above. The Durbin-Watson statistic value is between 1 and 3, with 1.659722 being more than 1 and less than 3. This means that the residual values do not show evidence of high autocorrelation. This signifies the data passes the autocorrelation test.

Panel Data Regression Model Selection Test

Tabel 5.
Chow Test

Effects Test	Statistic	d.f.	Prob.
Cross-section F	4.322113	(12,49)	0.0001
Cross-section Chi-square	46.927802	12	0.0000

Source: EViews Output (Processed Data, 2026)

Based on the Chow Test results, the Cross-section F probability value is 0.0001 and the Cross-section Chi-square is 0.0000, both of which are less than 0.05. These results indicate that the Fixed Effect Model (FEM) is more suited to utilise than the Common Effect Model (CEM). Next, the Hausman Test was run to select the best appropriate model between the Fixed Effect Model (FEM) and the Random Effect Model (REM).

Tabel 6.
Hausman Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	3.824713	3	0.2810

Source: EViews Output (Processed Data, 2026)

The Hausman test results show a probability value of 0.2810, which is greater than the 0.05 significance level. This result suggests that the null hypothesis (H_0) is accepted, so the Random Effects Model (REM) is regarded more acceptable than the Fixed Effects Model (FEM). Based on these test results, the panel data regression model employed in this work is the Random Effects Model (REM).

Tabel 7.
Lagrange Multiplier Test

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	13.70299	0.914205	14.61720
	(0.0002)	(0.3390)	(0.0001)

Source: EViews Output (Processed Data, 2026)

The Lagrange Multiplier (LM) test results show a Breusch-Pagan probability value of 0.0001, which is less than 0.05. This result suggests that H_0 is rejected, hence the Random Effects Model (REM) is more suited than the Common Effects Model (CEM). These evaluations informed the selection of the Random Effects Model (REM) for panel data estimation in this investigation.

Tabel 8.
Random Effect Model Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.574481	1.796085	1.990151	0.0511
EDI	-3.343650	2.070032	-1.615264	0.1114
SDI	1.353683	3.910685	0.346150	0.0073
GDI	12.09814	10.25540	1.179684	0.0024

Source: EViews Output (Processed Data, 2026)

Based on Table 8, the results of the moderated regression analysis produce the following equation:

Financial Stability = 3.5745 – 3.3436 EDI + 1.3537 SDI + 12.0981 GDI

Assuming EDI, SDI, and GDI remain constant, the Financial Stability value comes out to 3.574481. With a probability value of 0.1114 and a coefficient of -3.343650, the EDI variable is negatively but insignificantly related to Financial Stability. With a probability value of 0.0073 and a coefficient of 1.353683, the SDI variable is positively and significantly correlated with Financial Stability. In addition, the GDI variable has a positive and significant effect on Financial Stability, as indicated by its 12.09814 coefficient and 0.0024 probability value. Disclosure of environmental factors has not had a substantial impact, but disclosure of social factors and corporate governance does contribute to enhancing the financial stability of the firm, according to these findings.

Moderated Regression Analysis (MRA)

Tabel 9.
Results of Moderated Regression Analysis (MRA)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.439472	5.070450	0.086673	0.9312
EDI	-3.595725	4.501704	-0.798748	0.4278
SDI	1.356889	9.203184	0.147437	0.0088
GDI	17.87053	25.04451	0.713551	0.0478
M	7.485929	9.941982	0.752961	0.0455

EDIM	-1.491204	16.74061	-0.089077	0.9293
SDIM	1.598494	30.44261	0.052508	0.0096
GDIM	5.748877	49.90956	0.115186	0.0087

Source: EViews Output (Processed Data, 2026)

Table 9 shows the MRA results for Financial Stability, which reveal that SDI and GDI have a positive and substantial influence. This means that more social and governance disclosure can make a company's finances stronger. Environmental disclosure has not been shown to have a substantial influence on financial stability, since EDI has a negative but negligible effect. Furthermore, there is a favourable and statistically significant correlation between board size and financial stability. The results of the marginal relationship analysis (MRA) show that Board Size cannot moderate the link between EDI and Financial Stability, since the probability value of the interaction between EDI and Board Size (EDIM) is 0.9293 > 0.05. The likelihood value of 0.0096 < 0.05 for the interaction between SDI and Board Size (SDIM) suggests that Board Size can both reduce and enhance the link between SDI and Financial Stability. Board Size can moderate and strengthen the association between GDI and Financial Stability, as indicated by the fact that the probability value of the interaction between GDI and Board Size (GDIM) is 0.0087 < 0.05. Based on these findings, board size is more important than environmental disclosure in enhancing the impact of social and governance disclosure on the financial stability of a corporation.

Hypothesis Testing

Table 10.
Hypothesis Test Result

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	3.574481	1.796085	1.990151	0.0511
X1_EDI	-3.343650	2.070032	-1.615264	0.1114
X2_SDI	1.353683	3.910685	0.346150	0.0073
X3_GDI	12.09814	10.25540	1.179684	0.0024
R-squared	0.799969	Mean dependent var		1.700982
Adjusted R-squared	0.721758	S.D. dependent var		2.800132
S.E. of regression	2.830430	Sum squared resid		456.6462
F-statistic	0.805307	Durbin-Watson stat		1.659722
Prob(F-statistic)	0.000864			

Source: EViews Output (Processed Data, 2026)

1. Individual Parameter Significance Test (T-Test)

A t-statistic value of -1.615264 and a probability of 0.1114, which is greater than the significance level of 0.05, indicate that the Environmental Disclosure Index (EDI) has a negative but inconsequential effect on Financial Stability, according to the t-test results. On the other hand, the Social transparency Index (SDI) reveals a favourable and statistically significant relationship between growing social transparency and a company's financial stability, with a t-statistic value of 2.803397 and a probability of 0.0073. A t-statistic of 3.179684 and a probability of 0.0024 indicate that the Governance Disclosure Index (GDI) positively and significantly affects Financial Stability. According to these findings, environmental disclosure has not had a substantial impact on a company's financial health, but better disclosure of governance does.

2. Simultaneous Significance Test (F Test)

A Prob(F-statistic) value of 0.000864 is less than 0.05, and the F-statistic value was 8.805307 according to the findings of the simultaneous test. The results show that Financial Stability is significantly affected by the EDI, SDI, GDI, Board Size, and interaction variables all at once. These findings provide credence to the idea that the research model employed adequately explains the connection between Financial Stability, independent variables, and moderating variables.

3. Test of Determination Coefficient (R^2)

The adjusted R-squared value, which is a measure of the coefficient of determination, was 0.721758, or 72.18 percent. This means that 72.18% of the variance in Financial Stability can be explained by the model's environmental disclosure index (EDI), social disclosure index (SDI), governance disclosure index (GDI), board size, and interaction factors. Factors not included in the study model account for the remaining 27.82%.

The Effect of Environmental Disclosure on Financial Stability

Environmental Disclosure (EDI) has a -3.343650 coefficient and a 0.1114 probability value (>0.05), according to the test results. Rejecting H1, this finding shows that Environmental Disclosure does, in fact, have an effect on Financial Stability, although a small and negative one. Environmental disclosure is seen by stakeholders as a way for corporations to demonstrate their duty and dedication to sustainability, in line with Stakeholder Theory. Companies' environmental disclosures have not substantially enhanced financial stability, according to this study's conclusions. Investors and creditors do not yet primarily use environmental information when evaluating a company's financial stability, as this example shows.

According to the authors, the insignificant effect of Environmental Disclosure on Financial Stability is due to the economic benefits of environmental activities tending to be long-term, while financial stability is more influenced by the company's short-term financial condition. Furthermore, implementing environmental programs such as waste management, emission reduction, and the use of environmentally friendly technologies requires relatively large costs, so the financial benefits are not yet directly felt. Variations in environmental disclosure levels between companies, as well as the low level of stakeholder attention to environmental issues compared to social and governance aspects, may also contribute to the inability of Environmental Disclosure to significantly impact Financial Stability. This finding aligns with research by Hammad (2025) and Buallay (2019), which found that the environmental dimension of ESG does not always significantly impact a company's performance or financial condition.

The Effect of Social Disclosure on Financial Stability

A coefficient of 1.353682 and a probability value of 0.0073 (<0.05) are shown by the test results for Social Disclosure (SDI). We can accept H2 as true since these findings show that social disclosure significantly impacts financial stability for the better. Stakeholder Theory (Freeman, 1984) states that businesses will have more support from groups like the government, employees, and customers if they cater to their wants and expectations. The public's trust, the company's image, and operational risk can all be enhanced by responsible social disclosure. Consequently, a company's capacity to attain financial stability is directly correlated to the quantity of social disclosure it gives.

Broadstock et al.(2021) also discovered that robust ESG procedures can improve a company's financial situation and resistance to risk, therefore our results are in line with theirs. Moreover, as shown by Wu et al.(2025) a company's sustainability and stability can be enhanced through the social aspects of ESG, which in turn increase stakeholder trust.

The Effect of Governance Disclosure on Financial Stability

Governance Disclosure (GDI) has a coefficient of 12.09814 and a probability value of 0.0024 (<0.05), according to the test results. The results support the acceptance of H3, which states that Governance Disclosure significantly and positively affects Financial Stability. Corporate responsibility to stakeholders can be expressed through strong corporate governance, which is based on Stakeholder Theory (Freeman, 1984). A company's dedication to its operations, openness, and accountability are demonstrated by its high levels of corporate governance disclosure. The company's financial stability can be enhanced as a result of this condition, which can boost confidence among investors and creditors.

Good corporate governance standards lead to improved company performance and financial stability, according to Alexandra et al. (2024) , Choi et al. (2024) and Siregar et al. (2025), Corporate decision-making and the likelihood of conflicts of interest are both enhanced by well-governanced organisations.

The Role of the Board of Directors (BOD) and STEM in Moderating the Relationship between Environmental Disclosure and Financial Stability

The EDIM interaction variable, which stands for EDI × BOD STEM, has a probability value of 0.9293 (>0.05) and a coefficient of -1.491204, according to the MRA data. Based on these findings, we may reject H4 and conclude that BOD STEM does not alter the association between ED and FS. The educational background of senior management is one of the qualities that will impact a company's strategic decisions, according to the Upper Echelons Theory (Hambrick & Mason, 1984). Environmental disclosure has a neutral impact on financial stability regardless of whether or not a board has members with STEM backgrounds, according to this study.

This finding aligns with research by Nuhu & Alam, (2024) which shows that board expertise does not always improve the effectiveness of all ESG dimensions. The influence of board competence on environmental aspects is highly dependent on company strategy, available resources, and external pressure from regulators and stakeholders.

The Role of the Board of Directors (BOD) and STEM in Moderating the Relationship between Social Disclosure and Financial Stability

The SDIM interaction variable, as shown by the MRA results, has a probability value of 0.0096 (<0.05) and a coefficient of 1.598494. These findings provide support for H5, which states that BOD STEM enhances the positive correlation between Social Disclosure and Financial Stability. The quality of a company's strategic decisions is affected by the board of directors' educational background and competency, according to Upper Echelons Theory (Hambrick & Mason, 1984). A company's social programs and data management are both improved by having board members with backgrounds in science, technology, engineering, and mathematics (STEM). This result is in line with what Rizki et al., (2024), discovered: that certain board traits affect how good ESG disclosure is. A company's sustainability strategies can be more effective and yield larger economic benefits when the board members are competent and knowledgeable (Xu et al., 2025)

The Role of the Board of Directors (BOD) and STEM in Moderating the Relationship between Governance Disclosure and Financial Stability

A coefficient of 5.748877 and a probability value of 0.0087 (<0.05) are shown by the MRA results for the GDI×BOD STEM (GDIM) interaction variable. H6 is accepted as a result of these findings, which show that BOD STEM enhances the favourable correlation between Financial Stability and Governance Disclosure. Board members with expertise in science, technology, engineering, and mathematics (STEM) are better able to analyse complex problems and provide sound recommendations to companies, according to the Upper Echelons Theory (Hambrick & Mason, 1984). These competencies enable more effective corporate governance implementation, thus enhancing the benefits of Governance Disclosure on Financial Stability. This finding aligns with research by Alodat et al. (2022), and Cahyono et al.(2024), which found that board competency diversity can enhance corporate governance effectiveness. Furthermore, research by Hambrick and Mason (1984) confirmed that top management characteristics play a crucial role in determining the quality of a company's strategic decisions.

The Simultaneous Effect of Environmental Disclosure, Social Disclosure, and Governance Disclosure on Financial Stability with the Board of Directors (BOD) and STEM as a Moderating Variable

The findings of the simultaneous test revealed that Environmental Disclosure, Social Disclosure, and Governance Disclosure collectively impact Financial Stability with a Prob(F-statistic) value of 0.000864 (<0.05). In addition, with an Adjusted R-Squared value of 0.721758, we can see that Environmental Disclosure, Social Disclosure, and Governance Disclosure account for around 72.18% of the variance in Financial Stability, with other factors accounting for the remaining 27.82%.

The results provide credence to Stakeholder Theory (Freeman, 1984), which states that organisations will have more support and a more stable financial situation if they adhere to stakeholder expectations by implementing good ESG practices. In line with these findings, studies conducted by Choi et al. (2024), Siregar et al. (2025); Wu et al. (2025) have also shown that implementing ESG practices can help businesses become more resilient, less vulnerable to risk, and more financially stable in the long run. In addition, research has demonstrated that social and governance factors have a stronger impact on a company's financial health when a STEM BOD is present.

CONCLUSION

The impact of ESG (environmental, social, and governance) disclosure on the financial stability of corporations is the subject of this study. Unlike social and governance disclosure, which significantly improves financial stability, environmental disclosure does not. Additionally, financial stability is more strongly impacted by social and governance transparency when the BOD has a STEM background, whereas environmental disclosure is unaffected. With an explanatory power of 72.18 percent, all ESG factors produce a notable impact at the same time. The IDX mining sector being the only one studied, the study only followed participants for a short time, and content analysis-based ESG assessments could be subjective. It is suggested that in future studies, the research sectors be broadened, the observation time be lengthened, and standardised ESG metrics like the Refinitiv ESG Rating or the Bloomberg ESG Disclosure Score be employed.

REFERENCES

Afifah, N., Astuti, S. W. W., & Irawan, D. (2021). Pengaruh Corporate Social Responsibility

(Csr) Dan Reputasi Perusahaan Terhadap Nilai Perusahaan. *EKUITAS (Jurnal Ekonomi Dan Keuangan)*, *5*(3), 346–364. https://doi.org/10.24034/j25485024.y2021.v5.i3.4644

Alexandra, E., Svetlana, L., & Alexander, K. (2024). The Impact of ESG Indicators on the Financial Stability of Companies. *Procedia Computer Science*, *242*, 1226–1234. https://doi.org/10.1016/j.procs.2024.08.151

Allen, W. A., & Wood, G. (2006). Defining and achieving financial stability. *Journal of Financial Stability*, *2*(2), 152–172.

Almulla, S., Albaity, M., & Hassan Al-Tamimi, H. A. (2025). The Effects of ESG and Institutional Quality on Financial Stability: Evidence from GCC Banks. *International Journal of Economics and Financial Issues* , *15*(2), 309–326. https://doi.org/10.32479/ijefi.18152

Alodat, A. Y., Salleh, Z., Hashim, H. A., & Sulong, F. (2022). Corporate governance and firm performance: empirical evidence from Jordan. *Journal of Financial Reporting and Accounting*, *20*(5), 866–896.

Altman, E. I. (1968). Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *The Journal of Finance*, *23*(4), 589–609.

Amel-Zadeh, A., & Serafeim, G. (2018). Why and how investors use ESG information: Evidence from a global survey. *Financial Analysts Journal*, *74*(3), 87–103.

Andini, N. M., Darma, T., & Sari, R. (2024). *Pengaruh Karakteristik Dewan Direksi Terhadap Sustainability Reporting Pada Perusahaan Manufaktur Consumer Non-Clylicals Yang Terdaftar Di Bursa Efek Indonesia Tahun 2022-2024 The Influence Of Board Of Directors Characteristics On Sustainability Reporting*. 103–112.

Andini Pratiwi, T., Sufina, L., Putri Maharani, S., & Reza Putri, A. (2025). Pengaruh Environmental, Social, Governance (ESG) dan Financial Distress terhadap Firm Value Sektor Energi yang Terdaftar di BEI Tahun 2020-2024. *Jurnal Keuangan Dan Perbankan*, *9865*, 2020–2024.

Broadstock, D. C., Chan, K., Cheng, L. T. W., & Wang, X. (2021). The role of ESG performance during timeBroadstock, D. C., Chan, K., Cheng, L. T. W., & Wang, X. (2021). The role of ESG performance during times of financial crisis: Evidence from COVID-19 in China. Finance Research Letters, 38(June 2020), 101716. https:/. *Finance Research Letters*, *38*(June 2020), 101716. https://doi.org/10.1016/j.frl.2020.101716

Buallay, A. (2019). Is sustainability reporting (ESG) associated with performance? Evidence from the European banking sector. *Management of Environmental Quality: An International Journal*, *30*(1), 98–115.

Cahyono, S., Ardianto, A., & Nasih, M. (2024). Breaking barriers: CEOs STEM educational background and corporate climate change disclosure. *International Journal of Accounting and Information Management*, *32*(4), 651–684. https://doi.org/10.1108/IJAIM-10-2023-0268

Chiaramonte, L., Dreassi, A., Girardone, C., & Piserà, S. (2022). Do ESG strategies enhance bank stability during financial turmoil? Evidence from Europe. *European Journal of Finance*, *28*(12), 1173–1211. https://doi.org/10.1080/1351847X.2021.1964556

Choi, S. Y., Ryu, D., & You, W. (2024). ESG activities and financial stability: The case of Korean financial firms. *Borsa Istanbul Review*, *24*(5), 945–951. https://doi.org/10.1016/j.bir.2024.05.007

Dwi Jayanti, Siti Kustinah, Vita Citra Mulyandini, Eddy Winarso, & Adelia Nidyanti. (2024). Environmental, Social, Governance (ESG) Influence on Company Value Registered IDXESGL 2020-2022. *Economics World*, *11*(1), 35–41. https://doi.org/10.17265/2328-7144/2024.01.004

Eddy & Romli. (2025). The Influence of Environment, Social, and Governance (ESG) Practices on Bank Financial Performance. *International Journal of Economics, Business and Management Research*, *09*(08), 300–314. https://doi.org/10.51505/ijebmr.2025.9815

Fatemi, A., Glaum, M., & Kaiser, S. (2018). ESG performance and firm value: The moderating role of disclosure. *Global Finance Journal*, *38*, 45–64.

Freeman, R. E. (1998). A stakeholder theory of the modern corporation. In *The corporation and its stakeholders* (pp. 125–138). University of Toronto Press.

Ghozali, D. I. (2021). *Aplikasi Analisis Multivariate dengan Program IBM SPSS 26*.

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*, 101889.

Global Sustainable Investment Review. (2022). *Global sustA-Report-2022*. https://www.gsi-alliance.org/members-resources/gsir2022/

GRI Standards. (2021). *Global Reporting Initiative*. GRI Standards. https://www.globalreporting.org/standards/

GUANGQI, L. I., ABDULLAH, M., & HASSAN, M. S. (2024). Board Characteristics and ESG Disclosure: A Systematic Literature Review. *Asian Journal of Accounting & Governance*, *22*.

Haliza, N., & Ahmadi, M. A. (2024). Peran Environmental, Social, And Governance (ESG) Dalam Memengaruhi Keputusan Investor Pada Investasi Berkelanjutan: Literature Review. *Jurnal Media Akademik (JMA), 2(12).*, *2*(https://jurnal.mediaakademik.com/index.php/jma/issue/view/14), 3031–5220.

Hambrick, D. C., & Mason, P. A. (1984). Upper echelons: The organization as a reflection of its top managers. *Academy of Management Review*, *9*(2), 193–206.

Hammad, R. S. (2025). **T**he Importance of ESG Integration for Financial Stability: A Study of Energy-Intensive Companies in Saudi Arabia. *Journal of Economic Studies*, *17*(2), 227–242. https://doi.org/10.33948/esj-ksu-17-2-5

Hsieh, T.-S., Kim, J.-B., Wang, R. R., & Wang, Z. (2022). Educate to innovate: STEM directors and corporate innovation. *Journal of Business Research*, *138*, 229–238.

Kompas. (2025). *Kisah Kebangkrutan Sritex Setelah Ditinggal Sang Pendiri 10 Tahun yang Lalu.*

Kontan.co.id. (2022). Private placement Rp 24 triliun, langkah Bumi Resources (BUMI) merampungkan utang. *Kontan.Co.Id*. https://fokus.kontan.co.id/news/private-placement-rp-24-triliun-langkah-bumi-resources-bumi-merampungkan-utang

Kontan.co.id. (2023). *Kinerja Perusahaan Tambang dan Energi Merosot di 2023, Cermati Pemicunya*. https://industri.kontan.co.id/news/kinerja-perusahaan-tambang-dan-energi-merosot-di-2023-cermati-pemicunya#google_vignette

Lupu, I., Hurduzeu, G., & Lupu, R. (2022). How Is the ESG Reflected in European Financial Stability? *Sustainability (Switzerland)*, *14*(16). https://doi.org/10.3390/su141610287

Mahajan, R., Lim, W. M., Sareen, M., Kumar, S., & Panwar, R. (2023). Stakeholder theory. *Journal of Business Research*, *166*(December 2022), 114104.

https://doi.org/10.1016/j.jbusres.2023.114104

Maulidi, M. R., Nabila, S., Anggia, D., Amanda, A., Aisyah, M. S., & Mariana, M. (2026). THE SIGNIFICANCE OF LIQUIDITY, PROFITABILITY, AND SOLVENCY RATIOS ON FINANCIAL STABILITY: A SYSTEMATIC LITERATURE REVIEW. *HEI EMA: Jurnal Riset Hukum, Ekonomi Islam, Ekonomi, Manajemen Dan Akuntansi*, *5*(1), 83–93.

Muslichah, M. (2020). The effect of environmental, social disclosure, and financial performance on firm value. *Jurnal Akuntansi Dan Auditing Indonesia*, 22–32.

Nuhu, Y., & Alam, A. (2024). Board characteristics and ESG disclosure in energy industry: evidence from emerging economies. *Journal of Financial Reporting and Accounting*, *22*(1), 7–28.

OJK. (2025). *Penerapan Keuangan Berkelanjutan bagi Lembaga Jasa Keuangan, Emiten, dan Perusahaan Publik*. OJK.

Putri, W. E. (2020). Pengaruh Board Directors Diversity Terhadap Nilai Perusahaan dalam Perspektif Corporate Governance. *Jurnal Riset Akuntansi Dan Keuangan*, *8*(2), 307–318. https://doi.org/10.17509/jrak.v8i2.21825

PwC. (2023). Mining in Indonesia. *Mining Magazine*, *151*(5), 479–480. https://www.pwc.com/id/en/pwc-publications/industries-publications/energy--utilities---mining-publications/mining-guide-2023.html

Qodary, H. F., & Tambun, S. (2021). Pengaruh Environmental, Social, Governance (ESG) dan retention ratio terhadap return saham dengan nilai perusahaan sebagai variabel moderating. *Juremi: Jurnal Riset Ekonomi*, *1*(2), 159–172.

Ramadianti, S. S., & Romli, R. (2026). ENVIRONMENTAL PERFORMANCE AS A MEDIATOR BETWEEN CHIEF EXECUTIVE OFFICER CHARACTERISTICS AND FINANCIAL PERFORMANCE. *CURRENT: Jurnal Kajian Akuntansi Dan Bisnis Terkini*, *7*(1), 1–14.

Rizki, A., Ningsih, S., Ekasari, W. F., Putri, F. V., Aini, S. N., & Nowland, J. (2024). The impact of STEM CEO on investment efficiency: Evidence from Indonesia. *Cogent Business and Management*, *11*(1). https://doi.org/10.1080/23311975.2024.2429800

Romli, & Abdurohim. (2024). Pengaruh Pengungkapan ESG Terhadap Nilai Perusahaan. *Journal of Economic, Business and Accounting*, *7*(6). https://doi.org/10.53697/emak.v6i1.2257

Schinasi, G. J. (2004). *Defining financial stability*.

Siregar, I. F., Rasyad, R., & Onasis, D. (2025). Pengaruh Environmental, Social, and Governance (Esg) Terhadap Financial Stability Pada Perusahaan Yang Terdaftar Di Bursa Efek Indonesia. *Jurnal Akuntansi Kompetif*, *8*(2), 624–633. https://doi.org/10.35446/akuntansikompetif.v8i2.2307

Toedjono, A. (2013). *Stabilitas Keuangan: Definisi, Indikator dan Kebijakan*. 2–3.

Wahdah, A. N., & Jayanti, D. (2023). *Pengaruh Environmental Disclosuredan Environmental Management System Terhadap Kinerja Keuangan(Studi Empiris Perusahaan Batubara Terdaftar di BEI Periode 2017-2021)*. *6*(1), 234–245.

Wu, D., Song, Z., & Jin, S. (2025). ESG performance and financial Stability: The moderating effect of CEO characteristics. *Journal of Environmental Management*, *393*(August), 127049. https://doi.org/10.1016/j.jenvman.2025.127049

Xu, Y., Jiang, Y., & Ma, R. (2025). Bridging CEO Educational Background and Green Innovation: The Moderating Roles of Green Finance and Market Competition. In

Systems (Vol. 13, Issue 11). https://doi.org/10.3390/systems13110932

Zhang, D., & Liu, L. (2022). Does ESG performance enhance financial flexibility? Evidence from China. *Sustainability*, *14*(18), 11324.

Zheng, C., Mannan Khan, M. A., Rahman, M. M., Moudud-Ul-Huq, S., & Rahman, M. S. (2025). ESG Performance and Financial Stability: A Bibliometric and Meta-Analysis. *SAGE Open*, *15*(4), 1–24. https://doi.org/10.1177/21582440251381772