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Environmental, Social, and Governance Risk on Firm Performance: The Mediating Role of Firm Risk

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ABSTRACT

Business sustainability can be improved by achieving Environmental, Social, and Governance (ESG) aspects. The research aimed to examine the effect of ESG risk on firm risk and performance, the effect of firm risk on performance, and the mediating role of firm risk between ESG risk and performance. The research sample included 150 firms listed on the Indonesia ESG Leaders Index in Indonesian Stock Exchange in 2020-2022. The research measured ESG risk by the value of ESG risk, firm risk by stock return volatility, and performance by Return on Asset (ROA) and Tobin's Q. Data analysis applied path analysis. Based on data analysis, lower ESG risk reduces firm risk and increases performance. Moreover, lower firm risk increases performance, and lower ESG risk increases performance through firm risk reduction. The result indicates that lower ESG risk captures the ability of ESG implementation to reduce the risk of economic value and give benefit to reducing costs of conflict, uncertainty, and bad reputation risk. Furthermore, lower ESG risk improves performance by helping firms to promote higher revenue and cost efficiency. In additional analysis, the effect of lower ESG risk on firm risk reduction and performance improvement occurs more for firms in the environmentally sensitive industry. The results show that industry sensitivity strengthens the positive effect of ESG risk on firm risk and the negative effect of ESG risk on performance. The research contributes to giving new evidence of ESG risk on firm risk and performance in Indonesia since ESG risk assessment is a new evaluation on the Indonesian Stock Exchange.

Keywords: Environmental, Social, and Governance (ESG) risk, firm performance, firm risk

INTRODUCTION

Economic, social, and environmental performance (Boiral et al., 2019) and good corporate governance (Antwi-Adjei et al., 2020) help firms to achieve sustainable business. Sustainable business occurs when firms do not sacrifice any natural and environmental resources to maintain the fulfillment of needs in the future (Ongsakul & Sen, 2019). Business sustainability can be improved by achieving Environmental, Social, and Governance (ESG) aspects (Shakil, 2021). ESG refers to firms' achievement to improve social and environmental responsibility based on business ethics and effective governance implementation (Kim & Li, 2021).

ESG is the aspect that must be fulfilled to achieve business sustainability by increasing economic, social, and environmental performances (Shakil, 2021). According to Baier et al. (2020), ESG is a foundation of social and environmental responsibilities and sustainable business. ESG is also defined as environmental and social responsibilities based on business ethics and effective governance (Kim & Li, 2021). The governance aspect includes audit, control, board structure, remuneration, shareholders' rights, transparency, human resources, business ethics, corruption and fraud, political impact, accountability, whistleblowing, reporting and disclosure, stakeholders, regulation, and sustainability (Baier et al., 2020). Moreover, the environmental

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aspect consists of management of the ecosystem, land, water, climate change, natural resources, emission reporting, pollution, product responsibility, waste and recycling, and environmental supply chain (Baier et al., 2020). Then, social aspect has public health, medicine access, product safety, community, charity, education, employee, human rights, public relationship, and the workforce (Baier et al., 2020).

In Indonesia, some regulations are related to ESG implementation. Act No. 40 2007 about Limited Companies (*UU No. 40 2007 tentang Perseroan Terbatas*) and Government Rule No. 47 2012 about Social and Environmental Responsibility by Companies (*PP No. 47 tahun 2012 tentang Tanggung Jawab Sosial dan Lingkungan Perseroan Terbatas*) regulate firm to do social and environmental responsibilities, especially for firms related to natural resources and environmental impact. Financial Authority Rules No. 51/POJK.03/2017 about Financial Sustainability for Financial Service, Listed, and Public Companies (*POJK No. 51/POJK.03/2017 tentang Penerapan Keuangan Berkelanjutan bagi Lembaga Jasa Keuangan, Emiten, dan Perusahaan Publik*) also regulate firms to formulate sustainable business strategy and make the sustainability report. The regulation regulates firms on the Indonesian Stock Exchange to implement sustainable business by doing ESG. The regulation is implemented mandatorily in 2023, but it has been suggested early implementation since 2017. Based on the survey of Deloitte (2022), ESG implementation still play an important role in supporting firms' business where regulation, an initiative of Chief Executive Officers (CEOs), and investors' demand contribute respectively to 74%, 40%, and 34% of ESG improvement.

The Indonesian Stock Exchange issued a new stock index, Indonesia ESG Leaders Index, in 2020 to support ESG implementation. The index includes the firms with the best ESG performance in their sectors. The Indonesia ESG Leaders Index in Indonesian Stock Exchange is evaluated four times a year to reconsider which firms have had ESG performance change in the last three months. ESG performance evaluation uses ESG risk measurement. ESG risk refers to the level of firm risk that is affected by ESG implementation (Sustainalytics, 2021). Lower ESG risk refers to higher ESG performance to reduce and manage firm risk that is related to ESG implementation.

Unfortunately, business activities concern economic performance and profit more by avoiding natural damage and social and environmental consequences (Zhang & Xie, 2022). In Indonesia, there were 462 cases of environmental damage by firms up to 2018 (Biro Hubungan Masyarakat Kementerian Lingkungan Hidup dan Kehutanan, 2018). For example, PT Freeport Indonesia and PT Lapindo Brantas throw their waste away to the nearest environment and villages (Agustina et al., 2015).

Moreover, an effective ESG can give benefits to the firms. First, ESG can reduce firm risk. Based on legitimacy theory, ESG maintains firms' legitimacy in the community, so the conflict between firms and the community can be avoided (Kuruppu et al., 2019). Stakeholder theory also suggests a similar argument where ESG aims to fulfill stakeholders' interests and reduce conflict (Signori et al., 2021). ESG also helps firms to identify risk and innovation, especially the risk of environmental damage (The Association of Chartered Certified Accountants, 2013).

Around 22.000 empirical studies of ESG were reported from 1975 to 2015 (Friede et al., 2015). Then, there were more than 1.000 empirical studies of ESG and performance relationships in 2015−2020 (Whelan et al., 2021). However, most studies have inconsistent findings regarding the relationship between ESG and firm performance (Whelan et al., 2021). It comes from the misidentification that ESG implementation and reporting are the same as the ESG's ability to support performance improvement (Whelan et al., 2021).

Previous studies find some evidence of ESG, firm risk, and performance. According to Albuquerque et al. (2019) and Sassen et al. (2016), ESG reduces firm risk. Then, based on Kim and Li (2021), Hwang et al. (2021), and Yoo and Managi (2022), ESG also increases firm performance. However, ESG based on managerial opportunism is implemented to hide bad firm performance (Albuquerque et al., 2019; Sassen et al., 2016). ESG can increase firm risk (Iehl, 2020). According to Safriani and Utomo (2020) and Qodary and Tambun (2021), ESG does not affect firms' performance.

The inconsistency of previous findings comes from the gap in ESG contribution to economic value. ESG is complex, and not all parts of ESG implementation influence economic value (Aksoy et al., 2022). Since firm risk and performance are economic measurements, it is essential to identify ESG performance by its contribution to economic value. Previous studies do not capture the contribution of ESG to the economic value. For example, ESG implementation is measured by the activities without considering the activities' contribution to the economic values (Sassen et al., 2016). Next, ESG is also measured by the quality of the implementation also without considering the contribution to the economic values (Kim & Li, 2021; Hwang et al., 2021; Yoo & Managi, 2022). Moreover, ESG has ever been measured by disclosure and reporting (Safriani & Utomo, 2020; Qodary & Tambun, 2021).

There is a finding gap in previous studies. On the one hand, previous studies find that ESG reduces risk (Albuquerque et al., 2019; Sassen et al., 2016) and increases performance (Hwang et al., 2021; Kim & Li, 2021; Yoo & Managi, 2022). On the other hand, previous studies also suggest that ESG increases the firm risk (Iehl, 2020) and fails to improve performance (Qodary & Tambun, 2021; Safriani & Utomo, 2020). Since inconsistent findings come from the misidentification that ESG implementation and reporting are the same as the ESG's ability to support improvement (Whelan et al., 2021), the research

provides ESG's ability to support improvement by measuring ESG risk to capture the ESG ability to reduce firm risk.

ESG risk assessment is done by the external party, which is Sustainalytics. Some steps exist to assess ESG risk (Sustainalytics, 2021). First, Sustainalytics identifies the risk scope that is affected by ESG. Second, Sustainalytics divides the risk into manageable and unmanageable risks. Third, Sustainalytics determines which part of the manageable risk has been and has not been managed by the firms. The manageable risk that has been managed shows the ESG's ability to manage and reduce risk. On the other hand, the manageable risk that has not been managed and the unmanageable risk show that ESG fails to manage and reduce risk. In this case, ESG risk is determined by the manageable risk that has not been managed and the unmanageable risk.

The relationship between ESG and firm risk can be explained by legitimacy and stakeholder theories. Legitimacy theory suggests that there is legitimacy risk in the firms since they are part of society and community. The legitimacy risk comes from the potential conflict between firms and society, especially when the firms' business can bring consequences to harm the environment and disserve the local community. Since society's interest is also the public interest that the regulator must take, potential conflict can also occur between firms and regulators. When firms do not implement ESG, conflicts between firms and regulators can lead to legal and regulation violations. Based on the legitimacy theory, ESG is used to maintain firms' legitimacy to reduce risks of regulation violation (Zhang & De Vries, 2022). ESG implementer reduces legal risk (Sassen et al., 2016).

Legitimacy theory captures firm behavior to do environmental and social responsibilities (including ESG implementation) by considering their business legitimacy in the middle of society and community (Kuruppu et al., 2019). The motivation for ESG implementation is to reduce firm risk, especially the risk of regulation and social violation. In this case, legitimacy theory captures the relationship between ESG and firm risk.

Legitimacy theory explains why firms consider ESG in their business. According to Kuruppu et al. (2019), the legitimacy aspect is a firm position as a part of the whole value, norm, and culture system. Firms maintain their business legitimacy by implementing ESG (Zhang & De Vries, 2022). Their business is established based on the trust of society and community (Pirson et al., 2019), and they need to maintain their position in society to ensure their business existence (Erin et al., 2022). Although ESG aims to maintain business legitimacy and regulation fulfillment, firms also need to implement ESG based on all stakeholders' needs since society is not the only stakeholder. In the context of ESG, social and environmental responsibilities have to be implemented under effective governance to give a signal that firms fulfill stakeholders' needs (Sekerci et al., 2022).

Next, stakeholders' needs are captured by stakeholder theory. Stakeholder theory explains firm behavior to environmental and social responsibilities (including ESG implementation) by considering the stakeholders' interests in society and community (Signori et al., 2021). The motivation of ESG implementation is also to reduce firm risk, especially the risk of conflict of interests between firms and stakeholders. In this case, stakeholder theory also captures the relationship between ESG and firm risk.

Stakeholder theory is a development of legitimacy theory which is not only based on business legitimacy but also on stakeholders' needs. According to Signori et al. (2021), stakeholder theory concerns stakeholders' positions that get consequences from firms' business activities. It focuses on stakeholders' interests and expectations and conflict management between stakeholders. It is argued that ESG is a tool for firms to contribute to all stakeholders (Spence & Rinaldi, 2014). Based on stakeholder theory, innovation can be a tool to fulfill stakeholders' needs.

Stakeholder theory also suggests that firm risk can come from a conflict of stakeholders that can lead to a bad reputation. When firms do not implement ESG, firms get a bad reputation in front of employees, customers, suppliers, or investors. A bad reputation makes firms fail to keep productive employees, maintain customer loyalty, make a good deal with the supplier, and raise funds from investors. ESG reduces conflict between stakeholders and bad reputations (Signori et al., 2021).

Lower ESG risk shows that ESG implementation is successful in reducing firm risk. Firms with lower ESG risk have a lower risk of regulation violation, maintain reputation, and achieve business sustainability. Since ESG also help firms to identify risk (The Association of Chartered Certified Accountants, 2013), firms with lower ESG risk can manage their risk. It is found that ESG implementation is followed by lower firm risk (Albuquerque et al., 2019; Sassen et al., 2016). Hence, the first hypothesis is as follows.

H1 : ESG risk has a positive effect on firm risk

Firm risk shows the level of potential losses that can be experienced by the firms (Sassen et al., 2016). Potential losses come from the uncertain condition faced by the firms. Firms with higher risk bring uncertainty (Liesch & Welch, 2019). In this case, firms with less information and control cannot measure the uncertain condition they face (Tsai & Luan, 2016). When firms have higher risks, they have the potential to pay more uncertainty costs, such as bankruptcy costs, revenue losses (Bărbuță-Mișu & Madaleno, 2020), and market value losses (Sassen et al., 2016).

In the context of environmental-related risk, potential losses come from the costs of conflict to society, regulators, or other stakeholders, and it is enhanced when firms have a bad reputation. In this case, firms fail to maintain cost efficiency, which leads to lower performance. Higher risk can bring a

lower performance or bankruptcy (Bărbuță-Mișu & Madaleno, 2020; Tsai & Luan, 2016). Some studies find that firm risk reduces firm performance (Olaniran et al., 2016; Tsai & Luan, 2016). The second hypothesis is as follows.

H2 : Firm risk has a negative effect on performance

The relationship between ESG and firm performance can be explained by legitimacy, stakeholder, and signaling theories. Legitimacy theory suggests that the benefit of ESG for firms is to reduce the penalty costs of a regulation violation. Stakeholder theory suggests that the benefit of ESG is to make a good reputation in front of stakeholders. ESG brings reputation and credibility to the firms. Reputation and credibility help firms to maintain productive and qualified employees (Soeling et al., 2022) and reduce costs of conflict (Baier et al., 2020). Reputation can also increase revenues and reduce the costs of a regulation violation.

Based on signaling theory, ESG is a signaling tool of business sustainability where the sustainable business has lower future uncertainty in the future (Lys et al., 2015). ESG can improve firm performance. Based on signaling theory, ESG can give a signal of firm performance. ESG implementation improves firms' learning process to increase management quality by implementing transparency, maintaining business sustainability, and increasing financial performance (The Association of Chartered Certified Accountants, 2013). Indonesian Environmental and Forestry Ministry reported that there was innovation improvement in 2015−2019 from 150 to 794 innovations (Kementerian Lingkungan Hidup dan Kehutanan, 2017, 2019) and cost efficiency in 2017−2019 from IDR 53,08 trillion to IDR 287,34 trillion (Kementerian Lingkungan Hidup dan Kehutanan, 2018, 2019). Stakeholder theory also explains that stakeholders' interest fulfillment can give productivity benefits for firms. ESG helps firms to maintain their reputation. Reputable firms can get some business opportunities, such as maintaining qualified employees, creating a new market for "green customers," and reducing conflict costs when firms face regulators or the community (Hendratama & Huang, 2021; Sigdel & Amponstira, 2021; Signori et al., 2021).

Signaling theory explains that firms' actions can give a signal to external parties about private information (Puspitaningtyas, 2019). It aims to deliver information on firms' quality. In the ESG context, ESG implementation signals business sustainability (Moratis, 2018; Pulino et al., 2022). The signal of ESG can be used as a marketing tool to suppliers, employees, customers, and other parties. ESG helps firms to achieve credibility (Lee et al., 2022). In the signaling theory, ESG focuses on external perception and evaluation.

The signaling theory suggests that ESG implementation is a signal of firms' quality. First, firms' quality can come from the ability to make innovations. Effective ESG leads to innovation development in firms. Firms can establish "green products" and make a new market (Broadstock et al., 2020). Innovation also provides new "green technology" that can reduce pollution (Zhang et al., 2020) and cost efficiency (Broadstock et al., 2020). Second, a firm's quality can also come from the ability to sustain the business in the long run. ESG implementation is also a signal of business sustainability (The Association of Chartered Certified Accountants, 2013). A sustainable business has a lower risk of uncertainty (Lys et al., 2015). Sustainable business can ensure cash flow and earnings availability in the future. A sustainable business ensures lower future cash flow volatility (Lys et al., 2015). Business sustainability also mitigates the probability of market value losses since investors react positively to ESG (Sassen et al., 2016). In this case, effective ESG occurs when ESG risk is lower and where ESG is successful in reducing the potential costs of risk and bringing higher performance. Hence, ESG increases firm performance (Pham &Tran, 2020; Kim & Li, 2021; Hwang et al., 2021; Yoo & Managi, 2022). The third hypothesis is as follows.

H3 : ESG risk has a negative effect on performance

ESG can improve performance by optimizing the benefit of ESG to reduce firm risk. ESG can reduce the risk of legal and regulation violations. When the risk of legal and regulatory violation decreases, the penalty cost of legal and regulatory violation also decreases. Cost efficiency by penalty cost reduction can bring higher performance for firms. Since ESG also reduces the risk of a bad reputation, firms can optimize their reputation by creating a new market and maintaining productive employees to increase revenues. In the context of signaling theory, ESG signals business sustainability and reduces future uncertainty, attracting investors to get funding resources with a lower cost of capital (Sassen et al., 2016). In this case, lower ESG risk promotes lower firm risk to improve performance. The fourth hypothesis is as follows.

H4 : Firm risk mediates the effect of ESG risk on performance

Firms do their business to maximize performance. Better performance can be achieved by creating innovation, performing cost-efficiency, and having a good reputation to create a new market and increase revenues. Better performance can also be achieved by managing and reducing firm risk to reduce uncertainty costs and the potential of default. To provide innovation, cost-efficiency, and a good reputation, firms can formulate a strategy to implement ESG. Besides improving performance, ESG implementation can also help firms to decrease risk. Effective ESG implementation occurs when it can affect the aspect of the economic value of the firms, such as the aspect of risk of economic value. The

research provides the dimension of how effective ESG implementation can affect the risk of economic value, which is ESG risk. The research argues that ESG risk captures the level of risk of economic value that is affected by ESG implementation where ESG risk is relevant to contribute to firms' risk and performance.

In the research, ESG implementation is measured by considering the impact on economic value. The research uses ESG risk valuation as the ESG contribution to economic value. ESG risk refers to the risk level of economic value caused by ESG implementation (Sustainalytics, 2021). Lower ESG risk shows that ESG implementation is successful in mitigating firm risk. In Indonesia, there is a new stock called Indonesia ESG Leaders Index in Indonesian Stock Exchange based on ESG risk evaluation, launched in 2020.

The research aims to examine the effect of ESG risk on firm risk and performance. Lower ESG risk reduces firm risk and increases firm performance. Lower ESG risk also shows that, by mitigating firm risks, ESG can optimize sustainability, employee productivity, and innovation to increase performance. The research contributes to giving new evidence of ESG risk on firm risk and performance in Indonesia since ESG risk assessment is a new evaluation on the Indonesian Stock Exchange.

METHODS

The research sample includes firms listed on the Indonesia ESG Leaders Index in Indonesian Stock Exchange in 2020-2022. The research considers that the Indonesia ESG Leaders Index in Indonesian Stock Exchange provides an ESG risk assessment. Firms on the Indonesia ESG Leaders Index are also determined to have the best ESG performance in their sector industry. Financial data for firm risk and performance are accessed from the quarterly financial statement that follows the Indonesia ESG Leaders Index evaluation period. There are 150 total samples, as shown in Table 1.

The Independent variable is ESG risk. ESG risk value is provided by the Indonesian Stock Exchange. ESG risk shows the level of firm risk that is affected by ESG implementation (Sustainalytics, 2021). Higher ESG risk shows lower ESG performance to reduce firm risk, while lower ESG risk shows higher ESG performance to mitigate risk. ESG risk value is ranged from 0 to over 40. A score of 0−10 is categorized as negligible risk. Meanwhile, a score of 10−20 has low risk. Then, a score of 20−30 is categorized as medium risk, and a score of 30−40 is high risk. A score of over 40 is for severe risk.

Next, the dependent variable is performance. In the research, performance is measured by short- and long-term performance since ESG implementation gives consequences in the short- and long-term periods (Yoon & Chung, 2018). Short-term performance is measured by Return on Asset (ROA) (Yoon & Chung, 2018). ROA refers to the current earnings that the firms can generate by using available assets. ROA is calculated by earnings after tax divided by total assets. Moreover, long-term performance is measured by Tobin's Q. Which is the market-based performance measurement. Market-based performance refers to investors' perception of the future firm performance. Tobin's Q is suggested as a long-term performance measurement since it uses stock market price (Yoon & Chung, 2018). Stock market price captures investors' assessment of the prospect of firm performance in the future. Tobin's Q also shows the market value of assets to the book value of assets. The market value of assets is measured by the market value of equity and the book value of liabilities. Tobin's Q can be calculated using Equation (1) (Yoon & Chung, 2018).

Mediating variable is the firm risk. Firm risk is measured by stock return volatility. Stock return volatility captures investors' perception of overall firm risk (Sassen et al., 2016). The standard deviation of

Table 1 Samples in the Research

Period	Firms listed on Indonesia ESG Leaders Index
14 December 2020–16 March 2021	30
17 March 2021–15 June 2021	30
16 June 2021–14 September 2021	30
15 September 2021–14 December 2021	30
16 March 2022–14 June 2022	30
Total Sample	150

$$Tobin's\ Q = \frac{total\ liabilities + (number\ of\ outstanding\ shares \times stock\ price\ at\ ESG\ index\ issuance)}{total\ assets} \quad (1)$$

daily return for each evaluation period of the Indonesia ESG Leaders Index calculates stock return volatility.

Control variables are employee productivity, leverage, and size. Employee productivity aims to control the ESG benefit of a firm reputation to maintain productive employees. Then, employee productivity is measured by the logarithm natural of revenues per employee (Yoon & Chung, 2018). Higher employee productivity leads to lower risk and higher performance. Meanwhile, leverage aims to control financial risks. The debt-to-assets ratio measures leverage. Higher leverage leads to higher risk and lower performance. Then, firm size aims to control firms' resources to implement ESG. Bigger firms lead to lower risk and higher performance. Firm size is measured by the natural logarithm of total assets.

Moreover, the research uses path analysis to examine the hypotheses. Path analysis examines the direct effect of ESG risk and firm risk on ROA and Tobin's Q and the indirect effect of ESG risk on ROA and Tobin's Q through firm risk by firm's fixed-effect regression as shown in Equations (2)−(4). It has ESG as ESG risk, RISK as a firm risk, EMPLOY as employee productivity, LEV as leverage, and SIZE as the firm size.

$$RISK = \alpha_0 + \alpha_1 ESG + \alpha_2 EMPLOY + \alpha_3 LEV + \alpha_4 SIZE \quad (2)$$

$$ROA = \beta_0 + \beta_1 RISK + \beta_2 ESG + \beta_3 EMPLOY + \beta_4 LEV + \beta_5 SIZE \quad (3)$$

$$TOBIN = \gamma_0 + \gamma_1 RISK + \gamma_2 ESG + \gamma_3 EMPLOY + \gamma_4 LEV + \gamma_5 SIZE \quad (4)$$

Equation (2) examines H1. H1 is accepted if the coefficient value of α_1 is positive and significant. Then, Equation (3) is for H2. H2 is accepted if the coefficient value of β_1 is negative and significant. Additionally, Equation (4) also examines H2. H2 is accepted if the coefficient value of γ_1 is negative and significant. Furthermore, Equation (3) and Equation (4) are also used to examine H3. In Equation (3), H3 is accepted if the coefficient value of β_2 is negative and significant. Meanwhile in Equation (4), H3 is accepted if the coefficient value of γ_2 is negative and significant.

The indirect effect of ESG risk on performance through firm risk is examined using the total effect of ESG risk and firm risk on ROA, and Tobin's Q. H4 is accepted if the total effect is negative and significant. Equations (2)−(4) are examined by using SmartPLS with Structural Equation Modeling (SEM). Since mediating analysis needs a large number of samples, the research follows Pham and Tran (2020) to run bootstrapping until 1.000 replications to promote better estimation of indirect effect (Tofighi, 2020).

RESULTS AND DISCUSSIONS

Table 2 shows that the lowest ESG risk (ESG) is 11,450, while the highest ESG risk is 29,740. The average value of ESG risk is 23,197. It indicates that, on average, each firm listed on Indonesia ESG Leaders Index has ESG risk in the medium risk category. Then, the lowest firm risk (RISK) is 0,010, and the highest firm risk is 0,072. So, the average value of firm risk is 0,025. Next, the lowest ROA is -0,504, while the highest is 0,349. On average, each firm listed on the Indonesia ESG Leaders Index can generate a ROA of 0,026. Moreover, the lowest Tobin's Q (TOBIN) is 0,446, while the highest is 18,406. On average, each

Table 2 Descriptive Statistics in the Research

Variable	Minimum	Maximum	Mean	Std. Deviation
ESG	11,450	29,740	23,197	5,024
RISK	0,010	0,072	0,025	0,009
ROA	-0,504	0,349	0,036	0,083
TOBIN	0,446	18,406	2,107	2,754
EMPLOY	9,986	23,507	20,673	2,240
LEV	0,105	1,044	0,547	0,232
SIZE	27,810	34,333	31,075	1,529

Table 3 Model Fit in the Research

Indicator	Result	Cut-off	**Notes** (Henseler et al., 2014)
Chi-Squared	6,135	< 103,765	A sufficient number of variables
NFI	0,971	> 0,90	Model fitting data
SRMR	0,032	< 0,08	No problem of misspecification model
RMS theta	0,043	< 0,12	Small error correlation
VIF	< 0,05	< 0,05	Having multicollinearity problems

firm listed on the Indonesia ESG Leaders Index has Tobin's Q of 2,107.

The lowest employee productivity (EMPLOY) is 9,986. Meanwhile, the highest value is 23,507. On average, each firm listed on the Indonesia ESG Leaders Index has employee productivity of 20,673. Next, the lowest leverage (LEV) is 0,105, while the highest is 1,044. On average, each firm listed on the Indonesia ESG Leaders Index has leverage of 0,547. Moreover, the smallest firm size (SIZE) is 27,810, and the biggest firm size is 34,333. On average, each firm listed on the Indonesia ESG Leaders Index has firm size of 31,075.

Table 3 shows the model fitness, which indicates how good the model is in the research. The value of the Chi-squared is 6,135 (below 103,765). It shows that the model has a sufficient number of variables. Then, the value of Normed Fit Index (NFI) is 0,971 (above 0,90), showing that model fits the data. Next, the value of Standard Root Mean Square Residual (SRMR) is 0,032 (below 0,08). So, there is no problem with the misspecification model. Meanwhile, the value of Root Mean Square (RMS) theta is 0,043 (below 0,12). It shows a small correlation between errors in models. Last, the value of Variance Inflation Factors (VIF) is below 0,05, implying no multicollinearity problem between independent variables. The research finds that the model is a fit based on all indicators.

In Table 4, there are three models of the regression of ESG risk on firm risk, regression of firm risk on ROA, and regression of firm risk on Tobin's Q controlled by employee productivity (EMPLOY), leverage (LEV), and firm size (SIZE). In the regression of ESG risk on firm risk, the path of ESG risk on firm risk (ESG → RISK) has a coefficient value of 0,0363 with a t-statistic of 4,961 (significant in 0,05). The result shows that lower ESG risk leads to lower firm risk. In this case, H1 is accepted where ESG risk positively affects firm risk.

In the regression of firm risk on ROA, the path of firm risk on ROA (RISK → ROA) has a coefficient value of -0,302 with a t-statistic of 3,910 (significant in 0,01). The result shows that lower firm risk leads to higher ROA. Meanwhile, in the regression of firm risk on Tobin's Q, the path of firm risk on Tobin's Q (RISK → TOBIN) has a coefficient value of -0,185 with a t-statistic of 3,457 (significant in 0,01). The result shows that lower firm risk leads to higher Tobin's Q. In this case, H2 is accepted where firm risk has a negative effect on performance.

Next, in the regression of firm risk on ROA, the path of ESG risk on ROA (ESG → ROA) has a coefficient value of -0,163 with a t-statistic of 3,189 (significant in 0,01). The result shows that lower ESG risk leads to higher ROA. Meanwhile, in the regression of firm risk on Tobin's Q, the path of ESG risk on Tobin's Q (ESG → TOBIN) has a coefficient value of -0,295 with a t-statistic of 2,893 (significant in 0,01). Hence, lower ESG risk leads to higher Tobin's

Table 4 The Results of Direct Effect Analysis

Path	Coefficient	T-Statistics	P-Values
ESG → RISK	**0,363**	**4,961*** **	**0,000**
EMPLOY → RISK	0,055	0,497	0,619
LEV → RISK	0,421	4,394***	0,000
SIZE → RISK	-0,492	4,445***	0,000
R-Square	0,173		
Adjusted R-Square	0,150		
RISK → ROA	**-0,302**	**3,910*** **	**0,000**
ESG → ROA	**-0,163**	**3,189*** **	**0,001**
EMPLOY → ROA	0,071	0,769	0,442
LEV → ROA	-0,099	0,586	0,558
SIZE → ROA	-0,075	0,491	0,624
R-Square	0,146		
Adjusted R-Square	0,117		
RISK → TOBIN	**-0,185**	**3,457*** **	**0,001**
ESG → TOBIN	**-0,295**	**2,839*** **	**0,005**
EMPLOY → TOBIN	0,219	4,460***	0,000
LEV → TOBIN	0,152	1,860*	0,063
SIZE → TOBIN	-0,161	2,084**	0,037
R-Square	0,192		
Adjusted R-Square	0,164		

***Significant at 0,01, **Significant at 0,05, *Significant at 0,10

Q. In this case, H3 is accepted where ESG risk has a negative effect on performance.

Table 5 shows the indirect effect of ESG risk on performance through firm risk. The coefficient value of the indirect effect of ESG risk on ROA through firm risk (ESG → RISK → ROA) is -0,110 with a t-statistic of 2,979 (significant in 0,01). It indicates that firm risk mediates between ESG risk and ROA. Then, the coefficient value of the indirect effect of ESG risk on Tobin's Q through firm risk (ESG → RISK → TOBIN) is -0,067 with a t-statistic of 2,704 (significant in 0,01). It indicates that firm risk mediates between ESG risk and Tobin's Q. In this case, H4 is accepted where firm risk mediates the effect of ESG risk on performance. The explanation of the indirect effect can also be seen in Figure 1.

Based on Figure 1, ESG risk affects ROA and Tobin's Q both through firm risk indirectly and directly. The effect of ESG risk on firm risk, ROA, and Tobin's Q is controlled by employee productivity, leverage, and size. Employee productivity aims to control the ESG benefit of firms' reputation to maintain productive employees. Employee productivity is measured by the logarithm nature of revenues per employee (Yoon & Chung, 2018). Higher employee productivity leads to lower risk and higher performance. Meanwhile, leverage aims to control financial risks. Leverage is measured by the debt-to-assets ratio. Higher leverage leads to higher risk and lower performance. Next, firm size aims to control firms' resources to implement ESG. Bigger firms lead to lower risk and higher performance. Firm size is measured by the logarithm natural of total assets.

Figure 1 shows that firm risk partially mediates the effect of ESG risk on ROA and Tobin's Q. ESG risk directly affects ROA by reducing conflict and penalty costs. ESG risk also has a direct effect on Tobin's Q by providing a signal of sustainability business. In contrast, ESG risk indirectly impacts ROA and Tobin's Q through firm risk, which indicates that lower ESG risk promotes lower firm risk to improve firm performance.

The research examines the effect of ESG risk on firm risk, the effect of firm risk on performance, and the mediating role of firm risk between ESG risk and performance. The research is essential to answer the previous inconsistent finding on ESG implementation, firm risk, and performance by providing ESG risk as the picture of ESG performance to reduce economic value risk. Based on data analysis, the first result shows that lower ESG risk leads to lower firm risk. In this case, H1 is accepted that ESG risk positively affects firms' risk. The result is consistent with Albuquerque et al. (2019) and Sassen et al. (2016) that ESG implementation is followed by lower firm risk. It confirms the legitimacy theory where there is a legal and regulation violation risk when firms do not implement ESG. In this case, lower ESG risk shows that ESG implementation successfully reduces firm risks, especially legal and regulation violation risks. It also confirms the stakeholder theory where lower ESG performance leads to conflict among stakeholders and the risk of a bad reputation. Lower ESG risk gives firms a good reputation and reduces the risk of stakeholders' conflict. A good reputation means that firms can keep productive employees, maintain customer loyalty, make good deals with suppliers, and raise funds from investors. Additionally, the result confirms the signaling theory where ESG signals business sustainability. Lower ESG risk leads firms to reduce future cash flow and earnings uncertainty by providing sustainable business. The result implies firms' management to implement ESG to reduce firm risk.

Table 5 The Results of Indirect Effect Analysis

Path	Coefficient	T-Statistics	P-Values
ESG → RISK → ROA	-0,110	2,979***	0,003
ESG → RISK → TOBIN	-0,067	2,704***	0,007
***Significant at 0,01			

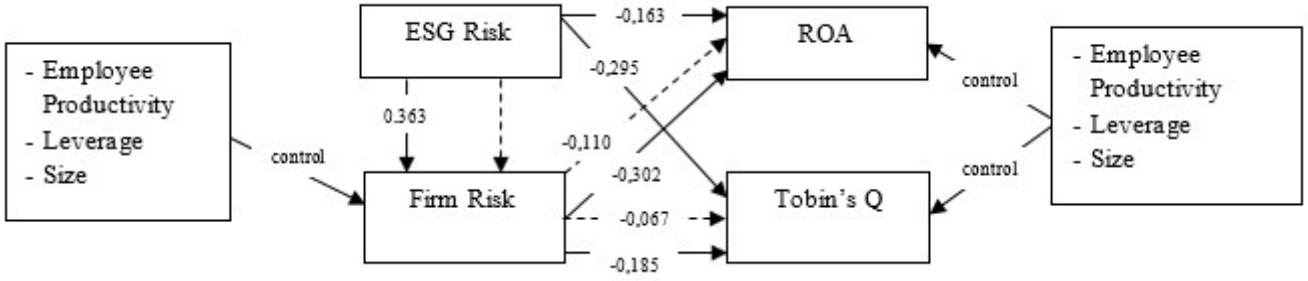

Figure 1 Mediating Role of Firm Risk

The second result shows that lower firm risk leads to higher performance. In this case, H2 is accepted where firm risk has a negative effect on performance. The result is consistent with Olaniran et al. (2016) and Tsai and Luan (2016) that lower firm risk leads to higher performance. By having lower risk, firms have less potential for losses. However, firms with higher risks tend to face higher uncertainty, leading to more costs. In this case, cost efficiency does not occur. The absence of cost efficiency leads firms to have lower performance. The result implies that firms' management manages risk so they can improve performance.

The third result shows that lower ESG risk leads to higher performance. In this case, H3 is accepted where ESG risk has a negative effect on performance. It is consistent with Kim and Li (2021), Hwang et al. (2021), and Yoo and Managi (2022) that ESG increases firm performance. It confirms the legitimacy theory where ESG implementation brings firms to pay no penalty cost of regulation. In this case, lower ESG risk shows that ESG implementation successfully promotes cost efficiency, especially penalty cost reduction. Then, it also confirms the stakeholder theory where ESG implementation promotes a good reputation in front of stakeholders. Lower ESG risk leads firms to have a good reputation to maintain productive and qualified employees and reduce costs of conflict. Furthermore, it can increase revenues and reduce cost efficiency. Meanwhile, the result also proves the signaling theory where ESG implementation can be a signal of innovation and business sustainability. Lower ESG risk shows that firms can promote innovation by creating a new market to increase revenue or new technology to improve cost efficiency. It also gives a signal of business sustainability to ensure good performance in the future. The result implies firms' management to implement ESG to improve firms' performance.

The fourth result shows that firm risk mediates between ESG risk and performance. In this case, H4 is accepted where firm risk mediates the effect of ESG risk on performance. The result becomes new evidence in the literature. Lower ESG risk promotes higher performance for firms by optimizing firm risk reduction. The result implies firms' management to make a strategy of ESG implementation that can reduce firm risk to improve performance.

Table 6 The Results of Industry Sensitivity

Path	Coefficient	T-Statistics	P-Values
ESG → RISK	0,221	3,074***	0,002
INDUSTRY → RISK	0,396	5,303***	0,000
INDUSTRY × ESG → RISK	**0,266**	**6,140*** **	**0,000**
EMPLOY → RISK	0,060	0,586	0,558
LEV → RISK	0,399	4,376***	0,000
SIZE → RISK	-0,469	5,195***	0,000
R-Square	0,445		
R-Square Adjusted	0,421		
RISK → ROA	-0,428	4,381***	0,000
ESG → ROA	-0,228	3,084***	0,002
INDUSTRY → ROA	-0,107	2,225**	0,026
INDUSTRY × ESG → ROA	**-0,114**	**3,368*** **	**0,001**
EMPLOY → ROA	0,098	1,065	0,287
LEV → ROA	-0,093	0,542	0,588
SIZE → ROA	-0,039	0,266	0,791
R-Square	0,190		
R-Square Adjusted	0,150		
RISK → TOBIN	-0,255	2,698***	0,007
ESG → TOBIN	-0,220	2,720***	0,007
INDUSTRY → TOBIN	0,071	0,586	0,558
INDUSTRY × ESG → TOBIN	**-0,068**	**2,475** **	**0,013**
EMPLOY → TOBIN	0,191	3,107***	0,002
LEV → TOBIN	0,148	1,740*	0,082
SIZE → TOBIN	-0,199	3,549***	0,000
R-Square	0,216		
R-Square Adjusted	0,178		

***Significant at 0,01, **Significant at 0,05, *Significant at 0,10

The additional analysis aims to analyze ESG risk on firm risk and performance in different scenarios to ensure that the main result is consistent if examined in different situations. In the research, the additional analysis uses the factor of industry sensitivity. Industry sensitivity refers to the specific industry where the business activities have significant environmental consequences, especially business activities that have the potential for environmental damage (Ahsan et al., 2022; Purnomo, 2021). Some previous studies find that firms in an environmentally sensitive industry tend to implement ESG (Ahsan et al., 2022; Purnomo, 2021). It also finds that industry sensitivity positively affects performance (Wahyuningrum & Budihardjo, 2018). Industry sensitivity has a role in explaining more about ESG risk on firm risk and performance. Since ESG implementation is crucial in the sensitive industry, the effect of ESG risk on firm risk and performance occurs more in the sensitive industry. The research argues that industry sensitivity strengthens the effect of ESG risk on firm risk and performance. The research also determines the environmentally sensitive industry based on Regulation of Environment Minister No 5 2012, where cement, chemical, woods, and pulp and paper industries have more potential for environmental damage. Industry sensitivity is measured by a dummy variable where score 1 is for firms in the sensitive industry, and score 0 is for otherwise. The result of the additional analysis is in Table 6.

Table 6 shows that, in the regression of ESG risk on firm risk, the interaction variable between ESG risk and industry sensitivity (INDUSTRY × ESG → RISK) has a coefficient value of 0,266 with t-statistics of 6,140 (significant in 0,01). It indicates that industry sensitivity strengthens the positive effect of ESG risk on firm risk. The effect of lower ESG risk to reduce firm risk occurs more for firms in the sensitive industry. Next, in the regression of firm risk on ROA, the interaction variable between ESG risk and industry sensitivity (INDUSTRY × ESG → ROA) has a coefficient value of -0,114 with t-statistics of 3,368 (significant in 0,01). It means that industry sensitivity strengthens the negative effect of ESG risk on ROA. The effect of lower ESG risk to improve ROA occurs more for firms in the sensitive industry. Last, in the regression of firm risk on Tobin's Q, the interaction variable between ESG risk and industry sensitivity (INDUSTRY × ESG → TOBIN) has a coefficient value of -0,068 with t-statistics of 2,475 (significant in 0,01). It shows that industry sensitivity strengthens the negative effect of ESG risk on Tobin's Q. The effect of lower ESG risk to improve Tobin's Q occurs more for firms in the sensitive industry. The additional analysis results in Table 6 are consistent with the main result in Table 4.

CONCLUSIONS

The research examines the effect of ESG risk on firm risk and performance, the effect of firm risk on performance, and the mediating role of firm risk between ESG risk on performance. Based on data analysis, lower ESG risk reduces firm risk and increases performance. Then, lower firm risk increases performance, and lower ESG risk increases performance through firm risk reduction. The result also indicates that lower ESG risk implies the ability of ESG implementation to reduce the risk of economic value and reduce costs of conflict, uncertainty, and bad reputation risk. Additionally, lower ESG risk improves performance by helping firms to promote higher revenue and cost efficiency. The research contributes to giving new evidence between ESG risk, firm risk, and performance in Indonesia since ESG risk assessment is new on the Indonesian Stock Exchange. The finding also answers the conflicting findings of ESG implementation on firm risk and performance.

The research implies that managers should formulate effective ESG to reduce firm risk and increase performance. Moreover, investors should invest their funds in firms with lower ESG risk to get the optimal return in the future. Then, regulators in Indonesia should provide guidance on ESG risk assessment.

Nevertheless, the research has limitations in the research sample. The research only uses a sample of firms listed on the Indonesia ESG Leaders Index. Hence, the result cannot be generalized to all listed firms on the Indonesian Stock Exchange. There is still a possibility to explore more about ESG risk in Indonesia, especially in the other firms on the Indonesian Stock Exchange. Future research is expected to use more samples. Hence, the result can be generalized to the population.

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