



# ekonomia

## międzynarodowa

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# Non-linear effect of Environmental, Social, and Governance on corporate performance (study in non-financial firms listed on Indonesia Stock Exchange)

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## Summary

Environmental, Social, and Governance (ESG) factors have become essential considerations for stakeholders. Balancing external and internal performance is crucial. However, there are some constraints to implementing ESG at the corporate level, especially in Indonesia. This study aims to test the effect of ESG on corporate performance. The non-financial firms listed on Indonesia Stock Exchange from 2016–2020 were used as a sample. Empirical evidence found the U-shaped effect of ESG rating on corporate performance. Further, robustness tests are conducted by dividing the sample annually and removing the 2020 period to show more robust evidence. In contrast, the results showed no evidence of a U-shaped effect. The robustness test showed that the ESG rating positively

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affected corporate performance in 2016–2019 and turned negative in 2020, the first time COVID-19 happened in Indonesia. This result indicated that in a crisis time, implementing ESG will be costly and reflected in financial performance. In contrast, during a non-crisis time, ESG positively impacts financial performance.

**Keywords:** corporate performance, ESG, Indonesia, sustainability finance.

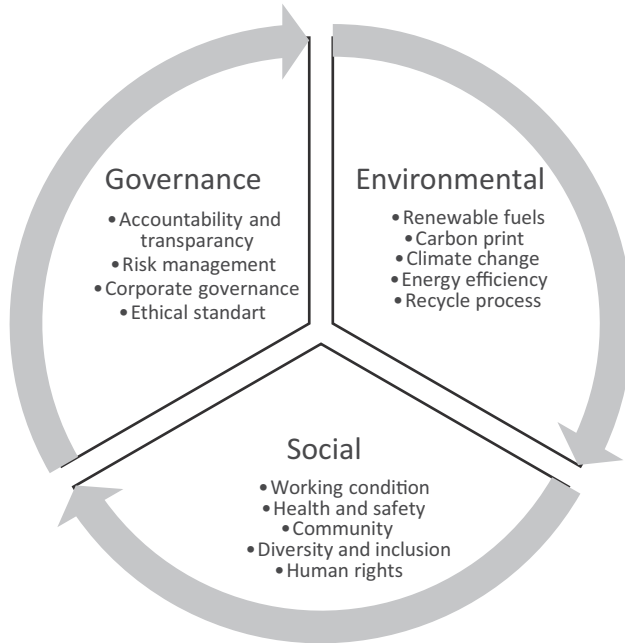
**JEL:** C12, C23, G30

## Introduction

Sustainable development goals are a world mission to enhance peace and prosperity. The world is trying to accomplish the SDGs' mission to create stability and support globalization. Many things have been pursued not only by developed countries, but also by the emerging ones, including Indonesia. For example, the papers that are worth mention include: improving water sanitation in rural areas (Odagiri et al. 2020), smart agroforestry (Octavia et al. 2022), and energy policy scenario (Santika et al. 2020). Efforts to achieve the SDGs can also be conducted at the corporate level. In corporate financial management, the corporate goal is to increase the stakeholders' value. To increase sustainable performance, a firm could consider many steps in line with the SDGs principle. Based on Sustainability (2022), all 17 goals of SDGs can be attributed to ESG (Environmental, Social, and Governance) consideration. ESG framework has become a corporate strategy for development by prioritizing concerns for various stakeholders (Kim et al. 2021).

Sustainability action is reflected on the ESG framework. Sustainability corporations have become crucial for the investor. Not only looking for a high profit in the economic aspect, but also implementing a social activity. Investors consider some characteristics, metrics, and ESG data to adapt the strategy. These factors include specific issues about industry activity, carbon print, climate change, human resource management, corporate governance, political views, transparency, and accountability. ESG performance is monitored by investors, employees, partners, government, and society. Figure I shows the framework of the ESG principle.

**Figure 1.** Framework of ESG principle.



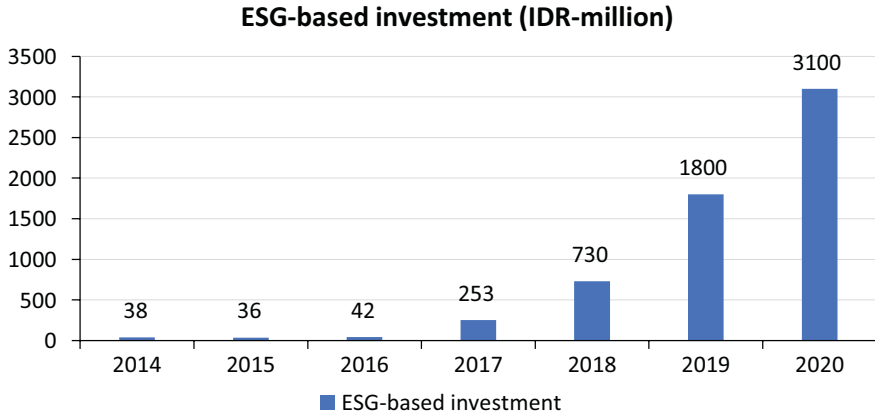
Source: own elaboration on the basis of Sustainalytics (2022)

The concept of sustainable investment was especially introduced in Indonesia. Sustainable investment is a type of investment that considers ESG aspects before providing funding to a business. The approach to these three aspects has a positive long-term impact on the social and environmental policy. In Indonesia, to support ESG performance, the Financial Services Authority as a regulator has issued Financial Services Authority Regulation Number 51/Pojk.03/ 2017 concerning the Implementation of Sustainable Finance for Financial Services Institutions, Issuers, and Public Companies Article 1 states that Sustainable Financial products and services are financial products and services that integrate economic, social, and environmental aspects, as well as governance in its features. Furthermore, article 10 explained that Financial Services Institutions, Issuers, and Public Companies are required to prepare a Sustainability Report. The report must be submitted to the Financial Services Authority annually in accordance with the deadline for submitting annual reports that apply to Issuers, as well as Public Companies (Otoritas Jasa Keuangan 2017).

Even though the investment portion in Indonesia is still relatively small compared to other countries, there has been an increase in the number of ESG-based investment-managed funds (Bayu 2021). The increase in the number of funds is shown in Figure 2. To support this, the Indonesia Stock Exchange issued the ESG

Leaders Index as a form of support and encouragement for companies to implement ESG. The ESG Leaders Index is also expected to help investors to choose a company not only by assessing financial performance but also by the company's responsibility in implementing ESG in its business processes.

**Figure 2.** ESG-based investment



Source: own elaboration on the basis of Bayu (2021)

Implementing ESG at the corporate level could be seen as a double-edged sword. Firms that enable to decide regarding the implementation of ESG can increase the firm's position in the market because they have effective ESG management (La Torre et al. 2020). Based on stakeholder theory, the stakeholder can fully trust the organization, so implementing ESG in corporate area can enhance the relationship between stakeholders and management by showing concern about sustainability (Chan et al. 2014). Further, legitimacy theory states that the management system at the corporate level should focus on society, government, and community (Nur & Priantinah 2012), so ESG should be considered at the corporate level as a strategy. Otherwise, Giuli & Kostovetsky (2014), found a negative impact on CSR scores and changes in ROA or stock return across three years because the company's social activity could be an opportunity for management to have a pet project which has a different goal with the stakeholder. Therefore, stakeholder, legitimacy, and agency theory will be explained in the next section as the background for these hypotheses.

Previous research found different roles of ESG in corporate performance. Stakeholder, legitimacy, and agency theory underline how ESG can have different roles in company performance. So, this explain the gaps in previous research, which found positive and negative impacts of ESG implementation. This study will also describe the role of ESG implementation on firm performance. The

authors used a sample of non-financial companies in the Indonesia Stock Exchange. Indonesia is one of the emerging countries that can be used as a reference for the other ones. The results of this study are expected to provide implications for managers, shareholders, and other stakeholders. This study contributes to the existing literature by providing a comprehensive analysis of the impact of ESG on corporate performance using non-financial firms in Indonesia as a sample.

## Literature review

### Stakeholder theory

The essential thing about stakeholder theory is that stakeholders are the structure that is specifically based on views about an institution and its situation regarding the nature of the exchange between two parties, which are heterogeneous and progressive. Stakeholders and organizations impact each other, and this can be viewed from their social relations in the form of obligation and accountability. Therefore, stakeholders should trust the organization (Nur & Priantinah 2012). The primary basis of stakeholder theory is that the corporate business will improve by getting solid. On the other hand, the worse the corporate relationship, the more difficult it will be. Strong relationships with stakeholders are based on trust, appreciation, and partnership. Stakeholder theory is a strategic management concept that supports firms in enhancing relationships with external parties and improving competitive advantages (Mardikanto 2014). Adopting a stakeholder-oriented approach to decision-making enables companies to recognize and address the concerns of all stakeholders, including those associated with the ESG issues. A company adhering to stakeholder theory would prioritize environmental sustainability, social responsibility, and effective corporate governance while making decisions. This would involve implementing environmentally friendly production, enhancing workers' rights and ensuring their safety as well as upholding rigorous ethical standards across the organization. If the implementation of ESG at the corporate level can run properly, it supports the stakeholders' interests so that the organization is adequately viewed.

### Legitimacy theory

Legitimacy theory explains that organizations continuously establish their activities following societal boundaries and norms (Deegan 2002). Community legitimacy is an essential aspect for the firm in order to improve the company in the future. Companies usually find a legitimization and strengthen the relationships within the broader social and political environment in which they operate; with



such legitimacy, they will survive, regardless of how well their financial performance is (Lanis & Richardson 2012). Further, the firm should improve its relationship with the environment and surrounding community because its performance depends on this factor. Legitimacy is essential for social norms and values imposed on organizations, boundaries, and answers to these boundaries drive the essential of identifying organizational behavior concerning the environment. By incorporating ESG factors into their operations, companies can demonstrate their commitment to social responsibility and sustainability, which enhances their perceived legitimacy and credibility in stakeholders' view. ESG factors provide a tool for companies to sustain and improve their perceived legitimacy and credibility among stakeholders. This enables companies to align their operations with societal expectations, build a favorable reputation, and ensure long-term sustainability. In conclusion, based on legitimacy theory, ESG activities carried out by companies should naturally receive positive support and responses from stakeholders as reflected in improved financial performance.

### Agency theory

The agency relationship in the employment contract is the relationship between the shareholder (principal) and the manager (agent), where the shareholder employs the manager to provide services to the shareholder for the shareholder's benefit. Shareholders delegate decision-making authority to company managers. Agency theory assumes that managers are self-interested. Managers will act opportunistically to achieve specific goals. If the manager's performance is terrible, they tend to cover up their bad performance. Voluntary ESG practices can be used as a pet project for managers to cover up actual performance where it is contrary to the interests of shareholders (Bagnoli & Watts 2003; Fernández-Kranz & Santaló 2010; Witt et al. 2018). In conclusion, ESG implementation at the corporate level stresses the need to incorporate environmental, social, and governance aspects in decision-making processes, considering the interests of all stakeholders rather than solely focusing on shareholders. This approach may clash with agency theory, as ESG implementation may involve costs that could result in lower short-term financial gains, contradicting the shareholders' objectives of maximizing returns on their investments. This contradiction occurs because ESG implementation requires balancing financial returns with other factors, such as social and environmental impacts, which may demand trade-offs.

## ESG and corporate performance

ESG refers to a set of standards for a firm's behavior used by socially conscious investors to screen potential investments. There are several issues highlighted in the ESG principle. The first one is the environmental aspect. Company activity has a high risk of hazarding the ecosystem. For example, greenhouse gas emissions, resource use and waste generated. Management can minimize this risk by implementing an environmentally friendly system. For example, Jayal et al. (2010) showed firm could change the manufacturing system using the 6R methods (Reduce, Reuse, Recycle, Recover, Redesign, Remanufacture). Next, the social aspect includes health and safety, community, diversity and inclusion, and human rights. A firm can support social activity by utilizing a CSR strategy. CSR encompasses a broad range of activities oriented to society, for example, community involvement using informative communication (Sharp & Zaidman 2010). Last, the governance aspect includes accountability, transparency, risk management, and corporate governance. The governance aspect explains how a firm manages itself, enhancing internal controls to maintain compliance with external regulations. Good corporate governance can be reflected in the transparency, efficiency, and efficacy of the management (Shank et al. 2013).

Based on stakeholder and legitimacy theory, the implementation of ESG at the corporate level will be valued by the investor because it aligns with long-term sustainability performance. Yawika & Handayani (2019) used corporate categorized as a high-profile industry in Indonesia as a sample and found that governance positively affects accounting measurements. These findings are supported by Mohammad & Wasiuzzaman (2021). In an emerging market, ESG could improve the firm performance and competitive advantage due to better access to financing. In addition, Öcal & Kamil (2021) also explained that stocks with higher ESG exposure in quantity, quality, and credibility tend to have a lower risk. This study was conducted in Germany, France, and Indonesia. However, based on the agency theory, ESG could enhance the agency problem and be reflected in negative financial performance. Giuli & Kostovetsky (2014) find a negative impact between changes in firms' ESG/CSR scores and changes in ROA or stock return across three years. In addition, Masulis & Reza (2015) also showed that the stock market reacts negatively to corporate philanthropic contributions. Implementation of ESG also needs additional cost; for example, the implementation of ISO 14001 needs a higher cost and is reflected in lower financial performance (Miroshnychenko et al. 2017). Based on the gap and previous study, the following hypothesis is proposed.

Hypothesis: There is a u-shaped relationship between ESG and corporate performance.

## Method

This study used non-financial firms listed on the Indonesia stock exchange. ESG and financial data are obtained from the Bloomberg database and financial reports. This study used purposive sampling as a sampling method. Sugiyono (2015) stated that the purposive sampling technique aims to choose a sample based on the criteria set. The sample should follow these criteria:

1. The company does not have minus equity during 2016–2020;
2. The company's share price fell to 50 during 2016–2020;
3. The company routinely issues financial reports during 2016–2020;
4. The company did not carry out stock splits and stock reverses during 2016–2020.

The study used multiple regression to test the impact of ESG on corporate performance, which is proxied by ROA and ROE. ROA and ROE are used as performance measurements because ROA measures the efficiency of asset management to finance operational activity; meanwhile, ROE measured the efficiency of equity to fund the company activity (Brigham & Houston 2014).

$$\text{Corporate Performance}_{i,t} = \alpha + \beta_1 \text{ESG}_{i,t} + \beta_2 \text{ESG}_{i,t}^2 + \beta_3 \text{Size}_{i,t} + \beta_4 \text{Leverage}_{i,t} + \beta_5 \text{EPS}_{i,t} + \epsilon_{i,t} \quad (1)$$

All of the variables were computed using a proxy, as shown in Table 1. The model included ESG2 to test the possibility of a nonlinear effect. ESG2 is the square of the composite ESG index. The model used some control variables: size, leverage, and EPS. Based on previous research ((Borhan & Ahmad 2018; Paniagua et al. 2018; Surroca et al. 2009), size, leverage, and EPS have a significant impact on corporate performance that could be considered as a control variable. The control variable was used to strengthen the validity by limiting the impact of other variables.

**Table 1.** Measurement of Variable

Dependent Variable	Corporate Performance
ROA	Return of Asset
ROE	Return of Equity
Independent Variable	Environmental Social Governance
ESG	Composite ESG Index by Bloomberg
Control Variables	
Size	Natural Logarithm of Total Asset
Leverage	Debt to Asset Ratio
EPS	Earnings Per Share

Source: own elaboration on the basis of (Brigham & Houston 2004; Borhan & Ahmad 2018; Paniagua et al. 2018; Surroca et al. 2009)

After computing all of the variables, the descriptive statistic is conducted to understand the actual condition of the data. The analysis consisted of the mean, median, and standard deviation using Stata 17 software. The analysis of the mean was carried out to find out the average value of the data used in the study, the analysis of the median was conducted to determine the median value of the data, and the standard deviation was used to determine the level of distribution of research data to the average (Sugiyono 2015). The next step is conducting panel data regression. Chow, LM, and Hausmann tests were executed to determine the best model. After that, the multicollinearity, autocorrelation, and heteroscedasticity tests are conducted to ensure that panel data comply with the BLUE (Best Linear Unbiased Estimator) principle (Gujarati & Porter 2004).

## Result and discussion

The total number of observations after collecting data according to the purposive sampling criteria was 270 observations with 72 companies, so the data is unbalanced. Table 2 shows the results of the descriptive analysis regarding the mean, median, and standard deviation values of the independent variable (ESG), the dependent variables (ROA and ROE), as well as the control variables (size, leverage and EPS).

**Table 2.** Descriptive statistics

Variable	Mean	Median	St.dev
ESG	29,8233	28,3058	13,36178
ROA	0,06256	0,0416	0,08441
ROE	0,114141	0,0945	0,231413
SIZE	10.1823	10.167	1.046
LEVERAGE	0,46244	0,4640	0,2060
EPS	313,4553	101,665	728,720

Source: own elaboration

Based on the descriptive results of the ESG variable, the standard deviation value is still lower than the mean and median values. This shows that the distribution of ESG data is relatively small so that the deviation of the data is not too high. This indicates that ESG data is effective enough to represent the whole data. Based on the results of the descriptive analysis, it can be seen that the ESG score of non-financial companies in Indonesia is still low because the maximum ESG score is 100. The average ESG score in Indonesia only reaches 29.82%, with a maximum score of 54.54%. After performing a descriptive analysis, a model selection test was applied to select the best regression model. The results of the model selection test are in Table 3.

**Table 3.** Regression Model Selection Test

Dependent Variable	Chow Test Prob > F	Hausman Test Prob > Chi2	LM Test Prob > Chibar2	Conclusion
ROA	0,0000	0,0380	–	Fixed effect model
ROE	0,0000	0,0356	–	Fixed effect model

Source: own elaboration

The first regression model selection test was the Chow test, which was performed to choose between the Fixed Effect Model (FEM) or the Common Effect Model (CEM). Chow test results show the probability value of cross section F is 0.0000. This result means that if the probability value of the cross-section  $F < 0.05$ , then  $H_0$  is rejected, which means the Fixed Effect Model is accepted. The Hausman test was carried out to choose between the use of the Fixed Effect Model (FEM) or the Random Effect Model (REM). The Hausman test results show a Chi-Square probability value of 0.0380. This result means that the probability value of Chi-Square  $< 0.05$ , that is,  $H_0$ , is rejected, which means that the Fixed Effect Model is accepted. The Fixed effect model is used to control for any individual-specific characteristics that do not vary across time (Gujarati & Porter 2004). Data from the same firm from many different times were included in the sample. Some firms can have the same characteristics for an extended period. This reason supports to utilization fixed effect model. Because the Fixed Effect Model has been selected in both model selection tests, the last model selection test, namely the Lagrange Multiplier test, is not necessary to choose between the Common Effect Model and the Random Effect Model.

Next, the multicollinearity tests, autocorrelation tests, and heteroscedasticity tests are conducted to ensure that panel data comply with the BLUE principle. The data has no multicollinearity problem, which is indicated by the VIF value  $< 10$ . Next, the Durbin-Watson test was conducted, and the value still fulfills the condition  $-2 < DW < 2$ . Autocorrelation was also tested using an `xtserial` command by Drukker (2003). The command `xtserial` is derived from Wooldridge (2002). In line with the Durbin-Watson test, the result of `xtserial` in both models is insignificant, indicating no serial correlation. Further, the data is affected by heteroscedasticity problems. So, to overcome this problem, a robust standard error was carried out with Hoechle (2007) regression test.

Multiple linear regression analysis was applied to test the hypotheses that had been formulated. Based on the results of the classical assumption test, which states that the model contains heteroscedasticity, the regression used is robust regression. Robust regression is a regression that is used to overcome interference. Based on this, the results of robust regression are regression results that are resistant to changes in the sample and produce estimated coefficients with the best standard error. Table 4 shows the results of the hypothesis testing.

**Table 4.** Hypothesis Testing Results

N= 270	Fixed Effect Model – Robust Regression	
	ROA	ROE
cons	0.43120**	0.9721
ESG	-0.004167**	-0.10413**
ESG <sup>2</sup>	0.000052**	0.0001279*
SIZE	-0.02532	-0.055509
LEVERAGE	-0.1537**	-0.4024**
EPS	0.000090**	0.0002146**
R <sup>2</sup> overall	0.2239	0.0739

\* significant at 10%

\*\* significant at 5%

Source: own elaboration

The results showed that the coefficient of ESG is negatively significant in these two models. The result also showed that the coefficient of ESG<sup>2</sup> is positively significant. Empirical evidence shows a U-shaped relationship between ESG and company performance that is proxied by ROA and ROE. ESG will have a negative impact on company performance until it reaches a certain minimum point; the ESG relationship will turn positive on company performance. The empirical result supported the hypothesis that there is a U-shaped effect of ESG on corporate performance. For the control variable, leverage has a significant negative effect on firm performance, EPS has a significant positive effect on firm performance, and firm size does not have a significant effect.

However, although the coefficient of the ESG<sup>2</sup> is significant, the value is too low. So, the additional test was conducted by splitting the sample per year and removing the 2020 period. The yearly data test used OLS robust regression and fixed effect-robust regression for 2016–2019 because the data is affected by heteroscedasticity. Table 5 shows the result of hypothesis testing using yearly data and data from 2016–2019. The model has a slightly higher R-squared value than the models in Table 4, but the result does not support the hypothesis. The results showed there is no nonlinear effect of ESG on corporate performance. In addition, there are inconsistent findings for each period. For the 2016–2019 period, ESG had a significant positive effect on financial performance proxied by ROA, then in the 2017–2019 period, ESG had a significant positive effect on financial performance proxied by ROE. However, in 2020, ESG has a negative influence on financial performance which is proxied by ROA and ROE. Further, after removing the 2020 period from the observation, the result showed a positive effect of ESG on corporate performance. The coefficients of ESG<sup>2</sup> are not significant.

**Table 5.** Robustness Test: (Yearly Data)

	OLS – Robust Regression 2016		OLS – Robust Regression 2017		OLS – Robust Regression 2018	
	ROA	ROE	ROA	ROE	ROA	ROE
cons	.3339821**	.7714962**	.3053544*	.6841007	.3991584**	.7124018**
ESG	.0078408**	.0156488	.0059032*	.015353*	.002947*	.0028218*
ESG <sup>2</sup>	-.0001025	-.0001902	-.0000915	-.0002239	.0000492	.0000694
SIZE	-.0369231**	-.1095115**	-.0307757	-.0965042	-.0282752*	-.0685638*
LEVERAGE	-.040021	.4449251	.014312	.580949	-.0390503	.2249732
EPS	.0000313**	.0001086*	.0000409**	.0000867*	.0000535**	.0001053**
R <sup>2</sup>	0.2765	0.2825	0.1761	0.2568	0.3028	0.2235
	OLS – Robust Regression 2019		OLS – Robust Regression 2020		Fixed Effect – Robust Regression 2016–2019	
	ROA	ROE	ROA	ROE	ROA	ROE
cons	.2002363**	.5897426**	.0979536	.0853846	.0820345	.0012020
ESG	.0014561**	.0002769*	-.0033999**	-.0083338**	.0013929**	.0003338**
ESG <sup>2</sup>	-.0000157	.000045	.0000415	.0001064	.00000012	.0000136
SIZE	-.0150152	-.0547367	.006087	.0218751	.009087	.0418751
LEVERAGE	-.0650653	-.0230104	-.1476742***	-.2889351	-.003181*	-.062311*
EPS	.0000364*	.0001044	.0000229	.0000506	.0000212*	.000004*
R <sup>2</sup>	0.2030	0.1086	0.3671	0.2911	0.202	0.109

\* significant at 10%

\*\* significant at 5%

\*\*\* significant at 1%

Source: own elaboration

The results in Table 4 use panel data and a fixed effect model – robust regression that mixed the whole sample. The models showed lower R squared and coefficient of ESG<sup>2</sup>, so it reflected weak evidence of a nonlinear effect of ESG on corporate performance. Overall, the result in Table 5 showed the trend that ESG had a positive effect on corporate performance in 2016–2019. In contrast, the result showed that ESG had a negative effect on corporate performance in 2020. It is possible because, in 2020, Indonesia faced a crisis due COVID-19 pandemic. Next, after removing the 2020 period, the result showed a positive effect of EGS on financial performance. These findings only showed a positive linear impact which does not support the hypothesis.

Based on the empirical result, ESG has a positive effect on financial performance when the economic condition is normal. However, it turns into negative effect when there is a crisis. This can be attributed to the alignment with stakeholder priorities, enhanced risk management, and long-term orientation that ESG-focused companies exhibit during normal times. However, during a crisis, economic uncertainty, a shift in stakeholder priorities towards short-term financial stability, and industry-specific effects can lead to a temporary deterioration in financial performance for companies that heavily emphasize ESG program. These findings emphasize the importance of understanding the dynamic relationship between ESG and corporate performance and the need for companies to adapt their strategies to maintain sustainability commitments while navigating through challenging times.

## Conclusion

Implementing ESG at the corporate level is one way to support the SDGs. SDGs are also crucial for an emerging country, in this case, specifically Indonesia. This study aims to test the impact of ESG on corporate performance. The study used non-financial firms listed on the Indonesia stock exchange as a sample. It used the ESG index by Bloomberg as an ESG measurement and ROA and ROE as a corporate performance measurement. The result showed a U-shaped effect of ESG on corporate performance, but there is a limitation on the model, so an additional test is conducted. However, the additional test showed that ESG had a positive effect on corporate performance from 2016–2019; meanwhile, ESG had a negative effect on corporate performance in 2020.

In 2020, the COVID-19 crisis caused a significant change in economic conditions in Indonesia. COVID-19 crisis provoked significant stock and price volatility, supply chain constraints, and economic recession. Therefore, the implementation of ESG has a negative impact on corporate performance in crisis time. It is



possible because the implementation of ESG will be costly, for example, fulfilling the standard of the green system (Miroshnychenko et al. 2017). Meanwhile, in crisis, management should prioritize that operational activity run smoothly and cut the budget, including the ESG activity. On the other hand, based on agency theory, the ESG project could increase agency conflict (Gillan et al. 2021). Agency conflict becomes higher during financial crises and is reflected in firm value (Buchanan et al. 2018). The results of this study supported that finding.

However, in the previous conditions, the results showed that ESG positively impacts corporate performance. The firm will get an advantage by implementing ESG financially. For example, a firm started implementing environmentally friendly machines or changing the procedure. The first time, a firm will spend a budget to invest in a new machine and make a new procedure. Nevertheless, after some period, the machine can minimize the cost, a new process is more efficient, removing environmental hazards, and better monitoring function. This new change will start being valued by a shareholder, and the market reaction could be positive. This result is in line with the previous finding that showed ESG has a positive role in financial performance. In addition, this finding is in line with stakeholder and legitimacy theory (La Torre et al. 2020; Mohammad & Wasiuzaman 2021; Yawika & Handayani 2019).

The practical implication for the government is to support the change of firms that will start to implement ESG, especially in a crisis, because firms tend to focus on short-term goals and ignore the long-term mission. In addition, firms that change from conventional business processes to ESG-based business processes require a higher cost and a chance to increase the agency problem, particularly in crisis conditions. To minimize agency problems, a manager could make the process of the ESG project open and transparent. For the investor, the information about sustainability should be updated and the implementation of ESG should be monitored to ensure long-term performance.

This study has several limitations. First, although the coefficient of ESG and ESG<sup>2</sup> significantly affects ROA and ROE, the values and R squared work similarly. Future research can develop a better model and consider more control variables to increase the R squared, so the results can show strong evidence of the existence of a nonlinear effect. Second, this study only uses a sample that published the ESG score in Bloomberg, so the ESG score is overall based on the Bloomberg standard. Future research can consider a qualitative method to show how the company's efforts in improving ESG performance are reflected in its annual report. Third, limited observation for companies that issue ESG ratings, cause statistical results that are not yet strong. Future research can use other measurements with more comprehensive datasets.

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