

## The Effect of Sustainable Performance Disclosure on Systematic Risk in Energy Companies in Indonesia in the Year of 2017-2021

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**Abstract.** *This study examines the effect of environmental, social, and governance (ESG) disclosure towards systematic risk of energy companies in Indonesia. ESG performance is measured by Environmental, Social, and Governance Disclosure Score from Bloomberg, while systematic risk is measured using beta. This study performed regression using a sample of 9 energy companies in Indonesia during 2017-2021 and found that social disclosure variable has a significant negative effect towards the company's systematic risk. Meanwhile, environmental and corporate governance disclosure variable do not affect systematic risk significantly. This study contributes on how ESG information determines risk-adjusted returns and adds to previous research finding conducted in Indonesia by Triyani et al. (2021) that social performance disclosure has a negative impact on the systematic risk of companies in overall sector.*

**Keywords:** *ESG Disclosure Score, systematic risk, sustainability, emerging country, energy sector*

**Abstrak.** *Penelitian ini menguji pengaruh pengungkapan environment, social, dan governance (ESG) terhadap risiko sistematis perusahaan sektor energi di Indonesia. Pengungkapan kinerja ESG diukur dengan Environmental, Social, dan Governance Disclosure Score dari Bloomberg, sedangkan risiko sistematis diukur dengan beta. Dengan menguji 9 perusahaan energi di Indonesia periode 2017-2021 menggunakan regresi, hasil menunjukkan variabel pengungkapan kinerja sosial memiliki hubungan negatif yang signifikan terhadap risiko sistematis perusahaan. Sedangkan variabel pengungkapan kinerja lingkungan dan tata kelola perusahaan tidak memiliki hubungan signifikan terhadap risiko sistematis. Penelitian ini berkontribusi dalam menjelaskan pertimbangan informasi keberlanjutan terhadap risiko sistematis perusahaan untuk menentukan risk-adjusted return. Penelitian ini menambah hasil temuan dari penelitian sebelumnya oleh Triyani et al. (2021) yang dilakukan di Indonesia bahwa pengungkapan kinerja sosial berdampak negatif terhadap risiko sistematis perusahaan pada industri secara umum.*

**Kata kunci:** *ESG Disclosure Score, risiko sistematis, keberlanjutan, negara berkembang, sektor energi*

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## Introduction

Indonesian capital market becomes a place for the investors to invest their money. One of the instruments to invest in the capital market is stocks. Investors can invest in shares of public companies listed in Indonesia Stock Exchange or *Bursa Efek Indonesia* (BEI). All investment activities in the capital market are regulated and monitored by the Financial Service Authority (known by Indonesians as OJK), including the regulations of information disclosure principle that must be done by the public companies. Based on OJK Regulation No. 29 Year 2016, public companies have to submit their annual reports to OJK. Annual report is a source of information for investors or shareholders to make investment decisions.

In the past years, sustainability issues became an important topic in the world. These issues are related to the term ESG, or Environmental, Social, and Governance. Governance & Accountability Institute, Inc. (2021) suggested that in 2012, only 20% of the companies in the S&P 500 Index had sustainability reports. However, in 2021, 92% of the companies in S&P 500 Index and 70% of the companies in Russell 1000 Index published sustainability reports. As sustainability issues become a developing trend, OJK requires the public companies in Indonesia to publish separated sustainability reports other than the annual reports based on OJK Regulation No. 51 Year 2017. Besides financial aspect reported on the annual report, the sustainable non-financial aspect has become an important source of information in making investment decisions.

With the growing interest in ESG issues, the investors start to take ESG aspect into consideration in investing. BlackRock, the biggest asset management company in the world, applies ESG integration, which is integrating the ESG information into investment decisions to maximize risk-adjusted return no matter whether that strategy has sustainability obligation or not (BlackRock, 2020).

Risk-adjusted return is a return on an investment related to the risk level that has to be taken to achieve it. By taking a particular risk, there has to be something in return to compensate for the risk. An investor will find stocks with the best risk-adjusted return. If there are two stocks that give the same return, but one has a lower risk, that stock has a better risk-adjusted return.

There are two types of risks in investment: systematic and non-systematic risks. Systematic risk is inherent risk that is an uncertainty in the market which is experienced by all sectors and cannot be controlled by diversification. Non-systematic risk is a risk that specifically happens to certain industries or companies. It is also called diversifiable risk because it can be controlled by diversification.

Studies on the effect of ESG performance disclosure on company's financial performance have resulted in consistent findings. However, studies on the effect of ESG performance disclosure to the company's risks have not shown consistent results although has been done quite often. A study done by Kumar, Smith, Badis, Wang, Ambrosy, & Tavares (2016) showed that companies that integrate ESG factor in the company's strategy have low stock price volatility so the market risk of the company is low. Moreover, specifically, non-financial performance disclosure can influence a company's risk in food and beverage industry (Kim and Mattila, 2017). One of the non-financial performance components is CSR that can mitigate risk to increase (Rezaee et al., 2020). On the other hand, environment and social performance disclosure does not have any effect to systematic risk (Benlemlih et al., 2018). This is also supported by Annisa & Hartanti (2021) that ESG performance disclosure does not have any effect at all to the systematic risk. The existing research showed that the effect of ESG performance disclosure to the systematic risk is negative or no effect at all. Moreover, the existing research has studied one specific industry only.

Thus, the authors will complement the existing researches in focusing on another industry which is the energy industry as energy sector is the source of various environmental impact ranging from greenhouse gas emissions, air and water pollutions, and other environmental problems (Luderer et al., 2019). Besides that, Indonesia is one of the South East Asia countries that has not committed to the Paris Agreement in overcoming the climate change (Gong and Balazs, 2021).

Other countries in South East Asia have cut down the construction of Coal-fired Steam Power Plant (PLTU Batu Bara) except Indonesia (Gong dan Balazs, 2021). This can be seen from China Coal-fired Steam Power Plant financing in Table 1. Indonesia received almost half of the total financing of China Coal-fired Steam Power Plant construction in South East Asia.

Table 1.  
*Financing of China Coal-fired Steam Power Plant in South East Asia, 2000-2021*

| No. | Country   | Amount (million USD) |
|-----|-----------|----------------------|
| 1   | Indonesia | 9,307                |
| 2   | Vietnam   | 8,749                |
| 3   | Filipina  | 493                  |
| 4   | Total     | 18,549               |

(Source: GCEF Database, from Gong, X., & Balazs, D. (2021))

Investors view ESG as a positive because of its relation to company's innovative activities in creating new products or technologies to complete the environmental protection target, which enforces technology enhancement as well as cost efficiency and financial performance improvement (Meng and Zhang, 2022). Thus, it is important for investors to consider ESG factors in deciding to make an investment on energy companies.

The narratives show that the existing studies have not reached conclusive findings on the effect of ESG disclosure on company's risk, so further research will be necessary. Therefore, this study can contribute in, first, examining the effect of ESG disclosure on company's risk specifically in energy industry in Indonesia that has not been done by other researchers. Moreover, the risk is focused on systematic risk as indicated by the company's beta value. Second, this study can complement the empirical test results on the effect of ESG disclosure on the energy company risks in developing countries that are vulnerable to ESG-related threats, such as climate change and lawsuits due to social problems compared to developed countries (Maisonneuve, 2017).

The possibility of losses due to ESG increase the potential for developing countries such as Indonesia to raise awareness of ESG. Therefore, the authors posed the research question, "What is the effect of ESG performance disclosure on the systematic risk of energy-sector companies in Indonesia?" This research is useful for investors to choose potential energy company's stocks based on the company's ESG implementation. McKinsey (2019) explained that companies with better ESG performance disclosure can reduce the risk of loss, evidenced by lower amounts of debt and difference of credit default swaps, and higher credit ratings. Thus, this study is expected to assist Indonesian investors in knowing the effect of sustainability aspects on companies's risk.

*Literature Review*

Generally, corporate investors need appropriate information to analyze company behavior from several perspectives (Iamandi et al., 2019). ESG has been recognized as a part of non-financial information; paid attention to by markets, companies, and investors in Indonesia (Setyahuni and Handayani, 2020, and Indonesian Institute for Corporate Directorship (IICD), 2022).

Thus, information from financial reports alone are not enough for investors; especially to those who deem corporate ESG important since they focus on both quantitative and qualitative information (Brooks & Oikonomou, 2018). However, the data used in the previous research (Setyahuni and Handayani) and supporting statements from IICD, are not in accordance with the authors' findings, namely the fact that shares of energy companies, especially coal, are one of Indonesia's most popular and profitable investments in the long term.

This research focuses on two things. First, to find out the variables that could be used as indicators for both ESG and systematic risk based on the findings from previous studies. Second, to conclusively prove the connection and significance of ESG information disclosure's effect to the systematic risk of each company in energy sector, primarily consisting of coal along with gas and oil sub-sectors in Indonesia (both are in energy sector with operational activities having negative impact to the environment and human health) by paying attention to previous studies with similar topics (connection between ESG and risk.)

The issue of ESG was first mentioned in the United Nations Principles for Responsible Investment report (UNPRI, 2006). This also marks the beginning of the companies' obligation to include ESG criteria in their reports, as an effort to further develop the concept of sustainable investment. Over time, both concepts (sustainable investment and ESG application) are considered increasingly important as they give a lot of positive impact to the company (Wimboh Santoso, 2021). Thus, the number of studies conducted to explore the effect of ESG on companies and stakeholders has also increased.

According to one of the available empirical studies on sustainable investment, ESG gives a couple of competitive benefits for the company, such as stakeholders' value creation through risk reduction and financial performance improvement, management

quality, company's reputation, and stakeholders' trust (Zumente and Bistrova, 2021). To get that conclusion, both researchers did qualitative analysis on 65 articles that had been selected carefully with research scope of global companies from 1997 to 2020 to see further development of the correlation between sustainable business practices and company performance in creating long-term value for stakeholders. The result of the study is quite good in representing the conclusions of several previous studies that also tested the impact of ESG.

From the industrial equilibrium model presented by Albuquerque et al. (2012), it was shown that consumers are important agents with great influence on company policies and risk profiles. As companies involved in ESG create positive sentiment to its consumers (PWC, 2021), it will increase the company's operational profit and consequently cause risk-averse investors (assuming other things are the same) to value the company higher, set a lower systematic risk, and expect a lower return. In the process, Albuquerque et al. also modeled CSR (as it is related to ESG) as an investment for product differentiation that allows the company to benefit from higher profit margins. From the research by Giese et al (2017), an analysis of the multi-channel approach was carried out, namely ESG on cash flow, idiosyncratic risk, and valuation to see the transmission development of ESG information embedded in the company to the equity market. One of the findings from this study states that companies with better ESG evaluation are able to manage the company's business and operational risks, thereby reducing the probability of undesirable events occurring, which increases stakeholder trust and leads to reduced corporate risk.

Still, there are also different results such as the conclusion from a research by Karoui and Nguyen (2022) with a study coverage of American stocks from 1991-2019, which confirms the hypothesis that stocks with high exposure to ESG factors show higher firm value, but followed by a higher debt, total risk, and systematic risk.



Then, raising the results of studies with several similar variables to the research that is being done, in general, a study by Annisa and Hartanti (2021) with the scope of hundreds of companies in five South-East Asia countries, concludes that good ESG performance can reduce a company's total risks. However, if the company's risk in that conclusion are broken down to its main components, it is found that ESG disclosure will give negative effects to the idiosyncratic risks but no effect the company's systematic risks. This result is in line with the findings of several researchers such as Goyal and Santa-Clara (2003) and Gaspar and Massa (2006), stating that idiosyncratic risk has a much larger share in firm risk than systematic risk (the biggest value of systematic risk in total firm risk is 20% and idiosyncratic risks take rest). It should be noted that this study has limitations such as not differentiating the companies into different industry categories. Each industry should have had different risk profiles, just like the materiality of ESG issues that is substantially different from one industry to another (Clark, Feiner, dan Viehs, 2015).

However, if you take a look at the research result from Eratalay and Angel (2022) with data scope of European blue chip companies, and Waner (2021) with data scope of Chinese public companies which possessed ESG ratings, it is concluded that companies with high ESG value provides benefit to the company by reducing the systematic risk they face. About limitation problems, Eratalay and Angel took extra steps as further regression was carried out by dividing companies into each sector. However, the results are considered irrelevant due to the relatively small number of company samples per sector. While the research done by Waner has the same limitation with the research by Annisa and Hartanti (regression without categorizing the company into the sectors). The three previous journals examined the relationship between the risk of ESG rating with profitability ratio as controls and additional dummy variables such as COVID-19 in research by Eratalay and Angel, as well as state ownership in Waner's research.

Based on the GRI standard, environmental disclosure indicators include the use of raw materials, energy and water consumption, biodiversity protection, emission reduction, waste management, environmental compliance, and assessment of new suppliers based on environmental criteria. For companies operating in the coal, oil and gas sectors that damage the environment, environmental disclosure is an important factor that investors consider when they want to invest in the sector. Environmental information that is generally disclosed by companies in this sector in their annual financial reports includes details of expenditures for environmental preservation programs, resource saving programs as well as the amount of resources saved, and the volume of waste management.

When talking about companies in the coal, oil and gas sector in Indonesia that have low awareness of disclosing environmental information, the more complete the environmental information provided by companies is an indication that these companies are responsible for minimizing environmental pollution. Good environmental disclosure acts as a protection that reduces the probability of negative events from happening. Previous literature found that disclosure of corporate environmental performance only has a negative impact on corporate risk in environmentally sensitive industries (Sassen et al., 2016). Similar results were also found by Wamba et al. (2020), reducing environmental and resource emissions has the potential to significantly reduce a company's systematic risk. Using this argument as a basis, we assume that the higher the environmental disclosure of coal, oil, and gas companies (an environmentally sensitive sector), the lower the company's systematic risk. The first hypothesis is:

*H<sub>1</sub> = Environmental performance disclosure gives negative effect to energy companies' systematic risks*

Disclosure of social information includes labor, human rights, social, product, environmental and economic. With the company supplying information regarding its social performance, investors can assess the operational activities carried out by the company. Stakeholders theory argues that disclosing social performance is a form of corporate responsibility to stakeholders. This theory is also supported by signaling theory in which social information disclosure indicates a company's efforts to be transparent about its business activities so as to provide a positive signal to investors. Sassen et al. (2016) saw that the more complete the disclosure of information regarding social performance, the greater the investor's trust in the company. High public trust increases the company's image, therefore reducing company risk, making it easier for companies to obtain lower cost of capital.

Sassen et al. (2016) also found that social performance disclosure (CSR) has a negative effect on the company's systematic risk. This finding is in line with the findings of Sharfman and Fernando (2008) and Ghoul et al. (2010) that shows a significant link between social performance and a lower level of cost of capital. This study was continued by Albuquerque et al. (2012) which expands the previous research question, namely proving that changes in the level of cost of capital due to social performance disclosure can be attributed to changes in beta. The results showed that CSR has an effect on systematic risk which then affects the level of cost of capital. The results of this study support our assumption that the higher the disclosure of corporate social performance, the lower the company's systematic risk. Hence, the second hypothesis is:

$H_2 = \text{Social performance disclosure gives negative effect to energy companies' systematic risks}$

Disclosure of corporate governance performance plays an important role in controlling and supervising the company's business activities. Some governance information that needs to be considered are transparency, independence, accountability, and fairness.

In an organization, there is a need for monitoring activities. Based on the research conducted by Chang et al. (2014), governance creates "check and balance" between management and corporate stakeholders. In addition, governance also functions to align management goals with those of shareholders. The existence of disclosure regarding the field of governance shows the company's commitment to protecting shareholder rights (Khan et al., 2013). With the availability of corporate governance performance, investors can assess the level of risk control that has been implemented by the company. So the more complete the governance information, the higher the quality of corporate governance, and shows the company's ability to mitigate risks properly. This statement is in accordance with the research done by Triyani et al. (2021) which revealed that the higher the quality of governance, the better the ability to manage risk, so the company's systematic risk level is predicted to be lower. Contrary to other research, the findings of Sassen et al. (2016) does not show a significant effect of governance on systematic risk. For now, we assume that good governance reduces the level of systematic risk of a company. Thus, the third hypothesis is:

$H_3 = \text{Governance performance disclosure has negative effects on an energy company's systematic risks}$

#### *Conceptual Framework*

Broadly speaking, several previous foreign studies have investigated the relationship between ESG and company systematic risk, found concrete evidence that ESG disclosure has a negative effect on systematic risk (Albuquerque et al., 2017; Jo and Na, 2012; Luo and Bhattacharya, 2009; Orlitzky and Benjamin, 2001). Nofsinger, J.; Varma, A., 2014; Lins et al., 2017 expressed that good ESG implementation can mitigate the effects of market crashes which include systematic risk. Thus, the authors illustrate the research framework as follows:

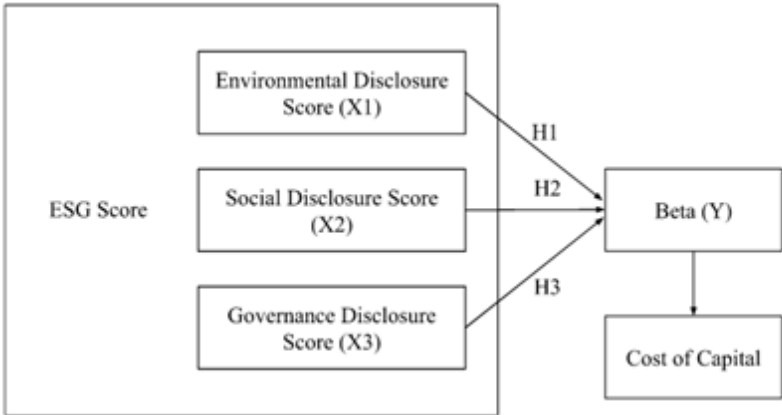


Figure 1.  
Research Frame of Mind

Research Methodology

Before moving on to hypothesis testing, the authors collected some samples from available secondary sources. Then the samples were processed in the variable operationalization stage to decide on the dependent and independent variables. After variable operationalization, the authors did regression and classic assumption tests from the processed samples.

Samples

The authors chose the energy industry, particularly coal along with oil and gas sub-sectors in Indonesia as their research focus because there is no previous studies that observed the connection between ESG disclosure and energy-sector companies' systematic risks, especially in Indonesia which is vulnerable to ESG threats due to climate change.

Previously, research had been conducted by Triyani et al. (2021) in Indonesia but with the context of all kinds of industries that are registered in ISE. Additionally, Indonesia is a part of South East Asia and is known to have a fast market development which highlights the importance of this research. The samples used in this study are coal, oil, and gas companies that are publicly listed in ISE and have ESG scores in the period of 5 years, specifically from 2017 to 2021. The number of energy-sector companies that have ESG scores for this period is 9 companies per year, so the total number of samples is 45 data.

Variables

Quantitative datas are used in all variables in this study, which are companies' annual secondary data taken from Bloomberg and Capital IQ.

Table 2.  
Research Variables

| Variables                                       | Unit of Measurement | Source of Data |
|---|---------------------|----------------|
| Company Systematic Risk or Adjusted Beta (BETA) | Ratio               | Pefindo        |
| Environmental Disclosure Score (ENV)            | Ratio               | Bloomberg      |
| Social Disclosure Score (SOC)                   | Ratio               | Bloomberg      |
| Governance Disclosure Score (GOV)               | Ratio               | Bloomberg      |

*Dependent Variable: Systematic Risk (Adjusted Beta)*

Company risk is defined as uncertainty in a company's operations caused by internal and external factors that affect company's profitability (Jo and Na, 2001). This research aims to find out the impact of a good company's ESG on its systematic risk. The initial assumption of this research is that ESG will reduce the company's cost of capital due to changes in beta (systematic risk) as the ESG disclosure score improves. This study will use beta to represent the dependent variable, which is systematic risk. Beta has two main functions (Ruefli et al., 1999), namely as a measure of a company's exposure to systematic risks and as a translator of equity risk premium into the company's required rate of return. To obtain systematic risk value, Benlemlih et al. (2016) calculated beta in *Capital Asset Pricing Model* (CAPM) by regressing *market's daily excess return* from each country.

*Independent Variables: Environmental, Social, and Governance (ESG) Disclosure Score*

The ESG disclosure score is a percentage number that represents the company's combined (environmental, social, and governance) level of disclosure against quantitative ESG data points taken from global standards and considered relevant to each existing industry. To this point, information on ESG in Indonesia is still very limited so the ESG indicators that will be used as independent variables in this study includes: environmental, social, and governance disclosure score from Bloomberg. The disclosure score from Bloomberg is the result of measurement from the weight of information disclosure related to ESG with consideration on the information quantity and quality (Qiu et al., 2016). As one of the ESG indicators, the score is often published by companies in the industry which are not legally required. According to Martha Oberndorfer (2021), this is because ESG is starting to be considered as one of the crucial things that can be used by companies to withdraw additional capital from the market.

According to the London Stock Exchange (2019), ESG disclosure score is increasingly being widely used by investors to inform investment decisions. Explanation for each ESG scores are (Machmuddah dan Wardhani, 2019):

1. *Environmental disclosure score* as an indicator of a company's environmental performance disclosure as seen from the company's operational activities, its impact to the environment, and the risks posed; such as carbon emissions, hazardous waste disposal and treatment, greenhouse gas emissions, climate change, ecosystem changes, renewable energy, natural resource depletion, use of toxic chemicals, etc.
2. *Social disclosure score* as an indicator of a company's social performance disclosure as seen from the effect of the company to the social system in its surroundings, such as environmental welfare in relation to animals, child workers, discrimination, diversity of workers and management composition, wages, slavery, product responsibility, etc.
3. *Governance disclosure score* as an indicator of a company's governance disclosure as seen from the transparency in the company's structure and composition in order to ensure the related bodies' and individuals' accountability, such as executive compensation, relationship, authority, and stakeholders' rights, distribution of positions, etc.

## Panel Regression Model

$$R_{it} = \alpha + \beta_1 [ENV]_{it} + \beta_2 [SOC]_{it} + \beta_3 [GOV]_{it} + \varepsilon_{it}$$

$R_{it}$  = Systematic risk of entity i in year t

$\alpha$  = constant

$\beta_1, \beta_2, \beta_3$  = regression coefficient

ENV = Environmental Disclosure Score

SOC = Social Disclosure Score

GOV = Governance Disclosure Score

it = entity i in year t

$\varepsilon$  = error term



### *Steps of Research*

In testing the authors' hypothesis and seeing its relation to the data, panel regression analysis will be used which is a combination of cross-section and time series (Kuncoro, 2011). First, the authors did a regression to identify the significance between beta (dependent variable) and the three types of disclosure scores consisting of Environmental, Social, and Governance Scores (independent variables) using E-Views. Second, the authors conducted a classic assumption test, namely the multicollinearity test by looking at the centered VIF value for each variable. Third, if the dataset's multicollinearity effect has been removed, the authors will decide on the suitable regression model by seeing the results from Chow and Hausman tests. Through these two tests, the authors found that the fixed effect model (FEM) was the most appropriate model to use in this study. Finally, the authors will test the classical assumptions again, through the heteroskedasticity test and autocorrelation test.

### *Descriptive Statistics*

According to Ghozali (2018), descriptive statistics is an activity which consists of collecting, processing, and analyzing data in order to provide an overview regarding the characteristics of the studied data with a better display without making any conclusion. The output of this method is in the form of tables or diagrams, consisting of mean, median, maximum score, minimum score, and standard deviation from each of the involved variables.

### *Multicollinearity Test*

According to Ghozali (2018), this test is done to find out whether there is a connection among the independent variables of the regression model. To identify this problem, variance inflation factor (VIF) test will be used. If the centered inflation factor in the output of the test shows a number greater than 10, this indicates that the related independent variable has a high correlation with other independent variables. The solution to solve this problem is to remove or replace variables with high correlation, increase the amount of observed data, and change the data into other forms (Meiryani, 2021).

### *Chow Test*

According to Widarjono (2009), Chow test is conducted to compare the best model between common effect (CEM) and fixed effect (FEM) which will be used in estimating panel data. The FEM model will be considered appropriate if the cross-section chi-square probability value is  $< 0.05$  and CEM is appropriate if the probability value is  $> 0.05$ .

### *Hausman Test*

According to Widarjono (2009), Hausman test is conducted to compare the best model between random effect (REM) and fixed effect (FEM) which will be used in estimating panel data. The FEM model will be considered appropriate if the value of the cross-section random probability is  $< 0.05$  and REM is appropriate if the probability value is  $> 0.05$ .

### *Fixed Effect Model (FEM)*

According to Gujarati (2008), FEM is a model with the assumption that the intersection point will change for each subject but with a fixed slope per subject over time. This model pays attention to the variations of the independent variables, using the dummy variable technique to distinguish subjects. Thus, it is often referred to as the least squares dummy variable or LSDV. Taken from Lilly Chen's (2021) explanation, here is a comparison between the ordinary panel regression model and the fixed effect regression model:

Panel regression model:

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 Z_i + \epsilon_{it}$$

Y = Dependent variable

X = Independent variable

Z = Unobserved variable

Z<sub>i</sub> only has one letter i because there is an assumption that the unobserved variable is constant over time, but varies from one entity to another.

$\epsilon$  = error term

i = entity notation

t = time notation

Panel regression model with fixed effect:  
 $Y_{it} = \beta_1 X_{it} + \alpha_i + \epsilon_{it}$

$\beta_0$  and  $\beta_2 Z_i$  are combined into  $\alpha_i$  which is the fixed effect for entity  $i$

Or

$$Y_{it} = \beta_0 + \beta_1 X_{it} + \gamma_2 D_2 + \gamma_3 D_3 + \dots + \gamma_n D_n + \epsilon_{it}$$

$\beta_2 Z_i$  can be changed into a number of dummy variables and  $D1$  is not included to avoid perfect multicollinearity

*Heteroscedasticity Test*

This test is simulated to see if the observation data has unequal variance in its residuals. According to Ghazali (2018), cross-section data has heteroscedasticity symptoms due to the varying sizes (small, big, or medium) of the observed data.

The Glejser test will be used to identify this problem and from the results, if the probability from all independent variables shows the number  $< 0.05$ , the authors can conclude that there is an element of heteroscedasticity in the data. As such, it is necessary to fix this problem by changing the GLS weight from no weights to cross-section weights or period weights.

*Autocorrelation Test*

According to Ghazali (2018), this test appears because the data is presented sequentially in terms of time and is correlated with each other. The aim of the test is to see if there is correlation between the residuals in period  $t$  and period  $t-1$  or earlier. The Durbin Watson test will be used to detect this problem. In this test, the authors have to calculate the  $d$  score (durbin watson) and the value of  $dL$  (durbin watson lower) along with  $dU$  (durbin watson upper) in table  $t$  based on the number of samples used. In the Durbin Watson test, the authors will make decisions based on the following table:

Table 3.  
*Correlation Test Decision Table*

| No | Null Hypothesis                          | Decision     | If                          |
|----|--|--------------|-----------------------------|
| 1. | No positive autocorrelation              | reject       | $0 < d < dL$                |
| 2. | No positive autocorrelation              | No decision  | $dL \leq d \leq dU$         |
| 3. | No negative autocorrelation              | reject       | $4 - dL < d < 4$            |
| 4. | No negative autocorrelation              | No decision  | $4 - dU \leq d \leq 4 - dL$ |
| 5. | No negative nor positive autocorrelation | don't reject | $dU < d < 4 - dU$           |

(Source: from Ghazali (2018))

**Results and Discussion**

After testing the hypothesis of the processed sample, the authors obtained the results of data processing by using the methods stated in the steps of research section. After the results were obtained, the authors analyzed the results in the Discussion section.

*Results*

The results obtained from hypothesis testing consist of descriptive statistics, regression results, multicollinearity tests, and classical assumption tests.

*Descriptive Statistics*

Figure 2 shows the descriptive statistics table of this study. Overall, data on companies in the coal and oil and gas sub-sector companies in Indonesia are widely dispersed.

This indicates that small to large-scale companies in Indonesia have been included in this study. The results of the ESG scores show that energy companies in Indonesia focus more on governance disclosures (76.49% of overall companies exceed the industry average

GOV), followed by environmental disclosures (35.06% of overall companies exceed the industry average ENV) and social disclosures (34.88% of overall companies exceed the industry average SOC).

|                  | Variable | Min   | Max   | Mean  | STDev | VIF  | Chow Test | Hausman Test | Glejser Test | DW    | Coeff  | t      | Prob   | Adj R Square |
|------------------|----------|-------|-------|-------|-------|------|-----------|--------------|--------------|-------|--------|--------|--------|--------------|
|                  | ENV      | 2.11  | 78.07 | 35.06 | 20.88 | 1.06 |           |              |              |       |        |        |        |              |
|                  | SOC      | 16.23 | 48.97 | 34.88 | 9.43  | 1.21 |           |              |              |       |        |        |        |              |
|                  | GOV      | 48.37 | 93.62 | 76.49 | 11.36 | 1.28 |           |              |              |       |        |        |        |              |
|                  | BETA     | 0.37  | 2.11  | 1.42  | 0.53  |      |           |              |              |       |        |        |        |              |
| Dependent - BETA | ENV      |       |       |       |       |      | 0.0001    | 0.0106       | 0.236        | 2.006 | 0.0008 | 0.1188 | 0.9061 | 0.5713       |
|                  | SOV      |       |       |       |       |      |           |              |              |       | -      | -      | 0.0870 |              |
|                  | GOV      |       |       |       |       |      |           |              |              |       | 0.0094 | 1.1655 | 0.2521 |              |

ENV (Environmental Disclosure Score); SOC (Social Disclosure Score); GOV (Governance Disclosure Score); BETA (Systematic Risk or Beta); DW (Durbin Watson)  
\*Significant at level 0.10

Figure 2.  
Descriptive Statistics, Test Results, and Regression Table

| No. | Company | Year |      |      |      |      |      |      |
|-----|---------|------|------|------|------|------|------|------|
|     |         | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
| 1   | PTBA    | 0.77 | 1.66 | 2.01 | 1.87 | 1.72 | 1.06 | 1.10 |
| 2   | PGAS    | 1.23 | 1.62 | 1.66 | 2.01 | 1.83 | 1.88 | 1.86 |
| 3   | ADRO    | 0.54 | 1.49 | 1.74 | 2.11 | 1.71 | 1.13 | 1.08 |
| 4   | ITMG    | 0.60 | 1.42 | 1.83 | 2.04 | 1.92 | 1.20 | 1.42 |
| 5   | AKRA    | 0.90 | 0.63 | 0.59 | 1.24 | 1.49 | 1.36 | 1.29 |
| 6   | INDY    | 1.18 | 1.59 | 1.67 | 1.35 | 1.94 | 1.42 | 1.76 |
| 7   | BUMI    | 1.40 | 0.60 | 0.84 | 0.56 | 1.97 | 0.75 | 1.04 |
| 8   | MEDC    | 0.93 | 1.57 | 1.89 | 1.88 | 2.07 | 1.56 | 1.56 |
| 9   | DEWA    | 0.34 | 0.33 | 0.41 | 0.58 | 0.60 | 0.39 | 0.37 |

Figure 3.  
Beta Sample of Energy Companies 2015-2021

*Multicollinearity Test*

The results of the FEM model multicollinearity test show that there are no multicollinearity problems in the regression. In other words, there is no relationship among the independent variables in the regression. This is indicated by the centered VIF values of the three independent variables that are less than 10.

*Chow Test*

In conducting the Chow test, the authors used the following hypothesis:

$H_0$ =The common effect model is applicable (*cross-section chi-square probability* > 0.05)

$H_1$ =The fixed effect model is applicable (*cross-section chi-square probability* < 0.05)

Based on the Chow test conducted through *EViews*, the *cross-section chi-square* probability value is 0.0001. This value is less than 0.05 and indicates that the suitable model for panel regression in this study is the fixed effect model (FEM).

*Hausman Test*

In conducting the Hausman test, the authors used the following hypothesis:

$H_0$ =The random effect model is applicable (*cross-section random probability* > 0.05)

$H_1$ =The fixed effect model is applicable (*cross-section random probability* < 0.05)

Based on the Hausman test conducted through *EViews*, the *cross-section random* probability value is 0.0106. This value is less than 0.05 and indicates that the suitable model for panel regression in this study is the fixed effect model (FEM).

*Fixed Effect Model*

Through the Chow and Hausman tests, the suitable regression model for this study was fixed effect model (FEM). The equation obtained through FEM regression in the *EViews* is as follows:

$$R_{it} = 1.446830 + 0.000893ENV_{it} - 0.021696SOC_{it} + 0.009367GOV_{it} + \varepsilon_{it}$$

*Heteroscedasticity Test*

In conducting the heteroscedasticity test, the authors used the following hypothesis:

$H_0$ =There is no heteroscedasticity in the model (*probability* > 0.05)

$H_1$ =There is heteroscedasticity in the model (*probability* < 0.05)

Based on the Glejser Heteroscedasticity test, it is found that all independent variables have probability value greater than 0.05. Thus, the data used in this study does not have heteroscedasticity, so no correction was needed.

*Autocorrelation Test*

The method that will be used for the autocorrelation test is by examining the Durbin-Watson value in the Fixed Effect regression model. The hypothesis used for the autocorrelation test are as follows:

$H_0$ =there is a positive autocorrelation

$H_1$ =there is a negative autocorrelation

Regression on the Fixed Effect model has value of  $n = 9$  and  $k = 2$ . The model has Durbin-Watson ( $d$ ) value of 2.0068. In addition, the value of  $dL = 0.8243$  and  $dU = 1.3199$  are obtained. There are two possibilities of autocorrelation, namely a positive or a negative autocorrelation. In detecting a positive autocorrelation, the decision rule used are:

- If  $d < dL$ , there is a positive autocorrelation
  - If  $d > dU$ , there is no autocorrelation
  - If  $dL < d < dU$ , the test cannot be concluded
- Based on the decision rule, the Durbin Watson value is greater than  $dU$  ( $2.0068 > 1.3199$ ) and thus there is no positive autocorrelation.

In detecting negative autocorrelation, the decision rule used are:

- If  $(4-d) < dL$ , there is negative autocorrelation
- If  $(4-d) > dU$ , there is no negative autocorrelation
- If  $dL < (4-d) < dU$ , the test cannot be concluded



Based on the decision rule, the 4-d value is greater than dU ( $[4 - 2.0068] > 1.3199$ ) and thus there is no negative autocorrelation.

### *Discussion*

Over the past few years, the topic of research on the effect of ESG performance disclosure on corporate risk has received attention from management and financial practitioners. Nowadays, a company's objective is not only limited to increasing its stockholders' wealth, but also improving the welfare of all its stakeholders to avoid any potential external pressures. To increase investors' confidence in the company as well as to reduce uncertainty and corporate risks, the company uses ESG performance disclosures to show the company's commitment to address its environmental, social and governance issues. In terms of risk management, the company's initiatives in disclosing ESG performance have the potential to reduce its corporate risks.

Based on the E-Views results that the authors obtained, it shows that the disclosure of Social Disclosure Score is the only thing that has a significant negative effect on the company's beta. The results of this research are supported and in line with research conducted by Benlemlih and Bitar (2018) and Sassen et al. (2016) which found a significant and negative relationship between social disclosure and the company's systematic risk. It is also in line with the signaling theory which reveals that social disclosure is one of the positive signals to the public that the company contributes to the welfare of the company's stakeholders. Companies that openly disclose their social responsibility can increase investors' confidence to invest in them. In addition, Triyani et al. (2021) said that social disclosure can reduce stock price volatility and thus reduce the company's risks. In this case, we see that the findings showing a significant but negative effect illustrates the bias that investors have towards the energy sector (an environmentally sensitive sector) which causes systematic error and it's in line with Im & Oh's (2016) research.

Sumunar and Djakman (2020) argue that social information tends to be more relevant to investors in terms of making investment decisions and measuring company risk. Companies that openly disclose their social information are considered as responsible companies so that they tend to have a lower cost of capital and risk level. However, it should be noted that the Social Disclosure Score in this research is only considered significant at the 10% significance level. This is one of the indications of the delayed trend in Indonesia's ESG implementation for companies engaging in the energy industry.

This research also found that the Environmental Disclosure Score had no significant effect on the company's beta. This is because projects that damage the environment itself often provide relatively more attractive returns (Mehar, 2020). This return then attracts many investors in developing countries such as Indonesia, who allegedly still consider profit as the most important investment criterion and that they do not consider environmental aspects as a matter that needs to be considered in making decisions in the capital market (Mehar, 2020; Deswanto and Siregar, 2018).

Apart from the Environmental Disclosure Score, the Governance Disclosure Score also had no significant effect on the company's beta. This is because of all the companies that disclose their corporate governance, only a few show concrete statistics regarding the relationship between ESG with cost and income benefits or with projected governance-related risk costs (Mehar, 2020).

Both of these results are supported by Rinaldi (2016) who considered that the application of voluntary disclosure cannot run effectively. Companies tend to store information that has the potential to harm them and only disclose profitable information (good news). Therefore, an obligated and regulated information disclosure (mandatory disclosure) is needed to provide incentives for companies to disclose ESG information.

But in reality, ESG has not been integrated in Indonesian public companies. OJK only established an ESG disclosure framework in 2021, while companies in other countries have been implementing ESG since 2009 through the GRI framework. The loose ESG regulations and the low awareness of Indonesian investors of the importance of ESG are the main factors for the minimum disclosure of ESG information in Indonesia and are the reasons that Environmental Disclosure Score and Governance Disclosure Score have no significant effect on company beta.

Research conducted by Annisa and Hartani (2021) conducted in ASEAN and Benlemlih et al. (2016) in England also oppose the relationship between ESG and corporate risk. This finding is supported by Sassen et al. (2016) who argue that systematic risk is more influenced by industry characteristics than company characteristics, so that systematic risk is said to tend to be less responsive to changes in the company's ESG than other risk proxies. The variation in the results of this study is thought to be due to differences in the ESG scoring method used and the market characteristics studied. In this case, developed markets such as the UK tend to have implemented ESG into the company's strategy.

## Conclusion

This study observes the effect of ESG performance disclosure of coal, oil and gas sub-sector energy companies in Indonesia as measured by three types of ESG Disclosure Score, which are Environmental, Social, and Governance Disclosure Score, that are projected on the company's systematic risks. The samples used in the research are public companies in the coal, oil and gas sectors listed on the IDX from 2017 to 2021.

In general, the model obtained is able to explain the relationship between the dependent and independent variables. There are two findings found based on the results of this study.

First, the independent variables Environmental Disclosure Score (ENV) and Governance Disclosure Score (GOV) have no significant relationship to Beta (BETA). This means that there is no effect of the disclosure of environmental and governance performance on the systematic risks of coal, oil and gas companies in Indonesia. Second, the independent variable Social Disclosure Score (SOC) has a significant negative relationship to Beta. This means that the disclosure of social performance of coal, oil and gas companies in Indonesia has a significant negative impact on the companies' systematic risks. Thus, it can be concluded that good or increasing disclosure of corporate social performance can reduce the company's systematic risks in Indonesian coal, oil and gas sub-sector. On the contrary, poor disclosure of corporate social performance can increase the company's systematic risks.

This study was conducted with some limitations, namely the data that has not varied due to the small number of companies in the energy sector, especially the coal sub-sector, that disclose ESG performance or have a Sustainability Report. These limitations can be the foundation for the improvement of further research by adding the industry control variables.

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