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Determinants of environmental disclosure of mining industry near the COVID-19 outbreak: Some Indonesian evidence

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Abstract. In their business operations, mining companies that process natural resources must deal with environmental degradation. The companies shall do environmental preservation to mitigate global warming due to business processes and make an environmental responsibility report to ensure a sustainable business. Whether the COVID-19 pandemic affects environmental responsibility is the focus of this study. The pandemic disrupts all sectors, including the mining industry. Therefore, this study investigates the level of environmental reporting made by mining companies before and after the COVID-19 outbreak. In addition, this study also investigates the determinants of the level of environmental reporting disclosed in either the annual report or sustainability report. Thirty-seven companies listed on the Indonesia Stock Exchange in the mining sector in 2019 and 2020 were used as a sample. Results from the Wilcoxon signed rank analysis suggest that the level of environmental disclosure increased following the epidemic's spread, contrasted to levels prior to the outbreak. The multiple regression analysis reveals that public ownership and size are likely to enhance environmental disclosure. Meanwhile, leverage tends to reduce environmental disclosure. The analysis offers perspective on the capital market authority agency's new strategy aimed at enhancing aspects that could influence environmental responsibility disclosure.

Keywords: environmental reporting, public ownership, COVID-19, mining industry

1. Introduction

Regarding the mining industry, Indonesia is a leading nation in the world. Coal, metal, gold, tin, natural gas, and nickel are among the abundant minerals found on the country's more than 17,000 islands, which are positioned in the Pacific Ring of Fire [1]. Through many generations, Indonesia's mining industry has been a major contributor to the country's economic development. Most mines are situated in rural areas of Indonesia; therefore, the industry substantially impacts the country's GDP (gross domestic product), government revenue, export, employment, and regional development [2].

Alongside with mining industry's huge economic value, the environmental damage caused by the industry's operation process is also severe. A recent study that scrutinizes the impact of mining on deforestation in twenty-six countries reveals that more than fifty percent (58.2%) of tropical deforestation attributed to commercial mineral extraction exists in Indonesia [3]. The highest deforestation occurs in East Kalimantan Province, largely caused by the coal mining industry. Deforestation and environmental degradation in the forest highly contribute to global warming and

climate change, where Greenhouse gas (GHG) emissions from Indonesia are among the highest worldwide [4].

Balancing a profitable mining business and environmental protection is a challenging task to do. To safeguard the environment, Indonesia has enacted several laws, regulations, and decrees, the violation of which can result in monetary fines and even the cancellation of relevant permits and licenses [5]. Companies are under increasing pressure to ensure that their operations have minimal impact on the local ecosystem as the public's awareness of environmental issues grows [6]. The government and many international and associated organizations are vested in seeing mining companies comply with environmental protection requirements. For publicly listed companies, according to Financial Service Authority Regulation, the environmental responsibility activities shall be reported under the corporate social responsibility section in the annual report [7].

The objective of this study is twofold. First, this study examines the level of environmental reporting made by mining companies before and after the COVID-19 outbreak. Second, this study investigates the determinants of the level of environmental reporting of publicly listed mining companies in Indonesia. Since it arrived in early 2020, the COVID-19 pandemic has disrupted the country's economy due to the policies to control the spread of disease, i.e., the massive social restrictions and lockdowns. The restrictions forced companies in almost every sector to shut down their operations. Mining operations are negatively impacted economically due to falling coal and metal prices as a result of falling worldwide demand for these commodities [8]. The present study focuses on whether the COVID-19 pandemic affects environmental responsibility reporting.

Research on environmental disclosures in the mining industry has been conducted extensively in developed and emerging countries. In emerging countries, for example, the Philippines, it was revealed that the ten mining corporations' environmental reports varied widely [9]. In Ghana, mining corporations share environmental information more frequently than manufacturers do [10]. A study in Brazil reveals that although Brazilian corporations have a penchant for disclosing data on climate hazards, the level of such disclosure is still quite low [11]. Similarly, some studies in Indonesia [12,13] also found that the country's corporate environmental disclosure of the mining industry was at a moderate level. A more recent study conducted in Indonesia that assesses environmental disclosure in industries other than mining revealed that the extent of disclosure varied by industry sector [6,14–16].

As mentioned above, a review of previous research reveals that COVID-19 has yet to be elaborated on in terms of the impact of the pandemic on the level of environmental disclosure. The social and environmental disclosures may reflect corporate resilience to the pandemic. The social and environmental disclosures may reflect corporate resilience to the pandemic [17]. Hence, the present study offers a new perspective by relating the COVID-19 pandemic to the degree of environmental disclosure.

Research on environmental reporting may be attributable to the theory of legitimacy. According to the legitimacy theory, an unspoken agreement exists between a company and its community, which serves as the basis for its legitimacy as a social actor. If a company violates the community's standards and norms, it may lose its social license to operate [18].

Concerning the second research objective, i.e., the determinants of environmental disclosures, this study will investigate the role of public share ownership and financial indicators, namely profitability, level of debt, and size, in the level of the disclosure. Public share ownership is the percentage of a company's stock owned by members of the general public. Those who do not hold a 5 percent share in the company and are not part of management or otherwise connected to the business are considered "public" investors [19]. Since public responsibility is a key factor in organizations with public ownership, it is reasonable to assume that these businesses will participate more actively in environmental and social initiatives [20]. Because of the greater public oversight, it is logical to predict that publicly traded corporations will include more corporate social and environmental responsibility in their annual reports than privately held companies. Hence, the current study thinks that companies with more public ownership will be more likely to report environmental information.

Profitability is a metric for evaluating a business's profit potential. Profitable businesses can better tell their stakeholders about their environmental responsibility initiatives since they are in a better financial position to do so [21]. It is believed that the corporation will gain legitimacy from society if it discloses more details regarding its environmental impact [16]. It is also believed that the company will be able to continue operating, enhance its public image, and receive monetary benefits from its shareholders. Previous research [22,23] found that profitability encourages the management to disclose environmental information. As a result, this study anticipates that businesses with higher profit levels will release more environmental data than those with lower profit levels.

The debt level reflects the company's financial risk and is measured by leverage. Leverage is a metric that analyzes a company's reliance on external financing to acquire and maintain its assets. Corporations pursuing funding from prominent overseas organizations are expected to provide an environmental assessment outlining the company's environmental consequences, major environmental dangers, and preventative actions [24]. Hence, when a company approaches a donor or creditor to approve its funding proposal, it reports environmental responsibility to attract the creditor. The previous study in Jordan [25] confirms the above hypotheses. Therefore, this study predicts that businesses with a higher level of debt should release more environmental data than those with lower debt.

Company size reflects how big the company is measured by the value of assets, equity, sales, or market capitalization. Given the greater number of interested parties in a larger corporation, the public demand and pressure for the disclosure of information are naturally stronger for these organizations than for their smaller counterparts. Big businesses face problems with taxation, labor legislation, and the environmental and social effects of their operations. As a result, bigger companies will care more about their impact on society and the environment than smaller ones. Large corporations understandably take special care of critical topics like the environment because they are the focal point of so many different people's attention. One of the most contentious aspects of industrialization is undoubtedly the devastating impact commercial activities have on ecological well-being. Previous studies have revealed a favorable effect of size on environmental reports. [6],[11], [24,25]. Thus this study posits that businesses with a larger asset should release more environmental data than those with a lower asset.

In organizing the research report, this study elaborates into four sections. The first section discusses the motivation of the study and its hypotheses. The research method is stated in section 2 in detail. The next section discusses the result that ends with a conclusion.

2. Materials and methods

2.1. Source of data research and sample

This quantitative study uses secondary data, i.e., annual reports of mining industry companies listed on the Indonesia Stock Exchange (IDX). As of 31st December 2020, forty-seven mining corporations were found listed. In line with the research objective, which examines the amount of environmental reporting prior to and preceding the COVID-19 pandemic, this study uses 2019 and 2020 data to portray the event of pre and post-pandemic. The year 2020 reflects post-outbreak, while 2019 exhibits pre outbreaks. The sample was selected through the availability and completeness of data variables in the firms' annual and sustainability reports. This study finds thirty-seven corporations whose annual reports are accessible as the research data. Hence the final sample was 37.

2.2. Variables and data analysis

There are four independent variables: public share ownership, profitability, the level of debt, and size. Public share ownership is drawn from the percentage of a company's stock owned by members of the general public, i.e., those who do not hold a 5 percent share in the company and who are not part of management or otherwise connected to the business. A firm's profitability is derived from earnings after interest and tax divided by total assets. The level of debt refers to leverage, i.e., the fraction of total debt and total assets. Meanwhile, firm size is the total asset transformed into its natural logarithm.

In terms of dependent variables, this study utilizes an unweighted environmental disclosure checklist. The checklist assesses whether a company discloses a particular statement or not as a reference to the Global Reposting Initiatives (GRI) G4 of environmental sustainability. Therefore, this study gives a score of one or zero for the availability of the statements from the checklist in the company's CSR report. The score sum was then divided by 34, the maximum obtainable score a company can get [16].

This study conducts two types of analysis for data analysis: the Wilcoxon sign rank test and the multiple regression test. While the Wilcoxon is used to test whether the environmental disclosures are statistically improved or decreased after the COVID-19 outbreak, the regression test examines the determinants of environmental disclosure. The regression model is presented as follows.

$$END = \alpha + \beta 1KP + \beta 2FP + \beta 3FL + \beta 3SIZE + e \quad (1)$$

Where END is environmental disclosure; KP is public share ownership; FP is profitability; FL is leverage; SIZE is corporation size. The measurement of variables has already been explained in the above paragraphs.

3. Result and discussion

3.1. Descriptive statistic

The mining industry in IDX is divided into four subsector industries, namely (1) coal mining, (2) crude petroleum and natural gas production, (3) metal and mineral mining, and (4) land/stone quarrying [26]. For the END variable, this study also assesses each subsector industry's environmental disclosure level. The descriptive statistics of END based on mining industry classification are presented in Table 1.

Table 1. Descriptive statistics of environmental disclosure based on the mining subsector industry

Mining subsector industry	Mean	Min	Max	SD	N
Coal mining 2019	0.2648	0.0000	0.7353	0.2036	22
Coal mining 2020	0.3690	0.0000	0.7647	0.2347	22
Crude petroleum and natural gas production 2019	0.0672	0.0000	0.2059	0.0956	7
Crude petroleum and natural gas production 2020	0.1554	0.0588	0.4412	0.1458	7
Metal and mineral mining 2019	0.2310	0.0000	0.5000	0.2191	7
Metal and mineral mining 2020	0.2773	0.0000	0.5294	0.2448	7
Land/stone quarrying 2019	0.0882	0.0882	0.0882	0.0000	1
Land/stone quarrying 2020	0.0588	0.0588	0.0588	0.0000	1
All sample 2019	0.2162	0.0000	0.7353	0.1999	37
All sample 2020	0.3029	0.0000	0.7647	0.2231	37

Source: data processed by researchers

As illustrated in Table 1, the average END score of the coal mining industry increased from about 26 percent in 2019 to around 37 percent in 2020. Similarly, in the crude petroleum and natural gas production industry, the END score also enhanced from around 7 percent to about 15 percent on average in 2019 and 2020, respectively. In the metal and mining industry, END slightly increased from about 23 percent to about 28 percent on average. In the land/stone quarrying industry, however, the average END score decreases slightly from about 9 percent to about 6 percent. In this sector, only one company is the sample from the total of two companies listed in the stock market. The other company was excluded since it was delisted in 2019. The average END score of all samples increased from 22 percent in 2019 to 30 percent in 2020. Overall, the level of environmental disclosure of the mining industry listed on IDX is higher in the period preceding the outbreak than in those before the outbreak.

Table 1 suggests that the highest number of mining companies sample are in coal mining which accounts for 22. At the same time, the lowest is listed in the land/stone quarrying sector, with only one company listed. The highest score of END is about 76 percent, which was disclosed by a coal mining corporation in 2020. The lowest score of END is 0 percent, indicating that there are companies that do not report their environmental responsibility. The crude petroleum and natural gas production industry has seven companies as the sample. The highest score of END is about 44 percent, reported in 2020. Similarly, the metal and mineral mining industry have seven companies as the sample. The maximum END score in the industry is about 53 percent, relatively higher than in the crude petroleum and natural gas production industry.

Table 2 presents the descriptive statistics of all variables within the two years of observation without considering the Covid-19 pandemic.

Table 2. Descriptive statistics of all variables

	Mean	Minimum	Maximum	SD
END	0.2595	0.0000	0.7647	0.2200
END Coal	0.3168	0.0000	0.7647	0.2234
END Crude	0.1113	0.0000	0.4412	0.1270
END Metal	0.2542	0.0000	0.5294	0.2245
END Land	0.0735	0.0588	0.0882	0.0208
KP	0.2913	0.0227	0.7733	0,1829
FP	0.0318	-0.5790	0.2380	0.1053
FL	0.3931	0.0424	0.8876	0.2856
SIZE	29.39	24.95	32.24	1.5179
N	37	37	37	37

Source: data processed by researchers

Table 2 shows that the average END level in the sample company is about 25 percent. The number suggests that the mining industry in IDX reports a small amount of environmental disclosure. The findings are consistent with previous research in the country's mining industry [12], [23]. The level of END based on subsector industry classification reveals that coal mining discloses the highest END (32 percent), followed by metal and mineral (25 percent), crude oil and gas (11 percent), and land and stone quarrying (7 percent). The average KP is 0.29. It indicates that the public share ownership of mining-listed corporations is at the level of 29 percent. FP indicates the profitability of the mining industry, which is about 3 percent on average. FL indicates the solvability or level of debt of the mining industry. The number is relatively high, i.e., 39 percent on average.

3.2. Does the environmental disclosure improve?

Table 3 presents the result of the Wilcoxon signed rank test. The test was utilized to assess whether the END level improves or decreases statistically due to the pandemic. As shown in Table 3, the END level of all samples increases from about 21 percent to 30 percent, which is statistically significant at p 0.01. The test results are consistent when the sample is divided into categories according to industrial sub-sectors. The END level has improved significantly, specifically in the coal mining and crude petroleum sub-sector industries. The END level increases in the metal and mineral mining sub-industry, although the difference is not statistically significant. The Wilcoxon signed rank test could not be performed for the land/stone quarrying sub-industry because there is only one company in this industry. Overall, the findings imply that regardless of hard times due to the sudden effect of the COVID-19

outbreak, the mining industry keeps maintaining its environmental responsibility, which also reflects its resilience.

Table 3. Result of Wilcoxon signed rank test

	Mean Pre	Mean post	Z	Sig
END 2019_2020	0.2162	0.3028	-3.417	0.001***
END Coal 2019_2020	0.2647	0.3689	-0.2643	0.008***
END Crude 2019_2020	0.0672	0.1554	-2.410	0.016**
END Metal 2019_2020	0.2310	0.2773	-0.677	0.498
END Land 2019_2020	NA	NA	NA	NA

Source: data processed by researchers; *** conveys significance at 1%;
** conveys significance at 5%.

3.3. Determinants of the environmental disclosure

Table 4 demonstrates the result of multiple regression analysis. The analysis was utilized to examine the determinant factors of END.

Table 4. Multiple regression results.

	B	t	Sig	Tolerance	VIF
Constant	-2.046	-5.313	0.000		
KP	0.301	2.692	0.009***	0.857	1.167
FL	-0.257	-3.630	0.001***	0.881	1.135
FP	-0.009	-0.044	0.965	0.794	1.260
SIZE	0.079	5.950	0.000***	0.889	1.125
F Value			16.378		
F sig			0.000		
Adjusted R^2			0.457		
Durbin Watson			1.545		
Kolmogrov Smirnov Sig			0.200		

Source: data processed by researchers; *** symbolizes significance at 1%;
** symbolizes significance at 5%.

As displayed in Table 4, KP positively affected END. The results indicate that management tends to release more environmental disclosures as the proportion of publicly held shares increases. This finding is consistent with the notion that public responsibility is a key factor in organizations with public ownership. It is reasonable to assume that these businesses will participate more actively in environmental and social initiatives. Because of the greater public oversight, it is reasonable to believe that publicly traded corporations will take more corporate social and environmental responsibility in their annual report [20].

Table 4 shows that FL has a negative relationship with the level of environmental disclosures. These results indicate that a high level of debt is likely to reduce environmental disclosure. In other words, a

company with a smaller debt tend to disclose environmental detail in its annual report. Our result is consistent with a previous study done in Indonesia [6]. However, its contrary to our hypothesis that businesses with a higher level of debt should release more environmental data than those with lower debt. The explanation relates to the finding that mining companies tend to allocate their money or resources to pay their debt rather than to do environmental responsibility.

Table 4 also suggests that SIZE is positively associated with END. The result indicates that the bigger the company, the higher the environmental disclosures. The result is in line with previous research in emerging countries, which suggests that bigger companies have sufficient resources to conduct environmental activities and thereby disclose a higher level of environmental disclosure [6], [13], [25], [27,28].

4. Conclusion

The objective of this research is to investigate whether the COVID-19 pandemic impacts the extent of environmental reporting in the mining industry. Data analysis using the Wilcoxon signed rank test results indicate that environmental disclosures increased after the COVID-19 pandemic spread in Indonesia as compared to before the pandemic. The research findings imply that regardless of hard times due to the sudden effect of the COVID-19 outbreak, the mining industry keeps maintaining its environmental responsibility. The increased level of environmental reporting reflects the mining industry's resilience. In terms of determinants of environmental disclosure, the regression analysis suggests that public ownership and size have a positive effect on environmental disclosure. At the same time, leverage negatively affects the level of environmental disclosure.

There are limitations to this study that need to be taken into account when attempting to interpret its findings. The period of observation was only a year before and a year after. Since the newest annual report was available only a year after the pandemic. Future research may lengthen the observation window so that the trend of environmental disclosures over the years can be assessed.

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