IRJEMS International Research Journal of Economics and Management Studies
Published by Eternal Scientific Publications
ISSN: 2583 – 5238 / Volume 3 Issue 6 June 2024 / Pg. No: 401-409
Paper Id: IRJEMS-V3I6P144, Doi: 10.56472/25835238/IRJEMS-V3I6P144

Original Article

Analysis of Environmental Perspective and Good Corporate Governance Perspective on Firm Risk (Empirical Study on Mining Companies Listed on the Indonesia Stock Exchange in 2020-2022)

[1]Muhammad Wahyu, [2]Rr. Karlina Aprilia Kusumadewi*, [3]Rr. Diana Atika Ghozali
[1,2]Department of Accounting, Faculty of Economics and Business, Diponegoro University, Indonesia.
[3]Tax Accounting Program Study, Applied Vocational, Diponegoro University, Indonesia.

Received Date: 24 May 2024 Revised Date: 09 June 2024 Accepted Date: 17 June 2024 Published Date: 26 June 2024

Abstract: *The aim of this study was to examine the effect of the Environmental Perspective and the Good Corporate Governance Perspective on Firm Risk proxied by RISK. The environmental perspective in this study is focused on the amount of carbon emissions released by the company, and the Good Corporate Governance perspective is focused on the board of directors and managerial ownership in mining companies listed on the Indonesia Stock Exchange (IDX) for the period 2020-2022. Furthermore, this study uses different measurements than usual, especially in the risk and carbon emission variables so that these different measurements can become a reference or new view for future researchers. Based on statistical tests that have been carried out in this study it shows that the disclosure of the amount of carbon emissions has no effect on firm risk. Meanwhile, board size and managerial ownership have a negative effect on firm risk. Furthermore, in this study, it can also be concluded that environmental disclosure through the disclosure of carbon emissions in Indonesia has not affected the firm's risk and has not become the concern of all parties. On the other hand, the perspective of corporate governance is very influential in reducing firm risk.*

Keywords: *Firm Risk, Carbon Emissions, Good Corporate Governance, Board Size, Managerial Ownership, Agency Theory, and Triple Bottom Line Theory.*

I. INTRODUCTION

Several industrial sectors certainly have a level of risk both internally and externally. Internal risks can be seen from operational, financial, human resources, and other risks. At the same time, external risks are closely related in the political, legal, social, and environmental fields. According to Darma et al. (2019), risk is related to uncertainties. Something that cannot be ascertained can create opportunities or even have a direct adverse impact by causing risk. Because their operating operations are strongly linked to pollution, environmental degradation, and the exploitation of natural resources with little effort put into rehabilitation, mining businesses are classified as high risk. This may result in operational uncertainty for the business, which will have an impact on its long-term viability.

In an effort to maintain the sustainability of the company's operations, mining companies are required to provide feedback and accountability to stakeholders. This has given rise to the term Corporate Social Responsibility (CSR). In Indonesia, CSR disclosure has been regulated in the Law of the Republic of Indonesia number 40 of 2007, article 66, and paragraph 2 C on Limited Liability Companies, which explains the obligation of the board of directors to issue CSR in the annual report. However, at this time, the implementation of CSR is still in the distribution of profits used to meet perceived needs, not the actual needs of the community. As a result, many companies fail to see the importance of identifying and meeting the true needs of society through effective CSR implementation (Bunga Nayenggita et al., 2019). Due to the lack of formal legislation outlining the disclosure of CSR information in detail, CSR disclosure in annual reports is still insufficient. So, the form and content of CSR reports tend to vary.

Based on items released by the Global Reporting Initiative (GRI) and research conducted in 2016 by the Business School at the National University of Singapore (NUS) shows that Indonesia's CSR reporting and practices are in third place with a score of 48.4, after Singapore (48.8) and Thailand (56.8) (Suastha, 2016). In this case, the practice of CSR certainly requires organizations to go above and beyond only following the law and serving their interests to promote social good actively. Elkington (1997) coined the Triple Bottom Line theory, which states that companies should consider people, profit, and the planet when making decisions. Then, the success of the company can also be measured by the Triple Bottom Line by

considering social and environmental factors in addition to financial factors.

In essence, one of the main instruments to determine whether a company is high-risk or low-risk is environmental disclosure. This can be based on the amount of disclosure of carbon emissions released by the company from its operational activities. Then, the amount of carbon emissions can be considered as a systematic or external risk factor in a company. Carbon emissions can be a systematic risk factor if regulations expected to curb emissions apply uniformly to all emissions Bolton & Kacperczyk, (2021).

Effective corporate governance is also necessary to mitigate risk, as is excellent control of carbon emissions. Good governance can increase corporate transparency in influencing shareholders' perceptions of company performance, which can affect share value and investment decisions. This is because capital providers naturally choose different corporate governance mechanisms to ensure themselves a return on their investment. Corporate governance is closely related to credibility, transparency and accountability as well as effective information disclosure. This will certainly encourage better company performance.

Based on previous research, there is a research gap where CSR reduces firm risk (Salama et al., 2011; Cai et al., 2016). According to Salama et al. (2011 and Cai et al. (2016), Companies that perform well in CSR also perform better financially. (Kabir et al., 2021) also found that the level of carbon emissions intensity has a significant and positive effect on risk. Furthermore, Bolton and Kacperczyk (2021) found that carbon emissions are significant to risk, and Chaudhry et al., 2020) also found that carbon emissions can significantly and positively increase risk at the national and sub-national levels. However, the assessment conducted in this study is not in line with (Benlemlih et al., 2018), who reported that the relationship between CSR and systematic risk is not related. Furthermore, Dutta (2016) also reported that carbon emissions do not significantly affect firm risk.

Corporate governance, which includes board size and executive ownership, also has a significant impact on firm risk in addition to environmental factors. Brick & Chidambaram (2010), examining the relationship between board size and risk-taking in the United States, showed a negative insignificant relationship between board size and risk-taking. Another study from (Adams & Jiang, 2016) reported that there is a positive relationship between board size and risk-taking when testing the effect of board structure on risk-taking. In Nuringsih's (2006) research, it is reported that managerial ownership is positive in reducing risk. On the other hand, Ismiyanti and Hanafi (2004) reported an insignificant and negative correlation between management ownership and risk level. Therefore, based on the above statement, in this study, the author takes a new view and measurement in managing risk variables and carbon emissions in order to find out if there are different values and can provide a unique picture in a study. Afterwards, the authors found that environmental disclosure through carbon emission disclosure in Indonesia has not yet affected firm risk and has not become a concern for all parties. On the other hand, the corporate governance perspective is very influential in reducing firm risk.

II. LITERATURE REVIEW

A) Agency Theory

Agency theory is the idea that managers and shareholders have a conflict of interest where managers often prioritize their own desires (Jensen & Meckling, 1976). This occurs when one or more principals grant decision-making authority to an agent after hiring the agent to perform a service. If both parties aim to maximize their own wealth, then there is a strong reason that the agent may act in a deviant manner. Within the company, the dynamics between managers and shareholders can embody the principal-agent relationship (Christiawan & Tarigan, 2007). According to Panda & Leepsa (2017), this theory views managers as opportunistic and ignores their competence, leading to the emergence of "Agency Problems".

B) Triple Bottom Line

Andrew Savitz (2006) states the triple bottom line theory as "measuring how an organization's operations affect the world by considering social capital, human resources, the environment, and shareholder values in addition to profits. This method effectively summarizes the essence of sustainability in a company". Companies that implement Corporate Social Responsibility (CSR) should apply the standards covered in the triple bottom line, which is closely related to social, environmental, and financial factors (Ratna et al., 2019). This theory can also minimize firm risk because companies can use environmental accounting methods that focus on monitoring and measuring environmental performance (Nurhidayat et al., 2020). This can help companies to minimize the risk of environmental pollution and negative effects on society and help companies to clarify environmental briefings that can be used in decision-making.

C) Theoretical Framework

The framework in this study was prepared because of the awareness of both companies and the public of the risks caused by company activities. From this, agency theory explains the impact of firm risks that occur as a result of corporate governance that is still insufficient in managing company activities, so companies find it quite difficult to minimize firm risks.

Furthermore, the Triple bottom line theory also explains that companies are no longer looking at just one side, in this case, profit, but companies must integrate on two other sides, namely the planet and people.

Fig. 1: Theoretical Framework

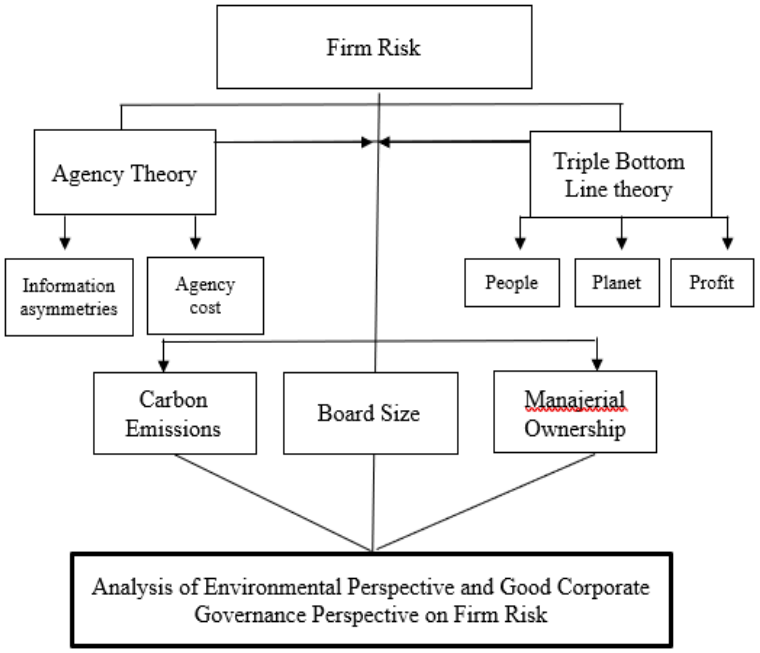
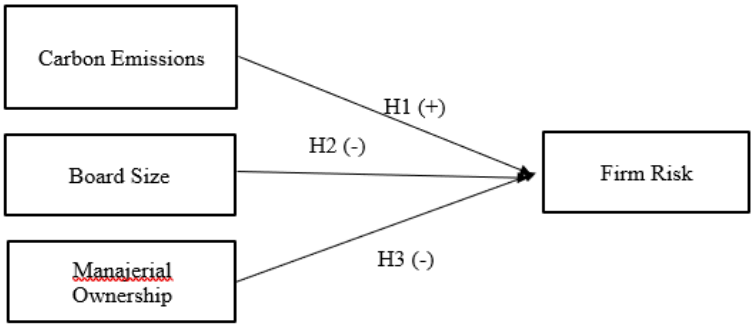


Fig. 2: Empirical Study



D) The Effect of Carbon Emissions and Firm Risk

Companies might lower risk by encouraging more voluntary disclosure (e.g. disclosure of environmental information) to meet the information needs of stakeholders and minimize information asymmetry. This happens because the availability of additional information to stakeholders can strengthen transparency and reduce information asymmetry. According to Cormier et al. (2005), the higher the firm's risk, the more difficult it is for shareholders to assess the company's value appropriately. A high level of risk can be caused by external factors such as economic news, political events, market sentiment, and the environment, as well as internal factors such as financial performance, size, and liquidity of the company.

Based on agency theory, managers may use the amount of carbon emissions to increase transparency because being transparent will allow the market to respond positively. As a result, it can reduce the risk to the company (Jensen & Meckling, 1976). Then, the Triple Bottom Line theory, especially in the environment (planet), states that the disclosure of carbon emissions and the use of environmental accounting can minimize risks and negative effects on society and can be used in decision-making (Nurhidayat et al., 2020.)

Kabir et al. (2021) found that the level of carbon emission intensity has a significant and positive effect on risk. Furthermore, Bolton and Kacperczyk (2021) found that carbon emissions are significant to financial risk. The following is the initial hypothesis regarding the connection between risk and environmental disclosure, founded on the aforementioned arguments:

H1: Carbon emissions are positively associated with firm risk.

E) The Effect of Board Size and Firm Risk

Board size plays a key role in the relationship between governance and risk-taking (Adams & Jiang, 2016). Based on agency theory, a good governance system has a crucial role in directing the behavior of directors, especially if the board of directors is large (Adams & Jiang, 2016). Moreover, according to (Bhimani, 2009), a large board of directors can increase value for agents by regularly reviewing and assessing the company's management plans and strategies. Furthermore, agency theory in corporate governance can explain that a large board size can reduce agency costs because it can provide more effective supervision to company management so that management will behave in line with the needs of shareholders and can reduce potential conflicts of interest. In this case, a large board size can help lower agency costs by improving oversight, company performance and effectiveness in decision-making.

Furthermore, according to Arafat et al. (2012) triple bottom line theory, especially in human resources (people), directors can provide direct and indirect benefits to productivity, efficiency, and corporate image and minimize firm risk. By utilizing the triple bottom line, companies can improve relationships with stakeholders so that the company's image increases and can minimize firm risk. The results of previous empirical studies support the above explanation. Brick & Chidambaran (2010) showed an insignificant negative relationship between board size and risk-taking. Furthermore, S. Cheng (2008) indicates that board size has a negative relationship with firm risk. Based on the discussion above, the second hypothesis of this study is:

H2: Board size is negatively associated with firm risk

F) The Effect of Managerial Ownership and Firm Risk

Basically, the main purpose of managerial ownership is to inspire them to perform better. Based on agency theory, with large managerial ownership, decision-making will be more critical and cautious. Furthermore, by coordinating the objectives of management and shareholders, managerial ownership can also reduce agency conflicts (Jensen & Meckling, 1976). Furthermore, human resources (people) in the triple bottom line theory can also help in repositioning and expanding managerial ownership practices. This relates to the fundamental adjustments that will call for managerial techniques in decision-making that are not only focused on the economic and social spheres but also on the planet so that the decisions taken are also more critical and careful because there are internal and external scopes in decision making (Fauzi et al., 2010).

Previous empirical studies have found that there is a negative relationship between managerial ownership and firm risk (Wright et al., 1996). Furthermore, Farwis & Azeez (2019) found a significant negative relationship between managerial ownership and risk-taking behavior. Based on this discussion, the hypothesis of the relationship between managerial ownership and firm risk is as follows:

H3: Managerial ownership is negatively associated with firm risk

III. RESEARCH METHOD

A) Population and Sample

In this study, the population used includes all entities documented on the Indonesia Stock Exchange (IDX). Mining entities listed between 2020 and 2022 of the study period were sampled. The approach to selecting samples is purposive sampling. The sample criteria to be used are as follows:

1. Companies listed on the Indonesia Stock Exchange for the period 2020-2022 and not delisted during that period.
2. Publish annual financial reports (annual reports) or complete sustainability reports during 2020 - 2022.
3. Have sufficiently complete data related to the variables used.

B) Variables and Measurements

This study uses 4 variables consisting of 1 dependent variable and 3 independent variables. The following are the variables used and measurements:

Table 1: Variables and Measurements

Variables	Symbols	Measurements
Dependent Variable		
Firm Risk	RISK	$SROA_{I,T} = ROA_{I,T}/\sigma ROA_{I,T}$
Independent Variable		
Carbon Emissions	EMK	Total carbon emissions $scope\ 1 + scope\ 2$
Board Size	BDSIZE	number of board members in a company.
Manajerial Ownership	KEPM	$\frac{\text{Ratio of shares held by manajerial}}{\text{Number of shares outstanding}}\ x\ 100\%$

Source: *Author*

C) Analysis Method

This research uses the Multiple Regression Analysis method. But before that, descriptive statistical analysis and classical assumption test analysis are carried out first. Normality test, multicollinearity test, autocorrelation test, and heteroscedasticity test, which are all part of the classical assumption test, will be carried out to assess the quality of research data. The Multiple Regression Analysis testing equation, namely:

$$\boldsymbol{RISK = b0 + b1EMK + b2BDSIZE + b3KEPM + \varepsilon}$$

With the following information:

- RISK = Firm Risk
- bo = Constant Value
- b1, 2, 3, 4 = Coefficient Value
- EMK = Carbon Emissions
- BDSIZE = Board Size
- KEPM = Manajerial Ownership
- ε = Residual Value

IV. RESULT AND DISCUSSION

A) Description of Research Sample

A total of 84 mining entities for the period 2020 to 2022 listed on the Indonesia Stock Exchange (IDX) were taken as samples for this study. The data for this study was collected using a purposive sampling strategy. The research sample was collected with predetermined criteria and contains the following details:

Table 2: Sample Selection

No.	Sample Criteria	Quantity
1.	Mining companies documented on the Indonesia Stock Exchange (IDX) for the period 2020-2022.	84
2.	Companies that do not meet the specified criteria	(65)
Total samples		57
Outlier Data		(9)
Total Final Sample		**48**

Source: *Author*

B) Descriptive Statistics

Table 3 shows descriptive statistics containing the minimum, maximum, mean, and standard deviation values for the variables used. Based on these descriptive statistics, it can be analyzed as follows.

RISK (firm risk) is applied as a proxy of the standard deviation of ROA divided by ROA (Return on Assets). RISK in mining companies has the following values: minimum value of -0,97, maximum value of 2,60, mean (average) value of 0,8100, and standard deviation value of 0,88926.

Carbon emissions were applied using a measurement of the sum of scope 1 and scope 2 emissions denoted by EMK. The values obtained are as follows: minimum value of 1.243,07, maximum value of 5.736.438,00, mean value of 1.159.795,9275, and standard deviation value of 154.809.750.243.

By summing up the boards of directors of a company, BDSIZE (board size) can be determined. In Indonesia, the number of boards of directors in mining companies is at an average of 3,4. If observed from this average, mining companies in Indonesia have at least 3 people for the number of boards of directors in their companies. However, table 4.2 shows a minimum value of 2,00, a maximum value of 11,00, 4,9583 for the mean, and 2,38754 for the standard deviation value.

Managerial ownership is denoted by KPEM. Managerial ownership can be proxied based on the number of shares owned by managers and dividing it by the number of shares outstanding. From table 4,2, it can be interpreted that the minimum value is 0,0012, the maximum is 0,68, 0,0697 for the average, and the standard deviation is 0,16393.

Table 3: Descriptive Statistics

	N	Minimum	Maximum	*Mean*	Std. Deviation
RISK	48	-0,97	2,60	0,8100	0,88926
EMK	48	1.243,07	5.736.438	1.159.795,9	154.809.750.243
BDSIZE	48	2,00	11,00	4,9583	238,754
KEPM	48	0,0012	0,68	0,0697	0,16393
Valid N (listwise)	48				

Sumber: *Output SPSS 26, secondary data processed in 2024*

C) Classical Assumption Test

The classical assumption test is used to assess the reliability of the regression model by conducting a series of tests in the form of normality tests, multicollinearity tests, autocorrelation tests, and heteroscedasticity tests. Table 4 also presents the results of the normality test using the Kolmogorov-Smirnov test with a significance value > 0,05 so that the research data is normally distributed.

Table 4: Kolmogorov-Smirnov Normality Test Results

		Unstandardized Residual
N		48
Normal Parameters a,b	Mean	0,0000000
	Std.Deviation	0,86156390
Most Extreme Differences	Absolute	0,094
	Positive	0,094
	Negative	-0,063
Test Statistic		0,094
Asymp.Sig. (2-tailed)		0,200

Source: *Output SPSS 26, secondary data processed in 2024*

If the tolerance value exceeds or is above 0,10 and the VIF value < 10, it indicates that the specified variable is free from multicollinearity. Table 5 shows that the VIF value < 10 and the tolerance value > 0,10 for all independent variables. Based on the test results it illustrates that the independent variables used do not show any relationship between one variable and another.

Table 5: Multicollinearity Test Results

Model		Tolerance	VIF
1	EMK	0,842	1,188
	KEPM	0,946	1,057
	BDSIZE	0,872	1,146

Source: *Output SPSS 26, secondary data processed in 2024*

The autocorrelation test conducted with the run test can be seen by looking at Table 6, where the SPSS output results for the Run test value are -0,4675 with a probability of 0,189, which means that the null hypothesis is accepted because it exceeds the significance value of 0,05. From this table, it shows that the data used in testing the regression model is free from autocorrelation.

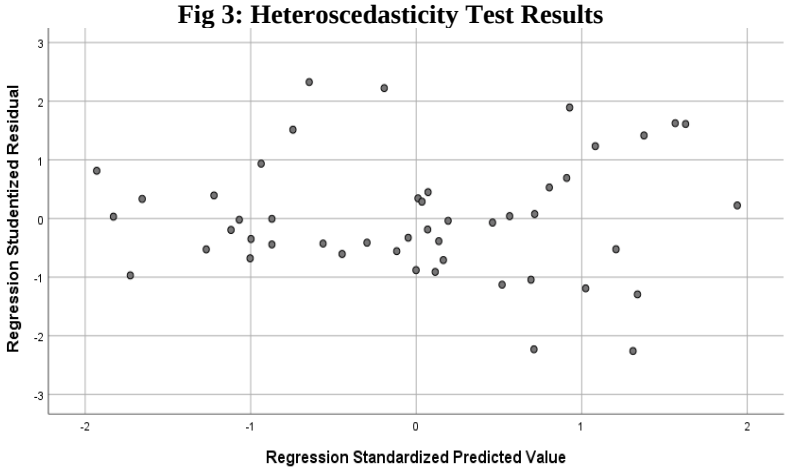
Table 6: Autocorrelation Test Results

	Unstandardized Residual
Test Value[a]	-0.04675
Cases < Test Value	24
Cases >= Test Value	24
Total Cases	48
Number of Runs	20
Z	-1.313
Asymp. Sig. (2-tailed)	0,189

Source: *Output SPSS 26, secondary data processed in 2024*

The scatterplot graph can be used to test whether there is heteroscedasticity in this study. If the graph forms a certain pattern, it indicates heteroscedasticity. If, on the graph, the pattern spreads above and below 0 as the Y axis, it indicates the absence of heteroscedasticity. This can be seen in Figure 3 as follows.

Fig 3: Heteroscedasticity Test Results



Source: *Output SPSS 26, secondary data processed in 2024*

D) Analysis of Hypothesis Test Results

Hypothesis testing is carried out with a series of tests included in multiple regression analysis in the form of the coefficient of determination (R2) test, F statistical test, and T statistical test. Table 7 shows that the dependent variable, namely firm risk, is influenced by 0,340 or 34% by independent variables such as carbon emissions, board size and managerial ownership. However, 66% of the rest are variables outside this study that may have an impact on firm risk.

Table 7: Test Results of the Coefficient of Determination (R^2)

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.626[a]	0.392	0.34	1.89713	1.039

Source: *Output SPSS 26, secondary data processed in 2024*

Table 8 shows that the calculated F value of the test is 7,523, and the F table is 2,80. In the provisions of the F test, if the value of Fcount > Ftable and the significance value < 0.05, then carbon emissions, board size, and managerial ownership simultaneously have an influence on the dependent variable, namely firm risk, and the regression equation is reliable.

Table 8: Statistical F Test Results

Model		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	81.233	3	27.078	7.523	.001[b]
	Residual	125.968	35	3.599		
	Total	207.201	38			

Source: *Output SPSS 26, secondary data processed in 2024*

The t-test results can be determined by evaluating the t-value obtained through statistical calculations with the t-table. The significance threshold used is 0,05. If the t count or significance level is above the t table, the hypothesis is accepted. If the t count or significance level is above 0,05, the hypothesis is considered unreliable. Table 9 presents the results of the T statistical test between the independent variables and the dependent variable in this study.

Table 8: Statistical T-Test Results

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	10,253	2,279		4,499	0,000
	BDSIZE	-1,454	0,556	-0,374	-2,617	0,013
	KEPM	-8,768	2,956	-0,417	-2,966	0,005
	EMK	0,128	0,235	0,075	0,545	0,589

Source: *Output SPSS 26, secondary data processed in 2024*

From the description of Table 8, the results of the t-test can be explained that the first hypothesis states that carbon emissions have a positive impact on firm risk. The t-test explains that the β coefficient value of carbon emissions is positive, namely 0,128, with a calculated t-value of 0,545 and a significance value of 0,589. Based on these results, it can be seen from the t value < t table, namely 0,545 < 2,010, with a significance value of 0,589 > 0,05, which means that the carbon emission variable does not affect firm risk insignificantly. From this explanation, the first hypothesis proposed is rejected.

Based on the test results in Table 8, the second hypothesis states that board size has a negative impact on firm risk. This shows that the β coefficient value of the board size is negative, namely -1,454, with a calculated t-value of -2,617 and a significance value of 0.013. Based on these results, it can be seen from the value of -t count < -t table, namely -2,167 < -2,010 with a significance value of 0,013 < 0,05, meaning that the board size variable affects firm risk significantly and negatively. From this explanation, the second hypothesis proposed is accepted.

Finally, the third hypothesis shows that risk is negatively affected by managerial ownership. The t-test from the table above shows that the β coefficient value of the board size is negative, namely -8,768, with a calculated t-value of -2,966 and a significance value of 0.005. Based on these results, it can be seen from the value of -t count < -t table, namely -2,966 < -2,010 with a significance value of 0,005 < 0,05, meaning that the managerial ownership size variable affects firm risk significantly and negatively. From this explanation, the second hypothesis proposed is accepted.

V. CONCLUSION

Empirical data were collected in this study to determine the extent to which corporate governance and carbon emissions affect firm risk in mining companies listed on the Indonesia Stock Exchange (IDX) in 2020 and 2022. The sample of this study was determined by purposive sampling method, where, according to the predetermined criteria, out of 48 data, 19 entities fit into the sample criteria. Then, the results of the research in this study show that the carbon emission variable shows no influence on firm risk. Meanwhile, the results of testing the board size variable are proven to have a significant and negative relationship in influencing firm risk, and managerial ownership significantly and negatively affects firm risk. Furthermore, This research still has limitations based on the findings of the tests that have been carried out. These limitations include: (1) It was found that the results of the low Adjusted R^2 value of 0,34 or 34%, thus indicating that there are 66% of variables not examined in this study that have an impact on firm risk. (2) There are outlier data in the research sample that need to be eliminated, which causes the sample data to be smaller. Finally, the following suggestions and recommendations relate to the limitations found in this study: (1) Future research can analyze and examine other factors that affect firm risk, such as profitability, institutional ownership, and independent boards. (2) To ensure that each proxy provides a unique picture with different benefits and drawbacks, future research can use other proxies for firm risk. (3) future studies can use different populations or samples to provide a picture that is not the same and different.

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