The Effect of Risk on Capital Structure, Profitability, and Firm Value with Sustainability Report as a Moderating Variable

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Abstract: This study investigates the moderating effect of sustainability reports on the relationships between risk and firm value, as well as profitability and firm value, within Indonesia's mining sector from 2013 to 2020. The mining industry faces unique challenges including environmental pressures, climate change impacts, geopolitical tensions, and technological disruptions, making it an ideal context for examining risk-value relationships. Despite growing emphasis on sustainable development and ESG reporting, the role of sustainability disclosure in moderating financial relationships remains understudied, particularly in emerging markets. The research employs a comprehensive theoretical framework integrating Pecking Order Theory, Modigliani-Miller Theory, Signaling Theory, and Energy Economic Theory to examine five key variables: risk, capital structure, profitability, firm value, and sustainability reporting. Using purposive sampling, the study analyzes 160 observations from 20 publicly listed mining companies on the Indonesia Stock Exchange. The methodology utilizes Structural Equation Modeling with Partial Least Squares (SEM-PLS) and Multi-Group Analysis (MGA) to test both direct and moderating effects. The findings reveal significant direct relationships among variables. Risk demonstrates a positive effect on firm value (coefficient: 0.146, p-value: 0.029), supporting the risk-return paradigm. Conversely, risk negatively affects both profitability (coefficient: -0.191, p-value: 0.007) and capital structure (coefficient: -0.158, p-value: 0.020). Capital structure shows a negative relationship with profitability (coefficient: -0.161, p-value: 0.018), while profitability positively influences firm value (coefficient: 0.250, p-value: <0.001). The moderation analysis yields mixed results. Surprisingly, sustainability reports do not moderate the risk-firm value relationship (p-value: 0.189), suggesting that investors in Indonesia's emerging market may not yet fully incorporate sustainability information when evaluating risk-adjusted returns. This finding may reflect the novelty of sustainability reporting, voluntary disclosure nature, and short-term investment horizons. However, sustainability reports significantly moderate the profitability-firm value relationship (p-value: <0.001), strengthening this positive association. This supports signaling theory, indicating that sustainability disclosure amplifies the value-enhancing effect of profitability by demonstrating corporate commitment to long-term viability. The study contributes to literature by providing empirical evidence from an emerging market where sustainability practices are evolving. It extends research by examining sustainability reports as moderating variables rather than direct determinants. The findings have important implications for corporate managers, investors, and policymakers. Mining companies should recognize that while sustainability reporting may not immediately alter risk perceptions, it enhances profitability's value impact. Policymakers might consider transitioning from voluntary to mandatory sustainability reporting to improve market efficiency. Future research should examine cross-industry comparisons, sustainability report quality metrics, and longer-term effects of sustainability disclosure on value creation.

***Keywords*:** Capital Structure, ESG, Firm Value, Risk, Sustainability Report

Introduction

Firm value, which is investors' perception of the performance and success of the research (Sukesti et al., 2019), (Nugroho & Halik, 2021), is an important indicator for management, shareholders, and investors to assess whether the company operates efficiently. An increase in company value shows that it has managed its assets and resources well, generated profits, and faced risks effectively. Companies that work more efficiently can create profits, have high value, and be more attractive to investors and shareholders (Sukesti et al., 2019). Investors tend to look for opportunities in companies with the potential for significant value growth (Das & Kumar, 2023). Instead, shareholders want to see the value of their shares increase over time. Thus, increasing company value is a way to gain easier and cheaper access to capital.

Realizing good company values can be done in various ways. Research regarding what determinants can increase company value is needed (Nguyen, 2020); (Nugroho & Halik, 2021) and has been done a lot ((Data et al., 2017); (Kassi et al., 2019); (Dang et al., 2020); (Roy & Bandopadhyay, 2022); (Dewaelheyns *et al.*, 2023). However, company value has broad dimensions, so in-depth research with new studies related to company value is still interesting (Dang et al., 2020), especially for companies in the mining sector.

The mining sector is very sexy and attractive for investors. Demand for this commodity is very high because even though the issue of clean energy is currently widely discussed, the existence of the old mining business is still supporting the new clean energy business. The outlook for commodities such as copper, lithium, rare earth, nickel, and platinum remains strong, as they are essential in the transition to green energy. However, it can be denied that the global mining industry faces complex challenges such as environmental pressure and climate change, trade wars and geopolitics, changing and uncertain demand, technological changes, and global maintenance, which impact the mining industry. Therefore, understanding more deeply the factors that influence company value in the mining industry also significantly affects strategy.

Literature Review

Several business risks mentioned above (environmental and climate change pressures, trade wars and geopolitics, changing and uncertain demand, technology changes, and global maintenance) are inherent in industrial mining (Adi et al., 2013). Prevention, minimization, and mitigation of risk are crucial if mining companies build trust, limit risk, and leave a positive legacy after their mining operations close (Foundation, 2022). Risks that commonly occur in the business world include liquidity risk, credit risk, market risk, and other types of non-financial risk. Market risk and financial risk also have the potential to influence firm value fluctuations (Kassi et al., 2019). In perfect market conditions, strong risk management does not change the firm's value (Modigliani, F., & Miller, 1958). However, this condition is only achieved in a perfect market, while research implications show that this risk can trigger the opportunity for a rapid decline in company value or vice versa (Data et al., 2017). These risks cannot be eliminated but must be managed (Adi et al., 2013).

Every financial decision contains elements of risk and return. Financial risk has a significant influence on overall economic aspects. A main principle of monetary economics is that assets with high risk must provide a higher expected return (Cooper & Schindler, 2011). Investors have expectations of companies that have a high level of risk because they assume that companies that have a high level of risk will also be followed by a high level of return (Campbell, Polk, & Vuolteenaho, 2010; Mehrara, Falahati, & Zahiri, 2014 in Nugroho & Halik, 2021).

Kassi et al. (2019) explain that market risk is an important component of financial risk because it is a systematic risk that investors cannot eliminate through a diversified portfolio. These risks influence firm value, as research by Roy and Bandopadhyay (2022) explains that financial risk affects substantial value. Data *et al.* (2017), Dang et al. (2020), and Dewaelheyns *et al.* (2023) show that risk has a negative influence on firm value. The statistical results show a negative and significant path coefficient, where increasing business risk will reduce firm value. The opposite effect was found in research by Asiri and Hameed (2014) that business risk has a significant and positive influence on firm value, so if there is an increase in business risk, it will increase firm value. Similar to the findings of Asiri and Hameed (2014), Nugroho and Halik (2021) stated that systematic risk positively affects firm value. Meanwhile, in Pecking-order Theory, which starts with asymmetric information, managers know more about their companies' prospects, risks, and values than outside investors (Gharaibeh & Bani Khaled, 2020). Therefore, company management does not feel confident in financing their investments with debt, which negatively impacts profitability and company value.

Business, market, and financial risks also determine a company's profitability. Agency theory suggests a positive relationship between business risk and profitability because investors require a significant profit to withstand the risks associated with financial distress and bankruptcy, as priority is given to debt holders in the case of bankruptcy

(Gharaibeh & Bani Khaled, 2020). Sondakh et al. (2021) investigated the influence of third-party fund credit risk, market risk, and operational risk on banking profitability. The research results show that credit risk, market risk and operational risk significantly affect profitability. Other research in the banking industry that evaluates this relationship includes Rakshit and Bardhan (2022) and Ibrahim (2023)). Empirical results of the positive influence between market risk and profitability were found in research by Sondakh, Tulung, and Karamoy (2021), Rachman, Mohd Saudi, and Sinaga (2019), and Reboredo and Ugolini (2022). Reboredo and Ugolini (2022) found that climate transition risks performed better regarding ROA, ROE, EBITDA, and Tobin's q ratio. Rachman, Mohd Saudi, and Sinaga (2019) evaluated the influence of credit and market risks on profitability, both simultaneously and partially. The result is that credit risk and market risk have a simultaneous effect on profitability, while credit risk has a partial negative effect on profitability, the opposite result occurs for market risk and profitability. Negative influences were also found in research by Nugroho and Halik (2021) and Gharaibeh and Bani Khaled (2020).

The risks mentioned above are also related to the capital structure. Capital structure is the capital structure or capitalization of a company's capital, which is permanent financing represented by long-term debt, preferred shares, and shareholder equity (Fred Weston, 1991). Zietlow, J. Hankin, J. Seidner (2018) note that debt is one of the critical items in a company's capital structure. The greater the company's business risk, the greater the possibility of financial distress (Fabozzi, F. J. and Peterson, 2003). As explained by Frank & Goyal (2009), companies with high business risk characteristics will impact their funding sources. This company will be more careful in choosing funding sources to cover its operational costs. If the business risk gets bigger, it means the use of debt should get smaller.

The influence of risk and capital structure was studied by Floquet and Biekpe (2008)on emerging market banks. This research concluded that there is a positive relationship between capital and risk, but only in the longer term. The results of the influence in a positive direction were found in Chakraborty's (2015) research. In comparison, negative effects were found in Tahir *et al.* (2020), which states that there is a significant negative influence of credit risk on leverage both in seasonal and non-seasonal businesses. Other research with the same results is the research of Isnurhadi et al. (2020) that threat hurts capital structure.

Increasing profitability is closely related to capital structure. Explained through the MM Theory (Modigliani and Miller), which emerged in 1958 and was refined in 1963 by adding tax variables in the formula, it was concluded that using debt is a better choice compared to using your capital because, with a high debt value, tax savings can be achieved. carried out (Modigliani, F., & Miller, 1958). The decision to determine the capital structure is important because determining the capital structure is related to the incurrence of capital costs. Choosing the optimal capital structure makes the company run effectively and efficiently. According to (Pinto et al., 2017), decisions regarding capital structure are very important to face a competitive environment because companies need to maximize returns, and capital structure decisions will impact the company's financial condition and stability. The optimal debt ratio is the ratio that maximizes the company's profitability (Kebewar, 2012).

Indicators that can be used to calculate the capital structure value are the debt ratio, long-term debt-to-equity ratio, and debt-equity ratio. Based on previous research, the debt-to-equity ratio has a significant negative relationship with company profitability (Mohammed et al., 2020).. According to research results from (Abor, 2005), capital structure, which is measured using short-term debt to total assets, has a significant positive effect on profitability, which is calculated using return on equity (ROE), capital structure, which is measured using long-term debt to total capital (Equity) has a significant positive effect on profitability as measured using ROE, capital structure as measured using long-term debt to total assets has a significant positive effect on profitability as measured using ROE. The research results of Zeitun and Gang Tian (2007) show that the company's capital structure significantly negatively impacts company performance measures, both in accounting and market measures. Different results were presented by (Salim & Yadav, 2012) that capital structure was significantly and positively related to company performance as measured by Tobin's Q, while capital structure and ROA had a negative relationship. (Sorana, 2015) found that the capital structure indicator, namely total equity to total assets, had a significant positive effect on profitability as measured using ROA and ROE, while the capital structure indicator, namely the ratios of total liabilities and short-term liabilities to total assets, had a significant negative effect on Profitability is measured using ROA and ROE. Detthamrong, U., Chancharat, N., & Vithessonthi, 2017 stated that leverage positively affects company performance.

While capital structure is indicated to have a relationship with profitability, profitability is also indicated to have a relationship with firm value (Das & Kumar, 2023). (Keown et al., 2005) state that companies must aim to maximize shareholder wealth by maximizing the value of the company's shares. Previous research shows a positive influence in various contexts, such as research by (Sucuahi & Cambarihan, 2016), Dang et al. (2020), Nugroho and Halik (2021), and (Harahap et al., 2022) which state that measured profitability has a significant positive effect on firm value.

The variables above (risk, capital structure, profitability, and firm value) are combined to form a research model whose influence will be studied in this research. Then, we added one variable that we felt was no less important in forming the overall construct, especially if we focused on the mining industry sector, namely the sustainability report.

Currently, sustainability issues are increasingly emerging (Alshehhi et al., 2018), (Valenza & Damiano, 2023), especially on the 17 agendas in the Sustainable Development Goals (SDGs). Over time, sustainability reporting has become a crucial tool that enables companies and organizations to meet the increasing need for transparency from customers, investors, various stakeholders, and society at large (Martínez et al., 2016 in Girón et al., 2021). Companies that will lead in the market of the future will be companies with a sustainable development vision that can go beyond a short-term financial focus and further expand to economic, environmental, and social sustainability (Alshehhi et al., 2018), (Girón et al., 2021), (Valenza & Damiano, 2023) which includes developing company strategy and transforming the company into an organization that is responsible and cares about the environment and social aspects.

The mining industry is a sector that is being demanded not only to focus on creating value or profit for the benefit of the company itself (Setyawan et al., 2022) but also to have responsibility for three important aspects, namely economic, social and environmental performance. Considering the business risks from an ecological perspective inherent in this sector, responsibility for sustainability related to the pillars of sustainable development should be a company concern. Energy Economics Theory reviews fundamental problems and possible solutions to address the challenges of energy production and use challenges, and presents a framework for energy decisions based on sound economic analysis (Schwarz, 2019). These values are at least explained and can be stated through a sustainability report.

The sustainability report is information on contributions and achievements related to the SDGs, which reveals a long-term vision, especially regarding social and environmental issues (Girón et al., 2021). Sustainability reports can positively signal investors to increase interest in company shares (Alshehhi et al., 2018). This is based on stakeholder theory and Legitimacy Theory, the two prevailing theories concerning the necessity of sustainability reporting in firm value (Nguyen, 2020). Meanwhile, Signaling theory assumes that efficient companies provide relevant and better information to investors than less efficient companies (Musleh Al-Sartawi & Reyad, 2018). This encourages companies to provide information related to annual financial reports to external parties to reduce information that only the company has, both financial and non-financial information.

Another external benefit of sustainability reports is that they can increase competitiveness, relationships with stakeholders, image, reputation of issuers and public companies, and public trust (Girón et al., 2021). Sustainability reports also have internal benefits for the company, such as sharpening the vision and strategy related to sustainability aspects, increasing transparency and accountability in sustainability governance, and strengthening company management in the sustainability aspect.

In Indonesia, submitting sustainability reports is still voluntary, so few make and publish them compared to other developed countries (Anna & Dwi R.T, 2019; Setyawan et al., 2022). By investigating the moderating relationship between sustainability reports and the influence of risk and profitability on firm value, which was carried out in this research, it can be seen whether sustainability reports can strengthen or weaken the effect of risk on firm value and the influence of profitability on firm value. It is hoped that this can provide input for stakeholders to consider including a sustainability report in their financial reports. Finally, this answers the novelty of research in the context of emerging markets and the mining sector, including answering the research model proposed by Alshehhi et al. (2018), to make the sustainability report variable a moderating variable to reduce variation in theory and results.

Hypothesis

H1: risk influences firm value
H2: risk affects profitability
H3: risk affects capital structure
H4: capital structure affects profitability
H5: profitability affects firm value
H6: sustainability reports moderate the effect of risk on firm value
H7: sustainability reports moderate the effect of profitability on firm value

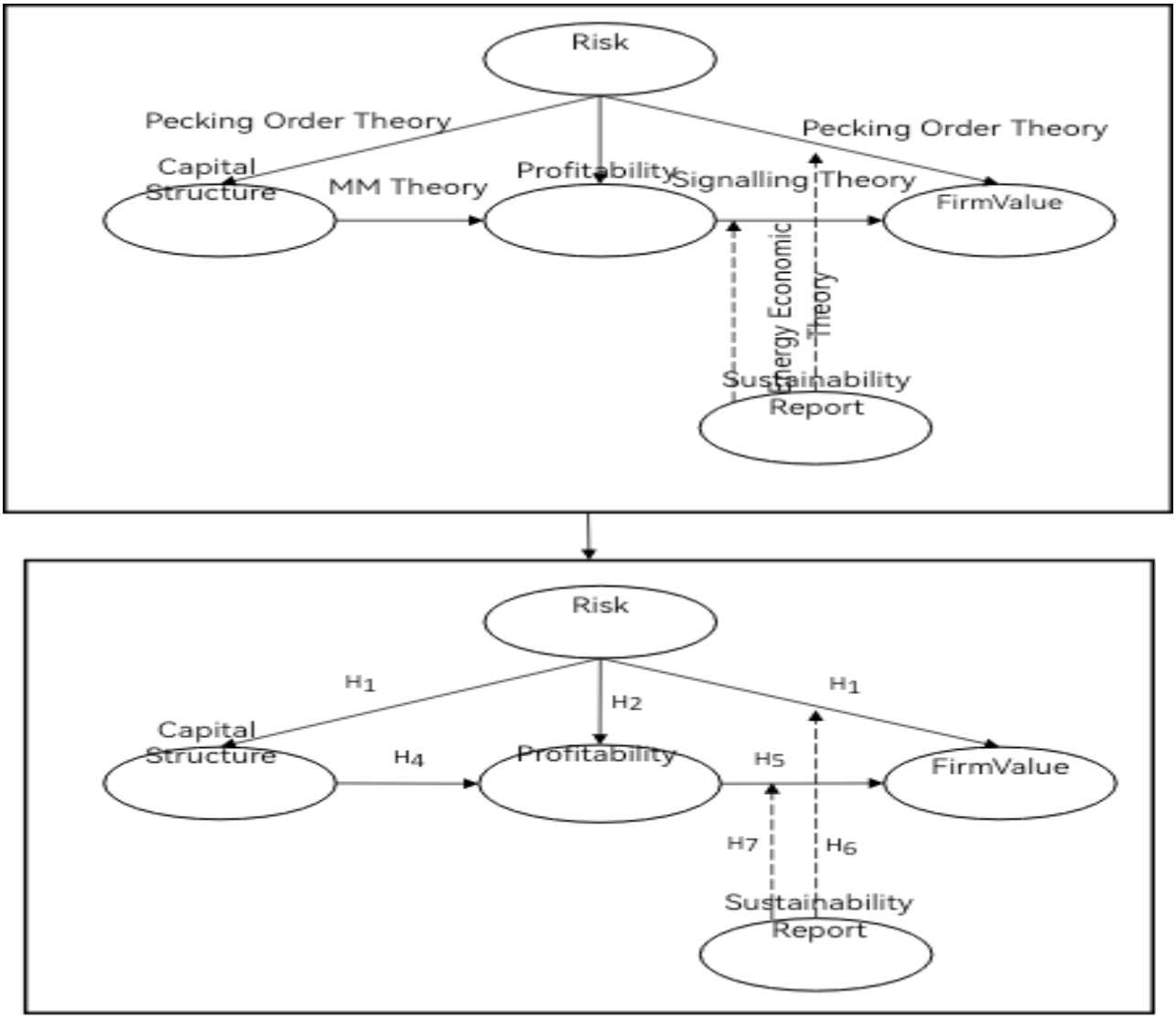

Figure 1: Conceptual Framework and Hypothesis Model

Material and Methods

The population of this research is all mining companies that went public on the Indonesia Stock Exchange in 2013-2020, totaling 47 companies. The companies sampled in this research were selected using a purposive sampling technique, namely selecting samples by setting specific criteria that follow the researcher's objectives and are felt to provide the most appropriate information related to the researcher's problem formulation (Creswell, 2017). The population criteria for this research are companies that have had an IPO before the research period, companies that publish regularly audited annual financial reports, and companies that present complete data related to research. Based on these criteria, 20 companies were obtained. The data collection period was from 2013 to 2020 (8 years), so the number of observations in this study was 160 observations.

Table 1: Sample Company Name

Company Name			
1	ADRO	11	ESSA
2	ANTM	12	HRUM
3	APEX	13	INCO
4	ARII	14	INDY
5	BUMI	15	ITMG
6	BYAN	16	SMMT
7	DKFT	17	KKGI
8	DEWA	18	TINS
9	DOID	19	PTBA
10	ELSA	20	TOBA

All secondary data was obtained from ICMD, company financial report documents, company financial performance profiles, and IDX fact books related to the variables in this research. The details of the variables and indicators are listed in the operational definition of the variables in Table 2.

Table 2: Operational Definition of Variables

Variable	Indicator	Reference
Risk (X1)	Market Risk (X1.1)	(Beaver et al., 1970); (Reddy et al., 2010); (Kim, H., & Berger, 2008)
	Business Risk (X1.2)	
	Financial Risk (X1.3)	
Capital Structure (Y1)	Debt Ratio (Y1.1)	(Zeitun & Gang Tian, 2007a); (Abor, 2005)
	Long-Term Debt to Total Equity (Y1.2)	
	Debt Equity Ratio (Y1.3)	
Profitability (Y2)	Return on Equity (Y2.1)	(Fabozzi, F. J. & Peterson, 2003); Adi et al. (2013); (Zeitun & Gang Tian, 2007a)
	Net Profit Margin (Y2.2)	
	Return on Assets (Y2.3)	
Firm Value (Y3)	Price-Earnings Ratio (Y3.1)	(Fabozzi, F. J. & Peterson, 2003); Adi (2013); (Sheikh et al., 2013);(Yulianto et al., 2019)
	Tobin's Q (Y3.2)	
	Earnings per Share (Y3.3)	
	Price to Book Value (Y3.4)	
Sustainability Report	Categorical Data	1 : publishes a Sustainability Report
		0 : does not issue a Sustainability Report

The sustainability report in the construct acts as a moderating variable predicted to moderate the influence between risk and firm value and profitability and firm value. Sustainability reporting is measured using dichotomous or dummy variables, forming categorical data (Table 2). Testing of this moderation effect was carried out using MGA. MGA aims to compare the explained variance among groups caused by heterogeneity (Klesel et al, 2019). Then, research utilized the PLS-MGA, parametric, and Welch–Satterthwaite tests in WarpPLS. The parametric and Welch–Sterterthwaite tests are parametric significance tests for the difference in group-specific PLS-SEM results that assume equal variances across groups (Henseler et al., 2012). Overall, data analysis in this research was carried out in three stages: financial ratio analysis, descriptive statistical analysis, and inference analysis.

Results and Discussion

The results of descriptive analysis on 160 observations can be seen in Table 3.

Table 3: Summary Statistic

Variable	Indicator	Min Value	Max Value	Average Value	Std. Deviasi
Risk (X1)	Market Risk (X1.1)	-17,51	99,22	3,18	11,45
	Business Risk (X1.2)	-116,80	110,69	0,28	13,84
	Financial Risk (X1.3)	0,05	385,96	5,18	31,49
Capital Structure (Y1)	Debt Ratio (Y1.1)	0,04	1,90	0,51	0,30
	Long-Term Debt to Total Equity (Y1.2)	-8,54	22,72	1,19	3,28
	Debt Equity Ratio (Y1.3)	-24,12	34,06	1,77	5,22
Profitabilit y (Y2)	Return on Equity (Y2.1)	-282,98	218,15	7,38	40,39
	Net Profit Margin (Y2.2)	-5.395,38	1.397,77	-22,49	444,72
	Return on Assets (Y2.3)	-64,39	45,56	3,14	10,19
Firm Value (Y3)	Price-Earnings Ratio (Y3.1)	-230,18	4.400,35	44,90	358,47
	Tobin's Q (Y3.2)	-0,16	7,90	0,87	0,84
	Earnings per Share (Y3.3)	-43.857,39	48.840,58	152,05	5.445,39
	Price to Book Value (Y3.4)	-3,67	24,84	2,00	3,05

SEM with WarpPLS analysis was conducted by testing the outer and inner models. In testing the outer model it follows the formative measurement testing stage, namely using the outer weight value by paying attention to the p-value of each indicator. In this test, there are two indicators with a p-value smaller than alpha, so you must pay attention to the loading factor value. Because the loading value also shows results below the criteria (<0.5), these two indicators must be removed. The outer weight, loading and p-value values are shown in Table 4.

Table 4: Outer Weight, Loading Dan P-Value

Variable	Indicator	First Perform SEM Analysis			Second Perform SEM Analysis		
		Loading Factor	Outer weight	P-value	Loading Factor	Outer weight	P-value
Risk (X1)	X1.1	0.404	0,372	<0.001	0.404	0.372	<0.001
	X1.2	-0.595	-0,543	<0.001	-0.595	-0.543	<0.001
	X1.3	0.759	0,695	<0.001	0.759	0.695	<0.001
Capital Structure (Y1)	Y1.1	0.518	0,257	<0.001	0.518	0.257	<0.001
	Y1.2	0.945	0,469	<0.001	0.945	0.469	<0.001
	Y1.3	0.924	0,458	<0.001	0.924	0.458	<0.001
Profitability (Y2)	Y2.1	0.155	0,100	0.100	Removed		
	Y2.2	0.858	0,550	<0.001	0.881	0.568	<0.001
	Y2.3	0.894	0,573	<0.001	0.881	0.568	<0.001
Firm Value (Y3)	Y3.1	0.770	0,391	<0.001	0.770	0.391	<0.001
	Y3.2	0.922	0,468	<0.001	0.922	0.468	<0.001
	Y3.3	0.027	0,014	0.431	Removed		
	Y3.4	0.726	0,368	<0.001	0.726	0.368	<0.001

In testing the inner model, the path coefficient and p-value are used to determine the influence model between variables. Based on these results, it is known that the p-value of the five direct effects produces a p-value <0.5, so the relationship between variables can be said to be significant. Therefore, the direct influence hypothesis (H1-H5) can be accepted. Furthermore, the direction of influence, whether positive or negative, for each relationship between variables and a detailed explanation of the hypotheses can be seen in Table 5.

Table 5: Outer Weight, Loading and P-Value Direct Effect

Hipotesis	Path Coeffisient	P-value	Description
H_1: *Risk* (X_1) → *Firm Value* (Y_3)	0.146	0.029	Significant (+)
H_2: *Risk* (X_1) → *Profitability* (Y_2)	-0.191	0.007	Significant (-)
H_3: *Risk* (X_1) → *Capital Structure* (Y_1)	-0.158	0.020	Significant (-)
H_4: *Capital Structure* (Y_1) → *Profitability* (Y_2)	-0.161	0.018	Significant (-)
H_5: *Profitability* (Y_2) → *Firm Value* (Y_3)	0.250	<0.001	Significant (+)

The relationship between risk and firm value produces a path coefficient of 0.146 and a p-value of 0.029, so the first hypothesis of this research is accepted. This relationship shows a positive and significant value, which means that an increase will follow an increase in risk in firm value. Considering the positive and significant findings on the relationship between risk and firm value, management must consider how risk can be managed well so that whatever form of risk in the company can create a good image of firm value for investors.

This positive result supports research by Asiri and Hameed (2014) that business risk has a significant and positive influence on firm value, so if there is an increase in business risk, it will increase firm value. The direction of the positive influence of this research also strengthens the findings of Nugroho and Halik (2021) that systematic risk positively affects firm value. However, the research results by Nugroho and Halik (2021)show that the effect is significant. The results of this study contradict the findings of Data et al., (2017), Dang *et al.* (2020), Roy and Bandopadhyay (2022) and Dewaelheyns *et al.* (2023) that business risk has a negative effect on firm value.

In the relationship between risk and profitability, which is also the second hypothesis in this research, it is known that risk has a negative and significant effect. This means that changes in risk will be followed by profitability, but the direction of the influence is the opposite. The higher the risk, the lower the level of profitability. These findings support the research results of Rachman, Mohd Saudi and Sinaga (2019), Gharaibeh and Bani Khaled (2020), Nugroho and Halik (2021), and Reboredo and Ugolini (2022). Meanwhile, these results weaken the research of Sondakh, Tulung, and Karamoy (2021) and Rachman, Mohd Saudi and Sinaga (2019), although in partial testing credit risk has a negative effect on profitability and research by Reboredo and Ugolini (2022). Seeing the results of this negative influence, it could be that the risk investors face regarding the sensitivity of the company's share price is not adequately compensated in the form of operating profits or higher share prices (Nugroho & Halik, 2021). Therefore, investors need to review this situation further if they will invest in high-risk shares because they will expect high returns when choosing high-risk shares.

Seeing the varying results in the relationship between risk to firm value and risk to profitability, in response, we can recall Marko-Witz's legendary statement that "high risk has high return" (Fabozzi et al., 2011). The risks in large mining companies are ideally followed by large returns so that they can increase firm value. Because this research does not focus on the mediating influence of profitability on the relationship between risk and firm value, this can be an input for further research.

In testing risk on capital structure, it is known that risk significantly negatively affects capital structure. This means that every increase in risk will result in a decrease in capital structure, and vice versa. This is in line with the statement by (Fabozzi & Drake, 2021) that the greater the company's business risk, the greater the possibility of financial distress, which ultimately makes management reduce the use of debt.

The results of this study strengthen the findings of Isnurhadi *et al.* (2020) and Tahir *et al.* (2020).. In their research, Tahir *et al.* (2020) stated that there is a significant negative influence of credit risk on leverage both in seasonal and non-seasonal businesses. The selected firms hold a larger amount of capital as an incentive to avoid failure. The results show managers consider business risks while deciding their company's capital structure (Tahir *et al.* 2020).

Meanwhile, these results weaken the research findings of Floquet and Biekpe (2008). Meanwhile, compared with the findings of Chakraborty (2015), this research supports his findings in the partial test of market risk on leverage. The ambiguity in research results can be partly explained by the fact that risk is a multidimensional construct, with various papers focusing on different dimensions.

Then, this research analyzes the direct influence of capital structure on profitability. The results of this study show that both have a significant negative effect. This may not be in line with the statement by Modigliani, F., & Miller that firm value is not influenced by capital structure. However, these findings strengthen the findings of Mohammed *et al.* (2020) and Zeitun and Gang Tian (2007) and weaken the research findings of Abor (2005), and (Detthamrong, 2017). Meanwhile, the partial results show varying results in the research findings of (Salim & Yadav, 2012), which are significant and positive in the relationship between capital structure and company performance as measured by Tobin's Q, while negative in the capital structure test on ROA. Likewise, (Sorana, 2015) research showed a positive relationship between total equity to total assets and capital structure and a significant negative relationship between ratios of total liabilities and short-term liabilities to total assets on profitability as measured by ROA and ROE.

The final direct influence test investigates the relationship between profitability and firm value. The research results showed a positive and significant influence, so the fifth hypothesis in this study was accepted. These results indicate that changes in profitability will be followed by changes in firm value in the same direction. If profitability increases, firm value also increases. This finding further strengthens that companies that generate high profits can provide dividends to shareholders. According to signaling theory, this will be captured as a good signal, thereby increasing firm value (Spence, 1973). Empirically, these findings strengthen the research of Nugroho and Halik (2021), Sucuahi dan Cambarihan (2016), (Dang et al., 2020), (Harahap et al., 2022), dan Suhadak et al. (2019).

Indirect Effect

On the influence of the indirect relationship, the moderation effect is tested using MGA to determine whether the sustainability report weakens or strengthens the relationship between the independent variables (risk and profitability) and the dependent variable (firm value). The results of testing the moderation effect produce coefficient values and p-values in table 6.

Table 6: Outer Weight, Loading and P-Value Indirect Effect

Hipotesis	Z=0		Z=1		Uji Moderasi	
	Coefficient	SE	Coefficient	SE	P-value	Hasil
H_6: *Sustainability Report* (Z) memoderasi *Risk* (X1) → *Firm Value* (Y3)	0.411	0.189	0.141	0.081	0.189	Non Significant Not moderating (Z0 is stronger)
H_7:*Sustainability Report* (Z) memoderasi *Profitability* (Y2) → *Firm Value* (Y3)	-0.466	0.182	0.249	0.079	<0.001	Significant Moderate (strengthen)

Based on these results, it is stated that the sustainability report does not moderate the relationship between risk and firm value (P-value: 0.189). This means that a sustainability report does not change the direct effect of the relationship between risk and firm value (path coefficient on direct effect: 0.146; p-value 0.029; positive and significant). This means that with the sustainability report as the third variable in the risk and firm value relationship, the risk and firm value relationship will remain positive and significant. This is because testing the sustainability report as a moderating variable in this study showed insignificant results.

This result was not previously anticipated, considering that much of the current literature shows that sustainability reporting can boost firm value when testing its direct influence, and only a little shows the opposite (Alshehhi et al., 2018). However, these results are in line with (Bachoo et al., 2013), who found a negative direct relationship between quality sustainability reporting and cost of equity capital and contradicted Bachoo et al. (2013), who examined the expected future performance and quality of sustainability reporting in ASX 200 companies in Australia. Meanwhile, other results (Yu & Zhao, 2015) confirm that sustainability performance has a positive relationship with firm value in Dow Jones member companies.

Empirical testing regarding the moderating effect in the relationship between risk and firm value is difficult, because researchers find it difficult to find this model in research, so this moderating effect is new and complements empirical findings related to sustainability reports. However, in testing each group, it can be seen that group Z=0 (not publishing a sustainability report) produces a higher coefficient value than group Z=1 (publishing a sustainability report). This means that the sustainability report does not yet reflect the increase in firm value caused by company risk.

Possible reasons for these unexpected results are in emerging markets, especially in Indonesia, the sustainability issues contained in the sustainability report are still relatively new, so it is possible that investors have not paid much attention to their existence, especially when choosing shares in the mining industry. Another reason researchers can put forward is that there are short-term investors who pay less attention to these aspects when purchasing shares, considering that the sustainability aspect is more focused on the medium to long-term aspect. Regarding this, although the debate regarding corporate sustainability has become more prominent over time, its role in the mining industry in Indonesia is still limited. Another opinion regarding sustainability reports states that they do not necessarily reflect actual sustainability results and their contents depend on the level of transparency and reliability. Therefore, greater transparency regarding sustainability issues enables contributions to sustainable development through more significant stakeholder interactions (Venturelli et al., 2022) (Valenza & Damiano, 2023).

The next test on the relationship between profitability and firm value which is moderated by the sustainability report produces a p-value <0.5 or significant. Based on these results, it can be concluded that the sustainability report mediates the relationship between profitability and firm value. The role of sustainability reports in moderating the relationship between profitability and firm value is strengthening, meaning that with the sustainability report variable, the relationship between the influence of profitability and firm value becomes stronger. This differs from previous findings which showed an insignificant moderating role in the risk and firm value relationship.

Theoretically, these findings support signaling theory, that information released in sustainability reports can be captured as a company's concern in supporting sustainability and answers to issues such as the environment. This provides a positive signal for investors so that it can increase firm value. This finding partly supports Wardhani (2019), who found a positive impact between the sustainability reporting award and financial performance, which will rationally improve financial performance, because Wardhani's (2019) findings have a significant positive effect. Another comparison of empirical tests on direct effects is in the research of Anam, O. A., Fatima, A. H., & Majdi, A. R. H. (2011), Kuzey and Uyar (2017). While Girón et al. (2021) stated that sustainability reports positively affect firm economic performance. Meanwhile, (Nguyen, 2020) findings found the opposite result. Discussion of the findings of this moderation effect empirically cannot be carried out in more depth because this study is still limited, so this is considered the novelty of this research.

Conclusions

This research provides valuable insights into the complex relationships between risk, capital structure, profitability, firm value, and sustainability reporting in Indonesia's mining sector. The study's findings lead to several important conclusions:

1. Risk-Value Dynamics in Mining The positive relationship between risk and firm value confirms that the mining sector operates under the traditional risk-return paradigm. Despite inherent industry risks, investors appear willing to accept higher risk levels in anticipation of superior returns. However, the negative effects of risk on both profitability and capital structure highlight the operational challenges that risk poses, suggesting a complex trade-off between risk acceptance and operational efficiency.

2. Capital Structure Implications The negative relationship between capital structure and profitability indicates that leverage may constrain financial performance in the mining sector. This finding suggests that mining companies face unique financing challenges, possibly due to commodity price volatility and operational uncertainties that make debt financing particularly burdensome.

3. Differential Impact of Sustainability Reporting The study reveals an intriguing dichotomy in sustainability reporting's moderating effects. While it fails to moderate the risk-firm value relationship, it significantly strengthens the profitability-firm value connection. This suggests that sustainability disclosure is more effective in amplifying positive financial signals than in mitigating risk perceptions.

4. Emerging Market Context The limited moderating effect of sustainability reports on risk-value relationships reflects the nascent stage of ESG integration in Indonesia's capital markets. Investors may lack the frameworks or

incentives to fully incorporate sustainability information into risk assessments, particularly in traditionally extractive industries.

5. Signaling Effectiveness The significant moderation of the profitability-firm value relationship demonstrates that sustainability reports effectively signal corporate commitment to long-term value creation when coupled with strong financial performance. This finding validates signaling theory in the context of sustainability disclosure.

Recommendations

Based on these findings, we propose the following recommendations for different stakeholders:

For Mining Companies:

1. **Integrated Reporting Strategy**: Companies should develop comprehensive sustainability reports that explicitly link ESG initiatives to financial performance metrics, making the business case for sustainability more apparent to investors.
2. **Risk Management Communication**: Enhanced disclosure of risk management strategies within sustainability reports could help bridge the gap between risk exposure and sustainability practices, potentially improving investor confidence.
3. **Long-term Value Creation Focus**: Management should emphasize long-term value creation narratives that connect current sustainability investments to future financial returns, helping shift investor attention beyond short-term metrics.
4. **Quality over Compliance**: Rather than treating sustainability reporting as a compliance exercise, companies should focus on material issues that directly impact operational efficiency and stakeholder value.

For Investors and Financial Analysts:

1. **Holistic Evaluation Framework**: Develop comprehensive evaluation models that integrate sustainability metrics with traditional financial indicators, recognizing the amplifying effect of sustainability on profitability.
2. **Long-term Investment Horizon**: Adopt longer-term investment perspectives that allow sustainability initiatives to materialize into financial returns, particularly in capital-intensive industries like mining.
3. **Engagement Strategy**: Actively engage with mining companies to understand their sustainability strategies and encourage improved disclosure quality.

For Policymakers and Regulators:

1. **Mandatory Disclosure Framework**: Consider transitioning from voluntary to mandatory sustainability reporting, with sector-specific guidelines for the mining industry that address material ESG risks.
2. **Standardization Initiatives**: Develop standardized sustainability reporting frameworks that enhance comparability and reduce information asymmetry in capital markets.
3. **Capacity Building Programs**: Implement training programs for both corporate preparers and investment professionals to improve sustainability report quality and utilization.
4. **Incentive Structures**: Create tax incentives or regulatory benefits for companies demonstrating excellence in sustainability reporting and performance.

For Future Research:

1. **Longitudinal Studies**: Conduct extended time-series analyses to capture the long-term effects of sustainability reporting on firm value.
2. **Quality Metrics Development**: Develop and test comprehensive sustainability report quality indices rather than binary presence/absence measures.
3. **Cross-Industry Comparisons**: Extend the research to other high-risk industries to validate the generalizability of findings.
4. **Stakeholder Perception Studies**: Investigate how different stakeholder groups interpret and utilize sustainability information in their decision-making processes.

These recommendations aim to enhance the effectiveness of sustainability reporting as a value creation tool while addressing the current limitations in emerging market contexts.

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