Moderating Environmental

by Doni Stiadi

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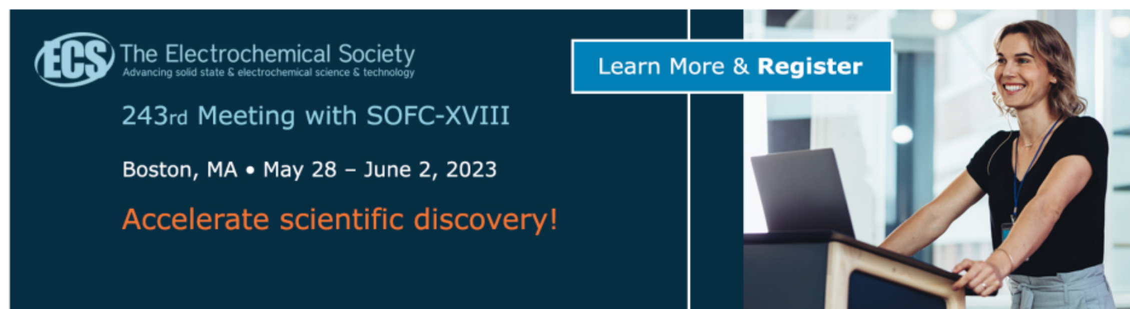

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Moderating Environmental, Social, and Governance (ESG) risk in the relationship between investment decisions and firm value

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Abstract. Investment decisions of companies and investors consider aspects of the company's financial performance and relate to the company's environmental responsibility from company activities. Corporate environmental responsibility can be implemented in its attention to the Environment, Social, and Governance (ESG). This study aims to analyze the role of ESG risk in moderating the relationship between investment decisions and firm value in the ESG Leader Index (IDXESGL) group of companies on the Indonesia Stock Exchange (IDX). Sample selection was based on a purposive sampling of 30 companies for the 2020-2022 period with 4 IDXESGL index evaluation periods, so 20 companies were selected, and the total observation data was 80 observations. Analysis of the research data used the structural equation model (SEM) method with the Partial Least Square (PLS) analysis technique. The analysis results show that ESG risk moderates the relationship between investment decisions and firm value. Therefore, the smaller the company's ESG risk will increase the influence of investment decisions on company value, and in the future, the company will continue to grow sustainably.

1. Introduction

The company's financial policy consists, first and foremost, of a set of principles needed to make decisions designed to maximize value for the providers of funds, especially shareholders [1]—maximizing shareholder wealth which then translates to maximizing share prices. A high stock price shows the company is performing well and increases the company's value in the investor's perception.

Increasing the firm's value is a long-term goal to be achieved by the firm, which will be reflected in the market price of its shares because investors' assessment of the firm can be observed through the company's stock price movement. In practice, conflict of interest often occurs to maximize firm value between shareholders (company owners) and mangers who manage the company, and this conflict is called the agency problem. The company's ownership structure, namely shareholders (institutional ownership), and managerial ownership, affect agency problems in the company. Some researchers believed the ownership structure could influence the running of the firm, which ultimately affects the firm's performance in achieving the firm's goals, namely maximizing firm value. Agency problems in the theory of the firm [2], will cause the company's financial goals not to be achieved in increasing firm value by maximizing shareholder wealth. Therefore, needed a control from outside parties where the role of good monitoring and supervision will direct the objectives as they should.

Currently, the value of the firm is not only the result of the firm's financial performance that increases the prosperity of shareholders, but also has an interest in wider stakeholders. Therefore, companies must

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care about the environment and social community around the company's location. The main environmental issues today are climate change and global warming. Global warming is a rising phenomenon temperature of the atmosphere, sea and land. One of the causes of global warming is the greenhouse effect. The greenhouse impact is when the sun's heat is trapped in the atmosphere, warming the earth's temperature. This is due to the accumulation of greenhouse gas emissions in the atmosphere which causes the sun's heat to be trapped in the atmosphere. Global warming that occurs continuously can cause global climate change, which is characterized by rising sea levels due to melting polar ice, extreme weather changes and a prolonged dry season. Global warming cannot be separated from the emission of greenhouse gases. Greenhouse gas emissions come from energy use, agriculture, forestry and land use, industrial processes, and waste. Greenhouse gas emissions consist of carbon dioxide (CO2), nitrogen dioxide (NO2), methane (CH4), and freon (CFC).

Data from the International Energy Agency (IEA), in 2020 carbon emissions on a global scale decreased due to the massive restrictions on community activities in various countries related to the Covid-19 pandemic. Then in 2021 global carbon emissions will increase to 36.3 gigatons of CO2 and hit a record high in history. Carbon emissions in 2021 will increase by around 6% from 2020, in tandem with the global economic recovery, which grew by 5.9% in the same period. The IEA noted that most global carbon emissions in 2021 will come from burning coal and natural gas. Meanwhile, carbon emissions from burning vehicle fuel are considered to have decreased, even 8% lower than pre-pandemic levels. According to the IEA, the increase in carbon emissions occurred in almost all countries, with the most significant increases in Brazil, India, China, the United States, and European Union countries. In response to this problem, the IEA emphasizes strengthening sustainable investment in new and renewable energy technologies (EBT). The IEA also emphasized that the world must work to reduce CO2 emissions by 2022 and pursue zero-emissions targets by 2050.

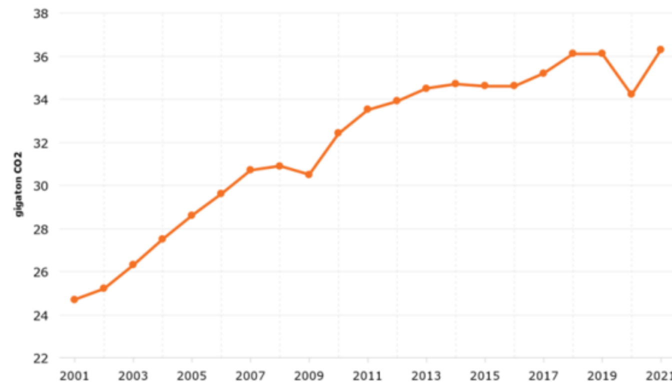

Figure 1. Graph of increase in global carbon emissions 2001-2021
Sources: Katadata Databox, International Energy Agency (IEA), (2022).

The firm's performance in this time is not only measured by the ability in the financial aspect but also the firm's benefits to environmental sustainability and improving the welfare of the surrounding community. A company can be successful if it meets three aspects: People, Planet, and Profit [3]. Investors are increasingly interested in investing in companies that are categorized as environmentally friendly. In recent years, a new trend has emerged where investors in measuring firm performance must consider environmental, social, and corporate governance factors or what is often called environmental, social, and governance (ESG).

Long-term corporate sustainability is a business goal; sustainability can be maintained with attention to environmental, social, and governance issues. Sustainable companies can attract investors to invest. Investors realize that companies that ignore ESG risks will impact company performance. Corporate

Social Responsibility is an important part of stakeholders. Therefore companies are required to report disclosure of information on sustainability reports on environmental, social, and governance (ESG) issues [5].

The implementation of sustainable finance on an ESG basis, especially in the Indonesian capital market, is fully supported by regulations from the Financial Services Authority (OJK). OJK has issued various policies, directives, and regulations, such as issuing a road map for sustainable finance, in which phase I started in 2015 and ended in 2020. Then from 2021 to 2025, a road map for sustainable finance phase II is issued with a focus on resolving problems and Faced to realize sustainable finance today. ESG is an aspect of sustainability in the company's business activities. The importance of ESG issues can be used to evaluate companies. Domestic and global investors use ESG criteria to avoid risky investments.

Empirical evidence mostly proves that good company have high ESG values, meaning that ESG is directly proportional to the level of return on investment [6], [7] and the company's profitability ratio [8]. The market will value and have higher expectations to invest because of the performance of good corporate governance, so the company's stock price also rises [9]. Company communication with stakeholders can be disclosed through company ESG information. The company discloses information about its business activities to make stakeholders have good expectations and views on the company [10]. ESG disclosure by companies to gain strong legitimacy from society and stakeholders. The existence of this legitimacy is expected to create a good image for the company for its attention to the environment and society around the company. Research from [11] shows that a positive ESG disclosure score will impact a greater return on assets. The same result is also expressed by[5]: ESG performance is positively related to ROA. Stakeholder theory and legitimacy theory encourage companies to participate and provide benefits to stakeholders. They are not only profit-oriented but must follow social norms and values that develop in the community where the company is located.

Investors believe a reciprocal relationship exists between the investment portfolio, the environment, and society. First, investors view that investment portfolios have an impact on the environment and society, especially a negative one. For example, an investment company's operations can cause environmental damage. Second, investors view that environmental and social issues can have both good and bad impacts on their investment portfolio, for example when a company does not consider the impact of pollution and employee welfare, it can have a financial impact on the company, both from the surrounding community, government and consumers [12]. Trust and support, and legitimacy from the community for the social and environmental roles that the company has carried out can have a good effect on the survival of the company in the future [13]; environmental performance assessment of a company will have a significant positive effect on firm value [14].

Concerning the internal company, the company's value is determined by financial performance through the right investment decisions. The company's ownership influences the choice of investment decisions (fund allocation), so the ownership structure has an important role in the company's business process decisions. Internally, the firm's ownership structure can impact firm value because of the transmission effect of [2] investment decisions. Internally, if further observed, the relationship between ownership structure and firm value through investment decisions is influenced by agency theory. Agency theory is formed because of the contractual relationship between the principal and agent, which can trigger agency conflicts. Agency conflicts can be triggered because of the company's large excess cash flow, so the principal wants to make high-risk investments expecting a high a return, but the management chooses low-risk investments to protect their position.

An investment decision is a decision in the form of a long-term investment with the expectation of the company's future profits. Generally, investment activities carried out by companies are to obtain high profits with a certain level of risk. According to [15], investment decisions are decisions regarding the allocation of company funds, both internal funding sources (internal financing) and external funding sources (external financing).

The investment opportunities that exist will affect the company's value, which is formed through the stock's market value. Investments made by companies often bring opportunities for companies to

increase their competitive advantage. Investment opportunities made with the right considerations will further improve the company's performance and company value. Vice versa, investment opportunities that are not misused will cause losses or decrease the company's performance [16]. The increase in firm value cannot be separated from the influence of investment decisions determined by the management and other majority principals, as revealed by [17] that the ownership structure influences investment decisions and firm value.

This research tries to study the moderating role of ESG risk on the effect of investment decisions on firm value. Environmental concern is currently the main concern in company operations; therefore, in this study, the object of research is companies with good ESG performance, namely companies that manage ESG risk well (low-medium ESG risk). The ESG risk rating is obtained from the IDX for the leading IDXESG index group companies. Companies in the IDXESG leader index category are companies that demonstrate good ESG risk management in implementing compliance with environmental conservation and sustainable company management.

2. Literature Review and Hypothesis

2.1. Effect of investment decisions on firm value.

Firm value is a picture of the company's current to outsiders regarding its condition, performance, and prospects in the future. Investors' welfare can be increased by increasing the company's value as measured by the stock price companies in the capital market. This can attract potential investors, so the company tries to show good performance to increase activities within the company. The development of company value cannot be separated from financial performance. So, financial management must make financial decisions carefully because it can affect other financial decisions. Several factors can influence other financial decisions: investment, funding, and dividend policies. All three are interconnected decisions that can affect the firm's value.

According to [18], investment decisions are an important factor in the financial function of a company. Companies as much as possible provide high investment decisions because it can provide opportunities for companies to get large returns. This helps influence the shareholders' understanding of the company and indirectly helps increase the value stock request. Investment decisions made by the company will be considered to give a positive signal to investors because it indicates that the company will grow in the future, increasing its value. Based on the description above, the hypotheses proposed in this study are:
H_1: Investment decisions affect firm value

2.2. Effect of ESG on firm value.

Ref. [19] defines sustainability as a way of managing current resources by taking into account the needs of future generations. Combining sustainability and corporate finance integrates profitability and non-financial aspects of ESG in business decisions to achieve sustainability. The ESG covers various issues, including climate change, waste recycling, occupational safety, health, human rights, executive remuneration, and board accountability.

ESG is an extension of corporate social responsibility (CSR) in a business context, which refers to "activities to socialize social activities, outside the interests of the company and those required by law" [20]. Both ESG and CSR focus on the environmental and social performance of companies. The difference is that ESG governance is disclosed explicitly, while CSR governance issues are raised implicitly based on their impact on environmental and social factors [21]. Therefore, ESG is a broader implementation than CSR. In addition, CSR is oriented towards corporate responsibility for environmental and social impacts on society, while the ESG criteria are measurable metrics for measuring accountability. Despite these differences, [21] uses ESG and CSR interchangeably, so the authors use the terms interchangeably in this paper. ESG/CSR involvement can increase a company's

profitability by building brand strength, enhancing a company's reputation, and strengthening relationships with customers and suppliers.

ESG/CSR disclosure is useful to signal to investors that this company has performed well, which will increase investor interest in the company. This is indicated by the increase in the value of the company and its share price [22]. This finding is supported by the results of previous research conducted by [23], [24], and [25] which shows that CSR/ESG activities carried out by companies can increase company value. Based on this description, the seventh hypothesis in this study is:

H_2: ESG affects firm value.

2.3. The moderating role of ESG on the effect of investment decisions on firm value.

Ref. [26] reveals that investment decisions are long-term decisions regarding the company's expected future profits. [27] prove that firm value can have a positive impact on investment decisions. The results show that the company's ability to maximize investment in an effort to generate profits is in accordance with the number of funds tied up. The results of this study also support the signaling theory, where their investment spending gives a good signal about the company's performance in the future, so that the increase in stock prices is used as an indicator of company value.

The value of the company is one of the benchmarks for the success of the company based on the value of the outstanding share price. Economic decision making by investors and company management not only considers aspects of the company's financial performance but also relates to the company's sustainability to the environment so that its existence is considered responsible for the environmental impact of their activities. Companies worldwide have been involved in efforts to integrate environmental disclosure into various aspects of their business [28], significantly to increase firm value [29].

Environmental issues are a major issue in investing in companies to achieve sustainable growth. Investors believe that environmental and social responsibility are essential to integrate corporate strategy and practices so that environmental, social, and governance disclosures reduce corporate risk and create long-term value [30]. This view is supported by [31], which confirms a positive and significant relationship between environmental disclosure and market assessment of companies located in developing countries. Several other researchers also concluded that environmental disclosure positively affects firm value ([32], [29]–[31], [33], [34]).

The determination of environmental, social and corporate governance (ESG) performance indicators is based on simultaneously measuring the situation determined by more factors. Determining appropriate key indicators for a sustainable corporate performance measurement framework that will support decision-making by managers and investors and which will be reflected in the Sustainability Report is the main objective of determining ESG performance indicators at the enterprise level. Research conducted by [35]–[37] show how important it is to incorporate ESG indicators into a company's strategy because financial indicators alone cannot provide an accurate picture of overall performance. It can be said that ESG integration is now an investment strategy. Companies considering ESG performance in their investment decisions are oriented towards sustainable company operations. [38] found that companies with a high sustainability report disclosure quality have a more favorable market reaction than low disclosure quality. The reputation value of the stock increases only when the company's actions are judged to demonstrate environmental and social responsibility. Therefore, companies that report sustainability reports to improve the company's reputation, which impacts increasing the company's value. The interaction of investment decisions with the implementation of ESG in companies is expected to improve their performance through positive signals. The better the management in managing ESG, the lower the risk of the company so that it can increase the value of the company. Based on this, the hypotheses in this study are:

H_3: ESG moderates the relationship between investment decisions and firm value.

3. Research Method

3.1. Population Sample.

This study's population is a company listed on Indonesia Stock Exchange in 2020-2022. This study uses a purposive sampling method, there are criteria required: (1) The company has consistently been included in the IDXESG Leader group category in the significant evaluations during December 2020-March 2022 period; (2) Having a complete set of financial statements in the period 2020-march 2020; (3) Using rupiah currency as unit of currency in the financial statements. Based on these criteria, the selection of samples for 30 companies included in the IDXESG Leader index group category in 4 evaluations during December 2020-March 2022 obtained 20 companies that are consistently in the IDXESG Leader Index group so that 80 observations are obtained.

3.2. Research Variable and Measurement.

This study's dependent (endogenous)variable is the company's firm value represented by the measuring instrument Price to Book Value (PBV). Price to Book Value is a proxy for comparing the stock market price and the book value per share of the company. In addition, the company's value is also proxied by the value of Tobin's Q. The researcher uses the PBV and Tobin's Q proxies because these two ratios measure the value given by the financial market to the management and organization of the company as a developing company and reflect investors' perceptions of the company's prospects.

Investment decisions as independent (exogenous) variables in this study are proxied by IOS, namely: (1) Market to book value of equity ratio (MVE/BVE); (2) Market value to book value of assets ratio (MVA/BVA); (3) Capital addition to assets book value ratio (CAP/BVA); and (4) Capital addition to assets market value ratio (CAP/MVA). Furthermore, ESG Risk Rating plays a role as a moderating variable in this study with measurements obtained directly from the data source on the IDX website in collaboration with Sustainalytics' ESG risk rating and controversies.

3.3. Data analysis technique.

Testing the effect of exogenous and endogenous variables according to the hypothesis was carried out using the Bootstrap resampling method on SEM-PLS developed by Geisser, (1975) and Stone, (1974) in [39]. The statistical test used is t-statistics or t-test. Testing the Bootstrap SEM-PLS resampling method on SmartPLS does not require the assumption of a normal distribution or the assumption that the data is distribution free, and does not require a large sample. Testing with the t-test of the SEM-PLS Bootstrap resampling method on Smart PLS, if a p-value < 0.05 ($\alpha = 5\%$) is obtained, it is decided to reject H_0 or accept H_a or is often called significant, and if the result is otherwise, the p-value >0.05 ($\alpha = 5\%$) then H0 is not rejected or is often called not significant. If the results of hypothesis testing on the outer model are significant, the indicator can be used as an instrument to measure latent variables. Meanwhile, suppose the test results on the inner model are significant. In that case, it can be interpreted that there is a significant effect on the latent (exogenous) variable on the latent (endogenous) variable [40]. Hypothesis testing of the relationship between variables was carried out by testing the SEM-PLS path analysis with the following research conceptual framework.

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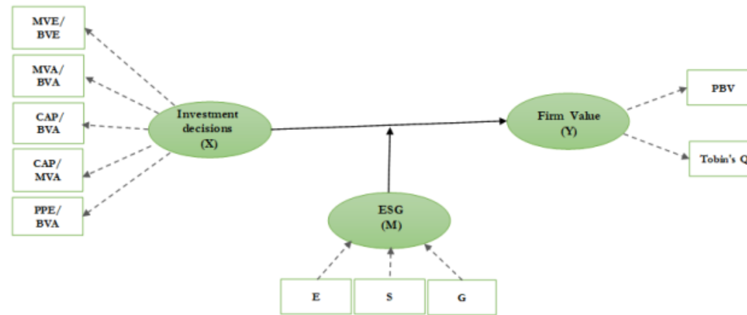

Figure 2. Research conceptual framework

4. Result and Discusion.

4.1. Descriptive Statistic.

Table 1 is presented the results of the descriptive statistics for the variables. From the descriptive analysis, the average firm value is at the level of 1.414 of Tobin's Q. It indicates that the market considers the firm's value positively. The value of Tobin's Q is good because it is greater than 1. In other words, the market generally assesses 3.326 of the company's book value. Conditions like this show that many investors are interested in investing in companies implementing ESG well. Investment decisions are 4.361, 5.622, 0.806, and 0.691 for the market to book value of equity ratio (MVE/BVE), market value to book value of assets ratio (MVA/BVA), capital addition to assets book value ratio (CAP/BVA), and capital addition to assets market value ratio (CAP/MVA) respectively. Furthermore, the average ESG Risk Rating is 23.101 indicating that companies in the IDXESG Leader Index are in the medium risk category, the lower the ESG Risk means the better the company manages ESG material risk. Sustainalytics in assessing the ESG Risk rating categorizes into 5 ESG risk groups, namely: (1) negligible if the ESG Risk rating score is in the 0-10 range, (2) Low in the 10-20 range, (3) medium in the 20-30 range, (4) High in the range of 30-40, and (5) severe if the ESG Risk rating score is more than 40.

Table 1. Descriptive Statistics for Research Variables

Variabel	Obs.	Mean	Median	Min	Max	Standard Deviation
ESG Risk Rating	80	23.101	25.65	11.31	29.74	5.145
MVE/BVE	80	4.361	3.46	0.12	14.268	3.679
MVA/BVA	80	5.622	3.571	0.357	26.51	6.027
CAP/BVA	80	0.806	0.882	0.294	0.976	0.179
CAP/MVA	80	0.691	0.667	0.364	0.939	0.147
PBV	80	3.326	2.19	0.44	12.1	2.948
TOBIN Q	80	1.414	1.05	0.32	6.62	1.067

4.2. Outer Model Evaluation.

The evaluation of this outer model is used to determine the relationship between latent variables and the indicators and assess the validity and reliability of the research model used. The results of the outer model are shown in Figure 3.

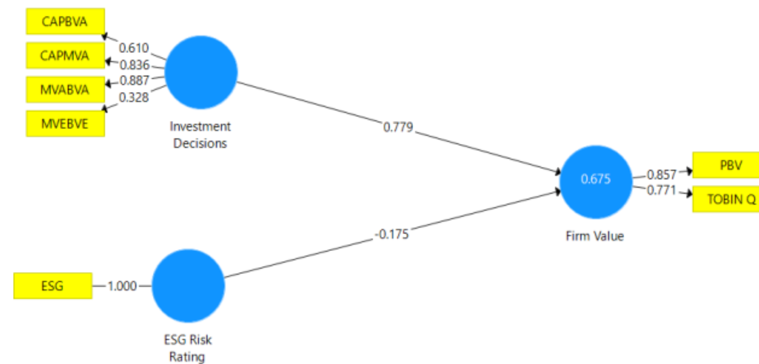

Figure 3. The results of the analysis of variable indicators from the evaluation of the outer model

Based on the structural model built, as shown in Figure 2 above, the first testing stage is the validity test. External loadings: is the relationship estimated in the reflective measurement models. They determine something total contribution to a particular construct. Manifest variable with an outer loading of 0.7 or higher is considered very high satisfying. While the loading value of 0.5 is considered as acceptable, manifest variable with less loading value than 0.5 should be dropped. Validity test results with looking at the outer loading value of all indicators shows that MVE/BVE does not meet the requirements because outer loading values are equal to 0.328 below 0.5 so they are excluded from the model. The results of further testing with model improvements show the following results in the Tabel 2.

Outer loading in Table 2 shows a value above 0.5 with a p-value less than 0.05, it can be concluded that all research indicators are valid. The AVE value of the Firm Value variable and the Investment Decision is more than 0.5, so these two variables are declared valid. Composite reliability is a measure of the internal consistency of item scales. The analysis results show that the composite reliability value of the two research variables exceeds 0.7. Therefore, the research variables are both reliable.

Table 2. Results of the research model validity and reliability test

Variables	Indicator	Outer loading	p-value	AVE	Description	CR	Description
Firm Value	PBV	0.864	0.000	0.664	Valid	0.797	Reliable
	Tobin's Q	0.763	0.000		Valid		
Investment Decisions	MVA/BVA	0.612	0.000	0.623	Valid	0.829	Reliable
	CAP/MVA	0.832	0.000		Valid		
	CAP/BVA	0.896	0.000		Valid		
ESG Risk Rating	ESG Risk* Rating	1.000					

*ESG Risk Rating is a Formative Variable with one indicator so that validity and reliability tests are not carried out

4.3. Inner Model Evaluation.

The evaluation of the inner model involves examining the predictive ability of the model and the relationship between constructs (variables) so that the resulting values are following the designed hypothesis [41] Based on the criteria, the relationship and the influence of each element in the measurement model of the inner model, it can be displayed in Figure 4 and Table 3.

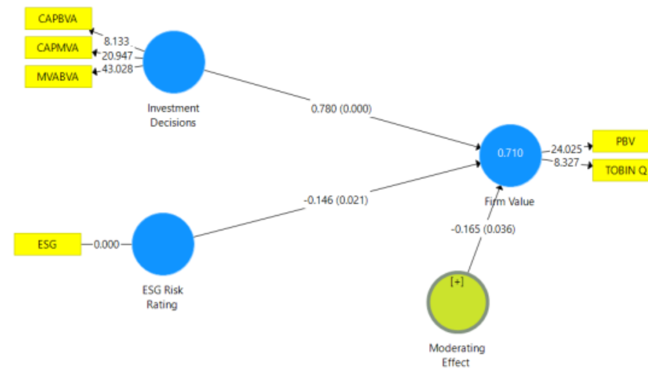

Figure 4. The results of the analysis on the evaluation of the inner model with a moderating effect

Figure 4 and Table 3 show the results of testing the relationship between variables in models I and II. In model I, it is known that investment decisions and ESG risk significantly affect firm value. Investment decisions have a significant positive effect on the company's value with a path coefficient of 0.789, significant at the level of α=1%, and this means that investment decisions have a positive effect on firm value, an increase in investment will increase firm value. An increase in the value of an investment in the company will increase investor confidence because investment growth can be perceived as a positive signal for investors. [15] According to signaling theory, investment spending gives a positive signal about the company's growth in the future so that it can increase stock prices used as indicators of company value. This is in line with research conducted by [42] that investment decisions affect the value of the company where if the investment decision increases, the company's value will also increase. These results indicate that investment decisions made by managers can increase firm value. When a company invests for the development of company growth, it can be a positive signal to investors that the company is healthy and growing in maximizing the value of the company. Companies with a high level of investment can be considered as good news for investors, because of their expectations of increased corporate earnings growth in the future.

The second part of model I shows the impact of ESG risk on firm value. Path analysis on the relationship between ESG Risk and firm value shows a coefficient value of -0.163 significant at the level of α=5%, these results indicate that ESG risk hurts firm value. An increase in ESG risk will reduce the company's value and vice versa, a decrease in ESG risk (companies can manage ESG risk) will increase the company's value. Therefore, improving ESG performance by reducing various material risks of ESG decisions will improve the company. This result is in line with the signaling theory that ESG Performance (low of ESG Risk) is perceived as a form of positive signal that will result in a positive response from investors on firm value. The study results support the findings of [4], [5], [10], [11], [14] that there is a positive and significant relationship between ESG and company performance that has an impact on firm value.

Table 3. Hypothesis testing result

Relationship between variables	Path coefficient	T-Stat	P -Values	Conclusion
Model I				
Investment Decisions ------> Firm Value	0.789	18.071	0.000	Sig.***
ESG Risk ------> Firm Value	-0.163	2.260	0.024	Sig.**
R-square = 0.688				
R-Square adjusted = 0.680				
Model II				
Investment Decisions ------> Firm Value	0.780	16.643	0.000	Sig.***
ESG Risk ------> Firm Value	-0.146	2.303	0.021	Sig.**
Moderating Efect------> Firm Value	-0.165	2.101	0.036	Sig.**
R-square = 0.710				
R-Square adjusted = 0.699				

*** significant of α =1%, **significant of α =5%, * significant of α =10%, N.Sig = Not Significant

Model II in Table 3 tests the moderating role of ESG Risk on the relationship between investment decisions and firm value. This second model shows that investment decision, ESG risk, and moderating effect (interaction of ESG risk with investment decision) significantly affect firm value. In other words, ESG risk moderates the effect of investment decisions on firm value. The moderating effect shows a negative value direction, which means that the higher the ESG risk reduces the effect of investment decisions on firm value. Conversely, the lower ESG risk will increase the effect of investment decisions on firm value. The results support previous research that ESG performance positively affects a company's financial performance [43]–[45]. ESG is a company standard in investment practice that integrates and implements company policies to align with environmental, social, and governance concepts[46]. Investors believe a reciprocal relationship exists between the investment portfolio, the environment, and society. First, investors view that investment portfolios have an impact on the environment and society, especially a negative one. Second, investors view that environmental and social issues can impact portfolio investigation. Based on these two reasons, it can be concluded that ESG-based investments are less risky and promise sustainable investments.

5. Conclusion

This research indicates some empirical evidence, namely: first, the positive impact of investment decisions on firm value; this conclusion indicates that investment decisions are one of the important factors in increasing shareholder value. Investor positively perceives companies that increase their investment as companies that continue to grow. The second finding of ESG risk has a negative effect on firm value, this means that the higher the ESG risk will reduce the firm's value from investor perceptions and conversely the better the firm's ESG performance (low ESG Risk) will increase firm value. The third finding is that ESG risk moderates the relationship between investment decisions and firm value in a negative direction, which means the higher ESG risk will reduce the impact of investment decisions and firm value; on the other hand, the better the company manages ESG risk, the higer the influence of investment decisions on firm value.

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