International Journal of Sustainable Development and Planning
Vol. 19, No. 12, December, 2024, pp. 4871-4879
Journal homepage: http://iieta.org/journals/ijsdp

Influence of Green Management on Stock Price: A Panel Data Analysis of Energy Sector Stocks Price on the Indonesian Stock Exchange

Suripto[1*], Arif Sugiono[1], Rifatin Cholidia[2], Nurul Fikriatus Sholihah[3]

[1] Department of Business Administration, Faculty of Social and Political Science, Lampung University, Bandar Lampung 35145, Indonesia
[2] Master of Administrative Sciences, Faculty of Social and Political Science, Lampung University, Bandar Lampung 35145, Indonesia
[3] Department of Economics, Faculty of Economics and Business, Gajah Mada University, Yogyakarta 555183, Indonesia

Corresponding Author Email: suriptob.1969@fisip.unila.ac.id

https://doi.org/10.18280/ijsdp.191234

Received: 13 October 2024
Revised: 29 November 2024
Accepted: 10 December 2024
Available online: 30 December 2024

Keywords:
environmental, performance, profitability, leverage, stock price, investment, fixed effect, signals

ABSTRACT

This study analyzes the effect of green management on the stock prices of energy companies listed on the Indonesia Stock Exchange from 2020 to 2023 with a sample of 17 energy companies. The results of panel data analysis using Eviews with a fixed effect model show that environmental performance as a proxy for environmentally based company management has a positive effect on stock prices. To obtain accurate prediction results in the study using control variables of profitability, leverage, and company size the results show that only profitability has a positive effect on stock prices. While leverage and company size do not have a significant effect on stock prices. This finding implies that energy companies must implement green management because it will have an impact on increasing stock prices and company value and maintaining environmental sustainability so that companies develop sustainably. These results further prove that information about green management can be a positive signal for investors, and this signal can be used as a basis for making investment decisions in the energy sector.

1. INTRODUCTION

Sustainable development issues are very crucial at this time due to the impact of industrialization, especially in industries that depend on the environment, for example, the energy industry. Therefore, cooperation is needed between the government, society and the private sector to overcome the problems of the impact of development. This means that economic growth will have an impact on environmental preservation. The strong relationship between economic growth and the environment is increasingly clear, so there must be an agreement to harmonize economic growth with environmental preservation. This will be very important for the survival of life in the universe. Therefore, research is needed that harmonizes sustainable development with the environment.

Investment is an attempt to obtain future returns. However, the results currently obtained are not balanced without ignoring the environmental impact of a business activity. Investment growth will remain sustainable if we continue to pay attention to the environment. This means that investors when investing not only pay attention to returns but also pay attention to the environmental impact of the business so that the returns obtained are also sustainable or long term. Because business activities or company energy will run out if environmental aspects are destroyed.

Therefore, companies must create policies, strategies and programs that aim at sustainable economic development while paying attention to environmental conservation. This concept is known as the green management concept. Energy industry companies must implement environmentally friendly management to ensure their business aspirations. Likewise, what companies do in implementing green management must be a concern for investors in the capital market. Is this information a positive signal for investors? This will be very important for sustainable economic development.

The concept of green management which is very popular today is in line with the concept of sustainable development (SDG). Green management is a concept that aligns environmental aspects with business goals. Thus, green management is a form of social responsibility for sustainable environmental preservation [1]. This indicates that implementing green management is a social corporate responsibility.

Environmental discussions will be crucial in the energy sector which is always related to environmental conservation. Mining companies are required to implement environmentally friendly management. The green management concept is part of the company's strategy for achieving sustainable goals through achieving environmental performance, which ultimately achieves sustainable development. Energy sector companies that implement green management are generally

public companies that become investment media. Thus, the implementation of green management is able to increase company value. Green management research is only linked to company performance [2]. But has not been linked to company value or share prices. This research aims to analyze the influence of green management on company value as proxied by share prices.

According to the statement that performance of companies is simply defined as the manner in which organizations can effectively achieve set goals [3]. It comprises financial metrics such as profitability and revenue growth, as well as non-financial metrics namely customer satisfaction, operational efficiency, and environmental sustainability. According to a previous investigation, the effective improvement of organizational performance is determined by various factors, including the understanding, development, and implementation of sustainable environmental strategies. Sustainable performance, companies must address internal challenges and ensure the preservation of the environment. A previous study supported this assertion, stating that the operational performance of companies can be measured by the corresponding level of environmental performance [4]. From this statement, it can be seen that a relationship exists between the achievement of green management and the attainment of improved operational performance.

Another study found that investors are more likely to value companies with policies aimed at improving environmental performance [5]. This implies that the market generally perceives companies that prioritize environmental sustainability positively. The attainment of environmental performance is expected to have an impact on the overall condition of an organization. Therefore, when there is an information gap between management and investors regarding the conditions of companies, the information provided by management will significantly influence the responses of investors. As previously stated, information about environmental performance can serve as signals for investors, this phenomenon is known as signaling theory.

In the present business landscape, conservation efforts and the responsible use of natural resources, water, and air have become global priorities. Companies that adopt sustainable practices have been observed to not only contribute to environmental preservation but also experience positive impacts on respective financial performance [6]. For instance, under the Green Europe agreement, companies in Europe are required to prioritize environmental considerations. The results of this policy show that companies with superior environmental performance see improvements in accounting-based performance alone, and not in market-based performance [7].

Several studies have been carried out with the primary aim of comprehending the relationship between environmental and financial performance. These investigations yielded different results primarily due to the varied use of moderators across each study [8]. For instance, Di Pillo et al. [9] reported that environmental performance had a positive relationship with financial performance. Therefore, this present study aims to examine the influence of green management on stock prices of companies, particularly those within the energy sector.

To accurately assess the effect of environmental performance on stock prices, this study incorporates control variables such as profitability, leverage, and company size. By adopting these variables, the results provide a more precise model of the causal relationship between environmental performance and stock prices.

2. LITERATURE REVIEW

2.1 Signaling theory

Investor in making investment decisions in the capital market has always been an interesting discussion in financial studies. The information needed in decision making greatly determines the quality of a decision. This information can come from internal company sources in the form of annual reports, or information from external sources. This information is a signal for investors who are implemented in investment which is reflected in the share price of a company.

The discussion of investor behavior in investing in the capital market is known as signaling theory. Signaling theory elucidates the behavior of individuals with access to varying information by focusing on how one party sends signals and how the other party interprets and responds to those signals [10]. Investors, being external to companies, typically lack detailed knowledge into its condition. The decisions of investors heavily hinge on available information, which is being used to assess the prospects of potential investments. Signaling theory simply elucidates how investors interpret this information to make informed decisions in the capital market.

Investors typically respond to the information provided by companies, including those related to environmental sustainability, and this can significantly impact stock prices. This effect is particularly significant in the mining industry, where environmental practices are closely scrutinized [11]. Accordingly, information asymmetry has been observed to exist between companies and investors, making the information provided crucial signals for market participants.

Signaling theory offers compelling reasons why companies should prioritize environmental concerns. A robust community-company relationship has been observed to ensure the fulfillment of long-term objectives. This relationship is further reinforced by the attainment of economic performance goals, which in turn secure the success of companies.

Another study found that investors are more likely to value companies with policies aimed at improving environmental performance [5]. This implies that the market generally perceives companies that prioritize environmental sustainability positively. The attainment of environmental performance is expected to have an impact on the overall condition of an organization. Therefore, when there is an information gap between management and investors regarding the conditions of companies, the information provided by management will significantly influence the responses of investors. As previously stated, information about environmental performance can serve as signals for investors, this phenomenon is known as signaling theory.

2.2 Green management

Green management is a new perspective in organizational management, where environmental aspects become part of implementing business strategies and operations. This aims to reduce the negative impact of environmental pollution and can improve business performance. Implementations of green management includes the use of environmentally friendly technology, the use of recycling to reduce waste and awareness of the importance of the environment. Companies

that imply environmentally friendly management have succeeded in developing policies that pay attention to ongoing environmental aspects [12]. Companies that successfully implement environmentally friendly management are able to improve performance and benefit the interests of stakeholders [13]. Companies that implement green management will be present with other organizations and will adapt to environmental standards and pay attention to environmentally friendly consumers in their business operations [14]. Understanding the importance of awareness of green management will determine success in competition in the era of globalization

In the last decade, there has been much research on the importance of green management in the context of sustainable development. Riyantini and Nusraningrum [2] found that green management influences green performance. This means that environmentally oriented policies are able to improve the performance of environmentally friendly organizations. Green management practices through green marketing and green technology have a significant effect on green performance and financial performance [15]. These findings indicate that green management is also different from increasing company profitability. Improving company performance through improving environmentally friendly management systems is important in the transformation of business management functions [14]. A green management system not only improves financial performance but is able to maintain a sustainable environment.

The environmental performance assessment program as a form of responsibility in environmental management is known as PROPER (Public Disclosure Program for Environmental Compliance). PROPER is the result of an evaluation carried out by the Indonesian Ministry of Environment on companies in managing the environment. PROPER is a Public Disclosure Program for Environmental Compliance. PROPER is a form of accordance with what has been stipulated in statutory regulations. The implementation of this instrument is an effort by the State Ministry of the Environment to apply some of the principles of good governance (transparency, fairness, accountability and community involvement) in environmental management [16]. Thus, the PROPER assessment can be used as a proxy for the assessment environmental performance. PROPER as a result of the implementation of environmental management has a significant positive effect on stock prices. Thus, the better the PROPER value, the higher the stock price will be [17]. Environmental performance is the result of a management process that implements company strategies by paying attention to the environment. Achieving environmental performance which is the result of the company's green management strategy will provide a signal to external parties or investors. This signal will be responded to by investors in making investment decisions in the stock market.

The application of signal theory in the context of this study is to help explain market behavior in transactions. The basic concept of signal theory is how market players interact between sellers and buyers, where both have different information in making decisions [18]. Price agreement between sellers and buyers when there is the same information so that a mutually beneficial price will be obtained. The results of the implementation of the green management strategy which is the achievement of environmental performance known as PROPER is information that must be conveyed to market players. This information is referred to as a signal of what has been done by the company will be responded to by investors as market players according to the content of the information. PROPER information indicates that the company has implemented green management. PROPER content will be used as a basis or information in making decisions to buy shares. Thus, the application of signaling theory in explaining the transaction process between companies and investors is very relevant. The relationship between the content of PROPER information and stock prices is directly proportional or positive. When the value is good, market demand will increase so that the price will increase.

3. HYPOTHESIS DEVELOPMENT

3.1 Green management

Management is a company strategy with an environmental conservation approach. This approach requires companies to pay attention to environmental conservation principles in operating their business. The assessment of this strategy is an environmental performance assessment known as PROPER. Thus, the measurement of green management can use the PROPER value as a form of implementation of the green management concept. The PROPER value can be used as a signal for investors in the stock market to what extent the company cares about the environment. This indicates that the more concerned about the environment, the company has the prospect of achieving sustainable goals. So with this, the research hypothesis can be formulated:

H1: *There is a positive relationship between Green Management and stock prices.*

3.2 Profitability

Profitability is the company's ability to generate profits with all its assets. Profitability is fundamental information in measuring financial performance. This performance can be used as a dominant signal for stock market players. High profitability indicates efficient and effective company management which ultimately provides benefits in the form of dividends for shareholders. Thus, the research hypothesis can be formulated:

H2: *There is a positive relationship between Profitability and stock prices.*

3.3 Leverage

Leverage is a concept that measures the comparison of total debt to total assets. This concept is known as the concept of funding policy. The purpose of this ratio is to measure how much company capital is financed by debt. When the company's prospects have good prospects, the use of debt can be used as a lever for company performance. This leverage can be used as a positive signal that the company has good performance. So, we can formulate a research hypothesis*:*

H3: *There is a positive relationship between Leverage and stock prices.*

3.4 Size of the firms

The scale of the company's financial performance achievement is very dependent on the size of the company. The larger the company as measured by total assets, the greater its performance, because the capital operated is also large so that it will have an impact on performance achievement. Thus, the size of the company can be used as a signal that the company has a profitable performance which ultimately provides stock returns for investors in the market. So, we can formulate a research hypothesis:

H4: *There is a positive relationship between Size of the Firms and stock prices.*

This research aims to analyze the influence of green management on stock prices in the energy sector. To obtain valid results, control variables will be added, namely profitability, company size and leverage using the panel data method. Therefore, this present study aims to examine the influence of green management on stock prices of companies, particularly those within the energy sector. To accurately assess the effect of green management on stock prices, this study incorporates control variables such as profitability, leverage, and company size. By adopting these variables, the results provide a more precise model of the causal relationship between green management and stock prices.

4. METHODOLOGY

4.1 Study sample

This quantitative study aimed to analyze companies in the energy subsector listed on the Indonesia Stock Exchange from 2020 to 2023. The selection of research samples is very relevant to environmental issues because energy companies are businesses that exploit natural resources that will have an impact on environmental conservation. Likewise, the selection of 2020-2023 is very appropriate because in that period there was still a Covid pandemic that had an impact on the operations of energy companies. The energy sector is the sector most affected by the pandemic. The restrictions on public mobility will affect energy use. Thus, this period is very important to study.

4.2 Study variables

The variables considered in this study include: Green management: This variable was measured using the Ministry of Environment's PROPER ranking, which assigns scores as follows, Gold (5), Green (4), Blue (3), Red (2), and Black (1). Returns on Asset (ROA): Includes the comparison of operating profit with total assets. Company Size (Size) proxied by total Assets.

Leverage (Debt Assets ratio -DAR): This variable comprises the comparison of total debt with total assets. Stock Price: refers to the closing stock price at the end of the year.

4.3 Data analysis: Panel data model

Regression analysis is typically conducted with the aim of measuring the strength and direction of the relationship between two or more variables. This analysis shows how the dependent variable is influenced by the independent variables.

$$Y=\alpha+\beta_1 Proper+\beta_2 ROA+\beta_3 Size+\beta_4 DAR+e \quad (1)$$

where, Y: Stock Prices; α: Constant; β_1: Green management Coefficient; β_2: ROA Coefficient; β_3: Size Coefficient; β_4: DAR Coefficient; e: Error term.

To estimate panel data parameters, several methods can be adopted, including:

4.3.1 Pooled least square

This method combines cross-sectional and time series data, treating both as a single observation to estimate the model. By pooling the data, the regression results tend to be more robust compared to using either cross-sectional or time series data alone. The estimation formula for PLS is as follows:

$$Y_{it=}\beta_1+\beta_2+\beta_3 X_{3it}+\ldots+\beta_n X_{nit}+\mu_{it} \quad (2)$$

4.3.2 Fixed effect model

This model incorporates additional variables not explicitly stated in the equation by permitting a variable intercept that can vary for each individual and over time. Unlike the ordinary least squares method, which assumes constant intercepts and slopes, the fixed effect model includes dummy variables to capture differences in parameter values across cross-sectional units. The equation formula for this model is:

$$Y_{it=}\alpha_1+\alpha_{2D2}+\ldots+\alpha_{nDn+}\beta_2 X_{2it}+\ldots+\beta_n X_{nit}+\mu_{it} \quad (3)$$

4.3.3 Random effect model

In this model, differences between individuals are reflected through the error term rather than the intercept. Specifically, the random effects model assumes that these differences are random and may be correlated across time series and cross-sections. The model is formulated as follows:

$$Y_{it=}\beta_{1+}\beta_2 X_{2it}+\ldots+\beta_n X_{nit+}\varepsilon_{it+}\mu_{it} \quad (4)$$

4.4 Model selection

In this study, several tests were conducted to select the appropriate model, including the Hausman test and the Fixed Effect Test (or Chow test). The Hausman test determines whether to use a fixed-effect or random-effect model, while the fixed-effect test (or Chow test) decides between a common model and a fixed-effect model.

4.4.1 Chow-test (common vs fixed effect)

The Chow test is used to determine the common or fixed effect to be used in an estimate. The Chow test formula includes:

$$CHOW = \frac{(RRSS-URSS)/(N-1)}{URSS/(NT-N-K)}.8 \quad (5)$$

The basis for decision-making using the Chow test is as follows:

a) If the Chow statistical value $F_{count}>F_{table}=H_0$ is rejected, then the Fixed Effect model is used, after which the Hausman Test should be conducted.

b) If the value of Chow statistics $F_{count}<F_{table}=H_0$ is accepted, then use the Pooled Least Square model.

4.4.2 Hausman test (fixed effect vs random effect)

The Hausman test is used to choose between a random-effect or fixed-effect model. The test statistic follows a Chi-Square distribution with k degrees of freedom, where k is the number of independent variables. If the Hausman test statistic is greater than the critical value, the fixed-effect model can be considered appropriate. Conversely, if the test statistic is smaller than the critical value, the random-effect model is appropriate. The formula for the Hausman test is as follows:

$$W=X_2\ [K]=(b-)[var(b)-var(\ ))]^{-1}(b-) \quad (6)$$

5. RESULTS

Please use the SI set of units as much as possible. Wherever the application domain uses a different set of units widely, please minimize the use of non-standard units or non-standard symbols for those units.

5.1 Descriptive statistical analysis results

Descriptive statistical results are a description of a research variable (Tables 1-4):

5.1.1 Descriptive statistics of stock prices

The share price is the closing share price at the end of the year. Based on Table 1, the average is IDR. 3,931 with quite large standard deviation and kurtosis values. This means that the distribution of stock price data is not normally distributed. This is because there are differences in share prices between large companies.

5.1.2 Descriptive statistics of PROPER

PROPER is a proxy for green management, a ranking criterion for assessing a company's environmental performance. Based on Table 1, the average PROPER value is 4. This means it is good at handling environmental conservation. Meanwhile, a kurtosis value of 2 means that the data has a normal distribution. Thus, the implementation of green management is very successful in all energy companies or the results are relatively the same.

5.1.3 Descriptive statistics of Return on Assets (ROA)

Return on Assets is a proxy for profitability which is a description of the company's financial performance. Profitability is measured by comparing operating profit to total assets. Based on Table 3, the average ROA value is 13 percent. This shows that the company is able to generate profits of 13 percent of total assets. Meanwhile, a kurtosis value of more than 2 indicates that there is quite a large difference in the profitability value between companies. This means that the data distribution is less than normal.

5.1.4 Descriptive statistics of size of the firms

The size of this research is to measure the size of the company by the total asset value. Table 1 shows the average value of total assets of 30 billion. Meanwhile, the average kurtosis value is 2.9, indicating relatively normal data. This shows that the total asset value of the company is relatively the same or the size of the company is relatively the same.

5.1.5 Descriptive statistics of leverage

Leverage is a variable that measures funding policy. This variable measures the comparison between total debt and total assets. The leverage value in Table 3 is 48 percent. This means that the company's debt composition is 48 percent of total assets. This condition indicates that the company's debt policy aspect is quite good. Meanwhile, the correlation value is almost the same as 2, meaning the data is normally distributed. This shows that the debt policies of energy companies are relatively good.

Table 1. Descriptive statistical of variable

	STOCK_PRICES	PROPER	ROA	SIZE	DAR
Mean	3931.544	3.867647	0.130885	30.54098	0.485007
Median	1553.500	4.000000	0.075853	30.53389	0.510590
Maximum	39025.00	5.000000	0.617597	32.76456	0.961314
Minimum	50.00000	3.000000	-0.098975	27.49350	0.023752
Std. Dev.	6970.069	0.731068	0.164771	1.247414	0.218340
Skewness	3.027791	0.206880	1.505079	-0.486506	0.106118
Kurtosis	12.93594	1.912375	4.461145	2.986028	2.243369
Jarque-Bera	383.6133	3.836688	31.72199	2.683016	1.749680
Probability	0.000000	0.146850	0.000000	0.261451	0.416929
Sum	267345.0	263.0000	8.900159	2076.787	32.98050
Sum Sq. Dev.	3.25E+09	35.80882	1.819021	104.2547	3.194034
Observations	68	68	68	68	68

Data processing was carried out on the panel data using three alternative methods, namely pooled least square/common effect, fixed effect, and random effect methods. First, a Chow test was conducted to determine between pooled least square and fixed effect.

5.2 Results of inferential statistical analysis

The results of this analysis are to test the hypothesis of green management variables environmental performance, profitability, company size and leverage on share prices.

Table 2. Chow test result

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	13.136007	(16,47)	0.0000
Cross-section Chi-square	115.573721	16	0.0000

Cross-section fixed effects test equation:
Dependent Variable: STOCK_PRICES
Method: Panel Least Squares
Date: 07/24/23 Time: 17:30
Sample: 2019 2022
Periods included: 4
Cross-sections included: 17
Total panel (balanced) observations: 68

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-57749.99	18569.56	-3.109927	0.0028
PROPER	-1440.487	1094.069	-1.316633	0.1927
ROA	22480.43	4487.938	5.009079	0.0000
SIZE	2243.677	690.3484	3.250065	0.0019

DAR	-8687.720	3618.823	-2.400703	0.0193
Root MSE	5155.201	R-squared		0.444798
Mean dependent var	3931.544	Adjusted R-squared		0.409547
S.D. dependent var	6970.069	S.E. of regression		5355.867
Akaike info criterion	20.08046	Sum squared resid		1.81E+09
Schwarz criterion	20.24366	Log-likelihood		-677.7356
Hannan-Quinn criteria	20.14512	F-statistic		12.61805
Durbin-Watson stat	0.485307	Prob(F-statistic)		0.000000

Table 3 shows that the F test and Chi-square are significant (p-values 0.0000 and 0.0000 less than 5%), hence, H_0 was rejected. Based on these results, the fixed-effect model was considered the appropriate model to be used. Subsequently, the Hausman test was carried out.

Table 3. Hausman test results

Correlated Random Effects - Hausman Test
Equation: Untitled
Test cross-section random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	18.632166	4	**0.0009**

Cross-section random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
PROPER	4351.165740	2150.572384	639953.053639	**0.0059**
ROA	7789.815193	13237.425034	6531275.178592	**0.0330**
SIZE	3007.036336	943.575013	2159682.333889	**0.1603**
DAR	-5866.554388	-6303.573350	3610449.517516	**0.8181**

Correlated Random Effects - Hausman Test
Pool: Untitled

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Cross-section random	6.862456	5	0.2311

The obtained p-value, which was 0.000, is smaller than 0.05, hence H_0 is rejected. Based on the results of the F test it can be concluded that the fixed effect is most suitable for use in the panel data analysis.

Based on the values in Table 4, the fixed-effect model uses the principle of ordinary least squares to produce a constant intercept from each data set and accommodate differences in data intercepts. This estimation model type is often called the Least Squares Dummy Variable technique. Thus, the method used in this study uses the panel least squares, which is a fixed-effect model.

Table 4. Fixed effect results

Dependent Variable: STOCK_PRICES
Method: Panel Least Squares
Date: 07/24/23 Time: 17:29
Sample: 2019 2022
Periods included: 4
Cross-sections included: 17
Total panel (balanced) observations: 68

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-102909.3	50898.48	-2.021855	0.0489
PROPER	4351.166	1327.179	3.278507	0.0020
ROA	7789.815	3897.325	1.998759	0.0514
SIZE	3007.036	1672.257	1.798190	0.0786
DAR	-5866.554	3690.519	-1.589629	0.1186

Effects Specification

Cross-section fixed (dummy variables)

Root MSE	2203.836	R-squared	0.898535
Mean dependent var	3931.544	Adjusted R-squared	0.855358
S.D. dependent var	6970.069	S.E. of regression	2650.847
Akaike info criterion	18.85143	Sum squared resid	3.30E+08
Schwarz criterion	19.53687	Log-likelihood	-619.9487
Hannan-Quinn criteria	19.12302	F-statistic	20.81059
Durbin-Watson stat	2.152335	Prob(F-statistic)	0.000000

5.3 Partial regression testing (t-Test)

This analysis is used to measure the strength of the influence and direction of the relationship between independent variables and dependent variables. The formula for multiple linear regression in general is:

$$Y=102909+4351.166\ X1+7789.815\ X2+3007.036\ X3-5866.554\ X4+e \quad (7)$$

5.3.1 Testing of variable X1

Based on the results of the data calculation. The results obtained are that the significance value is 0.000. This means that green management has a significant effect on stock prices with a positive relationship direction. Thus, the better the implementation of green management will increase the company's stock price. The Green Management strategy is able to provide a positive signal for stock market players. The regression coefficient of X1 is 4351.166, which means that every 1% increase in X1 will increase Y by 4351.166% assuming other variables are constant, and vice versa.

5.3.2 Testing of variable X2

Based on the calculation results, the results were obtained with a significance value of 0.051. This means that profitability has a significant effect and a positive relationship direction on stock prices. The greater the profit obtained, the more it increases the company's stock price. This indicates the profitability variable as a positive signal for investors. The regression coefficient of X2 is 7789.815, which means that every 1% increase in X2 will decrease Y by 7789.815% assuming other variables are constant, and vice versa.

5.3.3 Testing of variable X3

The results of data calculations using the Eview program obtained results with a significance value of 0.0786. This means that company size has an insignificant positive effect

on stock prices. This finding indicates that company size is not used as a source of information in buying shares. The regression coefficient X2 is 3007.036.

5.3.4 Testing of variable X4

Based on the results of data processing, the significance value is 0.1186. This means that Leverage has an insignificant negative effect on stock prices. This means that information on the amount of leverage is not a signal for investors so that it is not used as a basis for buying shares. The regression coefficient X2 is X3 - 5866.554.

5.3.5 Multiple determination coefficients

The value of the multiple determination coefficients can be seen that the R-Square is 0.898535, which means that the dependent variable in the model can explain the independent variable by 90%. While the rest is explained by other variables outside the model that are not studied. While the adjusted R Square value means the R Square value that has been corrected by the standard error value. Adjuster R Square is 0.855 with a standard error value of the regression model of while the standard error value of the regression model is 2.030858 indicated by the label S.E of regression. This standard error value is smaller than the standard deviation value of the independent variable which is assigned with the label "S.D. dependent var" which is 6970.069 which means that the regression model is valid as a dependent variable model.

6. DISCUSSION

The results of the panel data analysis conducted using the fixed effect model show that the PROPER variable, serving as a proxy for green management, significantly influenced the stock prices of energy companies listed on the Indonesia Stock Exchange. In line with previous studies, the analysis showed that environmental performance has a significant and positive effect on stock prices [19-27].

Environmental performance or PROPER is the result of the process of implementing green management of energy companies and this information for investors is a signal that the company cares about environmental preservation. Thus, green management is expected to have an impact on the achievement of the company's overall performance. This positive signal will be responded to by stock market players by buying shares of energy companies. This means that the movement of energy company stock prices is positively related to the achievement of environmental performance (green management). This phenomenon is known as Signaling Theory. This condition is very reasonable because energy companies are closely related to environmental issues. Energy companies that care about the environment will have an impact on the achievement of sustainable performance. This condition indicates that the application of signaling theory in financial management has been shown to increase the tendency of investors to allocate their capital [28]. This means that investors in the stock market tend to apply signaling theory in making decisions to buy shares. Investor behavior reflects the information obtained in making decisions.

According to a previous observation, stock price volatility would remain relatively stable even during a pandemic, provided environmental performance is strong [29]. This suggests that initiatives carried out by companies with a focus on environmental sustainability typically send positive signals to investors, showing expectations of strong future performance. Environmental considerations have been observed to play a significant role in shaping the perceptions of investors and this can impact the sustainability of companies. The extent to which companies effectively manage environmental performance proportionally reflects long-term sustainability [30]. Consequently, the capital market often interprets these efforts as positive signals, prompting favorable investor responses to achievements in environmental performance [22, 31]. Meanwhile, research examining environmental performance using PROPER values influences share prices in the energy sector, supported by previous studies [32, 33]. This research is not in line with the results which found that environmental performance does not determine stock prices [34]. These findings indicate that environmental performance, which is an implementation of green management, can have a significant effect on share prices or company value. Likewise, implementing strategies based on green management is also able to determine organizational sustainability or organizational performance [35, 36]. Thus, green management is very important in ensuring the sustainability of a company and is able to provide a positive signal to external parties or investors that the company is aligning the interests of environmental preservation and profits. This information is very useful for investors in making investment decisions in the capital market.

Investors base decisions on the information or signals provided by companies. This is in line with signaling theory, which addresses the information asymmetry between companies and investors. Typically, management communicates information about the environmental achievements of respective organizations, and investors analyze and make informed decisions using these signals. However, it is important to establish that this result is not consistent where investors do not respond to environmental performance or use the factor as a basis for making investment decisions.

According to the results of the fixed effect test, the Return on Assets (ROA) variable significantly impacted stock prices, in line with the observations of the previous study [7]. This suggests that profitability plays a crucial role in investors' decisions when purchasing shares in the energy sector. However, factors such as the sizes of companies and leverage are observed to not significantly influence stock prices. This result is consistent with the results where it was stated that information regarding these variables did not serve as a signal for investors. Rather, investors focus solely on environmental performance and profitability when making investment decisions in the energy sector capital market. This finding encourages the government to create policies supporting policies and operations in improving environmental performance, ultimately improving sustainable financial performance [37]. Thus, the implementation of green management has an impact on improving sustainable performance [38]. The results of this study indicate that the implementation of green management has an impact on improving financial performance, sustainable performance, and increasing company value through rising share prices.

7. CONCLUSIONS

In conclusion, based on the results of the panel data analysis, it can be seen that green management had a significant effect

on the stock prices of companies in the energy sector listed on the Indonesia Stock Exchange. The results from this study showed that information about environmental management served as a positive signal for investors regarding the prospects of companies. In addition, profitability was also found to significantly influence stock prices. This simply implies that profitability as a control variable influences the impact of environmental performance on stock prices. However, company size and leverage, which were also control variables, did not significantly contribute to the model. This result shows that the government's policy on environmental performance assessment, conducted by the Ministry of Environment, is highly credible to capital market players.

REFERENCES

[1] Uygur, A., Musluk, B.Y., Ilbey, N. (2015). Examining the influence of green management on operation functions: Case of a business. Research Journal of Business Management, 2: 348-365.

[2] Riyantini, K., Nusraningrum, D. (2024). The influence of green management and correspondence management on green performance. International Journal of Innovative Science and Research Technology, 9(1): 1022-1030. https://doi.org/10.5281/zenodo.10587405

[3] Hermundsdottir, F., Aspelund, A. (2022). Competitive sustainable manufacturing - Sustainability strategies, environmental and social innovations, and their effects on firm performance. Journal of Cleaner Production, 370: 133474. https://doi.org/10.1016/j.jclepro.2022.133474

[4] de Burgos Jiménez, J., Céspedes Lorente, J.J. (2001). Environmental performance as an operations objective. International Journal of Operations & Production Management, 21(12): 1553-1572. https://doi.org/10.1108/01443570110410900

[5] Abrams, R., Han, S., Hossain, M.T. (2021). Environmental performance, environmental management and company valuation. Journal of Global Responsibility, 12(4): 400-415. https://doi.org/10.1108/JGR-10-2020-0092

[6] Danso, A., Adomako, S., Amankwah-Amoah, J., Owusu-Agyei, S., Konadu, R. (2019). Environmental sustainability orientation, competitive strategy and financial performance. Business Strategy and the Environment, 28(5): 885-895. https://doi.org/10.1002/bse.2291

[7] Velte, P. (2023). Determinants and financial consequences of environmental performance and reporting: A literature review of European archival research. Journal of Environmental Management, 340: 117916. https://doi.org/10.1016/j.jenvman.2023.117916

[8] Becerra-Vicario, R., Ruiz-Palomo, D., Fernández-Miguélez, S.M., Gutiérrez-Ruiz, A.M. (2022). Examining the effects of hotel reputation in the relationship between environmental performance and hotel financial performance. Journal of Hospitality and Tourism Management, 53: 10-20. https://doi.org/10.1016/j.jhtm.2022.08.012

[9] Di Pillo, F., Gastaldi, M., Levialdi, N., Miliacca, M. (2017). Environmental performance versus economic-financial performance: Evidence from Italian firms. International Journal of Energy Economics and Policy, 7(2): 98-108.

[10] Levy, H., Lazarovich-Porat, E. (1995). Signaling theory and risk perception: An experimental study. Journal of Economics and Business, 47(1): 39-56. https://doi.org/10.1016/0148-6195(94)00022-6

[11] Fdez-Galiano, I.M., Feria-Dominguez, J.M., Gomez-Conde, J. (2022). Stock market reaction to environmental lawsuits: Empirical evidence from the case against Boliden-Apirsa. Environmental Impact Assessment Review, 96: 106837. https://doi.org/10.1016/j.eiar.2022.106837

[12] Kott, I. (2015). Green management in companies' policies and activities. In Semantic Scholar. https://api.semanticscholar.org/CorpusID:114916393.

[13] Hasan, A.N. (2021). Green Management System. Media Wisata. https://api.semanticscholar.org/CorpusID:113858106.

[14] Wasik, J.F. (1996). Green Marketing & Management: A Global Perspective. https://api.semanticscholar.org/CorpusID:106902049.

[15] Leung, B.C.M. (2023). The effects of green management practice on organizational performance success: An empirical study in HK building industry. Natural Resources Conservation and Research, 6(1): 1859. https://doi.org/10.24294/nrcr.v6i1.1859

[16] Rochmadi, T., Herdioso, R., Isharyadi, F., Rustianto, B., Aziz, A. (2022). Implementation of type III environmental declaration based on ISO 14025: A case study on an ideal and reality of the PROPER program implementation in Indonesia. IOP Conference Series: Earth and Environmental Science, 1108(1): 1-7. https://doi.org/10.1088/1755-1315/1108/1/012023

[17] Sarumpaet, S., Nelwan, M.L., Dewi, D.N. (2017). The value relevance of environmental performance: Evidence from Indonesia. Social Responsibility Journal, 13(4): 817-827. https://doi.org/10.1108/SRJ-01-2017-0003

[18] Ok, E., Qian, Y., Strejcek, B., Aquino, K. (2021). Signaling virtuous victimhood as indicators of Dark Triad personalities. Journal of Personality and Social Psychology, 120(6): 1634-1661. https://doi.org/10.1037/pspp0000329

[19] Castro, P., Gutiérrez-López, C., Tascón, M.T., Castaño, F.J. (2021). The impact of environmental performance on stock prices in the green and innovative context. Journal of Cleaner Production, 320: 128868. https://doi.org/10.1016/j.jclepro.2021.128868

[20] Yadav, P.L., Han, S.H., Rho, J.J. (2016). Impact of environmental performance on firm value for sustainable investment: Evidence from large US firms. Business Strategy and the Environment, 25(6): 402-420. https://doi.org/10.1002/bse.1883

[21] Li, Z., Feng, L., Pan, Z., Sohail, H.M. (2022). ESG performance and stock prices: Evidence from the COVID-19 outbreak in China. Humanities and Social Sciences Communications, 9(1): 1-10. https://doi.org/10.1057/s41599-022-01259-5

[22] Huang, J., Li, Y., Han, F. (2024). Walk well and talk well: Impact of the consistency of ESG performance and disclosure on firms' stock price crash risk. International Review of Economics & Finance, 93: 1154-1174. https://doi.org/10.1016/j.iref.2024.03.067

[23] Xu, D., Huang, J., Ren, X., Ye, M. (2024). ESG report textual similarity and stock price synchronicity: Evidence from China. Pacific-Basin Finance Journal, 85: 102343. https://doi.org/10.1016/j.pacfin.2024.102343

[24] Yang, Y., Zhang, J., Li, Y. (2023). The effects of environmental information disclosure on stock price synchronicity in China. Heliyon, 9(5): e16271. https://doi.org/https://doi.org/10.1016/j.heliyon.2023.e16271

[25] Piccioni, C.A., Bastos, S.B., Cajueiro, D.O. (2024). Stock price reaction to environmental, social, and governance news: Evidence from brazil and financial materiality. Sustainability, 16(7): 2839. https://doi.org/10.3390/su16072839

[26] Gül, Y., Altuntaş, C. (2024). Do ESG ratings affect stock prices? The case of developed and emerging stock markets TT - ESG Reytingleri Hisse Fiyatlarını Etkiler Mi? Gelişmiş ve Gelişen Hisse Senedi Piyasaları Örneği. Sosyoekonomi, 32(60): 243-258. https://doi.org/10.17233/sosyoekonomi.2024.02.12

[27] Ma, D., Zhai, P., Zhang, D., Ji, Q. (2024). Excess stock returns and corporate environmental performance in China. Financial Innovation, 10(1): 41. https://doi.org/10.1186/s40854-023-00569-0

[28] Elwisam, Muhani, Ria, Digdowiseiso, K., Kartini, Juliandi, D., Saputra, D. (2024). Implementation of signaling theory in financial management: A bibliometric analysis. Revista De Gestão Social E Ambiental, 18(3): e04963. https://doi.org/10.24857/rgsa.v18n3-092

[29] Zhou, D., Zhou, R. (2021). ESG performance and stock price volatility in public health crisis: Evidence from COVID-19 pandemic. International Journal of Environmental Research and Public Health, 19(1): 0202. https://doi.org/10.3390/ijerph19010202

[30] Zhou, S., Rashid, M.H.U., Zobair, S.A.M., Sobhani, F.A., Siddik, A.B. (2023). Does ESG impact firms' sustainability performance? The mediating effect of innovation performance. Sustainability, 15(6): 5586. https://doi.org/10.3390/su15065586

[31] Shakil, M.H. (2022). Environmental, social and governance performance and stock price volatility: A moderating role of firm size. Journal of Public Affairs, 22(3): 1-11. https://doi.org/10.1002/pa.2574

[32] Mukti, B.T.M., Sudarma, M., Chandrarin, G. (2014). Pengaruh mekanisme corporate governance, kinerja lingkungan dan pengungkapan lingkungan perusahaan terhadap reaksi pasar. El Muhasaba: Jurnal Akuntansi, 4(2). https://doi.org/10.18860/em.v4i2.2453

[33] Gita Indah Dewi Fortuna, N.M., Putra, I.N.W.A. (2020). Pengaruh kinerja lingkungan, pengungkapan informasi lingkungan, dan good corporate governance pada harga saham perusahaan. E-Jurnal Akuntansi, 30(4): 1019-1033.

[34] Deswanto, R.B., Siregar, S.V. (2018). The associations between environmental disclosures with financial performance, environmental performance, and firm value. Social Responsibility Journal, 14(1): 180-193. https://doi.org/10.1108/SRJ-01-2017-0005

[35] Wu, S.I., Wu, Y.C. (2014). The influence of enterprisers' green management awareness on green management strategy and organizational performance. International Journal of Quality & Reliability Management, 31(4): 455-476. https://doi.org/10.1108/IJQRM-01-2013-0019

[36] Raharjo, K. (2019). The role of green management in creating sustainability performance on the small and medium enterprises. Management of Environmental Quality: An International Journal, 30(3): 557-577. https://doi.org/10.1108/MEQ-03-2018-0053

[37] Bansal, N., Taneja, S., Ozen, E. (2023). Green financing as a bridge between green banking strategies and environmental performance in Punjab, India. International Journal of Sustainable Development and Planning, 18(10): 3155-3167. https://doi.org/10.18280/ijsdp.181017

[38] Yudawisastra, H.G., Anwar, M., Nidar, S.R., Azis, Y. (2023). The emergence of green management and sustainability performance for sustainable business at small medium enterprises (SMEs) in the culinary sector in Indonesia. International Journal of Sustainable Development and Planning, 18(5): 1489-1497. https://doi.org/10.18280/ijsdp.180519