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The Effect of Carbon Emission Disclosure, Investment Opportunity Set, Institutional Ownership, and Intellectual Capital on Company Value (Emperical Study on Energy Sector Companies Listed on the Indonesia Stock Exchange 2022-2024)

Aldo Septian[1]*, Sonia Sischa Eka Putri[2]

[1.2]Accounting Department, Sultan Syarif Kasim State Islamic University, Pekanbaru, Indonesia

Email Correspondent
sonia.sischa@uin-suska.ac.id

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ABSTRACT

This study aims to determine the effect of carbon emission disclosure, investment opportunity set, institutional ownership, and intellectual capital on the company's value in energy sector companies listed on the Indonesia Stock Exchange for the 2022- 2024 period. Sampling in this study used the purposive sampling technique, with a total sample of 40 samples with a research period of 2022-2024. Data analysis of this study uses panel data regression analysis with the help of eviews software 12. The results of the study explain that institutional ownership and intellectual capital have a significant effect on the value of the company. Meanwhile, the disclosure of carbon emissions and investment opportunity sets has no effect on the company's value. These findings identify that companies in the energy sector that have a large level of institutional ownership and good intellectual capital tend to have higher corporate value, while carbon emission disclosure, investment opportunity sets do not make a significant contribution to increasing the value of the company.

INTRODUCTION

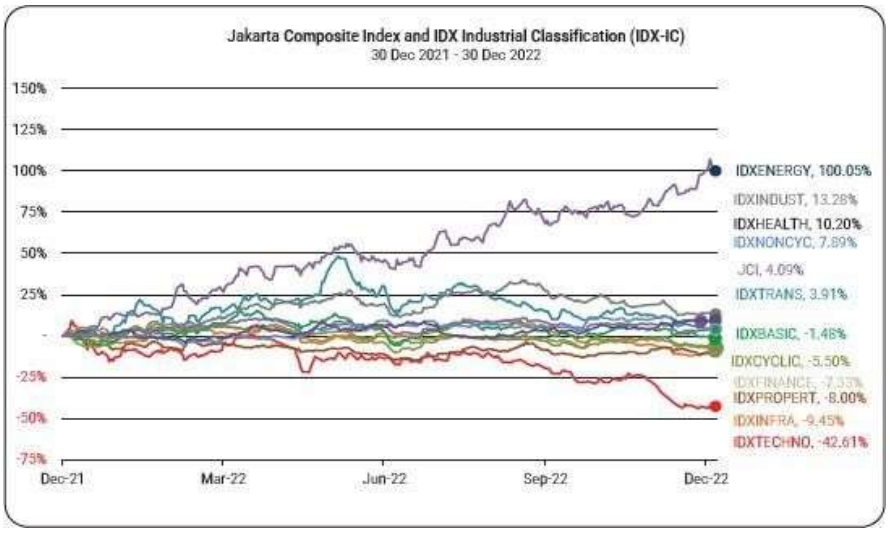
Along with the current economic and technological progress in Indonesia, companies are required to continue to innovate and adapt to the changes that occur. Each company has various goals, such as increasing profits, providing customer satisfaction, creating a competitive advantage, maintaining environmental sustainability, and paying attention to the welfare of its investors. The welfare of investors can be created by increasing the value of the company (Sagala & Aprilia, 2023).

Konuk et al., (2023) Explaining the value of a company is important to investors because it shows the overall value of a company, including debt and the market value of its shares. Investors use the value of this company as a reference to assess how healthy the company's financial condition is, how much opportunity the company has to grow, and how much profit can be obtained from investment, both in the form of stocks and bonds. Moreover Elbardan et al., (2023) stating that companies with high value will find it easier to obtain additional funds from the capital market or financial institutions.

Company value is a measure that shows how well a business is able to provide benefits or benefits to interested parties. In other words, a company's value reflects the company's level of success in achieving the goals that have been set. One way to assess a company's value is through stock prices, because stock prices can give investors an idea of the condition of a company (Satria & Widyawati, 2023).

The energy sector is the sector with the highest increase performance or the most benefit for its shareholders in 2022. During that year, the energy sector (IDXENERGY) recorded a price increase of +100%, far above the JCI of other sectors. This can be seen from the stock price chart during 2022 below:

Figure 1.1 Stock Price Chart During 2022



Source: IDX, 2023

Since May 2022, the price of energy stocks has begun to decline. In June 2022, oil prices decreased by -40% from $120 per barrel and declined again on May 20,

2023, to $72 per barrel. In September 2022, coal also decreased by -63% from 440 US dollars per ton to 162 US dellar per ton on May 20, 2023. The decline was due to low import demand from China (the world's largest oil and coal importer).

In 2023, the JCI (composite stock price index) will experience sectoral rotation which has resulted in a decline in stock prices in the energy sector. The causes can be varied, such as geopolitics or slowing economic growth. This resulted in the transfer of shares from the energy sector to another. On April 18–May 19, 2023, the energy stock price (IDXENERGY) decreased in price by -12.4%. In accordance with the stock price chart and JCI in the past year:

Figure 1.2 JCI Stock Price Chart 2023

Source: Stockbit, 2023

Briefly in the image above, it shows that the energy sector has a poor picture of movement, judging from the decline in energy commodity prices which has an impact on the decline in the stock price which causes *selling* pressure in the market (Stockbit, 2023). The assessment of the stock market in Indonesia refers to the Composite Stock Price Index (JCI). Based on the above phenomenon, it can be concluded that in 2023, the JCI of energy sector companies continues to decline little by little, which makes the share prices of companies in the sector also decrease.

Various factors that can affect the company's value are *Carbon Emission Disclosure, Investment Opportunity Set,* Institutional Ownership and Intellectual Capital. Each of these factors provides an overview of the company's growth potential, operational efficiency, and competitiveness in the market, which directly impacts the company's value assessment.

Previous studies on the relationship between *Carbon Emission Disclosure, Investment Opportunity Set,* Institutional Ownership and Intellectual Capital and corporate value have shown mixed results. Some researchers found that *Carbon Emission Disclosures, Investment Opportunity Set,* Institutional Ownership had an effect on the value of the company, while others showed no strong or consistent influence. This opens up opportunities to delve deeper into how the combination of internal and external factors plays a role in determining the company's value, especially in the context of an increasingly competitive business environment and emphasizing the sustainability aspect in Indonesia today.

This research has novelty because it combines financial and environmental factors simultaneously using a data panel approach, and analyzes its effect on the company's value in a relatively recent period. With this approach, this study seeks to fill in gaps in the previous literature that tended to test variables partially and did not consider the dynamics of the company and the business environment as a whole.

Based on this description, this study aims to analyze the effect of *Carbon Emission Disclosure, Investment Opportunity Set,* and Institutional Ownership on the value of energy sector companies listed on the Indonesia Stock Exchange during 2022-2024. The results of this research are expected to provide theoretical and practical benefits for investors, academics, and regulators in understanding the indicators that have the most influence on the value of companies, so that they can be used as a basis for investment and policy decision-making.

LITERATURE REVIEW

Stakeholder Theory

Theory *Stakeholder* (stakeholder), developed by Feeeman first in 1984, states that a group or individual that has the ability to influence the goals of a company is considered a stakeholder. These stakeholders include a wide range of parties, such as creditors, shareholders, employees, customers, suppliers, the community and the government (Freeman & McVea, 1984).

Mahajan et al., (2023) said that every company must adjust efforts and maximize shareholder profits and meet the needs of stakeholders. Theory *Squirrel* Playing a role in the sustainable development of a company because the continuity of a company is very much pegged to stakeholders who have the ability to manage the resources needed by the company. If the company's relationship with stakeholders is good, it will build a positive reputation that invites potential investors to invest and makes the company's price and value increase.

Fadilah & Rosdiana, (2024) stating that support from stakeholders may increase if company information is disclosed. The company's efforts to meet the interests of the *Squirrel* by improving the company's ability to manage the environment. While these efforts often cost a lot of money, companies need to balance economic and environmental goals to create optimal sustainability value.

Carbon Emission Disclosure

Carbon Emission is the amount of carbon gas produced and released into the atmosphere due to various human activities, especially in the company's operations Siburian, Saya (2020:1). While the disclosure of *carbon emission* is the disclosure of environmental care used by the company to overcome the adverse impact of the company due to carbon emissions and provides information about the carbon emissions produced due to the company's activities(Apriandi & Sri, 2023).

The amount of carbon emissions every year is always increasing because many companies carry out activities that result from the company's activities. Carbon emission disclosure in Indonesia itself does not have a specific standard, the disclosure still depends on the respective companies because it is still voluntary (Rachmawati, 2021) (Almaeda et al., 2023) and (Fanda & Dwijayanti, 2024). According to Stuart & Stuart (2023) Disclosure of carbon emissions is highly recommended because it is a consideration for investors before making investments.

The government issued Regulation No. 71 of 2011, concerning the Implementation of the National GHG (Greenhouse Gas) Inventory and Regulation No. 16 of 2011 concerning the National Action Plan for the Reduction of GHG Emissions

(Greenhouse Gas). These regulations are made so that companies can reduce carbon emissions.

Invesment Opportunity Set

Investment Opportunity Set (IOS) was first introduced by Myers, (1977), which sees the value of the company as a composite of the assets it already owns (*assets in place*) and investment opportunities (*Investment Options*) in the future. These investment opportunities are opportunities for companies to grow, but in reality not all opportunities can be utilized. If the company fails to take advantage of existing investment opportunities, there will be greater costs compared to the value of the lost opportunity.

According to Elaine (2024), The high value of IOS is an indicator that the company has good prospects for the future. Investors will assess the company as an entity capable of generating *Return* profitable, thereby increasing the attractiveness of investment.

Institutional Ownership

According to Sutrisno, (2012:314), institutional ownership refers to the ownership of business shares by other institutions such as banks, insurance, investments, and others. Because these institutions have the ability to increase oversight, sustainable institutional ownership is essential for managerial oversight. According to Jullia & Finatariani, (2024) Companies with strong institutional ownership (more than 5%), indicate that they are capable of supervising management. The welfare of shareholders will be further ensured by continuous supervision.

Intellectual Capital

Intellectual capital (*Intellectual* Capital) is something new and also a modern concept that reflects the important role in the company. Intellectual capital related to the company's intangible assets including the process for processing them (Ulum, 2017:74). Intellectual capital is also defined as a combination of resources *Intangible* and activities that enable organizations to transform materials, finances and human resources in a system's capabilities to create *Squirrel* value.

According to Edvinsson in the study Savila & Chariri, (2025), *Intellectual capital* is the application of experience, organizational technology, customer relations, and corporate expertise to create a superior company. In other words, intellectual capital acts as a strategic resource that helps companies maintain and improve their competitiveness in the market.

Company Values

Company value is one way of looking at the success of the company. According to Damas et al., (2021) Company value is a measure of the company's ability to generate profits for shareholders and the company's ability to achieve corporate goals. The value of a company can be seen from the company's share price to give investors an idea of a company (Satria & Widyawati, 2023). The company's value that continues to increase greatly attracts the attention of investors to invest, so companies continue to compete to increase the value of their company in order to achieve more profits. If many people are interested in investing, the stock price will increase, if the stock price increases, the value of the company will also increase Samuelson, A. Paul Nordhaus (1997:220).

Carbon Emission Disclosure

Disclosure *Carbon Emission* (carbon emissions) can provide positive value for the

company which will ultimately affect the value of the company. Carbon emission disclosure is an environmental concern disclosure used by the company to overcome the adverse impact of the company due to carbon emissions and provide information about carbon emissions produced due to the company's activities (Apriandi & Sri, 2023). Disclosure *carbon emission* is something that is considered by investors, potential investors and stakeholders because they are considered to care more about the environment (Damas et al., 2021).
H1: Carbon Emission Disclosure Affects Company Value

Invesment Opportunity Set

Invesment Opportunity Set is the value of the company which is influenced by future expenses determined by management which is currently expected to be a better performing investment option and is expected to yield *Return* larger (Putri et al., 2025). Companies that have high growth opportunities are considered to be able to produce high returns as well. The higher the IOS level, the higher it will be *Return* and the quality of the company's profits (Tiara & Nera Marinda Machdar, 2023). Investors tend to value companies with high IOS as entities that have long-term growth and profitability potential, thus having an impact on increasing stock prices and overall company value.
H2: *Investment Opportunity Set* affects the value of the company

Institutional Ownership

Institutional ownership refers to the ownership of shares of a corporation by the business world or organizations such as banks, insurance, investments, and others Cristofel & Kurniawati, (2021). The company is overseen as a whole by managers and institutional ownership. It is based on the idea that institutional oversight can prevent managers from acting aimlessly. Institutions do not only carry out financial supervision and the like. Institutional oversight will reduce management errors that can lower the value of the company. The greater the institutional ownership, the more external parties supervise and control the company. As a result, agency costs within the company can be minimized and the value of the company can increase (Elaine O'Neill, 2024).
H3: Institutional Ownership Affects Company Value

Intellectual Capital

The main goal of the company is to increase the value of its company. This is in line with the Theory *Stakeholder* developed by Feeman (1984) states that all company activities lead to value creation for the company itself (*Value Creation*) (Meliani & Ariyanto, 2021). This can be interpreted as the existence of intellectual capital that can describe the quality of the company which has an impact on increasing the value of the company. When a company has a good ability to create company value, it means that the company has indirectly been able to meet the interests of its customers. *Squirrel* (Saraha et al., 2022). So that the *Squirrel* will appreciate companies that have these qualities more. To attract the attention of the market, companies must be able to improve their intellectual capital management.
H4: Intellectual Capital Affects Company Value

METHODOLOGY

Research Types and Samples

This research uses secondary data obtained from the Indonesia Stock Exchange and the company's official website. The population in this study is energy sector companies listed on the Indonesia Stock Exchange in 2022-2024. The sampling

method uses *propsive sampling* while the analysis method used is the panel data regression analysis method which is processed using the *Eviews* version 12 application. The companies sampled in this study are 40 companies with an observation year from 2022-2024, so the total is 120 samples.

Research Variables and Measurement Variables

The dependent variable in this study is the company's value because the company's value is a measure of the company's ability to provide benefits to stakeholders (*Squirrel*) and the company's ability to achieve the company's goals (Damas et al., 2021). The value of the company can be seen from the company's share price (Satria & Widyawati, 2023). Tobins'Q because it is the most effective and relevant measurement method for measuring a company's value (Fanda & Dwijayanti, 2024). The value of a company is calculated using the Tobin's Q formula by looking at the share price multiplied by the number of outstanding shares, total liabilities and total assets of the company so that it can be seen for sure whether the company has good company value or not (Damas et al., 2021).

$$\textbf{Tobin's Q} = \frac{\boldsymbol{Total\ Market\ Value + Total\ Book\ Value\ of\ Liabilities}}{\boldsymbol{Total\ Book\ Value\ of\ Asseta}}$$

Carbon Emission Disclosure

Disclosure *carbon emission* (carbon emissions) is one of the company's efforts to recognize and present information about the amount of carbon emissions produced by a company (Damas et al., 2021). . Carbon emission disclosure can be found through the carbon emission disclosure index in the company's sustainability report. There are 5 categories in the carbon emission disclosure indicator with a total of 18 items disclosed. In accordance with research Choi et al., (2013). Gives a value of 1 if the company performs one 1 item and a value of 0 if the company does not disclose it, then adds up and divides by 18 (the total items that must be disclosed).

$$\textbf{PCE} = \frac{\boldsymbol{Jumlah\ Item\ yang\ diungkapkan}}{\boldsymbol{Jumlah\ Item\ yang\ dapat\ diungkapkan}\ (\mathbf{18})}$$

Invesment Opportunity Set

Elaine (2024), IOS refers to a set of investment opportunities that include assets that are likely to be invested in the future. These options are evaluated based on *Net Present Worth* (NPV) positive, which can have an impact on the overall value of the organization. A systematic approach, *Invesment Opportunity Set* (IOS) is formulated as follows:

$$\boldsymbol{Invesment\ Opportunity\ Set\ (IOS)} = \frac{\boldsymbol{ATt - ATt - 1}}{\boldsymbol{TAt}}$$

Institutional Ownership

According to Sutrisno, (2012:314), institutional ownership refers to the ownership of business shares by other institutions such as banks, insurance, investments, and others. Institutional ownership is the proportion of shares that an organization owns. The following metrics can be used to measure institutional ownership. Large shareholders and institutional investors will be able to keep a closer eye on the management group and increase the value of the company Murti et al., (2024).

$$\boldsymbol{KI} = \frac{\boldsymbol{Jumlah\ Kepemilikan\ Saham\ Institusional}}{\boldsymbol{Jumlah\ Saham}}\boldsymbol{x}\ \mathbf{100\%}$$

Intellectual Capital

Intellectual capital is used for all that are non-tangible or non-physical assets and resources of an organization, which includes the processes, innovation capacity, patterns, and invisible knowledge of its members and the organization's network of collaborations and relationships. Intellectual capital related to the company's intangible assets including the process for processing them The formula used in this variable is (Puspita & Wahyudi, 2021).

$$\mathbf{VAICTM = COW + COW + STVA}$$

Data Analysis Methods

In this study, the data analysis method applied included quantitative descriptive analysis along with panel data regression analysis to assess the influence of independent variables on bound variables. In this study, the Eviews 12 program was used as a tool to analyze the data.

Descriptive Statistics

Descriptive statistics describe the average of the data, the standard deviation that shows the extent to which the data differs from the mean, as well as the minimum and maximum values as a representation of the range of observed data values.

Model Data Panel

Among the estimates of the three existing models, the model that best suits the research objectives will be selected. There are three tests that are useful as a guide in choosing a panel data regression model according to the characteristics of the data, namely *the Chow* Test, *the Hausman* Test, and the *Langrangge Multiplier* (LM) Test.

Panel Data Regression Test

According to Ghozali (2021) Panel data regression analysis can use the following equations:

$$\mathbf{Y = \alpha + \beta 1X1it + \beta 2X2it + \beta 3X3it + \beta 4X4it + \varepsilon it}$$

Information:

Y = Company Value
α = Constant
X1 = Carbon Emission Disclosure
X2 = Investment Opportunity Set
X3 = Institutional Ownership
X4 = Intellectual Capital
ε = Error term, which is the level of guessing error in the study

Panel data regression is a regression consisting of several different company characteristics, for this it is necessary to select the best model using several tests consisting of *Common Effect Model, Fixed Effect Model* and *Random Effect Model* (Kusumaningtyas et al., 2022:103)

Classic Assumption Test

Normality Test

The normality test can be carried out using the Jarque Bera (JB) probability test as follows:

a. If the probability is below 0.05, then the null hypothesis will be rejected, indicating that the data is not normally distributed.
b. If the probability is more than 0.05, then the null hypothesis will be accepted, indicating that the data has a normal distribution.

Multicollinearity Test

To detect the presence or absence of multicolonialism in the regression model, it can be seen from the value of tolerance or *variance inflation factor* (VIF) with the following criteria:

a. If the tolerance value is >0.1 and the VIF<10 value, then there is no problem of multicollinearity, which means that the regression model can be said to be good.
b. If the tolerance value is <0.1 and the VIF>10 value is present, then there is a multicollinearity problem which means that the regression model can be said to be not good.

Heteroscedasticity Test

Heterokedasticity tests can be detected by tests *Glejser*, that is, by regressing an independent variable with the absolute value of the residual. If the probability value of each independent variable is >0.05, then it can be concluded that the regression model has no heterokedasticity. On the other hand, if there is an independent variable with a probability value of <0.05, it can be concluded that the regression model has heterokedasticity (Kusumaningtyas et al., 2022:99).

Autocorrelation Test

Autocorrelation tests can be detected using *the Durbin Watson* (DW) test. The Autocorrelation test aims to test whether in a linear regression model there is a correlation between the disruptive error in period t and the disruptive error in the period t-1 (previously). The provisions for decision-making whether or not there is autocorrelation are:

1. Positive autocorrelation occurs when D-W is below -2
2. There is no autocorrelation if the D-W is between -2 to +2
3. A negative autocorrelation occurs when D-W is above +2

Hypothesis Test

T test

The t-statistical test is used to measure the influence of each independent variable on the dependent variable (Ghozali, 2021). The criteria in this test are:

a) The value of sig. < 0.05 then the hypothesis is accepted. This shows that there is a significant influence between one independent variable on the dependent variable.
b) The value of sig. > 0.05, the hypothesis is rejected. This shows that there is no significant influence between one independent variable and the dependent variable.

Coefficient of Determination (R2)

The determination coefficient is basically done to measure how far a model is able to explain the variation of dependent variables. The coefficient value of determination expressed in percentages ranges from 0 < R2< 1. If the value of R2 = 0 means that there is no relationship between variables. If the value R2 Small means that the ability of independent variables to explain the variation of dependent variables is very limited. If the value R2 Approaching 1 means that the independent variables already explain almost all the information needed to predict the variation of the dependent variables (Ghozali, 2021).

RESULTS AND DISCUSSION

Descriptive Data Analysis

The results of the descriptive data analysis can be seen in the table below :

Table 1 Descriptive Statistical Test Results

	X1	X2	X3	X4	Y
Mean	0.575000	-0.014250	0.640500	7.865500	0.592750
Median	0.560000	0.000000	0.660000	4.140000	0.535000
Maximum	1.000000	0.640000	0.980000	65.69000	2.970000
Minimum	0.060000	-1.230000	0.180000	-9.380000	0.020000
Std. Dev.	0.222639	0.204888	0.185748	10.45422	0.431850
Skewness	0.145548	-3.094857	-0.390063	2.878805	2.075474
Kurtosis	2.606724	19.36307	2.266369	13.30578	10.82192
Jarque-Bera	1.197015	1530.313	5.734055	696.7963	392.0638
Probability	0.549631	0.000000	0.056868	0.000000	0.000000
Sum	69.00000	-1.710000	76.86000	943.8600	71.13000
Sum Sq. Dev.	5.898600	4.995532	4.105770	13005.61	22.19279
Observations	120	120	120	120	120

Source : Output Results *Eviews 12, 2025*

Information:
Y: Company Value
X1: Carbon Emission Disclosure
X2: Investment Opportunity Set
X3: Institutional Ownership
X4: Intellectual Capital

The results of the descriptive analysis in table 1 above can be seen that the amount of data (N) in each variable is 120. This number comes from 40 research samples from energy sector companies listed on the Indonesia Stock Exchange for the 2022-2024 period.

Based on table 1, the Company Value (Y) shows the average (mean) of the company value of 120 research samples measured using Tobins Q measurement, which is 0.592750 and has a standard deviation or deviation rate of 0.431850. The highest value of the company value variable (Y) is owned by PT. Bintang Samudera Mandiri Lines Tbk 1.61, the lowest value owned by PT. Rig Tenders Indonesia 0.02 in 2024.

Based on table 1 *Carbon Emission* (X1) shows an average (mean) of 120 research samples, which is 0.575000 and has a standard deviation or deviation rate of 0.204888. The highest value of the *Carbon Emission* variable (X1) is owned by PT. Mitrabara Adiperdana Tbk in 2022, PT. Golden Energy Mines in 2023, PT. Dian Swastatika Sentosa in 2024 of 1.00, the lowest value owned by PT. SMR Utama Tbk in 2022, 2023, 2024 is 0.11.

Based on table 1 *Invesment Opportunity Set* (X2) shows an average (mean) of 120 research samples, which is -0.014250 and has a standard deviation or deviation rate of 0.185748. Highest value of a variable *Invesment Opportunity Set* (X2) is owned by PT. Buana Listya Tama Tbk of 0.64 in 2023, the lowest value owned by PT. The mainstay energy source in 2022 is -1.23.

Based on table 1 Institutional Ownership (X3) shows an average (mean) of 120 research samples, which is 0.640500 and has a standard deviation or deviation rate of 0.185748, the highest value of the Institutional Ownership variable (X3) is 0.98 owned by PT. Golden Eagle Energy in 2023, the lowest value owned by PT. Buana Listya Tama Tbk in 2023 is 0.18.

Based on table 1, Intellectual Capital (X4) shows an average (mean) of 120

research samples, which is 7.865500 and has a standard deviation or deviation rate of 10.45422. The highest value of the Intellectual Capital variable (X4) was 65.69 PT. Bintang Samudera Mandiri Lines Tbk in 2023, the lowest value is owned by PT. Paragon Karya Perkasa Tbk in 2023 is -9.38.

Panel Data Estimation Method

Chow Test

Table 2 Chow Test Results

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

Effects Test	Statistic	d.f.	Prob.
Cross-section F	2.968756	(38,74)	0.0000
Cross-section Chi-square	108.346865	38	0.0000

Source: Output Results Eviews 12, 2025

Table 2 above shows the significance value of the Chi-square cross-section of 0.0000. The value is smaller than α (0.0000 < 0.05). So statistically H1 is accepted and H0 is rejected. So in this Chow Test, the selected model is the *Fixed Effect Model*.

Hausman Test

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	1.521087	4	0.8229

Based on Table 4.3, the value of the Random Cross Section Prob is 0.82 ded that the selected model *is Random Effects.*

LM *Lagrange Multiplier* Test

Table 4 Lagrange *Multiplier* (LM) Test Results

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	Time	Both
Breusch-Pagan	18.16587	0.524057	18.68993
	(0.0000)	(0.4691)	(0.0000)
Honda	4.262144	-0.723918	2.501904
	(0.0000)	(0.7654)	(0.0062)
King-Wu	4.262144	-0.723918	0.247456
	(0.0000)	(0.7654)	(0.4023)
Standardized Honda	4.503275	-0.384191	-2.062264
	(0.0000)	(0.6496)	(0.9804)
Standardized King-Wu	4.503275	-0.384191	-2.147151
	(0.0000)	(0.6496)	(0.9841)
Gourieroux, et al.	--	--	18.16587

	(0.0000)

Source: Output Results Eviews 12, 2025

Based on Table 4.4, the Prob Cross Section value is 0.0000 < 0.05, so it can be concluded that the selected model *is a Random Effect*.

Model Selection Test

Table 5 Model Selection Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.039773	0.122380	8.496232	0.0000
X1	-0.198752	0.126169	-1.575282	0.1180
X2	0.171730	0.118600	1.447979	0.1504
X3	-0.679766	0.168075	-4.044417	0.0001
X4	0.008396	0.002425	3.463043	0.0008

Effects Specification	S.D.	Rho
Cross-section random	0.200424	0.4252
Idiosyncratic random	0.233009	0.5748

Weighted Statistics			
R-squared	0.239964	Mean dependent var	0.307617
Adjusted R-squared	0.212820	S.D. dependent var	0.259702
S.E. of regression	0.230416	Sum squared resid	5.946248
F-statistic	8.840381	Durbin-Watson stat	1.442108
Prob(F-statistic)	0.000003		

Unweighted Statistics			
R-squared	0.217634	Mean dependent var	0.551966
Sum squared resid	10.18582	Durbin-Watson stat	0.841870

Source : Output Results Eviews 12, 2025

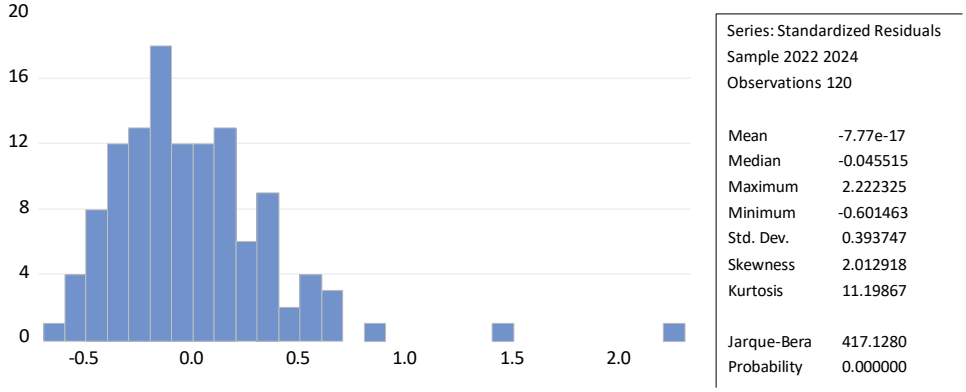
Information:
Y: Company Value
X1: Carbon Emission Disclosure
X2: Investment Opportunity Set
X3: Institutional Ownership
X4: Intellectual Capital

It can be seen from table 5 that the results of the model selection test using the Random Effect Model. With a total of 117 observations and a research period of 3 years (2022-2024) on energy sector companies.

Classic Assumption Test

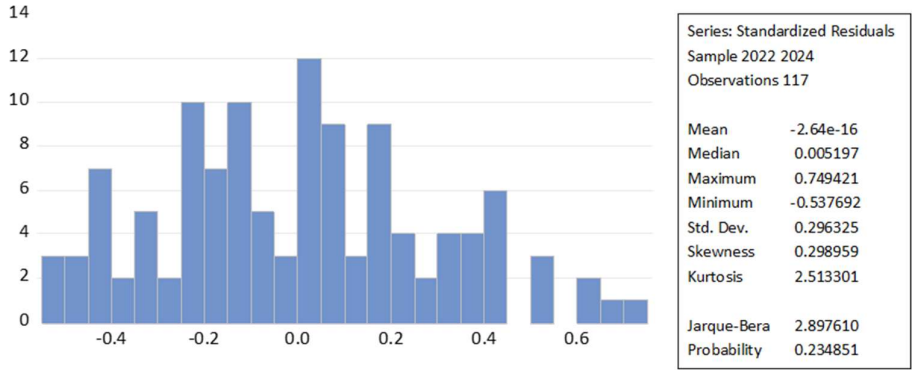
Normality Test

Figure 3 Normality Test Graph



Based on Figure 3, the normality results can be seen as a JB value of 0.000000 < 0.05 which means that H0 is rejected so that the data is not distributed normally. Therefore, an outlier analysis was carried out to evaluate whether the data had met the assumption of normality or there were still abnormal tendencies. The results of the normality test after outlier analysis can be seen in the image below:

Figure 3 Normality Test Results After Data Outlier



After the outlier analysis was carried out in the *Eviews* 12 application, there were 3 data identified as outlier data, so that the total number of analysis units was 117. After handling the outliers, the variable data in this study was distributed normally. This can be seen in figure 4.2, the results of the normality test can be seen as a JB value of 0.234851 > 0.05 which means that H0 is accepted so that the data is distributed normally. Therefore, the calculation results show that the data used in this study meets the assumption of normal distribution, so the sample is eligible for further research. Thus, the assumption of normality has been fulfilled and H0 is accepted.

Multicoloniality Test

Table 6 Multicoloniality Test Results

Variance Inflation Factors
Date: 10/26/25 Time: 00:24
Sample: 2022 2024
Included observations: 117

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	0.014977	10.02449	NA
X1	0.015919	4.649294	1.061849
X2	0.014066	1.023400	1.021366
X3	0.028249	8.882800	1.067592
X4	5.88E-06	1.267335	1.016270

The results of the test in table 6 above are the value of VIF *Carbon Emission* (X1) 1.061849, the *value of Investment Opportunity Set* (X2) 1.021366, Institutional Ownership (X3) 1.067592 and Intellectual Capital (X4) 1.016270 where from the four variables of the value of VIF <10, it can be concluded that there is no problem of multicolonialism.

Heterokedasticity Test

Table 7 Heteroscedasticity Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.310706	0.069949	4.441873	0.0000
X1	-0.065098	0.074030	-0.879349	0.3811
X2	0.027352	0.071514	0.382464	0.7028
X3	-0.083467	0.095535	-0.873681	0.3842
X4	0.002763	0.001452	1.903371	0.0596

In table 7, you can see that the probability of each variable is greater than 0.05. Therefore, it can be concluded that in this model there is no heteroscedasticity.

Autocorrelation Test

Table 8 Autocorrelation Test Results

R-squared	0.239964	Mean dependent var	0.307617
Adjusted R-squared	0.212820	S.D. dependent var	0.259702
S.E. of regression	0.230416	Sum squared resid	5.946248
F-statistic	8.840381	Durbin-Watson stat	1.442108
Prob(F-statistic)	0.000003		

Based on Table 4.8 above, which is the result of the autocorrelation test, it can be seen that the Durbin Watson value is 1.442108. This value is between - 2 to +2 so it can be seen that there is no autocorrelation.

Panel Data Regression Analysis

Based on table 6, the regression equation is obtained as follows:

$Yit = \beta 0 + \beta 1X1it + \beta 2X2it + \beta 3X3it + \beta 4X4it + eit$

Y = 1.039 - 0.198(X1) + 0.171(X2) - 0.679(X3) + 0.008(X4) + [CX=R]

Information:

Yit : Company Value
β0 : Constant
β1, β2, β3, β4, : Independent variable coefficients
X1it: *Carbon Emission Disclosure*
X2it: *Investment Opportunity Set*
X3it: Institutional Ownership
X4it: Intellectual Capital
eit: Error

The data regression analysis of the panel is explained as follows:

Constant = Constant Is a variable whose value is fixed and cannot be changed. In the model, the value of the constant 1.039 means that if *Carbon Emission* 0, *Invesement Opportunity Set* 0, Institutional Ownership 0, Intellectual Capital 0, then Company Value is 1,039.

X1 = -0.198. Means that if the variable *Carbon Emission* increased by 1, *Invesement Opportunity Set*, Institutional Ownership, Fixed Intellectual Capital, then the Company's Value decreased by 0.198.

X2 = 0.171. Means that if the variable *Invesment Opportunity Set* increased by 1, *Carbon Emission,* Institutional Ownership, Fixed Intellectual Capital, then the Company Value increased by 0.171.

X3 = -0.679. It means that if the Institutional Ownership variable increases by 1, *Invesment Opportunity Set, Carbon Emission*, Intellectual Capital is fixed, then the

Company's Value decreases by 0.678.

X4 = 0.008. This means that if the Intellectual Capital variable increases by 1, *Carbon Emission, Investment Opportunity Set,* Institutional Ownership, fixed, then the Company Value increased by 0.008.

Hypothesis Test

Partial Test

Table 9 Partial Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.039773	0.122380	8.496232	0.0000
X1	-0.198752	0.126169	-1.575282	0.1180
X2	0.171730	0.118600	1.447979	0.1504
X3	-0.679766	0.168075	-4.044417	0.0001
X4	0.008396	0.002425	3.463043	0.0008

The Effect of Carbon Emission Disclosure on Company Value (H1)

The first hypothesis (H1) that states the disclosure *carbon emission* The effect on the value of the company in this analysis cannot be supported or rejected. This research is in line with research conducted by Oktaviani & Ghozi, (2025), Siti Rochmah & Taharuddin, (2024), Arlita, (2019), Asmara & Najihah, (2025)and Kurnia et al., (2021) who finds that the Disclosure *Carbon Emission* has no effect on the company's value. This is due to the disclosure of *carbon emission* is still voluntary and not many companies have done so, so the pressure from *Squirrel* nor investors to disclose this information have not been significantly felt by the company. This condition indicates that the level of transparency of information related to *carbon emission* It is still very limited. These limitations also have an impact on investors' low attention to disclosure *carbon emission* as a reference in investment decision-making. In addition, the complexity and variety of disclosure items *carbon emission* making the information less attractive to investors directly. However, investors still consider environmental aspects in the decision-making process, although the focus is more on other factors. Therefore, the disclosure of carbon emissions to date has not been able to have a meaningful impact on the company's value.

The Effect of Investment Opportunity Set on Company Value (H2)

The second hypothesis (H2) states *Invesment Opportunity Set* The effect on the value of the company in this analysis cannot be supported or rejected. In this study, investment decisions do not affect the company's value because the company is less able to take advantage of the right investment opportunities in order to increase the company's value so that the amount of investment opportunities that exist in the company is not affected by the company's value. The large investment opportunities that the company has has not been able to attract the attention of investors to value the company higher, meaning that if the potential for future growth is reflected in the *Investment Opportunity Set* does not necessarily improve the market's perception of a company's performance and prospects. The results of this study are in line with the research conducted by Novita et al., (2024), Nikmah & Amanah, (2019), Sudiyatno et al., (2023), Wahasusmiah & Arshinta, (2022)and Mariva et al., (2022) who found that *Invesment Opportunity Set* has no effect on the company's value.

The Effect of Institutional Ownership on Company Value (H3)

The third hypothesis (H3) in this study states that Institutional Ownership has an effect on the value of the company and can be accepted based on the analysis conducted. This finding indicates that the greater the number of shares owned by the institution, the higher the value of the company which is reflected in the stock price in the market, and illustrates that the existence

of institutional investors has an important role in influencing the company's management policy and strategic direction, as well as being able to increase the trust of other investors. This is in line with the agency theory put forward by Jensen and Meckling (1976), the relationship between the manager (agent) and the shareholder (principal) often gives rise to a conflict of interest. Managers have a tendency to make decisions that benefit themselves, such as increasing the size of the company (empire building), increasing compensation, or making high-risk investments that are not in line with the interests of shareholders. This research is in line with research conducted by Bagus et al., (2024), Almashaqbeh et al., (2023), Abedin et al., (2022), Raharjo & Muhyarsyah, (2021), Doğan, (2020), Lestari, (2017) which states that Institutional Ownership affects the value of the company.

The Influence of Intellectual Capital on Company Value (H4)

The fourth hypothesis (H4) in this study states that Intellectual Capital has an effect on the value of the company and is acceptable based on the analysis carried out. These results show that energy companies that have staff with high intellectual capital will increase the value of the company, it can be by increasing the effectiveness of working time, reducing marketing costs which can be done because management has the ability (intellectual capital) in this case more deeply so that it can maximize the company's profits which will affect the company's value. High intellectual capital allows companies to innovate, provide better services, and maintain their reputation in the eyes of the public. When stakeholders feel the benefits of increasing the company's competence and innovation, trust in the company will increase. This is in line with research conducted by Malikah & Nandiroh, (2024), Muslim et al., (2023), Indyyati et al., (2025), Dewi et al., (2022), Dewi & Erawati, (2024), Indriastuti & Kartika, (2021) and Irsyahma & Nikmah, (2017) which states that Intellectual Capital affects the value of the company.

Coefficient of Determination

Table 10 Determination Coefficient Test Results

R-squared	0.239964	Mean dependent var	0.307617
Adjusted R-squared	0.212820	S.D. dependent var	0.259702
S.E. of regression	0.230416	Sum squared resid	5.946248
F-statistic	8.840381	Durbin-Watson stat	1.442108
Prob(F-statistic)	0.000003		

Table 10 shows that the influence of the free variables (*Carbon Emission*, *Investment Opportunity Set,* Institutional Ownership, and Intellectual Capital) on the tied variable (company value) results in an adjusted R Square value of 0.212820, or 21.28%. This shows that the free variables (*Carbon Emission*, *Investment Opportunity Set,* Institutional Ownership, and Intellectual Capital) contribute 21.28%, and other variables (*Carbon Emission*, *Investment Opportunity Set,* Institutional Ownership, and Intellectual Capital) contribute 78.71%.

CONCLUSION

1. The findings of the partial hypothesis test (t) show that *Carbon Emission* Disclosure has no effect on the Company Value of energy sector companies listed on the Indonesia Stock Exchange for the period 2022-2024. This condition shows that the level of transparency of information related to carbon emissions is still very limited. This limitation also has an impact on investors' low attention to carbon emission disclosure as a reference in investment decision-making.
2. The findings of the partial test (t) show that *the Investment Opportunity Set* (IOS)

has no effect on the Company Value of energy sector companies listed on the Indonesia Stock Exchange for the 2022-2024 period. Companies are less able to take advantage of the right investment opportunities in order to increase the company's value so that the size and size of the investment opportunities that exist in the company are not affected by the company's value.

3. The results of the partial test (t) show that institutional ownership has a significant effect on the value of companies in the energy sector listed on the Indonesia Stock Exchange for the 2022–2024 period. These findings indicate that the existence of institutional investors plays a role in strengthening supervision of management, thereby encouraging an increase in company performance and value.
4. The results of the partial test (t) show that intellectual capital has a significant effect on the value of companies in the energy sector listed on the Indonesia Stock Exchange for the 2022–2024 period. This indicates that effective intellectual capital management can improve the company's performance and value.

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