

Financial Reporting Quality, Debt Maturity, and Investment Efficiency: The Moderating Role of Institutional Ownership Cross-Country Evidence from Indonesia and Malaysia

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ABSTRACT

This study aims to examine the effects of financial reporting quality and debt maturity structure on investment efficiency, with institutional ownership serving as a moderating variable, among energy sector companies in Indonesia and Malaysia during the 2021-2025 period. The data were obtained from Refinitiv Eikon with a sample of 713 firm-year observations from 209 companies selected using purposive sampling. The data were analyzed using Moderated Regression Analysis (MRA) as proposed by Sharma et al. The results indicate the financial reporting quality has a positive and significant effect on investment efficiency. Furthermore, institutional ownership does not moderate the relationship between either financial reporting quality or debt maturity structure and investment efficiency. The comparative analysis also reveals that energy sector companies in Malaysia exhibit higher investment efficiency, better financial reporting quality and a greater proportion of short-term debt than their counterparts in Indonesia while energy sector companies in Indonesia have a higher proportion of institutional ownership than those in Malaysia.

INTRODUCTION

The energy industry is known to be capital-intensive and requires large, long-term investments. Therefore, inappropriate investment decisions can potentially lead to inefficient use of resources within a company. Investment efficiency issues are reflected in the *Incremental Capital Output Ratio* (ICOR). According to news reported by SindoNews, Indonesia's ICOR remains at 6.33 to 6.5 percent from 2025 to 2026 (Ananda, 2024). This figure exceeds Malaysia's, which is only around 4 to 4.5 percent.

It's crucial for a company operating in the energy sector to consider how its capital can be invested in profitable projects. A company's investments must be appropriate to achieve efficiency. Efficiency is defined as the appropriate use of *capital* without wasting company resources or investment targets (Pratomo et al., 2024). Investment inefficiencies are generally divided into two broad categories: *overinvestment* and *underinvestment*.

In the agency theory developed by Jensen and Meckling, there is an assumption that information asymmetry will exist in the relationship between principal and management

(Jensen & Meckling, 1976). This situation will potentially lead to *adverse selection* and encourage opportunistic management actions. One of these opportunistic behaviors is the avoidance of positive value projects due to risk. In addition, there is also the possibility of *empire building*. Both actions are the root cause of investment inefficiency, both in the form of *underinvestment* and *overinvestment*. The quality of financial reporting (*Financial Reporting Quality*) can be an appropriate mechanism to suppress opportunistic actions that affect investment efficiency. Quality financial reporting can reduce information asymmetry between management and external users of reports (Bushman & Smith, 2001). Higher information quality will result in a better institutional environment, mitigate agency conflicts, and create a supportive environment for planning and assessment (Cherkasova & Rasadi, 2017). This financial accounting information is used to monitor company managers to avoid inappropriate allocation of capital resources (Delgado-Domonkos & Zeng, 2023). A 2024 study by Bahy NM and Dewi et al. found that financial reporting quality (FRQ) has a positive and significant effect on investment efficiency (Bahy, 2024; Dewi et al., 2024). Sukarno's research found that FRQ negatively affects investment efficiency. This finding differs significantly from several previous studies (Sukarno et al., 2022).

Pecking Order theory explains that companies have their own preferences in choosing funding sources for carrying out operations (Myers & Majluf, 1984). The tendency for companies to rely solely on internal funding sources results in financial constraints, and lead to *underinvestment*. This decision is usually also based on information asymmetry with external parties, so external parties cannot pressure management to implement the project due to lack of information. Agency theory explains that management tends to behave opportunistically, especially when management does not bear the full economic consequences of the decisions taken, especially when managerial ownership is less than 100 percent (Jensen & Meckling, 1976). To prevent opportunistic actions, regular *monitoring* by external parties is necessary, such as creditor supervision through the company's debt structure. Companies that source capital from debt will group debt into two structures: short-term debt and long-term debt. The use of short-term debt can increase the frequency of *monitoring* by creditors by encouraging companies to finance external parties periodically and repeatedly, thus avoiding overfinancing on unprofitable projects and preventing *overinvestment* (Lasdi & Wibowo, 2024). On the other hand, minimizing the attachment to long-term debt gives companies better liquidity flexibility to take on new potential projects and prevents *underinvestment* (Lasdi & Wibowo, 2024). Research by Bach Nguyen states that external financing strategies have an effective impact on a company's investment level (Nguyen, 2022). Another study by Perla, Pflueger, and Szkup also shows that debt can create *heterogeneous investment distortions*, where companies with high debt structures tend to *overinvest*, while low-debt companies tend to *underinvest* due to external financing constraints (Perla et al., 2024).

A company needs a party to oversee governance mechanisms to promote transparency and appropriate capital allocation. This is in line with research by Dinh, Nguyen, and Gan in 2022, which showed that when investors own large blocks of shares, they are willing to bear monitoring costs to ensure management invests in optimal projects (Dinh et al., 2023). Research by Moradi et al. emphasized that institutional investors will act as effective external monitors to bridge this gap of interests and discipline management actions (Moradi et al., 2022). Institutional ownership is not only seen as a factor that directly drives efficiency, but is also strongly suspected of moderating the relationship between FRQ and *debt maturity* on

company investment efficiency. Its presence can act as a monitor and prevent information asymmetry (Bai et al., 2023) and other agency problems such as monitoring risky projects and opportunistic actions of managers (Bagh et al., 2025).

This study selected energy sector companies in Indonesia and Malaysia because the two countries have similar industry characteristics but differ in energy regulations and investor protection. Indonesia still faces uncertainty in energy regulations, while Malaysia has a more integrated legal framework and a more comprehensive investor protection mechanism through the Securities Commission Act 1993, the Capital Market and Services Act 2007, and the Investor Compensation Fund (ICF) (Elawati et al., 2025). These differences are expected to affect companies' investment efficiency mechanisms. This study fills the gap in previous research, which generally focuses on a single country, still shows inconsistent results regarding the effect of financial statement quality and debt maturity on investment efficiency, and uses diverse indicators. Therefore, this study offers a cross-country comparative approach by examining the effect of financial statement quality and debt maturity on investment efficiency, moderated by institutional ownership, in energy sector companies in Indonesia and Malaysia. This study is expected to provide novelty in the literature on the determinants of investment efficiency in a cross-country context, while also providing input for management, institutional investors, and regulators in improving the quality of financial reporting, financing policies, and corporate governance.

RESEARCH METHODS

This research employed a descriptive quantitative approach. The population comprised all *listed companies* operating in the energy sector located in Indonesia and Malaysia. The sample consisted of 118 companies listed in Indonesia and 91 companies in Malaysia.

The study uses secondary data including financial data for the period 2020-2025. Data will be taken from various sources, namely the Indonesia Stock Exchange (IDX), Bursa Malaysia (BM), Annual Reports, *Refinitiv Eikon*, journals and related articles. Sample selection was carried out using a *purposive sampling technique*, namely a sampling technique by considering the following criteria (Sekaran & Bougie, 2016): 1) Companies that only operate in the energy sector; 2) Listed on the Indonesia Stock Exchange (IDX) for Companies located in Indonesia and listed on Bursa Malaysia for Companies located in Malaysia; 3) Have complete financial data during the research period.

The dependent variable used is the level of investment efficiency (InvEff) using the Richardson (2006) model. This model is able to capture conditions of *overinvestment* and *underinvestment*, arises due to agency conflict. Richardson's model is reflected in the following equation (1):

$$\text{Investment}_{i,t} = \beta_0 + \beta_1 \text{Invest}_{i,t-1} + \beta_2 \text{Size}_{i,t-1} + \beta_3 \text{Lev}_{i,t-1} + \beta_4 \text{Growth}_{i,t-1} + \beta_5 \text{Cash}_{i,t-1} + \beta_6 \text{Return}_{i,t-1} + \beta_7 \text{Age}_{i,t-1} + \text{Industry}_{i,t} + \text{Year}_{i,t} + \varepsilon_{i,t} \quad (1)$$

The regression results of the *Investment*_{i,t} values will form the residual value of the model that explains any deviations from the expected investment level and uses the residual as a proxy for the investment level. In this model, the absolute value of the residual model is taken and multiplied by -1, so that a higher value indicates more efficient investment.

The first independent variable in this study is financial reporting quality (FRQ). The FRQ proxy used in this study refers to the *discretionary accruals model* developed by Kothari et al. (2005). The model equation used is explained as follows:

$$TA_{i,t} = \beta_0 + \beta_1(1/Asset_{i,t-1}) + \beta_2\Delta Sales_{i,t} + \beta_3PPE_{i,t} + \beta_4ROA_{i,t-1} + \varepsilon_{1,t} \quad (2)$$

All variables except $(1/Asset_{i,t-1})$ in the Kothari model are divided by *lagged* total assets to address the issue of firm size differences and to make the data comparable. In this model, the absolute value of the model residual is taken and multiplied by -1, so that a higher value indicates a higher FRQ.

The second independent variable is debt maturity *structure* (*STDebt*). In this study, the *debt maturity variable* uses the ratio of short-term debt (all debt maturing within the current year) to the company's total debt. This study uses a moderating variable. Institutional ownership in this study is positioned as a moderating variable that functions to strengthen or weaken the relationship between financial statement quality and debt maturity on investment efficiency. This institutional ownership variable is defined as the proportion of a company's shares owned by institutions or agencies such as banks, insurance companies, pension funds, other investment companies (Bagh et al., 2025; Nurina et al., 2025), other companies, and other legal entities outside of individual ownership.

In controlling the influence of other factors outside the main variables so that the relationship between independent and dependent variables can be estimated more accurately, this study uses control variables such as company size (*LnSales*), company age (*LnAge*), *tangibility* measures (fixed assets/total assets), profit with a dummy proxy (value 1 if the company's net profit before *extraordinary items* is positive and value 0 if it is negative), and operating cycle size ($Average\ Account\ Receivable/Sales \times 360 + (Average\ Inventory/COGS \times 360)$).

In this study, three models were used which refer to *Moderated Regression Analysis* (MRA) developed by Sharma, Durand and Gur-Arie (Sharma et al., 1981).

Model 1

$$InvEff_{i,t} = \beta_0 + \beta_1 FRQ_{i,t} + \beta_2 STDebt_{i,t} + \beta_3 Size_{i,t} + \beta_4 Age_{i,t} + \beta_5 Tang_{i,t} + \beta_6 Profit_{i,t} + \beta_7 Oprcycle_{i,t} + \varepsilon_{1i,t} \quad (3)$$

Model 2

$$InvEff_{i,t} = \beta_0 + \beta_1 FRQ_{i,t} + \beta_2 STDebt_{i,t} + \beta_3 IO_{i,t} + \beta_4 Size_{i,t} + \beta_5 Age_{i,t} + \beta_6 Tang_{i,t} + \beta_7 Profit_{i,t} + \beta_8 Oprcycle_{i,t} + \varepsilon_{2i,t} \quad (4)$$

Model 3

$$InvEff_{i,t} = \beta_0 + \beta_1 FRQ_{i,t} + \beta_2 STDebt_{i,t} + \beta_3 IO_{i,t} + \beta_4 FRQ_{i,t} * IO_{i,t} + \beta_5 STDebt_{i,t} * IO_{i,t} + \beta_6 Size_{i,t} + \beta_7 Age_{i,t} + \beta_8 Tang_{i,t} + \beta_9 Profit_{i,t} + \beta_{10} Oprcycle_{i,t} + \varepsilon_{3i,t} \quad (5)$$

Information

InvEff	= Investment Efficiency
FRQ	= Financial Report Quality
STDebt	= Debt Due Date
IO	= Institutional Ownership
FRQxIO	= Moderation
STDebtxIO	= Moderation

Size = Company Size
 Age = Company Age
 Tang = *Tangibility*
 Profit = *Profit or Loss*
 Operate = *Operating Cycle*

The first model is used to test the basic relationship between the independent and dependent variables. The second model then adds a moderator variable as a main effect to control for the moderator's direct influence on investment efficiency. Next, the third model includes an interaction variable between the independent and moderator variables to test whether the moderator changes the direction or strength of the relationship between the independent and dependent variables. This gradual model change is intended to facilitate interpretation of changes in regression results and evaluation of moderating effects.

RESULTS AND DISCUSSION

Results

Descriptive Analysis

Descriptive statistics are used to describe and provide an overview of the frequency distribution of variables in the study, maximum, minimum and average values and standard deviations without making generally applicable conclusions and generalizations (Sekaran & Bougie, 2016). The dependent variable tested is investment efficiency (*InvEff*) while the independent variables tested are financial report quality (*FRQ*) and debt maturity (*STDebt*). The moderating variable uses institutional ownership (*IO*). There are also control variables such as company size (*Size*), company age (*Age*), *tangibility size* (*Tang*), profit (*Profit*) and operating cycle size (*Opercycle*). The study uses STATA software version 14 as an analysis test tool.

Table 1 Descriptive Statistics

Variables	Obs	Mean	Std. Dev.	Min	Max
InvEff	713	-0.1364451	0.0899753	-0.6401326	-0.0003528
FRQ	713	-0.2999134	0.5645481	-9.024674	-0.0001231
STDebt	713	0.636075	0.2492374	0.0075872	1
IO	713	0.6108021	0.2999322	0	1
Size	713	18.59715	2.16062	10.41301	25.92312
Age	713	9.142452	0.6538844	7.219642	10.52186
Pliers	713	0.5425387	0.220027	0.0370063	0.9985113
Profit	713	0.7517532	0.42299	0	1
Operate cycle	713	15.37499	11.96925	0	55.09391

Source: Data processed 2026

Based on the descriptive statistics in Table 1, it can be concluded that the lowest *InvEff* (Y) variable, at -0.640, was found in Indonesia at PT Berkah Beton Sadaya Tbk in 2022, indicating that this company experienced significant investment inefficiency. Conversely, the highest value, at -0.0003, was found at Coraza Integrated Technology Bhd in 2024, a Malaysian company. The relatively small average value of -0.13 indicates that actual investment compared to the investment predicted by the model is relatively small. Meanwhile, the standard deviation value of 0.089 indicates that the distribution of investment efficiency data is relatively low, so that variation between companies is not too large and tends to be more homogeneous.

FRQ variable (*X1*) has the lowest *FRQ* value of -9.025 owned by PT Kapuas Prima Coal Tbk in 2024 indicating that the company has a much lower quality of financial reports compared to other companies. The maximum value is at PT Mandiri Herindo Adiperkasa Tbk in 2025 at -0.0001231 which indicates that the company has a very high quality of financial reports. The average *FRQ* of -0.299 indicates that in general the company has a fairly good level of financial report quality. The standard deviation showing 0.564 which is greater than the average value indicates that the quality of financial reports between companies in the sample has quite high variation.

The statistical results show that the smallest *STDebt* (*X2*) is the company PT Agro Yasa Lestari Tbk in 2025 while the maximum value is found in several companies such as PT Alumindo Light Metal Industry Tbk from Indonesia and OKA Corporation Bhd from Malaysia. The maximum value of 1 indicates that the company fully only has short-term debt as a component of its liabilities while the minimum value of 0.0075 indicates that the company's liabilities are dominated by long-term debt. The statistical results also show that the average sample company has a proportion of 0.636 or 63% short-term debt with a data variation distribution of 0.2492.

The *IO* (*Z*) variable indicates that there are companies that do not have institutional shareholders, such as PT J Resources Asia Pasifik Tbk, AIZO Group Bhd, EC Excel Holdings Bhd, MMIS Bhd, and Ray Go Solar Holdings Bhd. However, there are also companies where all shareholders are institutional, such as PT Bumi Resources Tbk. Judging from the entire research sample, the average company has 0.610 shares owned by institutions with a data variation spread of 0.2999. This value indicates that the level of institutional ownership between companies has a fairly moderate variation.

For the control variable, *Size* has an average value of 18.59, *Age* has an average of 9.14 years, *Tang* has an average of 0.54 or 54%, *profit* has an average of 0.75 or an average of having a profit and *opercycle* of 15.37 days.

Pearson Correlation Analysis

Table 2 Correlation Results

	<i>InvEff</i>	<i>FRQ</i>	<i>STDebt</i>	<i>IO</i>	<i>Size</i>	<i>Age</i>	<i>Tang</i>	<i>Profit</i>	<i>Opercycle</i>
<i>InvEff</i>	1.0000								
<i>FRQ</i>	0.1882***	1.0000							
<i>STDebt</i>	0.1369***	-0.0027	1.0000						
<i>IO</i>	-0.1001**	-0.0629*	-0.2132***	1.0000					
<i>Size</i>	0.2242***	0.1877***	-0.0304	0.3119***	1.0000				
<i>Age</i>	0.0935**	0.0355	-0.0256	0.1997***	0.1259***	1.0000			
<i>Tang</i>	-0.2070***	-0.1994***	-0.5451***	0.2236***	0.0327	0.0257	1.0000		
<i>Profit</i>	0.0692*	0.1614***	-0.0719*	0.0954**	0.3483***	-0.0168	-0.0471	1.0000	
<i>Opercycle</i>	0.0495	-0.0270	-0.0660*	0.2436***	0.3544***	0.0427	0.1394***	0.1888***	1.0000

*: Signifikan pada level $\alpha = 10\%$ **: Signifikan pada level $\alpha = 5\%$ ***: Signifikan pada level $\alpha = 1\%$

Source: Data processed 2026

In this study, the independent variables used are *InvEff* with dependent variables *FRQ* and *STDebt*, moderating variables *IO* and control variables *Size*, *Age*, *Tang*, *Profit* and *Opercycle*. From table 2. the strongest correlation value is 0.2242 owned by *InvEff* with *Size*. For the weakest correlation is 0.0495 which is the relationship between *InvEff* and *Opercycle*. Meanwhile, for the main variables tested, the correlation value formed is 0.1882 for a positive relationship between *InvEff* and *FRQ*, 0.1369 which also has a positive relationship between *InvEff* and *STDebt*, and -0.1001 which has a negative relationship between *InvEff* and *IO*. Overall, no variables have a correlation value above 0.8 according to Pearson correlation standards.

Panel Data Model Selection**Chow Test****Table 3** Chow Test

Fixed-Effect Reg.	F test that all u i	df	Prob > F
Model 1	6.68	(183, 522)	0.0000
Model 2	6.51	(183, 521)	0.0000
Model 3	6.46	(183, 519)	0.0000

Source: Data processed 2026

Table 3 shows that both Models 1, 2, and 3 obtained a Prob > F value of 0.0000, which is smaller than the 0.05 significance level. Thus, H0 is rejected and H1 is accepted, so it can be concluded that *the Fixed Effect Model* (FEM) is more appropriate to use than *the Common Effect Model* (CEM). This indicates that there are differences in characteristics between companies (*individual effects*) that significantly influence the model.

LM Test**Table 4.** LM Test

LM Test	Chibar2(01)	df	Prob > chibar2
Model 1	414.67	(183, 522)	0.0000
Model 2	397.97	(183, 521)	0.0000
Model 3	389.31	(183, 519)	0.0000

Source: Data processed 2026

Table 4 shows the results of the LM test, where both Models 1, 2, and 3 obtained a Prob > F value of 0.0000, which is smaller than the 0.05 significance level. Thus, H0 is rejected and H1 is accepted , so it can be concluded that *the Random Effect Model* (REM) is more appropriate to use than *the Common Effect Model* (CEM). This indicates that there are differences in characteristics between companies (*individual effects*) that significantly influence the model.

Hausman test**Table 5.** Hausman test

Hausman Test	Chi2	df	Prob > chi2
Model 1	8.26	(183, 522)	0.3105
Model 2	9.79	(183, 521)	0.2803
Model 3	13.41	(183, 519)	0.2015

Source: Data processed 2026

Table 5 shows that the Prob > Chi2 value for model 1 is 0.3105, model 2 is 0.2803, and model 3 is 0.2015. All three models have this value greater than the 0.05 significance level. Thus, H0 is accepted and H1 is rejected, so it can be concluded that the Random Effect Model (REM) is more appropriate to use than the Fixed Effect Model (CEM).

Multicollinearity Test

Table 6. Multicollinearity Test

Variable	Model 1		Model 2		Model 3	
	VIF	1/VIF	VIF	1/VIF	VIF	1/VIF
FRQ	1.35	0.740103	1.43	0.700706	1.18	0.846729
STDebt	1.46	0.682804	1.47	0.679254	1.49	0.669473
IO			3.87	0.258238	1.25	0.799012
FRQxIO					1.08	0.930012
STDebtxIO					1.10	0.907974
Size	1.16	0.861560	1.16	0.860940	1.25	0.797685
Age	1.02	0.981651	1.05	0.954018	1.05	0.949993
Pliers	1.55	0.646144	1.55	0.644735	1.58	0.633457
Profit	2.33	0.429592	3.28	0.305135	2.41	0.415153
Operate cycle	2.46	0.406488	2.93	0.340895	2.40	0.416112
Mean VIF	1.62		2.09		1.48	

Source: Data processed 2026

Model 1 tests the variables FRQ, STDebt, Size, Age, Tang, Profit, and Opercycle. The highest VIF value is in the Opercycle variable at 2.46 with a tolerance value of 0.406488. Meanwhile, the lowest VIF value is the Age variable at 1.02 with a tolerance value of 0.981651. For model 2, the IO variable is added to the regression. The input of the IO variable causes an increase in the VIF value of several other variables. In model 2, the highest VIF value is in the IO variable itself, at 3.87 with a tolerance of 0.258238. Model three includes interaction/moderation variables. The highest VIF value in this model is Profit with a value of 2.41 and a tolerance of 0.415153. Based on the results of the multicollinearity test, all three models pass the classical assumption test of multicollinearity. There are no serious symptoms of multicollinearity between the independent variables in the model, so this regression model is valid and reliable for use in further inferential analysis (hypothesis testing).

Hypothesis Testing Results

Table 7. Moderated Regression Analysis

Variables InvEff	Model 1		Model 2		Model 3	
	Coef.	P> z	Coef.	P> z	Coef.	P> z
Cons.	-0.1285573	0.000	-0.1046022	0.000	-0.1324984	0.000
FRQ	0.0109524	0.018	0.0100345	0.031	0.0103 628	0.033
STDebt	0.0162061	0.331	0.0139115	0.403	0.013 4451	0.426
IO			-0.0406 509	0.015	-0.0405173	0.016
FRQxIO					0.0031285	0.822
STDebtxIO					-0.0021661	0.964
Size	0.0084477	0.001	0.009865	0.000	0.0097991	0.000
Age	0.0093598	0.175	0.0112396	0.103	0.0112838	0.103
Pliers	-0.080181	0.000	-0.0752294	0.001	-0.0756519	0.001
Profit	-0.003965	0.560	-0.003941	0.562	-0.0039844	0.558
Operate cycle	-0.0001375	0.682	-0.0000552	0.869	-0.0000487	0.885
R2 Overall	0.1117		0.1295		0.1299	
Prob > F	0.0000		0.0000		0.0000	
Wald chi2	48.43		54.98		54.98	
Observation	713		713		713	
Groups	184		184		184	

Source: Data processed 2026

In this study, the hypothesis was tested using a regression moderation test using three models. The first model is the base model. Table 4.11 shows that in model 1, the FRQ variable has a significant value of $0.018 < 0.05$ with a coefficient value of 0.011. These results indicate that financial report quality (FRQ) has a positive and significant effect on investment efficiency. A positive coefficient indicates that the higher the quality of financial reports, the greater the company's investment efficiency. The second variable in model 1 is debt maturity (STDebt), which has a coefficient of 0.016 with a significance value of $0.331 > 0.05$. These results indicate that debt maturity does not have a significant effect on investment efficiency. Although the direction of the coefficient is positive, the effect is not statistically strong enough so that changes in the proportion of short-term debt cannot explain changes in the company's investment efficiency. Finally, in model 1, the control variable, company size (Size), has a significant positive effect on investment efficiency with a significance value of $0.001 < 0.05$ and the same direction of influence. This indicates that larger companies tend to have better investment efficiency. Conversely, the tangibility variable is significant, with a direction of influence opposite to investment efficiency, with a P-value of $0.000 < 0.05$. The control variables Age, Profit, and Operation Cycle do not show a significant effect on investment efficiency.

The second model included institutional ownership as an independent variable to determine the direct moderator effect on investment efficiency. In this model, it was found that the FRQ variable remained consistently significant with a probability value of $0.031 < 0.05$ with a coefficient of 0.010. These results indicate that the quality of financial statements remains a significant positive effect on investment efficiency after being controlled by institutional ownership. For the STDebt variable, it has a coefficient of 0.014 and a significance level of $0.403 > 0.05$. The results show that debt maturity remains insignificant on investment efficiency. The institutional ownership variable has a coefficient of -0.041 with a significance level of 0.015. This indicates that institutional ownership (IO) has a significant effect on investment efficiency. A negative coefficient indicates that an increase in institutional ownership can reduce the level of investment efficiency. Consistent with the previous model, the only significant control variables are Size and Tang with P-values of 0.000 and 0.001, respectively, while the Age, Profit, and Opercycle variables remain insignificant.

The third model is used to test whether institutional ownership (IO) is able to moderate the relationship between financial statement quality (FRQ) and debt maturity (STDebt) on investment efficiency (InvEff). For the FRQ variable, a coefficient of 0.010 was found with a significance level of $0.033 < 0.05$. This result indicates that FRQ still has a significant positive effect on InvEff even after including the interaction variable in the model equation. The next variable, STDebt, has a value of 0.013 with a significance of $0.426 > 0.05$. This result shows that even after adding the interaction variable, the results still show that debt maturity has no effect on investment efficiency. The IO variable is still consistent with the model where this variable is significant with $0.016 < 0.05$ and a coefficient of -0.0405173. For the interaction variables, both FRQxIO and STDebtxIO both show that the interaction is not significant with significance values of 0.822 and 0.964 respectively, where both are greater than $\alpha = 0.05$. So it can be concluded that the IO variable is not able to strengthen or weaken the relationship between FRQ and STDebt on InvEff. For the control variables, the results are consistent with

the first and second models where the only significant variables are Size and Tang, while the Age, Profit and Opercycle variables do not have a significant effect.

The test results can be seen in Table 4.10, which shows that all regression equation models have a Prob > F value of 0.0000, which is smaller than the 0.05 significance level. These results indicate that the independent variables jointly influence investment efficiency (InvEff).

The coefficient of determination (R^2) is used to measure the model's ability to explain variations in investment efficiency. The test results show that the Overall R^2 value in the first model is 0.1117, which means that financial statement quality (FRQ), debt maturity (STDebt), and control variables are able to explain 11.17% of the variation in investment efficiency. After the addition of institutional ownership (IO) variables in the second model, the R^2 value increases to 0.1295, indicating that the model is able to explain 12.95% of the variation in investment efficiency. In the third model, the addition of interaction variables only increases the R^2 to 0.1299 or an increase of 0.04%, so that the model's predictive ability is almost unchanged. This very small increase is in line with the results of the partial test which shows that both interaction variables are insignificant, so that institutional ownership is not proven to moderate the relationship between financial statement quality and debt maturity on investment efficiency.

Independent Sample t-Test

Table 8. Independent Sample t-Test

Variables	Country	Rank Sum	Expected	Z	Prob > z
Investment	Indonesia	141835.5	152,796	-4,068	0.0000
Efficiency (InvEff)	Malaysia	112705.5	101,745		
Financial Reporting	Indonesia	134130	152,796	-6,929	0.0000
Quality (FRQ)	Malaysia	120411	101,745		
Short-Term Debt	Indonesia	137248	152,796	-5,771	0.0000
(STDebt)	Malaysia	117293	101,745		
Institutional	Indonesia	191610.5	152,796	14,408	0.0000
Ownership (IO)	Malaysia	62930.5	101,745		

Source: Data processed 2026

A comparative test using the Mann–Whitney U Test showed that all research variables had significant differences between energy sector companies in Indonesia and Malaysia ($p < 0.001$). The test results showed that investment efficiency ($z = -4.068$) and financial reporting quality ($z = -6.929$) of companies in Malaysia were higher than those in Indonesia, as indicated by the Malaysian *rank sum value* exceeding its expected value. In addition, the proportion of short-term debt (STDebt) was also higher in Malaysian companies ($z = -5.771$), indicating differences in debt maturity structures between the two countries. Conversely, institutional ownership was higher in Indonesian companies ($z = 14.408$), as reflected by the Indonesian *rank sum value* exceeding its expected value. These findings indicate that although energy companies in Malaysia have higher investment efficiency, financial reporting quality, and proportion of short-term debt, energy companies in Indonesia tend to have a greater level of institutional ownership.

Discussion

The Influence of Financial Report Quality on Investment Efficiency

The regression results in the first model indicate that financial reporting quality (FRQ) has a positive and significant effect on investment efficiency ($\beta = 0.011$; $p = 0.018$). These results remain consistent in the second model after including institutional ownership variables ($\beta = 0.011$; $p = 0.031$), thus the first hypothesis is accepted. This finding indicates that the higher the quality of financial reporting, the higher the company's investment efficiency. This finding is in line with agency theory, which explains that financial reporting quality can reduce information asymmetry and conflicts of interest between management and shareholders by providing more transparent and reliable information (Jensen & Meckling, 1976). Quality financial information reduces the opportunity for adverse selection and opportunistic management behavior, such as investment decisions that are not based on the company's economic value (Bushman & Smith, 2001; Cherkasova & Rasadi, 2017). Thus, financial reporting quality serves as a governance mechanism that supports more objective evaluation of investment decisions and encourages more efficient resource allocation. The results of this study are also consistent with the literature stating that companies with better financial reporting quality tend to have higher levels of investment efficiency (Bahy, 2024; Dewi et al., 2024; Vitriani & Budiasih, 2022). This finding reinforces the notion that financial reporting quality is a crucial factor in improving a company's investment efficiency.

The Effect of Debt Maturity on Investment Efficiency

The test results show that debt maturity (STDebt) does not significantly influence investment efficiency, either in the first model ($\beta = 0.016$; $p = 0.331$) or the second model ($\beta = 0.014$; $p = 0.403$). Although the coefficient indicates a positive direction, the effect is not statistically significant, so the second hypothesis is rejected. This finding indicates that the proportion of short-term debt has not significantly influenced a company's investment decisions.

According to agency theory, short-term debt should increase the effectiveness of creditor oversight through *debt covenants* and higher evaluation frequency (Jensen & Meckling, 1976; Myers & Majluf, 1984). However, the results of this study indicate that this mechanism is not yet effective enough to increase investment efficiency. One reason is that an increase in the proportion of short-term debt does not always reflect additional new funding, but rather may originate from the reclassification of long-term debt that will mature within one year, thus not providing additional cash flow to finance investments (Fahdila et al., 2026). Furthermore, macroeconomic conditions during the study period, particularly rising interest rates in Indonesia and Malaysia, have the potential to increase funding costs, causing companies to prioritize meeting interest obligations over funding investment projects (FXStreet, 2025; Khairawati et al., 2025; Litbang, 2026).

Thus, investment decisions are influenced not only by the debt maturity structure but also by economic conditions and the availability of other funding sources. This finding aligns with research by Vitriani & Budiasih (2022), Pratiwi & Indrati (2023), and Dewi et al., (2024), which states that the proportion of short-term debt is not the main determinant of investment efficiency. These results also support *the Pecking Order Theory*, which explains that companies have funding preferences from internal funds, debt, to equity issuance, so investment efficiency is not solely determined by the amount of short-term debt (Myers & Majluf, 1984).

Institutional Ownership Moderates the Relationship between Financial Report Quality and Debt Maturity with Investment Efficiency

The results of the moderation test in the third model indicate that the interaction between financial statement quality and institutional ownership (FRQ×IO) as well as debt maturity and institutional ownership (STDebt×IO) does not significantly affect investment efficiency, with significance values of 0.822 and 0.964, respectively. Thus, hypotheses H3a and H3b are rejected, indicating that institutional ownership is unable to strengthen or weaken the relationship between financial statement quality and debt maturity on investment efficiency. Although agency theory states that institutional ownership acts as a monitoring mechanism that can reduce agency conflicts and information asymmetry through its monitoring function (Jensen & Meckling, 1976; Nurina et al., 2025), the results of this study indicate that this function is not strong enough to increase the benefits of financial statement quality or the effectiveness of debt maturity structure in encouraging investment efficiency. This can be explained because institutional investors act as supervisors, not as parties directly involved in the process of preparing financial reports, so their presence does not always provide additional benefits (*incremental effects*) on the quality of information produced by the company (Maula & Rohma, 2025). In addition, the heterogeneous characteristics of institutional investors, differences in investment objectives, and the tendency of some institutional investors to conduct passive monitoring cause the supervision carried out to be ineffective in influencing investment decisions (Bushee, 1998; Cao et al., 2018).

Based on Sharma et al.'s classification, institutional ownership in this study is more appropriately categorized as a predictor variable rather than a moderating variable. This is indicated by the significant direct effect of institutional ownership on investment efficiency in the second and third models ($\beta = -0.041$; $p < 0.05$), while the two interaction terms are insignificant. The negative coefficient indicates that increasing institutional ownership is actually associated with decreased investment efficiency. This finding indicates that under certain conditions, institutional investors can be oriented towards short-term interests or have business relationships with management, resulting in less effective oversight and potentially encouraging less efficient investment decisions (Bushee, 1998; Cao et al., 2018). The results of this study align with Nathaniel & Butar (2019) and Cao et al. (2018) who found that certain institutional ownership can negatively affect investment efficiency. Therefore, institutional ownership in energy companies in Indonesia and Malaysia plays a more direct role in influencing investment efficiency rather than as a moderating variable in the relationship between financial report quality and debt maturity on investment efficiency.

Comparison between Indonesia and Malaysia

The Mann–Whitney U Test results show that all research variables have significant differences between energy sector companies in Indonesia and Malaysia ($p < 0.05$). Companies in Malaysia have higher investment efficiency than Indonesia, as indicated by the rank sum value and descriptive statistics that show the average InvEff value is closer to zero. This finding indicates that a more integrated institutional and regulatory environment in Malaysia, particularly through the Renewable Energy Act 2011 and the Sustainable Energy Development Authority Act 2011, is able to reduce investment uncertainty and support more efficient investment decision-making. Conversely, the dynamics of energy regulations in Indonesia have the potential to increase policy uncertainty so that companies tend to be more conservative in realizing investments. This result is also consistent with agency theory which

states that better governance can reduce agency conflicts and increase investment efficiency (Jensen & Meckling, 1976; North, 2012) .

Significant differences were also found in financial reporting quality (FRQ), with Malaysian companies demonstrating better reporting quality than Indonesian companies. This finding supports institutional theory, which states that financial reporting practices are influenced by the quality of regulations, oversight mechanisms, and law enforcement (DiMaggio & Powell, 1983) . A stronger capital market oversight system in Malaysia encourages more transparent and reliable financial reporting, thereby reducing information asymmetry (Elawati et al., 2025; Leuz et al., 2003) . In terms of debt maturity structure, Malaysian companies have a higher proportion of short-term debt than Indonesian companies. This condition is thought to be influenced by Malaysia's more efficient banking system and financial markets, relatively lower borrowing costs, and more flexible access to short-term financing (Sugianto & Moin, 2025). Conversely, institutional ownership is higher in Indonesian companies. However, high institutional ownership does not necessarily reflect effective oversight because the monitoring function is also influenced by investor characteristics, investor protection, and the quality of law enforcement (Cao et al., 2018; Elawati et al., 2025; Leuz et al., 2003; Shleifer & Vishny, 1986) . This is evident in Indonesia, which has higher institutional ownership, but the quality of its financial reports and investment efficiency are still lower than those in Malaysia. Overall, the results of this study indicate that energy companies in Malaysia have higher investment efficiency, financial report quality, and a higher proportion of short-term debt, while institutional ownership is higher in Indonesian companies. Therefore, the fourth hypothesis is only partially *supported*.

CONCLUSION AND SUGGESTIONS

This study analyzes the effect of financial statement quality (FRQ) and debt maturity (STDebt) on investment efficiency (InvEff) with institutional ownership (IO) as a moderating variable in 713 observations of energy sector companies in Indonesia and Malaysia for the period 2021–2025 using Moderated Regression Analysis (MRA). The results show that financial statement quality has a positive and significant effect on investment efficiency, indicating that improving reporting quality can reduce information asymmetry and support more efficient investment decision-making. Conversely, debt maturity does not significantly affect investment efficiency, indicating that the proportion of short-term debt is not a major factor in determining investment efficiency. Furthermore, institutional ownership is not proven to moderate the relationship between financial statement quality and debt maturity with investment efficiency, so in this study, institutional ownership is more appropriately positioned as a predictor variable rather than a moderating variable. The results of the comparative test also show significant differences between energy companies in Indonesia and Malaysia. Companies in Malaysia have higher investment efficiency, financial statement quality, and proportion of short-term debt, while companies in Indonesia have a greater level of institutional ownership. In addition, the results of the robustness check using the alternative proxy of debt maturity (long-term debt) produce conclusions that are consistent with the main model, thus strengthening the robustness of the research results.

This study has several limitations, namely focusing only on energy sector companies in Indonesia and Malaysia, using a single proxy to measure investment efficiency and financial reporting quality, and having a relatively limited observation period. Therefore, future

research is recommended to expand the scope of sectors, countries, and periods studied, use alternative proxies to increase the validity of the results, and consider the addition of other variables that could potentially influence investment efficiency to obtain a more comprehensive understanding of its determinants.

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