



# Macroeconomic Factors, Energy Consumption and Firms Performance on Stock Return of Mining and Energy Sector: Evidence from Indonesia

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## ABSTRACT

The research aims to discover the effect of macroeconomic factors, energy consumption and fundamental analysis on stock return of mining and energy sector companies listed on Indonesia Stock Exchange (IDX) during 2014-2018 period. The population in this study firms in the mining and energy sector. The total population is 43 firms. 37 firms were selected as samples A total of the population was determined as samples by purposive sampling method. The analytical method used panel data regression analysis by SPSS program. The result shows: (1) Inflation has a significant effect on stock return (2) Interest rate has a significant effect on stock return (3) exchange rate has a significant effect on stock return (4) energy consumption has a significant effect on stock return (5) current ratio has no significant effect on stock return (6) debt to equity ratio has a significant effect on stock return (7) return on equity has a significant effect on stock return (8) earning per share has a significant effect on stock return.

**Keywords:** Energy Consumption, Mining Industry, Energy Sector

**JEL Classifications:** Q40, Q42

## 1. INTRODUCTION

The economic condition of a country is an important factor for investors in making investment decisions. The value of all companies listed on a country's stock market will depend on global economic conditions and the country's future perspective. Domestic and foreign investors consider the economic situation of a country before deciding on the purchase of shares. Some examples of macroeconomic factors include: inflation, money supply, industrial production, exchange rate, interest rate, gross domestic product, unemployment rate and foreign reserve. Some previous studies have examined the relationship of these macroeconomic variables with stock returns. The results of these studies showed that some macroeconomic variables have a significant effect while others do not.

In this research, we chose 3 macroeconomic factors i.e. inflation, interest rates, exchange rates and its relationship with stock returns.

Inflation is characterized by a decline in the purchasing power of a country's currency. As a result of inflation, operating expenses, general expense and administrative expenses will increase. The increase will reduce the profits generated by the company. Previous studies by Bilson et al., (2001) found inflation is significant in their association with emerging stock market returns. Kandir (2008) and Rjoub et al., (2009) found a significant relationship between the stock return and unanticipated inflation in Turkey. Khan et al., (2017) found the exchange rate and inflation rate have a positive effect on stock return in China. Flannery and Protapadakis (2002) found stock market returns are significantly correlated with inflation on NYSE, AMEX, and NASDAQ stock market. Tsoukalas (2003) found inflation and stock prices are strongly related whereas Chen et al., (1986) found a weak relationship between inflation and stock return. Different results obtained by Izedonmi and Abdullahi (2011) and Tursoy et al., (2008) found there is no significant effect of inflation on stock return.

An increase in interest rates will cause an increase in liabilities to be paid. The company will rethink to increase the amount of debt to increase its business capacity. Companies will be more conservative in conducting financial policies. Moreover, an increase in interest rates will make it more difficult for companies to repay their debts. Consequently, it will reduce the company's net profit. Companies will be reluctant to extend debt because they assume they are unable to pay it off. Some previous studies by Peiro (2016); (Rjoub et al., 2017); (Benaković and Posedel (2010); (Kandir, 2008); (Rjoub et al., 2009) showed interest rate has significant effect on stock return whereas Tursoy et al., (2008) found interest rate has no significant effect on stock return.

Previous studies by Khan et al., (2017); (Kandir, 2008); (Bilson et al., 2001); (Tsoukalas, 2003) showed exchange rate has significant effect on stock return. Some of the companies listed on the Indonesia Stock Exchange (IDX) have substantial foreign debt. They have income in the form of domestic currency but pay in dollars. This causes the fees paid to increase. The increase in costs will depress the company's profit so that it affects the stock price. Companies that carry out export and import activities will experience the impact of changes in the exchange rate. This theory was first popularized by Dornbusch and Fischer (1980). Different research results are shown by Izedonmi and Abdullahi (2011) and Tursoy et al., (2008) that found exchange rate have no significant effect on stock return.

In this research, we also examine the relationship between energy consumption and stock return. A previous study by Ersoy & Unlu (2013) found energy consumption affects stock exchange. Da et al., (2017) found a simple growth rate in industrial electricity usage can predict future stocks return. Energy consumption is an input in the production process in a country. An increase in the amount of energy consumption indicates that the amount of production has also increased. This will have an impact on the company's finances and its share price.

In addition to the macroeconomic factor and energy consumption variables, we also examine the relationship between firm's performance and stock returns. We assume in addition to external variables, internal variables also need to be considered. These variables are Current Ratio (CR), Debt to Equity Ratio (DER), Return on Equity (ROE) and Earning per Share (EPS).

Rochim and Ghoniyah (2017) found the current ratio has a significant effect on stock return. Current Ratio is the ratio used to evaluate a firm's ability to repay its short-term obligations by using its current assets. The low ratio means the firms are incapable to pay its liabilities immediately. Whereas, a high ratio means the company has a proper ability to pay off its short-term obligations. Companies with liquid shares get more concern from investors on IDX, Even more, IDX has specifically categorized the company's shares in the LQ 45 index. Different result found by Öztürk and Karabulut (2018) and Stefano (2015) that stated CR has no significant on stock return.

Dita and Murtaqi (2014) found debt to equity ratio has a positive and significant effect on stock return. Lewis and Tan (2016)

found the debt-equity composition of external financing predicts year-ahead stock return. Debt to Equity ratio is used to compare the proportion of liabilities and equity. a ratio value of  $<1$  means a proportion of the company's assets is provided more by shareholders than creditors and vice versa, if the ratio value is more than one, then the creditor has a larger portion in the ownership structure. Some investors, especially conservative investors, tend to prefer company ratio values that are  $<1$ . Investors try to avoid companies with a large proportion of liabilities. This will affect the demand and supply of shares in the capital market. Different results by Stefano (2015) that found Debt to Equity Ratio have no significant effect on stock return.

Martani and Khairurizka (2009) stated ROE has a significant effect on the adjusted return and abnormal return. Büyüksalvarci and Abdioglu (2010) found ROE has a significant effect on stock return. Allozi and Obeidat (2016) found ROE has a significant relationship with stock return. Rochim and Ghoniyah (2017) return on equity has a significant effect on stock return. A higher ROE ratio means the company can generate high profits when compared to the equity owned by the company. ROE is very attractive to shareholders or prospective shareholders in the future, as well as to management because the ratio is a crucial indicator of shareholders' value creation. Different result by Anwaar (2016) ROE have no significant effect on stock return and Hunjra et al., (2014) showed return on equity has no significant effect on the stock price.

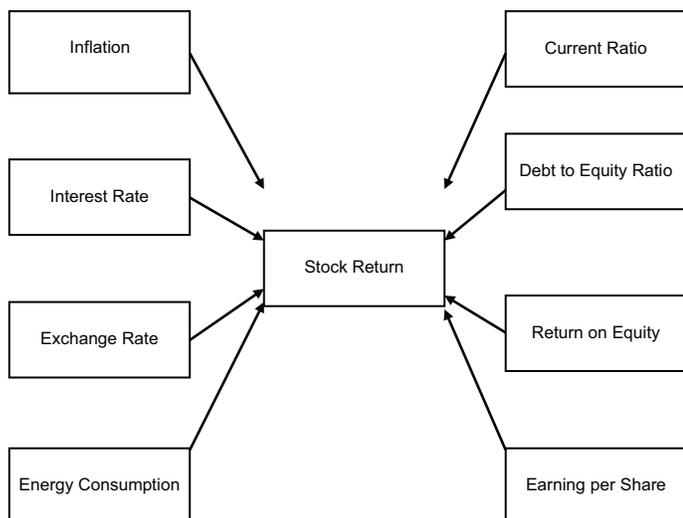
Büyüksalvarci and Abdioglu (2010); Allozi and Obeidat (2016); Idawati and Wahyudi (2015); Hunjra et al., (2014) found earning per share have a significant effect on the stock price. Earning per share ratio is obtained from the company's net profit divided by the number of outstanding shares. Earning per share is important because it can increase the company's stock price. If the company is able to produce high levels of profit per share, it means the company has more cash that can be reinvested in the business or distributed to shareholders in dividend payments. Opposite result found by Anwaar (2016) stated EPS has a negative and significant effect on stock return.

The theoretical framework was determined by reviewing some previous studies. According to previous studies, the following conceptual framework is presented to test the effect of inflation, interest rate, exchange rate, energy consumption, current ratio, debt to equity ratio, return on equity ratio, earning per share on stock return, as described in Figure 1.

The conceptual model above generates eight hypotheses that will be tested in this research. The hypotheses could be formulated as follows:

- H<sub>1</sub>: Inflation has a significant effect on stock return
- H<sub>2</sub>: Interest rate has a significant effect on stock return
- H<sub>3</sub>: Exchange rate has a significant effect on stock return
- H<sub>4</sub>: Energy consumption has a significant effect on stock return
- H<sub>5</sub>: Current ratio has a significant effect on stock return
- H<sub>6</sub>: Debt to equity ratio has a significant effect on stock return
- H<sub>7</sub>: Return on equity has a significant effect on stock return
- H<sub>8</sub>: Earning per share has significant effect on stock return

Figure 1: The conceptual model



## 2. METHODS

This study uses a quantitative approach. The data used in this study were obtained from the firm’s financial statements, IDX statistic, Central Agency on Statistic, handbook of energy and economic statistics of Indonesia published by the Ministry of Energy and Mineral Resources Republic of Indonesia.

The independent variables used are inflation (X1), interest rate (X2), exchange rate (X3), energy consumption (X4), current ratio (X5), debt to equity ratio (X6), return on equity (X7), earning per share (X8). The dependent variable is stock return (Y).

The population of this research firms in the mining sector: coal mining, crude petroleum and natural gas production, metal and mineral mining, land/stone quarrying and energy sector. The total population is 43 firms. The sample was determined by purposive sampling method. The criteria in determining the sample are as follows: (1) Firms which is active and available on IDX 2014-2018 (2) Firms have published its financial statements. Based on the criteria, 37 firms were selected as samples (Table 1).

This research uses analysis method which consists of descriptive analysis, classic assumption test and panel data regression. The program used is SPSS. F-test is used to test hypotheses simultaneously, t-test is carried out to test hypotheses partially.

## 3. RESULTS AND DISCUSSION

Before conducting data analysis, some variables are transformed using an algorithm to obtain better results. The transformed variables are exchange rate (X<sub>3</sub>) and energy consumption (X<sub>4</sub>). Descriptive output analysis statistics are shown in Table 2. The stock return (Y) mean is 0.117 with minimum value is -0.90 and maximum value 1.95 while the Standard Deviation (SD) obtained value 0.51297. Inflation (X<sub>1</sub>) mean is 4.7282 with minimum value is 3.20 and maximum value 6.40 while the SD obtained 1.45045. Interest rate (X<sub>2</sub>) mean is 6.1265 with minimum value 4.25 and maximum value 7.75 while the SD obtained is 1.41715.

Table 1: Sample selection

Criteria	Total
Firms in the mining and energy sector	43
Firm shares that are not actively traded and are not available for 2014-2018	(3)
Firms that do not have complete financial statement during the 2014-2018 period	(3)
Total samples	37

Source: Constructed by the author; data from www.idx.co.id

Exchange rate (X<sub>3</sub>) mean is 4.1279 with minimum value is 5.87 and maximum value 4.15 while the SD obtained is 0.02104. Energy consumption (X<sub>4</sub>) mean is 5.8933 with minimum value is 5.87 and maximum value 5.94 while the Standard Deviation (SD) obtained value 0.2502. Current Ratio (X<sub>5</sub>) mean is 0.1268 with minimum value -1.30 and maximum value 2.05 while the SD obtained value 0.42345. Debt to Equity Ratio (X<sub>6</sub>) mean is 1.6288 with minimum value is -17.24 and maximum value is 28.19 while the SD obtained 4.00820. Return on Equity (X<sub>7</sub>) mean is -4.0844 with minimum value is -534.36 and maximum value is 290.87 while the SD obtained value 73.54083. Earning per Share (X<sub>8</sub>) mean is 147.5476 with minimum value is -778.80 and maximum value is 3357.14 while the SD obtained value 510.94361.

Classical assumption testing has been carried out to determine the feasible model in panel data regression testing. The first classic assumption test is the normality test. In this test we discard some data so that the data becomes normal. The number of data that was originally 185 became 170. The results of the normality test are shown in the Table 3 below. Result of normality test with Kolmogrov Smirnov test showed asymp sig value 0.2000 > 0.05. This means that the data distribution is normal.

Multicollinearity test results showed no symptoms of multicollinearity. The tolerance coefficient value for each variable > 0.1. VIF coefficient value of each variable < 10. Result of multicollinearity are shown in the Table 4 below:

Based on scatterplot figure, the spots are scattered and do not shape certain patterns. So it can be concluded that there is no heteroscedasticity problem in the data. Heteroskedasticity test output is shown in Figure 2 below:

The result of testing coefficient of determination is shown in Table 5. The result output shows that stock return is influenced by inflation, interest rate, exchange rate, energy consumption, current ratio, debt to equity ratio, return on equity and earning per share by 29,2%. The rest is influenced by other variables outside the research framework.

In the F test results, it appears that the probability value <0.05. This means that the independent variable used as a predictor variable has a significant effect on the independent variable. The results of this test are also a requirement for partial hypothesis testing using the t-test. The result is shown in Table 6.

Hypothesis testing results are shown in Table 7. For Hypothesis 1, the test results show that inflation has a negative and significant effect

**Table 2: Descriptive statistics**

Variable	N	Minimum	Maximum	Mean	Standard deviation
Inflation_X1	185	3.20	6.40	4.7282	1.45045
Interest_X2	185	4.25	7.75	6.1265	1.41715
Exchange_log_X3	185	4.09	4.15	4.1279	0.02104
Energy_log_X4	185	5.87	5.94	5.8933	0.02502
CR_X5	185	-1.30	2.05	0.1268	0.42345
DER_X6	185	-17.24	28.19	1.6288	4.00820
ROE_X7	185	-534.36	290.87	-4.0844	73.54083
EPS_X8	185	-778.80	3357.14	147.5476	510.94361
Stock_Return_Y	185	-0.90	1.95	0.0117	0.51297
Valid N (listwise)	185				

**Table 3: Normality test**

One-Sample Kolmogorov-Smirnov Test		
Parameter		Unstandardized Residual
N		170
Normal parameters <sup>a,b</sup>	Mean	0.000000
	Standard deviation	0.43154357
Most extreme differences	Absolute	0.057
	Positive	0.057
	Negative	-0.041
Test Statistic		0.057
Asymp. Sig. (2-tailed)		0.200 <sup>c,d</sup>

a. Test distribution is Normal, b. Calculated from data, c. Lilliefors Significance Correction, d. This is a lower bound of the true significance.

**Table 4: Multicollinearity test**

Coefficients <sup>a</sup>			
Model		Collinearity statistics	
		Tolerance	VIF
1	Inflation_X1	0.103	9.850
	Interest_X2	0.110	9.759
	Exchange_X3	0.592	1.690
	Energy_X4	0.257	3.893
	CR_X5	0.957	1.045
	DER_X6	0.814	1.229
	ROE_X7	0.770	1.299
	EPS_X8	0.918	1.090

a. Dependent Variable: Stock\_Return\_Y

**Table 5: Coefficient of determination test result**

Model summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.541 <sup>a</sup>	0.292	0.257	0.44214

a. Predictors: (Constant), EPS\_X8, Exchange\_X3, DER\_X6, CR\_X5, Interest\_X2, ROE\_X7, Energy\_X4, Inflation\_X1

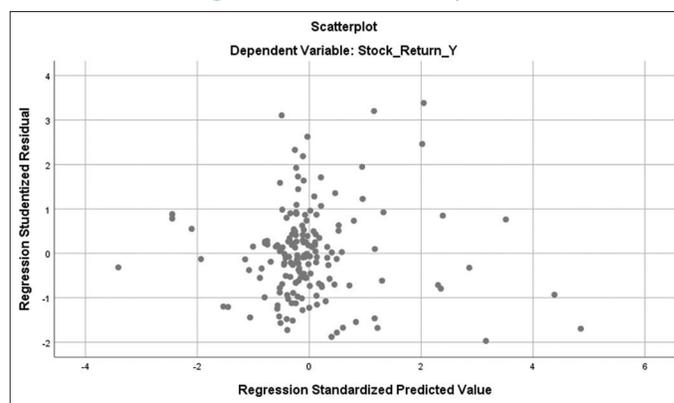
on stock returns. This can be observed from prob. value of  $0.000 < 0.05$ . Therefore,  $H_1$  is accepted. Inflation shows a decrease in the purchasing power of a country's currency. As a result of inflation, operational costs, general costs and administrative costs will increase. This increase will reduce the profits generated by the company. Consequently, it will have an impact on the company's stock return. The result of this study confirms previous studies by Bilson et al., (2001); Kandir (2008); Rjoub et al., (2009); Khan et al., (2017); Flannery and Protopapadakis (2002); Tsoukalas (2003); Chen et al., (1986) that stated inflation have a significant effect on stock returns.

**Table 6: F test result**

ANOVA <sup>a</sup>						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	12.997	8	1.625	8.311	0.000 <sup>b</sup>
	Residual	31.473	161	0.195		
	Total	44.470	169			

a. Dependent Variable: Stock\_Return\_Y, b. Predictors: (Constant), EPS\_X8, Exchange\_X3, DER\_X6, CR\_X5, Interest\_X2, ROE\_X7, Energy\_X4, Inflation\_X1

**Figure 2: Heteroskedasticity test**



For Hypothesis 2, the test result show interest rate has a positif and significant effect on stock returns. This can be observed from prob. value of  $0.033 < 0.05$ . Therefore,  $H_2$  is accepted. An increase in interest rates will cause an increase in liabilities to be paid. The company will rethink to increase the amount of debt to increase its business capacity. Companies will be more conservative in conducting financial policies. In addition, an increase in interest rates will make it more difficult for companies to pay off their debts. As a result, it will reduce the company's net profit. Companies will be reluctant to give loans because they think they are unable to pay it off. The result of this study confirms previous studies by Bilson (2001); Peiro (2016); (Rjoub et al., 2017); (Benaković and Posedel (2010); (Kandir, 2008); (Rjoub, 2009) that stated interest rate have a significant effect on stock returns.

For Hypothesis 3, the test result show the exchange rate has a negative and significant effect on stock returns. This can be observed from prob.  $0.004 < 0.05$ . Therefore,  $H_3$  is accepted. Some companies listed on the IDX have large foreign debts. They have income in the form of domestic currency but pay in dollars. This causes the fees paid to increase. Increased costs will

**Table 7: Multiple regression test result**

Coefficients <sup>a</sup>						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	80.159	16.788		4.775	0.000
	Inflation_X1	-0.380	0.089	-1.075	-4.260	0.000
	Interest_X2	0.167	0.078	0.461	2.153	0.033
	Exchange_X3	-6.214	2.104	-0.255	-2.954	0.004
	Energy_X4	-9.124	2.921	-0.445	-3.124	0.002
	CR_X5	-0.003	0.082	-0.002	-0.032	0.975
	DER_X6	0.022	0.009	0.174	2.358	0.020
	ROE_X7	0.001	0.001	0.207	2.705	0.008
	EPS_X8	0.000	0.000	0.151	2.180	0.031

a. Dependent Variable: Stock\_Return\_Y

depress corporate profits and thus affect stock prices. Companies that carry out export and import activities will experience the effects of exchange rate changes. The result of this study confirms previous studies by Khan et al., (2017); (Kandir, 2008); (Bilson et al., 2001); (Tsoukalas, 2003) that stated the exchange rate has a significant effect on stock returns.

For Hypothesis 4, the test results show that energy consumption has a negative and significant effect on stock returns. This can be observed from prob. value  $0.002 < 0.05$ . There,  $H_4$  is accepted. Energy consumption is an input in the production process in a country. An increase in the amount of energy consumption shows that the amount of production has also increased. This will have an impact on the company's finances and its share price. The result of this study confirms previous studies by Ersoy & Unlu (2013); Da et al., (2017) that stated energy consumption have a significant effect on stock returns.

For Hypothesis 5, the test results show that the current ratio has no significant effect on stock returns. This can be observed from prob.  $0.975 > 0.05$ . Therefore,  $H_5$  is rejected. Current Ratio is the ratio used to evaluate a company's ability to repay its short-term liabilities using its current assets. A low ratio means that the company cannot pay its liabilities immediately. In fact, a high ratio means the company has the right ability to pay off its short-term obligations. But the results of the output test found no evidence of a relationship between the current ratio and stock return. The result of this study confirms previous studies by Öztürk and Karabulut (2018) and Stefano (2015) that stated the current ratio has no significant effect on stock return.

For Hypothesis 6, the test results show that the debt to equity ratio has a positive and significant effect on stock returns. This can be observed from prob  $0.020 < 0.05$ . Therefore,  $H_6$  is accepted. Investors try to avoid companies with a large proportion of liabilities. This will affect the demand and supply of shares in the capital market. The result of this study confirms previous studies by Dita and Murtaqi (2014); Lewis and Tan (2016) that stated debt to equity ratio have a significant effect on stock return.

For Hypothesis 7, the results show that return on equity has a positive and significant effect on stock returns. This can be observed from  $0.008 < 0.05$ . Therefore,  $H_7$  is accepted. A higher ROE ratio means the company can generate high profits when

compared to the equity owned by the company. ROE is very attractive to shareholders or prospective shareholders in the future, as well as to management because the ratio is an important indicator of shareholder value creation. The result of this study confirms previous studies by Martani and Khairurizka (2009); Büyüksalvarci and Abdioglu (2010) Allozi and Obeidat (2016) Rochim and Ghoniyah (2017) that stated return on equity have a significant effect on stock return.

For Hypothesis 8, the results show that earning per share has a positive and significant effect on stock returns. This can be observed from  $0.031 < 0.05$ . Therefore,  $H_8$  is accepted. If the company is able to produce a high level of earnings per share, that means the company has more cash that can be reinvested in the business or distributed to shareholders in dividend payments. The result of this study confirms previous studies by Büyüksalvarci and Abdioglu (2010); Obeidat (2016); Idawati and Wahyudi (2015); Hunjra et al., (2014) that stated earning per share have a significant effect on stock return.

## 4. CONCLUSION

The study examines the effect of macroeconomic factors, energy consumption and fundamental analysis on stock return of mining sector companies listed on IDX during 2014-2018 period. The result shows inflation, interest rate, exchange rate, energy consumption, current ratio, debt to equity ratio, return on equity and earning per share simultaneously have a significant effect on stock return. Inflation, interest rate, exchange rate, energy consumption, debt to equity ratio return on equity and earning per share partially have a significant effect on stock return. However, current ratio have no significant effect on stock return.

Companies must pay attention to macroeconomic factors and take the right steps in the situation. Investment and funding policies also play an important role in the company's financial fundamentals which will also have an impact on the company's stock return in the future.

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