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IMPACT OF GLOBAL ENERGY INDEX AND CRUDE OIL & COAL PRICE TO INDONESIA STOCK INDICES

Ghani Fikri Yasri, Eka Pria Anas
Faculty of Economics and Business, Universitas Indonesia, Indonesia
Email: ghani.fikri@ui.ac.id, eka.pria@ui.ac.id

ABSTRACT

Oil prices have stagnated from 2015 to early 2020. After the crisis caused by Covid-19, oil prices slowly increased and even reached their highest point in the last 10 years in mid-2022. Coal prices reached an all-time high at the end of 2021 before then increasing again in early 2022. The significant increase in coal and oil prices was triggered by the war between Russia and Ukraine. The embargo on Russian oil and coal has contributed to the decline in coal and oil stocks as fuel for power plants in Europe. This aims to determine the impact of volatility of oil prices, coal prices, and global energy price index on the stock price index in Indonesia. Does global energy price index, which consists of crude oil and coal prices affect Indonesia stock indices more precisely. This study show volatility of oil prices and coal prices affects company stock prices in Europe. The analysis examined Jakarta Composite Index, LQ45 Index, Jakarta Islamic Index, and Sectoral Index for the 2018-2022 periods. Several techniques, including ordinary least square, linear regression, and multiple regression. The increases of the oil prices, coal prices, and global energy indices affect the stock price index in Indonesia. The study will help investor to understand the impact of oil, coal price volatility and global energy index to several Indonesia stock indices.

KEYWORDS *stock market; energy market; energy price volatility*

INTRODUCTION

In the midst of the rampant campaign for renewable energy, fossil fuels and petroleum are still the largest sources of energy used. Oil and coal prices was increased in 2022. Coal prices even reached their highest point in September 2022

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(Lin & Chen, 2019). The increase in oil and coal prices was partly due to the war between Russia and Ukraine (Blanchard & Pisani-Ferry, 2022). Russia as one of the major countries providing oil and coal to the European Union has received an embargo from the United States so that allied countries do not buy oil and coal from Russia (Dano, 2022; Khudaykulova et al., 2022). This caused a scarcity of oil and coal so that OPEC oil prices increased due to the explosion in demand.

The price of crude oil reached its highest point in June 2008 before plunging drastically to the remaining 26.7% in January 2009. After the 2009 crisis, crude oil returned to a price range of US$100 until 2014 (Jerome, 2016). Since 2015 the price of crude oil has decreased significantly to reach its lowest point in February 2016 which reached 32.92 US dollars. The recent decline has been driven by a number of factors: several years of upward surprises in the production of unconventional oil; weakening global demand; a significant shift in OPEC policy; unwinding of some geopolitical risks; and an appreciation of the U.S. dollar (Baffes et al., 2015).

Coal price volatility affects the stock price returns of utility companies in Europe, but not as big as the influence given by the volatility of oil prices, even though coal is the main fuel for most power plants in Europe (Oberndorfer, 2009). The IMF issues a global energy price index which consists of a combination of coal, natural gas and oil prices (Coady et al., 2015). The global energy price index is expected to provide a better picture of stock index movements compared to the separate prices of oil and coal.

Sadorsky (1999) stated that oil price movements are an important and interesting topic to study because increases in oil prices are often indicative of inflationary pressure in the economy which in turn could indicate the future of interest rates and investments of all types. He also stated that after 1986, oil price movements explain a larger fraction of the forecast error variance in real stock returns than do interest rates. There is also evidence that oil price volatility shocks have asymmetric effects on the economy.

The empirical evidence on the relationship between oil price movements and stock price movements is mixed. Generally, the empirical results indicate that an oil price factor is an important driver behind stock price movements (Sri & Astawinetu, 2020). At the economy-wide level, an oil price risk factor is important but it does not have the same impact on all countries' stock markets (Sadorsky, 2004).

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Sun et al. (2019) found that there was no significant positive relationship between new energy stock prices and carbon futures prices that may be attributed to the fact that today's carbon futures prices are at a low level and it cannot reflect the increase in external costs resulting from carbon emissions accurately. Therefore, carbon futures prices had limited effect on the substitution effect between new energy and traditional fossil fuels.

Dawar et al. (2021) state the lagged effect of WTI prices on clean energy equity returns is generally significant, which indicates that clean energy stock returns react differently to new information on oil returns under different market

conditions. This research aims to determine the impact of the volatility of oil prices, coal prices, and global energy price index on the stock price index in Indonesia.

RESEARCH METHOD

This study uses quantitative research method. Data used in this study are weekly and monthly data (Creswell & Poth, 2016). Independent variable that used in this study are brent crude spot price as the oil price variable, newcastle freight on board (fob) for the coal variable, and global energy price comodity index from International Monetary Fund (IMF). The dependent variables are several indices from Indonesia Stock Exchange, including Jakarta Composite Index (JKSE), LQ45 Index, Jakarta Islamic Index (JII), and 11 indices from IDX Industrial Classification. 11 indices from IDX Industrial Classification are IDX Energy, IDX Basic Materials, IDX Industrials, IDX Consumer Non-Cyclicals, IDX Consumer Cyclicals, IDX Healthcare, IDX Financials, IDX Properties & Real Estate, IDX Technology, IDX Infrastructures, and IDX Transportation & Logistic.

This study uses the method of correlation and regression analysis. Both are used to measure the degree of relationship between variables. Regression is used as a measure of the form of the relationship and correlation is used to measure the closeness of the relationship between variables (Sugiyono, 2019).

Regression measures the relationship between two or more variables expressed in the form of a relationship/ function. Variables in regression are divided into two, namely independent and dependent, which are usually symbolized in the form of x and y. The independent and dependent variables in the regression are expected to have dependence.

Correlation measures the level of relationship (degree of closeness) between variables. In correlation, there is no need for dependence between variables. Even without dependence, correlation still pays attention to the relationship or relationship (relevance) between variables.

The linear regression equation can be written as follows:

$$Y_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_k X_k + \varepsilon$$

Where as:
Y = Dependent Variable
X = Independent Variable
β = Regression coefficient
ε = Random Error Vector

RESULT AND DISCUSSION

This research was conducted to see the effect of significant oil and coal price movements during 2022 on several stock indices listed on the Indonesia Stock Exchange. Due to data limitations, the 4 indices from IDX-IC namely IDXCLYCLIC, IDXHEALTH, IDXTECHNO, and IDXTRANS were not included in the study sample. There are 2 data sets, weekly and monthly, to be tested.

Table 1. Classical Assumption Test Results

Model	Dependent Variable	Normality Test	Multicollinearity	Heteroscedasticty	Autocorrelation
1	IHSG	Yes	No	No	No
2	LQ45	Yes	No	No	No
3	JII	Yes	No	No	No
4	IDXENERGY	Yes	No	No	No
5	IDXBASIC	Yes	No	No	No
6	IDXINDUST	Yes	No	No	No
7	IDXNONCYC	Yes	No	No	No
8	IDXFINANCE	Yes	No	No	No
9	IDXPROPERT	Yes	No	No	No
10	IDXINFRA	Yes	No	No	No

Classical assumption testing is used so that research results are in accordance with scientific research standards. If the classical assumptions are met, then the regression estimate will be BLU (Best Linear Unbiased Estimator). Testing the classical assumptions in this study includes normality, multicollinearity, heteroscedasticity and autocorrelation tests. Table 1 shows there are multicollinearity between independent variable with IHSG, JII, and LQ45.

Table 2. Composite Index, the LQ45 index and the Jakarta Islamic Index

	IHSG	LQ45	JII
Constant	-45,241	139,914	365,608
(Koef. Regresi)			
p-value			
Brent	(1664,639)	(420,623)	(350,535)
	0,0046*	0,0014**	0,0021*
Newcastle Coal	(0,551)	(-0,133)	(-0,221)
	0,4908	0,4551	0,1479
Energy Index	(1413,425)	23,578)	(-159,409)
	0,0894	0,8975	0,3162
Obs	62	62	62
R Square	0,802	0,513	0,295
F-test	78,611	20,434	8,126
	0,0000	0,0000	0,0001

Note: *, ** and *** show significance at the 10%-, 5%-, and 1%-level, respectively.

Table 2 shows that crude oil prices have a significant effect on the Jakarta Composite Index, the LQ45 index, and the Jakarta Islamic Index, while increases in coal prices and the global energy index have no significant effect on the Jakarta Islamic Index, the Composite Stock Price Index, or the Jakarta Islamic Index.

Table 3. Multiple Linear Regressions Test Results

	IDX ENERGY	IDX BASIC	IDX INDUST	IDX NONCYC	IDX FINANCE	IDX PROPERT	IDX INFRA
Constant	6,554	1106,964	6,738	790,391	1129,283	942,172	753,808
(Koef. Regresi)							
p-value							
Brent	(-0,0033)	(1,888)	(-0,0001)	(-0,186)	(1,026)	(-1,137)	(-0,044)
	0,282	0,136	0,864	0,770	0,470	0,181	0,952
Newcastle Coal	(0,0038)	(0,089)	(0,0008)	(0,313)	(-0,401)	(-0,480)	(-0,417)
	0,0000**	0,702	0,0000**	0,0159*	0,144	0,0056**	0,0065**
Energy Index	(-0,0005)	(-0,205)	(0,0002)	(-0,622)	(1,428)	(0,195)	(1,217)
	0,637	0,662	0,369	0,0165*	0,013*	0,539	0,0002**
Obs	25	26	25	26	26	26	26
R Square	0,890	0,256	0,919	0,325	0,582	0,745	0,635
F-test	57,079	2,525	79,496	3,545	10,251	21,442	12,764
	0,000	0,083	0,000	0,031	0,000	0,000	0,000

Note: *, ** and *** show significance at the 10%-, 5%-, and 1%-level, respectively.
Table 3 shows the result of multiple linear regressions with IDX-Industrial Classification as the dependent variable. Coal prices have a significant effect on IDXENERGY, IDXINDUST, IDXNONCYC, IDXFINANCE, IDXPROPERT and IDXINFRA, while the global energy index only has a significant effect on IDXNONCYC, IDXFINANCE and IDXINFRA, while oil prices do not have a significant effect on sectoral indices.

CONCLUSION

Based on the results of the analysis and discussion that has been carried out in the previous chapter, the researchers obtained the following conclusions; Crude oil prices have a significant effect on the Jakarta Composite Index (IHSG), the LQ45 index and the Jakarta Islamic Index, while increases in coal prices and the global energy index have no significant effect on the Jakarta Islamic Composite Index (IHSG), the LQ45 index or the Jakarta Islamic Index. Coal prices have a significant effect on IDXENERGY, IDXINDUST, IDXNONCYC, IDXFINANCE, IDXPROPERT and on IDXINFRA, while the global energy index only has a significant effect on IDXNONCYC, IDXFINANCE and on IDXINFRA and for the price of petroleum does not have a significant effect on the Indonesian Industrial Classification (IDX-IC) Index.

This research has shortcomings and limitations, including; 1. This study only uses monthly data from Brent oil prices, Newcastle coal prices, global price enrgy index, the Jakarta Composite Index, the LQ45 index, the JII index, and the Indonesia Industrial Classification Index. 2. This study only uses 7 out of 11 classifications from the Indonesia Industrial Classification Index due to data limitations. 3. The Indonesia Industrial Classification Index is a new classification index that has been in effect since 2021 on the Indonesian stock exchange, so data is still limited. 4. This study does not compare the effect of oil and coal prices on the Indonesia Industrial Classification Index with the previous sectoral industry classification.

Researchers have suggestions for further research, including; Conducting an analysis of the effect of commodity prices on the movement of the Indonesia Industrial Classification Index as a whole, Comparing the effect of commodity prices on the movement of the Indonesia Industrial Classification Index with the effect of commodity prices on the movement of sectoral stock indices on the old Indonesia Stock Exchange, and Using daily data from oil prices and coal to the industrial classification index so that it is expected to get more accurate results to explain the effect of oil and coal price movements on the new industrial classification index.

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