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The Effect of World Oil Prices, Silver Price, Exchange Rates, Dow Jones Industrial Index to the SRI-Kehati Index from Indonesian Stock Exchange period of January 2021 to December 2021

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Abstract

Currently, awareness of the importance of environmental sustainability is a trend that is carried out by many countries in the world with the term Go Green. Awareness of Importance protecting the environment is currently supported by the publication of public policies related to this matter. So that SRI-Kehati Index was formed in 2009.

Objects of this research are the influence of world oil prices, silver prices, USD exchange rate, the Dow Jones Industrial Index on the SRI Kehati Index in the period of January 2021 to December 2021, and get a total of 247 data. We use method for this research is the Ordinary Least Square method with classical test, regression analysis, and determination test. The test conclude that world oil prices, silver prices, the Dow Jones index and the USD exchange rate have a significant influence for partially. Simultaneously. World Oil prices, silver prices, the Dow Jones Industriall index and the USD exchange rate were tested together against the Y variable SRI-Kehati Index. With adjusted results (r^2) 0.424210 or 42.42% while the rest is shown in the variables not examined in this study.

Keywords: Dow Jones Industrial Average Index, Exchange Rates, Silver Prices, SRI Kehati Index, World Oil Prices

Introduction

Currently, public awareness of the importance of environmental issues and their preservation is getting higher. Many strategies and policies support this. Indonesia, as one of the countries that focuses on environmental conservation. Quoted from an article in (Nurcholis Maarif, 2021) Currently, Indonesia's Environmental Quality Index (IKLH) is better in value than 2020 by 3.72 points from initially at position 66.55 in the 2019 period, increasing in 2020 to 70, 27.

We also known, The SRI-Kehati Index As one of index with the green index first in ASEAN and the second in Asia (Utama & Puryandani, 2020), this index is also famously for the SRI or social responsible investing category. It is one of the Indonesian Stock Exchange, which can be influenced by other index.

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Figure 1. The SRI-Kehati Index Graph

Source: <https://www.investing.com>

The silver market cannot be compared to gold, because gold is still the prima donna of precious metal investment, but silver is often used as industrial raw material and is currently trending in the metal market. According to data from (Team Money+, 2021) the price of silver has increased every year to 448%, from 2008 to 2011. The value of gold on the other hand only rose 166%. This huge demand is a lot in the global market. 56% of the use of industrial materials is from silver worldwide, not comparable to the use of gold for industry which is only used about 12%.



Figure 2. Silver Price Graph

Source : <https://id.investing.com>

According to article from (Melyani, 2021) the price of silver jumped 7.4% in the Spot market with a value of US\$28.98 per ounce. Throughout 2021, oil prices have increased drastically. In a year, Brent type oil increased 50.12% in a year. Light sweet crude (WTI) is 55% so far throughout the year. One of the triggers for the high increase in crude oil prices in 2021 is driven by the existence of mobility regulations which have begun to relax.

Since the occurrence of the Covid 19 Pandemic in Indonesia in 2020, people's mobility is very limited and the world's economy has stopped temporarily. World oil demand also

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dropped dramatically from 8.7 million barrels per day (mb/d) to 91 mb/d, based on data from the International Energy Agency (IEA) in the article (Robertus Andrianto, 2022)



Figure 3. Crude Oil Graph
Source: <https://id.investing.com>

As the most frequently and oldest index, The Dow Jones Industrial Average or DJIA index actually use by all the index indices in the world. From several existing studies, this index is very influential on the JCI. (Utama & Puryandani, 2020)



Figure 4. Graph of the dow jones index
Source : [Https://id.investing.com](https://id.investing.com)

According to Arifin and Hadi in (Marcelina Purnama & Hanitha, 2021) the notion of USD IDR as the converted as comparing of IDR currency related to USD currency. While the understanding of the exchange rate is the value of the ratio of trade to two currency values. This means that one currency is compared to another currency.



Figure 5. Graph USD/IDR Exchange Rate

Source: <https://id.investing.com>

During 2021 the exchange rate movement was stable, unaffected by the conditing that influenced by Corona Virus pandemic, but the IDR exchange USD rate remained at an average of 14,000 IDR each USD.

Literature Review

People before deciding to become an investor, usually influenced by information contained in the stock price, before they investing in the capital market. The condition of Stock price movement will focus in the movement to tradeoff between the return and the risk. So that, the investor will focus in this issue. the re are 22 classifications of the stock on Indonesia Stock Exchange (IDX). One of the stock is the SRI_KEHATI stock index.

This Reseach want to know relations of World Oil Prices, Silver Prices, USD Exchange, Dow Jones Index, on the SRI_Kehati Index for the 2021 research period by processing 247 data. In this research, the dependent variable (Y) is the Sri Kehati Index, a stock price index containing 25 issuers that registered to Indonesian Stock Exchanges (IDX) collaborated with the Indonesian Bio Diversity Foundation (KEHATI). In This index, there are many sectors from corporate example like mining, finance, manufacture, etc.

Understanding World Oil Prices

Dependence on world oil is currently very large, although now there is potential for renewable energy that can replace the use of oil. Petroleum as a fossil fuel will remain the usable significant source of energy, oil contributing 33% , coal 28% and natural gas 23% of total energy sources (Indonesia Investments, 2016).

Table 1. Largest Petroleum Producer in 2015

1. United States	12.704.000 bpd
2. Saudy Arabia	12.014.000 bpd
3. Russian	10.980.000 bpd
4. Canada	4.385.000 bpd
5. China	4.309.000 bpd
24. Indonesia	825.000 bpd

Source : <https://www.indonesia-investments.com>

The large contribution of the world oil and gas sector, in Indonesia has a positive effect on the Indonesian economy in terms of income from world exports and the country's foreign exchange reserves. However, its contribution to the State Budget has decreased over the past

decade, as has its contribution to the State Budget. The combination of world oil and gas contributes to around thirteen percent of domestic income as seen in the article of (Indonesia Investments, 2016) so in this research we conclude world oil prices and its relation to SRI Kehati Index

H1 : World Oil Prices affected to the SRI-Kehati Index for 2021 period

Understanding the Silver Price

As a portfolio diversification tool in overcoming uncertainty in the financial markets silver has become an attractive instrument for investors in reducing risk. To minimize risk at the level of income targeted by investors in periods of significant volatility. Precious metals can be an effective diversification tool in a portfolio created as an alternative investment tool, in addition to stocks, bonds, derivatives and foreign currencies. The silver market cannot be compared to gold, because gold is still the prima donna for precious metal investments, but silver is often used as industrial raw material and is currently trending in the metal market. (Baur, 2010) so in this research we conclude silver prices and its relation to SRI Kehati Index.

H2 : Silver Prices affected on the SRI Kehati Index for 2021 period

Understanding USD Exchange Rate

We also know that the USD exchange rate can be compared by the value of the rupiah price with the price of a foreign currency, that each country has its own currency exchange rate for the comparison of the value of one currency with other countries called the foreign exchange rate. Research in (Padliansyah et al., 2020) said that the middle exchange rate of the rupiah against the dollar used as research data using monthly statistical data for the observation period from January 2014 to December 2019 had a positive effect.

This is known as foreign exchange (forex) transaction. Otherwise the domestic currency will depreciate if the forex rate increased. So in this research we use USD Exchange rate and its relation to SRI Kehati Index.

H3 : USD Exchange rate affected on the SRI Kehati Index for 2021 period

Definition of the Dow Jones Index

As one of the largest price indexes in the world, DJI has some effect on many stock indices around the world, including SRI-Kehati Index (Wibowo, 2016). The influence like it is estimated to be positive on the SRI Kehati Index in the meaning of an increase in the DJIA index will affect the SRI-Kehati Index, this is indicated while the positive sentiment from investors towards world economic conditions. So in this research we conclude Dow Jones Index and its relation to SRI Kehati Index

H4 : Dow Jones Index affected to SRI-Kehati Index for year of 2021

Understanding The SRI-Kehati Index

The SRI Kehati index which consists of shares of 25 issuers with good performance, has the concept of sustainable business and company selection standards (sustainable and responsible investment). The Indonesia Stock Exchange (IDX) as of 2020 recorded 34 stock indexes, one of which is SRIKEHATI index. This index was published by the Indonesian Biodiversity Foundation or KEHATI on 08 June 2009. This index includes the Indonesia Stock Exchange, the existence of the KEHATI Foundation contributes in the form of consulting services, facilitation, grants, and other means to improve Indonesia's biodiversity conservation agenda and apply ASEAN reasonable and sustainable principles. Green investment (green

index). (Hermawan, 2020) This index is one of the alternative benchmarks for investors and investment managers to determine public companies.

H5 : World Oil, Silver Prices, Dow Jones Index and USD Exchange Rates as simultaneous affected on the SRI Kehati Index for 2021 period.

A criterion variable, output, and consequence is included in the dependent variable category. According to Sugiyono in (Marselia Purnama et al., 2021) This index is published on the website. So for this research we can figure conceptual framework as shown below.

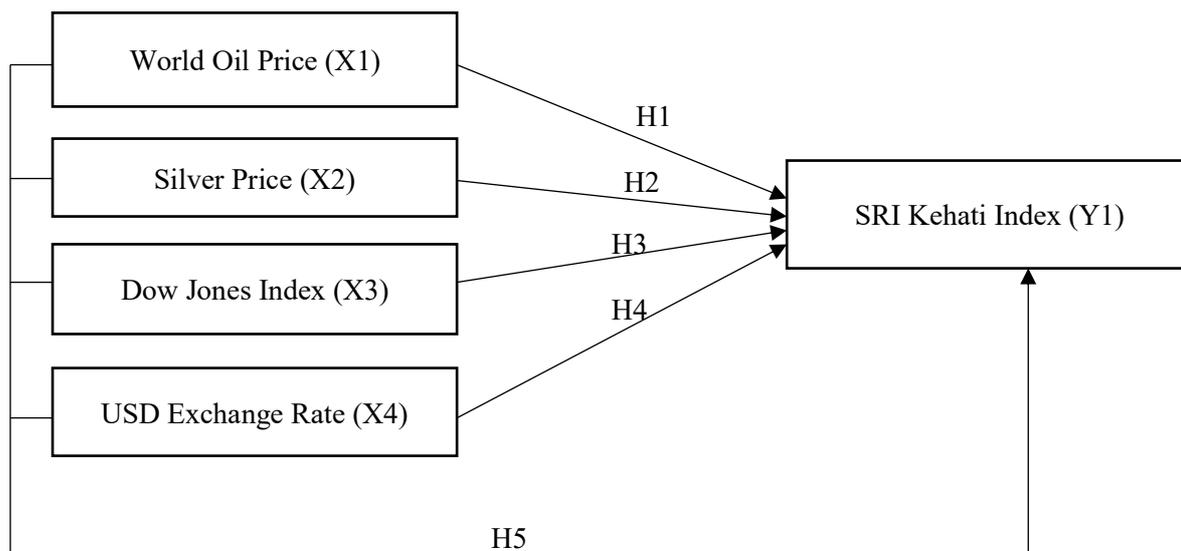


Figure 5. Conceptual Framework

Methods

The data collection in this research obtained from January to December 2021, so we used a quantitative method by using Time Series data. In this study, the data used is secondary data, which is data based on a source. The data observation of this study focuses on the relation between World Oil Price, Silver Price, Dow Jones Industrial Average, USD/IDR Exchange Rate, towards the return of SRI Kehati. This research want to show how big the influence of World Oil Prices, Silver Prices, USD Exchange, Dow Jones Industrial Average Index, on the SRI- Kehati Index for the 2021 by processing 247 data.

Data Analysis technique

1. Normality test

On this test we use the test of JB or known as The Jarque–Bera. This test use to explain a large sample on the normality test. The criterion for the data to be normally distributed is if the probability is > 0.05 .

The normality of a variable is generally detected by graphs or statistical tests, while the normality of the residual values is detected by the graph method. To check we use the Kolmogorowsmirnov test according to Ghozal (Marselia Purnama, 2021).

2. Multicollinearity Test

If the multicollinearity test of research data produces a tolerance value > 0.1 or a VIF value indicates, then multicollinearity symptoms occur in the regression model of this study. b) If the multicollinearity test of the research data produces a tolerance value

10 0.1 or a VIF value , it indicates that there is no multicollinearity in the regression model of this study, for further research.

a. Autocorrelation

Test This test is intended to see the relationship between data (observations) one with other data in one variable. After the initial test, it turned out that the data had autocorrelation, to overcome the symptoms of autocorrelation, the Durbin-Watson method was used. (Ghozali & Ratmono, 2017)

b. Heteroscedasticity Test

In this study to detect heteroscedasticity of the data can be done with the Glejser test there is no heteroscedasticity If the the scatterplot graph not exist a pattern. (Hanitha, Purnama, Purnama, et al., 2021)

With a significance level of 5%, the model is free or not from Heteroscedasticity problems:

- a. If the probability $P > 0.05$ the model is free from the heteroscedasticity problem.
- b. If the probability of $P < 0.05$ the model is not free from the problem of Heteroscedasticity.

3. Multiple Regression

This analysis is used by researchers with the aim of knowing the extent to which the relationship between World oil prices, Silver Prices, USDEXchange rate and DJI on The SRI Kehati Index on the IDX period 2021.

The multiple regression model used to determine the factors that affect the JCI are:

$$Y = a + b_1 \cdot x_1 + b_2 \cdot x_2 + b_3 \cdot x_3 + b_4 \cdot x_4 + \varepsilon_i$$

Description:

Y = SRI Kehati Index

a = Constant

b1 = Oil Price Regression Coefficient

b2 = Coefficient Silver Price Regression

b3 = Dow Jone Index Regression Coefficient

b4 = USD Exchange Rate Regression Coefficient

4. Hypothesis

T-Test

This test use for assume that if independent variables (Y) are constant to the dependent variable (X) (V. Wiratna Sujarweni, 2019)Decision criteria:

H0 is accepted if > 0.05 . H0 is rejected if < 0.05 .

F test

(Ho) is rejected if sig F < value (0.05), meaning that the Y simultaneously affects the X. If F value > (0.05),(Marcelina Purnama & Hanitha, 2021) then Ho accepted, meaning X variable has effect on the Y variable so.

5. Coefficient of Determination

It used to measure which model's ability to describe the variation from dependent model. Its value is between 0 and 1. The value of R^2 is show how the condition from

coefficient of determination. Its value change related to Y if one X Variable is adjust to the model of this part.

The Results

On JB test explains that we use large sample for normality test) (Hanitha, Purnama, & Purnama, 2021) The criterion for the data to be normally distributed is if the probability is > 0.05.

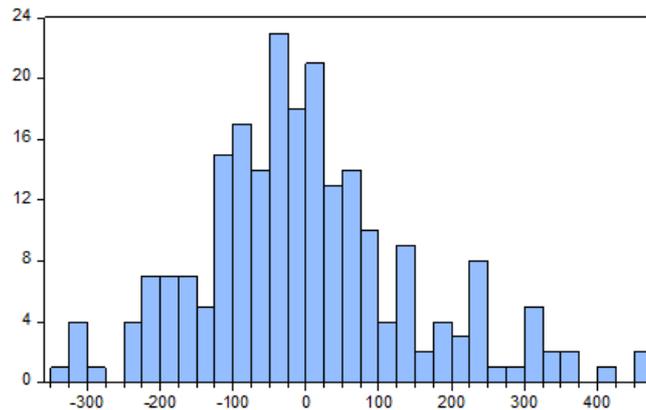


Figure 6. Result from Normality Test
Source: Eviews 10 Application

The picture shows that we can see that has a probability value bigger than >0,05, so it shows that the data were normally distributed. If the multicollinearity test of research data produces a tolerance value 10 0.1 or a VIF value indicates, then multicollinearity symptoms occur model of regretions of this study.(Hanitha, 2020)

Table 3. The test of Multicollinearity

Variance Inflation Factors
Date: 03/25/22 Time: 22:31
Sample: 1/04/2021 12/30/2021
Included observations: 247

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	11495.41	8962.063	NA
HARGA_MINYAK	0.066562	244.3153	3.579632
HARGA_PERAK	5.46E-07	271.0686	1.371652
DOW_JONES	2.16E-06	1953.641	4.502012
USD_RATE	6.87E-05	10938.32	1.369728

Source: Data Process

We see that Variance Inflation Factors have correlation value less VIF >10. So it conclude that in further testing we can use this data. We used this to determine if there are correlation between X variables and Y variables. (Ghozali & Ratmono, 2017) it is describes by table 4.

Table 4 The test of Autocorrelation

Durbin-Watson stats	0.087689
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Source: Data Process

This Durbin Watson test has value of 0,087689 in the range between minus two until plus two, it means there is no autocorrelation. So, we can for further analysis. With a significance level of 5%, the model is free or not from Heteroscedasticity problems.

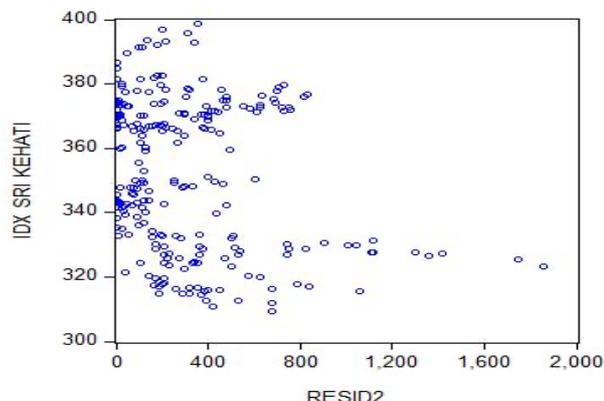


Figure 8. Scatterplot Graph

Source: *Data Process*

From the figure we conclude that there is no pattern from the graph above from the test figure, so it can be concluded that there is no problem for heteroscedasticity test.

Table 5. The Multiple Regressions Analysis

Dependent Variable: IDX_SRI_KEHATI

Method: Least Squares

Date: 04/04/22 Time: 21:02

Sample: 1/04/2021 12/30/2021

Included observations: 247

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1624.322	107.2167	15.14991	0.0000
HARGA_MINYAK	0.220828	0.257996	0.855939	0.3929
HARGA_PERAK	-0.003543	0.000739	-4.794620	0.0000
DOW_JONES	-0.005059	0.001469	-3.444003	0.0007
USD_RATE	-0.071789	0.008288	-8.661440	0.0000
R-squared	0.424210	Mean dependent var		352.1028
Adjusted R-squared	0.414693	S.D. dependent var		23.26563
S.E. of regression	17.79946	Akaike info criterion		8.616248
Sum squared resid	76670.61	Schwarz criterion		8.687289
Log likelihood	-1059.107	Hannan-Quinn criter.		8.644850
F-statistic	44.57306	Durbin-Watson stat		0.087689
Prob(F-statistic)	0.000000			

Source: Data process

The Regression model based on the table is :

$$\text{IDX SRI KEHATI} = 1624,322 + 0.220828 \text{ OIL} - 0.003543 \text{ SILVER} - 0.0005059 \text{ DOW JONES} - 0.071789 \text{ USD RATE}$$

Assume that :

Y = SRI-Kehati Index

X₁ = World Oil Prices

X₂ = Silver Prices

- X₃ = Dow Jones Index
- X₄ = USD Rate
- ei = error

From the test above can be explained that The C value of 1624,322 indicates if the independent variable, namely oil prices, gold prices, USD rates, DJI is zero, then SRI Kehati Index as dependent variable is worth 1624,322 unit. The coefficient of oil price consists of 0.220828 means that if increased 1 unit in the oil price, will change the SRI Kehati Index of 0.220828 units. Therefore, Oil Prices have impact on the SRI Kehati Index. The value for silver price is 0.003543 means that if increase by 1 unit, it change SRI Kehati for 0.003543 units. it concludes SRI Kehati influenced by Silver Price. The coefficient value of DJI of 0.005059 means if this variable change by 1 unit, will increase to SRI Kehati Index value of 0.005059 units. The coefficient value USD Rate of 0.071789 indicates increasing of Exchange Rate for 1 unit, will increase by 0,071789 units the SRI Kehati value.

The significance value is 0.3929 for Oil Price variable, so it is partially concluded that no effect from Oil Price on the SRI Kehati Index. Silver Price has a significance value of 0.0000, it means that smaller than alpha 0.05. so, it means Hypotesis one is being accepted and the other being rejected. there is have significant effect of the Silver price on the SRI Kehati Index. t-test value of 0.000 for Dow Jones index it conclude that there is a significance value is below 0.05. Hypotesis 0 was rejected and H₁ was accepted so it means DJI effect of on the SRI Kehati Index. if held constant for other independent variables. The value of USD Exchange Rate is 0.0000 < 0.05 (alpha value). So it conclude that H₁ was accepted and H₀ is rejected partially in 2021 if are held constant to the independent variables, then the SRI Kehati Index effect by USD exchange rate.

Table 6. f-test

F-statistic	44.57306
Prob(F-statistic)	0.000000

Source:Data processed

Showing to *F-statistic* of 0.000000 smaller than 0.05. it means that there is an effect simultaneous of World Oil Price, Silver Price, DJIA Index and Exchange Rates on the SRI Kehati Index for the 2021 period.

Table 7. Coefficient Determination test

R-squared	0.424210
Adjusted R-squared	0.414693

Source:Data Processed

The result test shows that amount of *Adjusted R²* is 0.424210 or 42.42%, from three independent variables (X) namely World Oil Prices, Silver Prices, DJI Index, and USD Exchange Rates is only able to explain 42.42% of the SRI Kehati Index. 57.58% can be shown by other variables that do not explain in this research.

World Oil Price have positive influence on SRI-Kehati Index. World Oil Prices studied by (Padliansyah et al., 2020)show that this price have an insignificant positive effect on the SRI Kehati Index. Different results are shown by research conducted by (Hermawan, 2020) that world oil affect positively on the SRI Kehati index. Silver price in this research shows that the silver price has an effect on the SRI Kehati according same to reseach from (Padliansyah et al., 2020) show. The Dow Jones Indexs has an effect to SRI-Kehati index according same to explain research by (Wibowo, 2016) Same conclusion as the effect of USD rate to research by

(Utama & Puryandani, 2020) that the USD exchange affected on the Sri Kehati Index in the 2014-2019 timeframe.

Conclusion

Conclusion of this reseach shows that from partially, the World oil prices, the silver prices. The Dow Jones Industrial Index DJIA and The USDexchange rate influenced to SRI-Kehati Index in the year of 2021 research period. Simultaneously, from analysis for X Variables, on Y Variable. where all Variable X Oil price, silver price, Dow Jones index and USD exchange rate were tested together against Y variable, namely the SRI Kehati Index. With *adjusted R*² 0.424210 or 42.42%, and the other of 57.58% affected by another variables. that are not shown into variable in this study. The hopes that this research can be useful for future researchers. The development of this research can add other variables related to the factors that influence the movement of the SRI-Kehati Index.

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