The Effect Of World Oil Prices, Gold Prices, And Other Energy Prices On The Indonesian Mining Sector -

by Sri Utami Ady

THE EFFECT OF WORLD OIL PRICES, GOLD PRICES, AND OTHER ENERGY PRICES ON THE INDONESIAN MINING SECTOR WITH EXCHANGE RATE OF INDONESIAN RUPIAH AS THE MODERATING EFFECT

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Abstract

The paper aimed to determine the effect of world oil prices, gold prices, and other energy prices on the Indonesian mining sector with the moderating influence of the exchange rate of the Indonesian Rupiah. This study is quantitative in which the data gathered from Investing.com from 2016 to 2020. The variables considered in the survey include exchange rate, Indonesian stock returns of mining companies, gold prices, oil prices, and gasoline prices. Concerning the analysis, the vector autoregression, Augmented Dickey-Fuller (ADF), and adopt the granger causality test. The results of this study identified no effect of oil price, gasoline price, and gold price on the Indonesian stock exchange of mining companies. On the other hand, there is no moderation of foreign exchange of Indonesian Rupiah among the relationship of oil price, gasoline price, and gold price with stock returns of Indonesian mining companies. This study's results are restricted to the Indonesian context, and the data considered from 2016 to 2019.

1. Introduction

Indonesia is considered one of those developing countries that have rich mineral resources. Many mineral resources can be found in the country, such as oil and gas and hard material (stone, coal, and metallic) because, in the Pacific ring of fire, located in the country. Indonesia's gross domestic product, mineral, and energy commodities have always contributed (Soelistijo et al., 2015). The trade of mineral commodities' primary intent is to gain from the exchange of minerals

to encourage economic growth through Balance of Trade (BOT). It is undeniable that in determining Indonesia's energy needs, the mining sector plays a considerable role. It has analyzed that in Indonesia's GDP, 6% to 12% contribution to its mining sector.
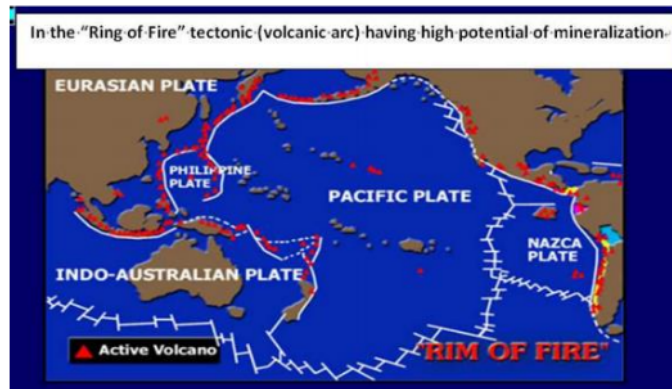

Figure 1: Pacific Ring of Fire
Source: Soelistijo et al. (2015)

However, due to an increase in energy consumption triggered by rapid industrial growth; therefore, from the production capacity of the Indonesian mining sector, the use of energy derived from petroleum cannot be met (Nawaz et al., 2020). Thus, to fulfil this, the government must import 20% to 30% from abroad. It has been analyzed that changes in world oil and gold prices reach the zenith point, which profoundly affects Indonesia's mining sector (Handri et al., 2019). For a long time, mineral trade markets have been volatile. There has been a fluctuation in the trend of mineral commodity prices, and recently due to costs of the commodity increasing within only several years, it has changed astronomically.

Consistent with the above information, the price fluctuation in gold prices, oil prices, and other energy prices, such as gas, strongly influences Indonesia's mining sector and, eventually, its economic development. The exchange rate plays a considerable role in the relationship between change in gold prices, oil prices, other energy resources prices, and Indonesia's mineral sector (Smith, 2001). The reason is that the trade of gold, oil, and other energy resources is made through the dollar. In other words, the world oil, gold prices, and different energy prices are dominated in US dollars (Beckmann et al., 2017; Othman et al., 2020). Therefore, when there is an increase in the US dollar costs, these minerals' prices also increase. This relation can also be understood. If

there is a decrease in the Indonesian Rupiah against the international currency, such as the dollar, there will be a higher cost borne by Indonesia on importing mineral resources.

Thus, based on the above context, the study is intended to assess the effects of world oil prices, gold prices, and other energy, such as gas, on Indonesia's mineral sector. In this direct relationship, the exchange rate's moderating effects are also considered (Wahyudi et al., 2017). This study will be very significant and have a considerable contribution to this field. The reason is that the effect of world oil prices, golds prices, and other energy, such as gas, has been assessed in a minimal number of studies, for instance (Keane & Prasad, 1991; Le & Chang, 2012; Lin et al., 2008). Moreover, there is excellent scarce in studies investigating this relationship between the mineral sector of Indonesia. Furthermore, previous research has significantly varied from different methods, such as autoregression, non-linear vector, and time series (Handri et al., 2019). Besides this, from changes in oil and gold prices in exporting countries, developed countries, and developing countries, research objectives also vary.

In addition to the above information, there are few studies wherein these minerals' relationship has been looked at in sectorial shares. To the best of our knowledge, no study has considered the exchange rate's moderating effects in this context. Therefore, these gaps are intended to be overcome in the present study. The main research question of the study is designed as:

What are the effects of world oil prices, gold prices, and other energy prices on the Indonesian mining sector with the moderating influence of the exchange rate of the Indonesian Rupiah?

Based on the research question, the objective of the study is designed as:

- To assess world oil prices, gold prices, and other energy prices on the Indonesian mining sector.
- To analyze the moderating effects of the Indonesian Rupiah's *exchange rate* in the relationship between world oil prices, gold prices, and other energy prices on the Indonesian mining sector.
- To provide a recommendation to maintain the prices of gold, oil, and other energy resources in Indonesia's mineral sector.

2. Literature Review

The world crude oil prices and other energy such as gas are directly affected by the increasing demand for oil and gas and the emergence of newly industrialized nations. A country's economy is directly affected by oil and gas prices associated with economic activity. As per the study of Wahyudi et al. (2017), there are variations in increased oil and gas prices on the economy in general and the capital market. It has been analyzed that the displacement of welfare from oil and gas importing countries to oil and gas exporting countries is illustrated by the rising prices of oil and gas (Chien et al., 2021; Sadiq et al., 2020; Degiannakis et al., 2017). Therefore, on the acceptance and welfare of the community, this will have an impact. Besides, a study conducted by Rahmanto et al. (2016) infers that a country's economy is also affected by it. Furthermore, a study put forward by Basher et al. (2012) demonstrates that on world oil and gas prices on stock return in short and long-term, there is a positive influence. Hence, based on the above description, the following hypothesis can be created:

H1: Oil price change has a positive effect on the stock return of the mining sector.
H2: Gas price change has a positive effect on the stock return of the mining sector.

The effects of gold prices on the mining stock return have been analyzed in various studies. A study put forward by Le & Chang (2012) reveals that between the recovery of the mining sector and the prices of gold, there is a significant favorable influence. Likewise, it has been argued in the study conducted by Nangolo & Musingwini (2011) that between gold and stock return, there is a positive relationship. The previous two studies' findings can also be validated by the survey results conducted by Gilmore et al. (2009). It has been indicated that with the price of gold, there is a significant favorable influence among French stock exchanges. Additionally, the study conducted by Smith (2001) also found a meaningful relationship between the prices of gold with the Malaysian Stock Exchange. The before the presented argument is sufficient to hypothesize that:

H3: Gold price change has a positive effect on the stock return of the mining sector.

Concerning the impact of exchange rates on prices of oil, gold, and other energy resources, such as gas, evidence obtained from previous research infer that the US dollars dominate causality

from exchange rate to the process of gold, oil, and natural gas. Another study conducted by Beckmann et al. (2017) demonstrates an appreciation of the US dollar increases oil, gas, and gold prices measured in terms of the domestic currency. As a result, the demand for these minerals decreases outside the countries where the dollar is not the official currency, such as Indonesia, where Indonesia Rupiah is used. It reduces the demand for these minerals in the country and affects the mineral industry's production (Akram, 2009; Blomberg & Harris, 1995).

In addition to the above information, a study conducted by Yousefi & Wirjanto (2004) opines that the price strategy is crucial to cope with the exchange rate. It will help to adjust oil prices. From these findings, it can be understood that the authors have recommended the use of price strategy because it has been insinuated that fluctuation in the exchange rate has a direct impact on the world oil prices, gold price, and gas. Coudert et al. (2008) conducted a study in which they have echoed that from the rise in oil and gas prices due to the US dollar appreciation, if production or drilling activity increases in the mining sector, there will be a positive supply response may stem. The findings of Yousefi & Wirjanto (2004) can also be supported by Putra & Robiyanto (2019). discovery. It has been analyzed that to adjust the prices of oil supply as a response, oil, and gas exporting countries, such as Indonesia, should also adjust oil supply as a response to the exchange rate. Based on the collected evidence, it can be hypothesized that:

H4: Exchange rate moderates the relationship between oil prices and the mining sector.

H5: Exchange rate moderates the relationship between gold prices and the mining sector.

H6: Exchange rate moderates the relationship between gas prices and the mining sector.

3. Theoretical Framework

Arbitrage Pricing Theory (APT) can be used in this study. Ross (1976) introduced this theory, which is generally considered a pricing model for security through which the relationship between price determinations in the CAPM is generalized. It has been inferred by Huberman and Wang (2005) that APT is one period model wherein it is believed by investors that the factor structure is consistent with the matters related to the stochastic level of profit. In determining the prices of assets, there are necessary implications held by the formulation of APT. APT has stated that the profit level of investment is influenced by one or several explanatory variables. However, what influences the level of profit is not displayed correctly by APT (Wahyudi et al., 2017).

The price of gold is high as it is rare and possesses corrosion resistance properties (Robiyanto, Wahyudi & Pangestuti, 2017). Gold is considered a risk-free investment. Apriyanti (2011) also supports this statement and opines that investors' wealth will remain intact by investing in gold. One of the essential advantages of gold for Indonesia's wealth sector is that gold price is not affected by inflation, and no price determination is involved. When it comes to oil and gas, they are often considered as the head of the commodity. An increase in the prices of oil and gas can decrease the return of the mining sector. Therefore, for all industries, world oil and gas have become the primary sources of energy. Rising oil prices will add to the country's welfare as the income of the local community increases. The exchange rate plays an imperative role in the relationship between gold, oil, and gas prices. To obtain one currency unit in another country, the amount of domestic money is needed, and the exchange rate can be interpreted. Concerning this, it has been stated by Tsen (2011) that in the world of investment, buying, and the system of selling internationally, the exchange rate has a crucial role to play. Therefore, it can be deduced that in the relationship between the prices of gold, oil and gas, and the Indonesian mineral sector, there is a crucial role play by the exchange rate, and APT theory can be employed here in the relationship between price determinations.

4. Methods

This research paper includes the study's quantitative design to assess the effect of world oil prices, gold prices, and other energy prices on the Indonesian mining sector and the moderating effect of the exchange rate of the Indonesian Rupiah. Data for measuring the effect is in numeric form and required statistical analysis for providing the evidence concerning the effect of oil prices, gold prices, and other energy prices on the Indonesian mining industry. The deductive approach has been utilized in this study, as the hypothesis has been tested (Razzaqi, Bilquees, and Shahbaz, 2011). It is because an already existing theory has been tested in the context of the Indonesian mining industry. The data collection method is secondary as time series data for world oil prices, gold prices, and other energy prices. The Indonesian mining index considered for the past six years, i.e., 2015 to 2020, of daily frequency. The analysis in this study is carried out with the help of E-views. The study conducted by Gerrard and Johnson (2015) argued that there is the presence of unit root in the macroeconomic data because of the random trends. Therefore, the researchers need to test the data stationary while implementing the ADF test. After the unit root test, the regression

is determined along with Indonesia's exchange rate's mediating effect. The regression equation is as follows:

$$IND_t = \alpha + \beta_1 GP_t + \beta_2 OP_t + \beta_3 GS_t + \beta_4 EX_t + \varepsilon_t$$

The above equation denotes the study's regression model in which IND refers to the Indonesian mining index. On the other hand, α refers to the constant, while OP is the world's oil prices over the period. In addition to this, GP refers to gold prices, while GS denotes gasoline prices over the years. Moreover, the EX is the exchange rate of Indonesian Rupiah, and ε is the error term. Furthermore, the equation for moderating effect is as follows:

$$IND_t = \alpha + \beta_1 GP_t + \beta_2 OP_t + \beta_3 GS_t + \beta_4 Ex_t + \beta_5 (GP * Ex)_t + \beta_6 (OP * Ex)_t + \beta_7 (GS * Ex)_t + \varepsilon_t$$

The above equation shows the moderating effect of the Indonesian Rupiah's exchange rate in the regression equation model. In this manner, the moderating influence of the Indonesian rupiah's exchange rate is tested with gold prices, oil prices, and gasoline prices to determine the effect over the Indonesian mining industry index.

5. Results

5.1. Descriptive Statistics

Table 1 depicts the descriptive statistics of the variables which have been considered in this study. In this manner, it determines with the help of Table 1 that the mean value for IDX returns is 0.0002, which shows that the average stock returns of mining companies in Indonesia are 0.0002. On the other hand, the standard deviation for IDX returns is determined to be 0.0134, which shows that the IDX return will deviate from $ 0.0134. The mean value for oil returns is 0.0004, which depicts that the average for oil returns is 0.0004%, while the standard deviation for oil returns was computed to be 0.0335, which shows that the oil return will deviate from 0.0335%. Concerning the gold returns, the mean value was 0.0002, which shows that the average gold return was 0.0002%. The standard deviation was computed to be 0.0155, depicting that the gold returns will deviate from 0.0155%. Moreover, the mean value for gasoline returns was determined to be 0.0002, which shows that the average gasoline returns were 0.0002%, having a standard deviation

of 0.0227, predicting that the gasoline returns will deviate from 0.0227%. Lastly, the mean value for foreign exchange returns was 0.0001, showing that the Indonesian rupiah's average foreign exchange returns were 0.0001%, having a standard deviation of 0.0041. It implies that the foreign exchange returns will deviate from 0.0041%.

Table 1 Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
IDX Returns	982	0.0002	0.0134	-0.0632	0.0623
Oil Returns	980	0.0004	0.0335	-0.2822	0.3196
Gold Returns	982	0.0002	0.0155	-0.0777	0.0782
Gasoline Returns	982	0.0002	0.0227	-0.2023	0.1349
FX Returns	982	0.0001	0.0041	-0.0278	0.0447

5.2. Augmented Dickey-Fuller (ADF)

The unit root testing is considered essential for forecasting the values based on previous patterns. As per the study conducted by Paparoditis and Politis (2018), future values' assessment is challenging based on historical values while using conventional inferential statistics. In this manner, the Augmented Dickey-Fuller (ADF) has been employed to determine the data's unit root.

Table 2 Augmented Dickey-Fuller (ADF)

Augmented Dickey-Fuller test statistic	t-Statistic	Prob.*
IDX Returns	-28.034	0.000
Oil Returns	-23.892	0.000
Gold Returns	-35.008	0.000
Gasoline Returns	-32.112	0.000
FX Returns	-21.557	0.000
FXxOI	-7.265	0.000
FXxGI	-20.920	0.000
FXxGSL	-26.953	0.000

The above Table 2 depicts the results of Augmented Dickey-Fuller (ADF) in which the null hypothesis is based upon the assumption that there is a presence of unit root in the data. In this manner, it can be determined from the above Table 2 that there is no unit root presence. In the IDX returns, oil returns, gold returns, gasoline returns, FX returns, FXxOI, FXxGI, and FXxGSL as the p-values of all the variables are below the threshold of 0.05.

5.3. Vector Autoregression

Table 3 depicts the association among each variable of the study concerning each model equation. It can determine that there is no association among the variables concerning the equation of IDX returns as the p-value is 0.517, which is above the threshold of 0.05. Similarly, there is no association among the variables concerning the equation of oil returns as the computed p-value was 0.298, which is also above the threshold of 0.05. In contrast to this, for the equation of gold returns, the p-value was 0.00, which is below the threshold of 0.05. Similarly, the association among the variables was also significant for the equation of gasoline returns. The p-value was determined to be 0.00, which is also below the threshold of 0.05. Moreover, the association among the variables was significant for FX returns as the computed p-value was 0.002, which is below the threshold of 0.005.

Table 3 Vector Autoregression Equations

Equation	Parms	RMSE	R-sq	chi2	P>chi2
IDX Returns	11	0.013	0.017	9.161	0.517
Oil Returns	11	0.032	0.022	11.809	0.298
Gold Returns	11	0.015	0.129	77.942	0.000
Gasoline Returns	11	0.023	0.075	42.661	0.000
FXReturns	11	0.004	0.051	28.524	0.002

Table 4 depicts the vector autoregression concerning the Indonesian stock index returns of mining companies. Based on Table 4, it can determine that there is no effect of oil returns, gasoline returns, gold returns, and FX returns over the Indonesian stock index returns of mining companies.

Table 4 Vector Autoregression (IDX Returns)

	Coef.	Std. Err.	z	P>|z|

	Coef.	Std. Err.	z	P>|z|
IDX Returns				
IDX Returns				
L1.	0.06794	0.04119	1.65	0.099
L2.	-0.0134	0.04038	-0.33	0.74
Oil Returns				
L1.	-0.0003	0.01762	-0.02	0.984
L2.	0.01675	0.01696	0.99	0.323
Gold Returns				
L1.	0.01975	0.03539	0.56	0.577
L2.	-0.0493	0.03739	-1.32	0.188
Gasoline Returns				
L1.	0.00537	0.02503	0.21	0.83
L2.	0.0349	0.02621	1.33	0.183
FX Returns				
L1.	0.10426	0.13681	0.76	0.446
L2.	0.0664	0.14527	0.46	0.648
_cons	-4E-05	0.00056	-0.08	0.94

Table 5 depicts the vector autoregression for the moderating effect of foreign exchange returns. In this manner, it can be determined from the below Table 5 that there is no moderation of FX returns over the relationship of oil prices, gold prices, and gasoline prices with Indonesian stock exchange return of mining companies. It is because all the p-values are above the threshold of 0.05, depicting no significant effect.

Table 5 Vector Autoregression (Moderation of FX Returns)

	Coef.	Std. Err.	z	P>|z|
IDX Returns				
IDX Returns				
L1.	0.064	0.041	1.56	0.12
L2.	-0.011	0.040	-0.28	0.782
Oil Returns				

L1.	0.001	0.018	0.03	0.975
L2.	0.019	0.017	1.14	0.254
Gold Returns				
L1.	0.017	0.035	0.49	0.626
L2.	-0.061	0.038	-1.61	0.108
Gasoline Returns				
L1.	0.010	0.025	0.41	0.681
L2.	0.033	0.026	1.26	0.209
FX Returns				
L1.	-0.045	0.160	-0.28	0.778
L2.	0.033	0.160	0.2	0.839
FXxOI				
L1.	-6.571	3.786	-1.74	0.083
L2.	-2.677	3.983	-0.67	0.502
FXxGI				
L1.	-4.896	9.035	-0.54	0.588
L2.	10.575	11.069	0.96	0.339
FXxGSL				
L1.	-11.722	6.414	-1.83	0.068
L2.	0.763	6.853	0.11	0.911
_cons	0.000	0.001	-0.05	0.959

5.4. Granger Causality Test

Table 6 depicts the Granger causality test in which none of the equation is determined to be significant. In this manner, it determines that oil returns, gold returns, gasoline returns, FX returns, and all the variables granger IDX returns. It is because the p-value of all the equations was determined to be above the threshold of 0.05.

Table 6 Granger Causality (IDX Returns)

Equation	Excluded	chi2	df	Prob>Chi2

IDX Returns	Oil Returns	0.976	2	0.614
IDX Returns	Gold Returns	2.527	2	0.283
IDX Returns	Gasoline Returns	1.774	2	0.412
IDX Returns	FX Returns	0.906	2	0.636
IDX Returns	ALL	6.381	8	0.605

Table 7 depicts the results of Granger causality concerning the moderating effect of FX returns. In this manner, it determines from the below Table 7 that oil returns, gold returns, gasoline returns, FX returns, FXxOI, FXxGI, and FXxGSL granger IDX returns as the p-values are above the threshold of 0.05.

Table 7 Granger Causality (Moderating Effect of FX Returns)

Equation	Excluded	chi2	df	Prob> chi2
IDX Returns	Oil Returns	1.303	2	0.521
IDX Returns	Gold Returns	3.319	2	0.19
IDX Returns	Gasoline Returns	1.613	2	0.446
IDX Returns	FX Returns	0.103	2	0.95
IDX Returns	FXxOI	3.538	2	0.17
IDX Returns	FXxGI	1.224	2	0.542
IDX Returns	FXxGSL	3.340	2	0.188
IDX Returns	ALL	14.300	14	0.428

5.5 Hypothesis Assessment and Discussion

Table 8 Summary of Hypothesis

S.NO	Proposition	Results
H1	Oil price change has a significant effect on the stock return of the mining sector.	Rejected

H_2	Gas price change has a significant effect on the stock return of the mining sector.	Rejected
H_3	Gold price change has a significant effect on the stock return of the mining sector.	Rejected
H_4	The exchange rate moderates the relationship between oil prices and the mining sector.	Rejected
H_5	The exchange rate moderates the relationship between gold prices and the mining sector.	Rejected
H_6	The exchange rate moderates the relationship between gas prices and the mining sector.	Rejected

The above table depicts the summary of the hypothesis, based on the analysis and results of this study as follows:

5.5.1   Oil Price has a Significant Effect on the Stock Return of Mining Sector.

The first hypothesis that changes in oil prices significantly affect stock returns in the mining sector is rejected. It can occur because coal companies with 23 coal companies dominate the mining sector's driving force. In comparison, there are only seven companies in the oil and gas sector, which causes changes in oil prices not to affect the mining sector's return of shares.

This result is following Kuwornu (2012); Saudi et al. (2018); Muramalla & Alqahtani (2020) argued that there is no association between the oil price on stock market prices in the mining sector. Then, Kelikume & Muritala (2019) argued that there is have a hostile impact oil prices on African stock markets.

However, it contradicts with the findings of Dawson (2007); Oberndorfer (2009); Basher et al. (2012); Movahedizadeh et al. (2014); Degiannakis et al. (2017); Akinlo (2014); Gupta (2016); Putra & Robiyanto (2019) and Antonoa et al. (2019) which demonstrates that there is a significant influence of world oil and gas prices on stock return in short and long-term. Then Boyer & Filion (2004) argued that oil prices impact stock markets in the mining sector.

5.5.2 Gas Price [1] has a Significant Effect on the Stock Return of Mining Sector.

The second hypothesis that changes in gas prices positively affect stock returns in the mining sector is also rejected. It because gas production and exploration are needed to meet demand. The ups and downs of gas price also do not affect the mining sector's return because only one company produces gas (PGAS). As a result, it does not affect returns in the mining sector.

This result is following Oberndorfer (2009); Arshad & Bashir (2015); Saudi et al. (2018); Antonoa et al. (2019) argued that there is no significant relationship between the oil price on the stock market price in the mining sector. However, it contradicts the findings of Basher et al. (2012); Wahyudi et al. (2017) argued that the impact of gas price changes on stock markets in the mining sector. Then Boyer & Filion (2004); Ghoilpour (2011), and Acaravci et al. (2012) show that gas prices have a significant relationship with mining sector stock returns.

5.5.3 Gold Price [1] has a Significant Effect on the Stock Return of Mining Sector.

The third hypothesis shows that gold price changes significantly affect the mining industry stock returns rejected. The ups and downs of gold prices do not affect the mining sector's return because only six companies produce gold (ANTM, BRMS, PSAB, MDKA, SQMI, UNTR) of the 23 companies in the mining sector that were the samples of this study. As a result, it does not affect returns in the mining sector.

It aligns with the study of Baur & Lucey (2011); Wang (2012); Agyei-Ampomah et al. (2014); Sheikh et al. (2020) that there is no change in the stock market with the shift in prices of gold. Then Apituley (2018) and Utama & Puryandani (2020) argued that there is no association between the gold price on IHSG. It also contradicts with the findings of Le & Chang (2012); Arfaoui & Rejeb (2017); Dwiati & Ambarwati (2017), and Putra & Robiyanto (2019) reveals that between the return of the mining sector and prices of gold, there is a significant favourable influence.

5.5.4 Exchange Rate Moderates the Relationship between Oil Prices of Mining Sector

The fourth hypothesis, which shows that the exchange rate moderates the relationship between oil prices and the mining sector, is rejected. If the dollar exchange rate increases, more dollars will be needed to pay for oil imports abroad. However, importers can get around this by hedging through forwarding contracts to anticipate changes in exchange rates.

This result is under Suriani et al. (2015), which shows that the exchange rate cannot moderate the relationship between the gold price on IHSG. Khan (2019) also stated that the exchange rate has a significant negative effect on stock returns on the Shenzhen Stock Exchange. Then Usman & Siddiqui (2019) that there is no influence of the exchange rate in the relationship of oil prices and stock prices.

It also contradicts with the findings of Sadorsky (2000); Mashayekhi et al. (2013); Vejzagic & Zarafat (2013); Hartley & Medlock (2014); Arfaoui & Rejeb (2017); Beckmann et al. (2017) and Antonoa et al. (2019) that the prices of oil measured in terms of the domestic currency is increased by an appreciation of the US dollar. Wahyudi et al. (2017) show that the exchange rate is the center of the relationship between the oil price and mining sector stock returns. Likewise, the results of Putra & Robiyanto (2019); Wasserfallen (1990); Hali J. Edison (1991) show that the exchange rate has a significant negative effect on stock returns.

5.5.5 Exchange Rate Moderates the Relationship between Gold Prices of Mining Sector

The fifth hypothesis is that the exchange rate moderates the relationship between the gold price and the mining sector is also rejected. If the dollar exchange rate increases, more dollars will be needed to pay for oil imports abroad. However, importers can get around this by hedging through forwarding contracts to anticipate changes in exchange rates.

Similar results were presented by Ghalayini & Farhat (2020) in which there was no intervention of exchange rates among the relationship between gold prices and stock returns. It also contrasts with the findings of Yousefi & Wirjanto (2004); Zagaglia & Marzo (2010); Adaramola (2012); Rahmanto et al. (2016), and Zarei et al. (2019) that the price strategy is critical to cope with the effects of the exchange rate as it will help to adjust oil prices. Beckmann et al. (2017) that the costs of gold measured in terms of the domestic currency is increased by an appreciation of the US dollar.

5.5.6 Exchange Rate Moderates the Relationship between Gas Prices of Mining Sector

It can be proven from table 8 above that the hypothesis that the exchange rate moderates the relationship between gas prices and the mining sector has also been rejected. If the dollar exchange rate increases, more dollars will be needed to pay for oil imports abroad. However, importers can get around this by hedging through forwarding contracts to anticipate changes in exchange rates.

This result is by Baatarzorig et al. (2018) determined that there is no moderation of exchange rate among the relationship between gas prices and stock prices.

It also contradicts the findings of Hartley & Medlock (2014), which indicates that the exchange rate affects gas prices. Wasserfallen (1990); Hali J. Edison (1991); Putra & Robiyanto (2019) that to adjust the prices of oil supply as a response, oil and gas exporting countries, such as Indonesia, should also adjust oil supply or process as a response to the exchange rate. Then Beckmann et al. (2017) that the prices of gas measured in terms of the domestic currency are increased by appreciating the US dollar.

Another factor that is considered why the ups and downs of oil prices, gold prices, and gas prices are not determinants for investors to get a return on shares in the mining sector is because trading on the stock exchange is mostly influenced by psychological factors (Ady, 2015; 2018; Ady et al., 2013; Ady & Hidayat, 2019). (Hagstrom, 2010) shows that 60% of investor transactions are based on psychological, and only 40% transact rationally. It means that the increase in share prices in the mining sector is caused by investor optimism for the mining sector in the future. If investors are optimistic, they see that energy from petroleum and coal in the future will get better and develop. Investors believe that energy production and exploration will continue, and energy demand will continue to increase so that mining stocks will increase, thereby increasing returns.

Meanwhile, suppose the investor is pessimistic, for example. In that case, they think that oil and coal energy will not last long and run out because it is replaced with alternative energy, such as solar energy, wind energy, water energy, and so on. It will reduce the purchase of shares in the mining sector so that the mining sector's share price declined and decreasing returns.

6. Conclusion

Indonesia has been a country that is considered rich in terms of natural resources. The mining industry of the country has a massive contribution to the development of the economy. However, external factors like fluctuations in rates cause considerable losses in this industry. Therefore, this study has focused on determining the effect of world oil prices, gold prices, and other energy prices in the Indonesian mining sector stock return with the moderating influence of the exchange rate of the Indonesian Rupiah. For this purpose, the data has been gathered from the secondary sources of information for the oil price, gold price, gasoline price, Indonesian mining

sector index, and Indonesian Rupiah exchange rate from 2016 to 2020. The results have been analyzed using descriptive statistics, Augmented Dickey-Fuller (ADF), vector autoregression, and granger causality test. Based on the analysis, it has been determined that there is no significant effect of oil price, gold price, gasoline price over on the Indonesian mining sector stock returns. In addition to this, it has also been determined concerning the moderation of foreign exchange return that there is no moderation of FX returns over the relationship of oil price, gold price, gasoline price with Indonesian stock returns of the mining sector. In this manner, it is suggested that the mining companies in Indonesia provide less emphasis on oil price, gold price, gasoline price, and the foreign exchange rate of the Indonesian Rupiah. Other factors, such as investor psychology, also affect the return of shares in the mining sector.

This study has focused on determining the effect of world oil prices, gold prices, and other energy prices on the Indonesian mining sector with the moderating effect of exchange rate on the Indonesian Rupiah. In this manner, the impact of all independent variables has been considered in the Indonesian mining sector. Therefore, it is suggested for future researchers also to investigate other sectors of the country, which are also influenced by oil prices, gold prices, and different energy prices. On the other hand, the Indonesian Rupiah's moderating effect has been considered in this study, which also restricts this study's scope. Therefore, it is also suggested for future researchers to investigate the moderating effect of other economic measures.

Moreover, the entire industry is restricted to one country, which is Indonesia. In this manner, it is also suggested for future researchers to investigate the change in oil, gold, and other energy prices over different countries' mining industry. Therefore, they will be able to make significant contributions to the existing literature.

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