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The correlation of gold, exchange rate, and stock market on Covid-19 pandemic period

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Abstract

This study aims to analyze the correlation of gold, exchange rate, and CSPI on COVID-19 pandemic periods by testing the effect of gold exchange prices and exchange rate on CSPI and stock volatility. Also, by considering the dynamic correlation of dynamic correlations between CSPI with gold and CSPI with exchange rates. The data was collected from secondary data in the form of JCI daily data, gold prices, and exchange rate during the COVID-19 pandemic period from January 2020 to June 2020. Further, the data was analyzed by using a GARCH method to examine the effect of changes in gold and USD prices for CSPI and stock volatility. Hence, DCC-GARCH method was used to see the dynamic correlation between CSPI with gold and IHSG with exchange rate. The result showed that changes of gold prices has significant effect of on stock price volatility, the presence of a positive dynamic correlation between CSPI and gold, and a negative dynamic correlation between CSPI and exchange rates. This research can be used as a reference for investors for their investments by looking at the relationship between the CSPI, gold, and the exchange rate.

Abstrak

Penelitian ini bertujuan untuk menganalisis mengenai keterkaitan emas, nilai tukar dan IHSG pada periode pandemi Covid-19 dengan menguji pengaruh perubahan harga emas dan nilai tukar terhadap IHSG dan volatilitas saham, serta melihat korelasi dinamis antara IHSG dengan emas dan IHSG dengan nilai tukar. Data penelitian ini menggunakan data sekunder yang berupa data harian IHSG, harga emas dan nilai tukar selama pandemi Covid-19 periode Januari hingga Juni 2020. Analisis data dilakukan dengan menggunakan metode GARCH untuk menguji pengaruh perubahan harga emas dan usd terhadap IHSG dan volatilitas saham, serta menggunakan metode DCC-GARCH untuk melihat korelasi dinamis antara IHSG dengan emas dan IHSG dengan nilai tukar. Hasil penelitian menunjukan adanya pengaruh yang signifikan perubahan harga emas terhadap volatilitas harga saham, dan adanya korelasi dinamis positif antara IHSG dengan Emas dan korelasi dinamis negatif antara IHSG dengan nilai tukar. Hasil penelitian ini akan membeikan referensi bagi para investor mengenai keputusan investasinya dengan melihat keterkaitan antara IHSG, emas dan nilai tukar.

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1. Introduction

Capital market has two main functions namely a source of funding for a business entity and an investment medium for investors in various instruments, for instance, stock, bonds, mutual funds, etc. Among those instruments, stocks are the most frequently traded instrument because they are considered as the easiest trading instrument and high returns. The development of the stocks listed on the Indonesia Stock Exchange can be seen through the Composite Stock Price Index (CSPI) (Sari, 2019).

Before investing the stock, the investors will conduct a stock selection by utilizing the stock rate volatility statistics to calculate the profit and loss potentials. The stock rate volatility can affect the uncertainty risk which brings a positive or negative impact on the investors' interest in their investment (Handayani, Muharam, & Mawardi, 2018). However, many investors are still interested in high volatility stocks. Although the investors have to deal with the high risks, they still get an opportunity for getting high profits.

Many factors influence the stock rate volatility so that stock investment also has several risks. However, the gold price and the USD exchange rate are macroeconomic factors that affect stock price volatility. Gold is one of the most important commodities traded internationally (Singh & Sharma, 2018). According to Husnul, Hidayat, & Sulasmiyati, (2017), gold is used as an alternative investment because it tends to be risk-free and not affected by inflationary pressure. Gold is one of the precious metals that considered as a safe asset to be stored in the long-run period because it has good durability (Robiyanto, Wahyudi, & Pangestuti, 2017). It also can be an effective diversification tool within the portfolio to reduce the risks (Tuna, 2019).

Research about the relation of gold price and the stock price had been conducted by Hlupo (2017) using the Granger causality test. The results are the price of gold and the performance of the ZSE Industrial Index stock have an insignificant relationship. Furthermore, Billah & Hartomo (2018) stated that the dynamic correlation of gold prices and the sharia stocks in Indonesia shows that there is a negative correlation between gold prices and sharia stocks. Hence, Tuna (2019) also investigated the correlation between precious metals and the sharia stocks market using the Pedroni Panel Cointegration Analysis method which found a relationship between the gold precious metals and the sharia stocks market. Moreover, by using the Panel Vector Autoregression method, Padungsaksawasdi (2019) discovered the relationship of gold and stock prices which was demonstrated through the relationship between gold market investor sentiment and stock price investor sentiment.

Besides gold, another variable that has a relationship with stock prices is the exchange rate of USD/IDR. The dynamic relationship between exchange rate and stock prices is a topic that attracts many researchers in the economy field, especially capital markets. It is because the exchange rate and stock prices play a role in influencing the economy of a country and this relationship is often used to conduct a fundamental analysis for looking at the movement of stock prices and exchange rates in the future (Syakhroza & Endri, 2012). Research conducted in India by Jayashankar & Rath (2017), research in several eastern European countries by Živkov, Njegiæ, & Pavloviæ (2016), and the research conducted in Indonesia by Pamungkas & Darmawan (2018) showed a relationship between exchange rates and stock prices.

Several studies that discuss the correlation between stock prices with exchange rates and the correlation between stock prices with gold prices, mostly use a static approach as in research that had been conducted by Gumilang, Hidayat, & Goretti (2014); Husnul et al. (2017); Pamungkas & Darmawan (2018); Putri (2015). Their research examined the composite stock price index using the multiple linear regression method. In addition, Hlupo (2017) and Mukhuti (2018) also examine the dynamic correlation between the stock market and

gold prices using multiple linear regression methods. But in reality, the stock market has dynamic movements. Therefore, this study will use a different method, namely Dynamic Conditional Correlation-Generalized Autoregressive Conditional Heteroscedasticity (DCC-GARCH) to be able to see the dynamic correlations between the variables in this study. The DCC-GARCH method is used because it has been proven to be predicted in a sequence for various covariant matrix (Robiyanto et al., 2017). Besides the DCC-GARCH method, this study also uses the GARCH method to determine the effect of changes in gold prices and changes in the exchange rate of the Dollar against the Rupiah on stock returns and stock volatility.

Research on the dynamic correlation of stock prices in ASEAN countries and the exchange rate was also carried out when Donald Trump was elected as a President of the United States by Stefan & Robiyanto (2019). Robiyanto (2018a) also conducted research on the dynamic correlation of ASEAN countries' stock prices with world oil prices. In contrast, this study will use daily data on the stock prices in Indonesia during the COVID-19 pandemic period due to the impact of the economic crisis caused by the pandemic in the world, especially Indonesia. Further, aside from the dynamic correlation of the CSPI with the USD/IDR exchange rate, this study will also look at the dynamic correlation between the CSPI with the gold price in the middle of the COVID-19 pandemic. It will also examine the effect of changes in gold prices and changes in exchange rates on the CSPI and volatility in stock prices.

This study aims to find out how the dynamic correlation of stock prices (CSPI) with gold prices and the dynamic correlation of stock prices (CSPI) with the exchange rate of Dollar to Rupiah (USD/IDR), and also investigate the effect of gold prices and exchange rates on IHSG and stock price volatility. Eventually, this research can be used as a benchmark and reference for investors and financial analysts in making decisions by looking at the dynamic correlation of CSPI with the price of gold, CSPI correlation with the exchange rate of the Dollar against the Rupiah (USD/IDR), also by looking at the effect of changes in gold prices and changes the exchange rate against the CSPI and the volatility of stock prices in dynamic market conditions such as the COVID-19 pandemic period.

2. Hypotheses Development

The performance of a capital market can be illustrated through the supply and demand mechanism of stock trading activities. By using a composite stock price index, the movement of stocks listed on the Indonesia Stock Exchange can be observed (Putri, 2015), whether the market is in a bullish or bearish condition. The calculation of the composite stock price index was carried out using closing stock prices in each sector in the Indonesia Stock Exchange. Therefore, CSPI illustrates the activity and trends of the capital market because it covers the movement of stock prices as a whole (Aditya, Sinaga, & Maulana, 2018) so that the CSPI can be used as a benchmark for investors to invest.

The ups and downs of stock prices is a movement in stock price called volatility. Volatility is a statistical measure for changes in the price of a security or commodity over a certain period (Robiyanto et al., 2017). The risk of a stock can also be reflected from the volatility of the stock price. If the volatility is high, there is an opportunity for loss and large profits in the short term because the stock price is difficult to be predicted. In contrast, if the volatility of the stock price is low, the stock price tends not to change frequently. Thus, investors can use the stock rate volatility to find out the opportunities for profit and loss from the stock before purchasing.

Gold is one of the precious metals which is the most important commodity in the world that can attract investors' interest and trade internationally (Singh & Sharma, 2018). According to Natalie & Artigas (2010) gold has two roles as a hedging

tactic against inflation and as a long-term strategic asset. Therefore, gold price fluctuations become a concern for policymakers, investors, financial institutions, central banks, and the wider community (Kumar, 2014).

The price of gold which increases from year to year and tends to be minimal risk can affect the movement of the CSPI. It caused by the market investor that will consider for moving their investment into gold commodities (Gumilang et al., 2014), the risk is relatively lower and gives better results (Gulo, Subiyantoro, & Tubing, 2017). Previous research conducted by Gumilang et al. (2014); Robiyanto et al. (2017); Gulo et al. (2017); Robiyanto (2018b); Shabbir, Kousar, & Batool, (2020) stated that gold price has positive effects on CSPI returns. Therefore, it can be concluded as the following hypothesis.

H_1: gold price changes have positive effects on the CSPI returns.

Choosing gold for investment is believed to be profitable because the price tends to increase. Gold is also included as a very liquid investment form because it can be accepted in many countries (Surbakti, Achsani, & Maulana, 2016). Baur & Lucey (2010) stated that gold can be used as a hedge fund on stock and a safe haven from the extreme stock market condition because of the negative correlation with stock movement.

Previous studies by Kumar (2014); Choudhry, Hassan, & Shabi, (2015); Surbakti et al. (2016); Chkili (2016); Robiyanto et al. (2017) stated that there is a negative correlation between gold price changes with stock volatility. Based on the explanation above, the hypothesis can be formulated as follows.

H_2: gold price changes have negative effects on stock volatility prices.

The exchange rate is the price of a particular foreign currency in the domestic currency unit (Yuswandy, 2013). Exchange rates can change frequently due to changes in supply and demand on the foreign exchange market. According to Faraga, Chabachib, & Muharam, (2012), the exchange rate changes of the domestic currency against foreign currency (USD/IDR) will harm the capital market. The reason is if the foreign currency exchange rates increased or appreciated, the exchange value of the domestic currency will depreciate. Hence, the price of imported raw materials and all imported products will increase and the company's production costs will also increase. Therefore, changes in exchange rates will affect the competitiveness of companies that will have an impact on the stock price and the product produced by the company (Yunita & Robiyanto, 2018).

The exchange rate is one of the macroeconomic factors that can affect stock returns. The reason is that the depreciation of the domestic currency on foreign currencies will increase the amount of Rupiah which is used to pay the foreign debt and it will also increase the price of imported raw materials (Robiyanto et al., 2019). Further, it will affect the reduction of the company's stock price and stock returns.

Changes in exchange rates are predicted to influence the stock returns. Previously, some research that had been conducted by Yogaswari, Nugroho, & Astuti, (2012); Patel (2012); Husnul et al. (2017); Wahyudi, Asdar, & Nohong, (2017); Aditya et al. (2018); Yunita & Robiyanto (2018) stated that exchange rate changes have negative impacts on CSPI returns. Therefore, it can be concluded as the following hypothesis.

H_3: exchange rate changes have negative impacts on CSPI returns.

The exchange rate can also affect the stock volatility. Changes in exchange rates will have an impact on price stability, corporate profitability, and stability of a country (Olweny & Omondi, 2011). Asih & Akbar (2016) asserted that the attractive-

ness of the stock market will decrease due to the negative effects of the depreciation of Rupiah to Dollar. It is caused by the movement of the investors to the money market. Finally, it will provide greater profits and ultimately will reduce the stock price index.

Previous studies by Katti (2014); Asih & Akbar (2016); Arfaoui & Ben Rejeb (2017); Fadhyla & Rikumahu (2018) found that there is a negative correlation between exchange rates with stock volatility. According to the explanation above, the hypothesis can be formulated as follows.

H_4: the changes in the exchange rate have negative impacts on stock volatility.

3. Method, Data, and Analysis

This research conducted using secondary data collected from www.finance.yahoo.com. The data consisted of IHSG daily data from Indonesia Stock Exchange, the price of the gold, and exchange rate from dollar to rupiah (USD/IDR) during COVID-19 between January 1st and June 30th, 2020. The dependent variable in this research is CSPI stock returns and stock volatility, while the independent variable is the changes of gold price and exchange rate from dollar to rupiah.

The calculation of CSPI Returns can be calculated using Eq. (1).

$$\Delta IHSG_t = \frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}} \quad (1)$$

Where, $\Delta IHSG_t$ = CSPI returns on the day t; $IHSG_t$ = CSPI on the day t; $IHSGt_{-1}$ = CSPI on the day t-1

The changes in gold price within the dollar currency can be calculated using Eq. (2).

$$\Delta GOLDUSD_t = \frac{GOLDUSD_t - GOLDUSD_{t-1}}{GOLDUSD_{t-1}} \quad (2)$$

Where, $\Delta GOLDUSD_t$ = the changes of gold price within dollar currency on the day t; $GOLDUSD_t$ = gold price on the day t; $GOLDUSD_{t-1}$ = gold price on the day t-1

The changes of exchange rate from dollar to rupiah (USD/IDR) can be calculated using Eq. (3).

$$\Delta USDIDR_t = \frac{USDIDR_t - USDIDR_{t-1}}{USDIDR_{t-1}} \quad (3)$$

Where, $\Delta USDIDR_t$ = the changes of USD/IDR exchange rate on the day t; $USDIDR_t$ = USD/IDR exchange rate on the day t; $USDIDR_{t-1}$ = USD/IDR exchange rate on the day t-1

Stock volatility means the ups and downs of stock rate. Stock volatility in this study was proxied using Conditional Variance which can be calculated using Generalized Autoregressive Conditional Heteroskedasticity (GARCH). In order to analyze the dynamic relationship, this study used Dynamic Conditional Correlation-Generalized Autoregressive Conditional Heteroscedasticity (DCC-GARCH) approach. Moreover, this research also used GARCH model approach to find out the effect of gold price changes and (USD/IDR) exchange rate toward stock and stock volatility returns. GARCH model can be written as Eq. (4) and (5).

$$R_t = \alpha + \beta_1 GOLD_t + \beta_2 USD_t + \sigma_t^2 + \varepsilon_t \quad (4)$$

$$\varepsilon t = \phi_t \varepsilon_{t-1} + \cdots + \phi_t \varepsilon_{t-q} + \eta_t \quad (5)$$

$$\eta_t = \sigma_t \varepsilon_t$$

$$\sigma_t^2 = \alpha_0 + \alpha_1 \varepsilon_{t-1}^2 + \cdots + \alpha_p \varepsilon_{t-p}^2 + \lambda_1 \sigma_{t-1}^2 + \cdots + \lambda_q \sigma_{t-q}^2$$

Where, R_t = stock returns/stock volatility; $GOLD_t$ = the changes of gold price; USD_t = the change of (USD/IDR) exchange rate; ε_t = error standard; σ_t^2 = conditional variance; $\alpha_1 \varepsilon_{t-1}^2$ = previous period of volatility (ARCH model component); $\lambda_1 \sigma_{t-1}^2$ = previous period of volatility (GARCH model component)

4. Results

Descriptive statistics

Descriptive statistics is used to find out the mean, maximum, minimum, and deviation standard of a data. Descriptive statistics in this study can be seen on the Table 1 and Table 2.

Table 1 shows that the mean of CSPI is -0.0019 and the deviation standard of CSPI is 0.0213. Meanwhile, the mean of gold variable is 0.0009 and its deviation standard is 0.0164. Then, the mean of USD variable is 0.0011 and its deviation standard is 0.0147.

Table 2 illustrates the mean of stock volatility is 1.0001 and the deviation standard of stock volatility is 0.2079. While, the mean of gold variable is 0.0009 and its deviation standard is 0.0164. The mean of USD variable is 0.0011 and the deviation standard of gold variable is 0.0147. The deviation standard on the Table 1 and 2 reports that stock has the highest risk among gold and USD.

Table 1. Descriptive statistics of CSPI, gold, and USD

Variable	N	Minimum	Maximum	Mean	Dev. Std.
CSPI Return	116	-0.0657	0.1019	-0.0019	0.0213
Gold	116	-0.0462	0.0764	0.0009	0.0164
USD	116	-0.0379	0.0468	0.0011	0.0147

Table 2. Descriptive statistics of stock volatility, gold, and USD

Variable	N	Minimum	Maximum	Mean	Dev. Std.
Stock Volatility	116	0.5638	1.9432	1.0001	0.2079
Gold	116	-0.0462	0.0764	0.0009	0.0164
USD	116	-0.0379	0.0468	0.0011	0.0147

Table 3. The result of the Augmented Dickey-Fuller test

Variable	Augmented Dickey-Fuller	Probability	Result
CSPI Returns	-9.6620	0.0000	Stationary
Gold	-9.7960	0.0000	Stationary
USD	-14.2116	0.0000	Stationary

Table 4. The result of GARCH Analysis (1,1) the impact of gold and USD toward CSPI

Independent Variable	Coefficient	Error Standard	Z-Statistics	Probability
C	-0.0009	0.0013	-0.9185	0.4724
Gold	0.0745	0.1041	0.7158	0.4741
USD/IDR	-0.0741	0.1094	-0.6770	0.4984
Variance Equation				
RESID (-1)^2	0.2986	0.1088	2.7438	0.0061
GARCH (-1)	0.7131	0.0967	7.3736	0.0000

Table 5. The result of GARCH Analysis (1,1) The Impact of gold and USD toward stock volatility

Independent Variable	Coefficient	Error Standard	Z-Statistics	Probability
C	0.9963	0.0001	5876.664	0.0000
Gold	-0.6684	0.9089	-0.7353	0.4621
USD/IDR	1.3754	0.6414	2.1442	0.0320
Variance Equation				
RESID (-1)^2	-0.0697	0.0088	-7.8928	0.0000
GARCH (-1)	1.0930	0.0157	69.4994	0.0000

The result of Stationary Data Test

Stationary test in this research used the Augmented Dickey-Fuller test with 0.01 significance value. The result of the test can be seen on Table 3.

Table 3 reveals that CSPI variable, Gold, and USD are stationary. Then, those variables are tested using GARCH Analysis.

The result of GARCH (1,1) Analysis

The result of GARCH analysis (1,1) can be seen on Table 4 and Table 5.

According to the result in the Table 4, it can be concluded that the first hypothesis about the changes in gold price takes positive effect on CSPI is rejected. Similarly, the third hypothesis about the changes in the USD/IDR exchange rate brings negative impact to CSPI is also rejected. Table 4 shows when the significance level is 10%, the changes in the gold price and USD/IDR exchange rate do not bring any effect to CSPI returns. Based on the variance equation can be seen that GARCH probability shows significance value which means that the research model can follow the GARCH pattern.

Based on the Table 5. the second and fourth hypotheses about the changes of gold price and USD/IDR exchange rate brings negative impact to stock volatility is rejected. When the significance level is 10%, the changes of gold prices do not affect the stock volatility. Meanwhile, the changes in the USD/IDR exchange rate bring positive effect to stock volatility. GARCH probability has significance value, so that the research model can follow the GARCH pattern.

Dynamic correlation between CSPI and the price of the gold to the various time

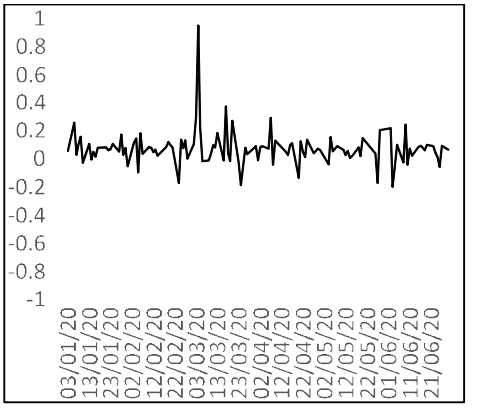

Figure 1. Dynamic correlation CSPI-GOLD

Figure 1 shows the result of dynamic correlation analysis between CSPI and gold using DCC GARCH. The result indicates the value of DCC CSPI and gold during the research period is -0.1960 until 0.9532. The highest DCC value is 0.9532 in the early March 2020. Meanwhile, the lowest DCC value is -0.1960 in the early June 2020. It can be seen in the Table 7 that the mean value of DCC is 0.0764 which means that the dynamic correlation between CSPI and Gold is positive and week.

Dynamic correlation between CSPI and USD/ IDR exchange rate to the various time

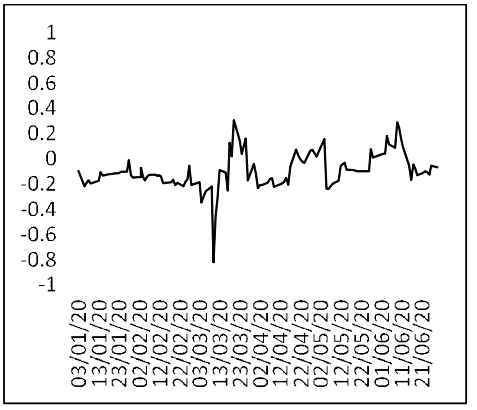

Figure 2. Dynamic correlation CSPI-USD/IDR

Figure 2 illustrates the result of dynamic correlation analysis between CSPI and USD/IDR exchange rate using DCC GARCH. The result reveals that DCC value between CSPI and USD/IDR exchange rate is -0.8206 until 0.3047. The highest DCC is 0.3047 in early March 2020 while the lowest DCC value is at the end of March 2020. Based on Table 7, the mean value of DCC is -0.100, thus the dynamic correlation between CSPI and USD/IDR is negative and weak.

The chronology of important events related to COVID-19 can be read on Table 6. It affects the correlation between CSPI and gold, CSPI and USD/ IDR. COVID-19 is a global pandemic which makes the virus becomes global attention. In contrast, Stefan & Robiyanto (2019) stated that monumental events do not affect dynamic correlation. The study from Putri (2015); Billah & Hartomo (2018) did not link the monumental events to the dynamic correlation. This is in line with Robiyanto (2018a) and Chen et al. (2018) that dynamic correlation can be affected by the important event which is happening.

5. Discussion

According to the developed hypothesis, all of the hypotheses are rejected. The analysis indicates that the changes of gold price and USD/IDR exchange rate do not affect to the CSPI and stock volatility. However, there is a significant positive effect of the changes of the gold price toward stock volatility. It is the effect of the crisis period during COVID-19 pandemic which makes people worry about their investment. It is supported by the findings of the stock volatility model in this study. The gold commodity proves that the higher gold returns the more volatility increase on the CSPI. There is an indicator that stock investors in the Indonesia Stock Exchange are skeptical responding to the changes in the gold price which makes them hesitate to invest gold. Electronic and printed media which mention that gold is the safest asset during the pandemic play an important role in the people's confusion. The result of this study was supported by oleh Choudhry et al. (2015); Ingalhalli & Reddy (2016); Raza et al. (2016) studies which explain that the changes in gold price takes positive effect to stock volatility.

Dynamic correlation happens between CSPI and gold, and CSPI and USD/IDR exchange rate is weak with different correlation condition. Considering the mean value of dynamic correlation on Table 7, correlation between CSPI and gold is positive yet weak. Therefore, gold cannot be categorized as a safe investment asset during the COVID-19 economic crisis. By contrast, Kumar (2014) pointed out that there are variative, positive, even negative dynamic correlations between stock and gold in the crisis period in India so that gold becomes a good portfolio diversification in India. Chkili (2016) and Tuna (2019) asserted that there is a low negative correlation between the stock market and gold so that gold can become a safe haven and effective portfolio diversification when there is an extreme stock movement on a crisis period. The result is in line with Choudhry et al. (2015) the disappearance of gold as a safe haven during the global economic crisis makes gold is not worth it to minimize the risk of the portfolio during the crisis period.

The dynamic correlation of CSPI and USD/ IDR exchange rate is negative and weak correlation,

it can be seen in the Table 7. The result is in line with the study by Stefan & Robiyanto (2019) about the negative correlation between the ASEAN stock market and the USD/IDR exchange rate. Similarly, the study by Živkov et al. (2016) in Europe and the study by Singh & Sharma (2018) in India discovered negative correlation between stock market and exchange rate.

6. Conclusion

The study aims to find out the dynamic correlation between CSPI with gold, and CSPI with USD. Also examines the effect of gold price changes and the changes of the USD/IDR exchange rate toward CSPI and stock volatility using GARCH and DCC GARCH analysis during COVID-19. The result of this study finds that only the changes in the gold price that affects significant positive toward stock volatility in the January until June 2020 during pandemic. It shows that people are confused determining their investment direction which is affected by COVID-19 pandemic. There is a weak positive correlation on the correlation between CSPI and gold, and a weak negative correlation on the correlation between CSPI and USD on the COVID-19

Table 6. Important events related to COVID-19

Events	Time
- China has identified the virus as a new virus with 2019-nCoV as the previous name. - Washington confirms the first case in the US. - WHO sets COVID-19 as Public Health Emergencies of International Concern (PHEIC).	January 2020
- The first COVID-19 death case outside China mainland. - Chinese tourist passes away in Paris, the first Corona death case in Europe. - COVID-19 death rate in China is 908 cases, and the total of positive case is 40,171 people. - The China-USA heats up after the Chinese Foreign Ministry accuses the US government of reacting inappropriately to the outbreak and spreading fear by imposing travel restrictions. - Japan, Egypt, Israel, Italy, South Korea confirm COVID-19 case in their countries. - A lot of countries include Indonesia confirm the first COVID-19 case in their countries. - Italy reports that there are 4,825 death cases among 53,578 positive cases.	February 2020
- USA reports 124,000 positive cases and 2,000 death cases. - WHO declares the new coronavirus as a pandemic. - Donald Trump signs an agreement about giving 2 trillion dollars to help workers, business, and health workers that affected by COVID-19.	March 2020
- China reopens Wuhan after 76 days lockdown. - Donald Trump stops the funding for WHO temporarily. - USA passes one million COVID-19 cases.	April 2020
- Trump and his government announce that federal government sends 11 billion dollars to some countries to expand the examination potency of corona virus. - The data which collected by Johns Hopkins University reports that there are 100,000 corona virus death cases in the USA.	May 2020
- Wuhan, China confirms that there is no new case after doing COVID-19 test to 9.9 million of its citizens. - WHO plans to give 2 billion COVID-19 vaccine doses to the people around the world. - USA passes 2 million COVID-19 cases.	June 2020

Source: Al Jazeera and News Agencies (2020); CNN Editorial Research (2020).

Tabel 7. Dynamic correlation to various time

	Mean	Min	Max
CSPI-Gold	0.0766	-0.1961	0.9532
CSPI-USD/IDR	-0.1002	-0.8207	0.3047

period based on DCC GARCH analysis in examining the dynamic correlation. The existing correlation is affected by the important events related to COVID-19.

This research is a multivariate study on the relationship of CSPI, gold, and exchange rate that used the daily data during the period of COVID-19 pandemic from January 2020 to June 2020. Further research is recommended to use the beginning period of COVID-19 pandemic to the end of the COVID-19 pandemic, so that it can obtain more findings in details about the correlation of CSPI, gold, and exchange rate on the period of COVID-19 pandemic. This research may be beneficial as a reference for the investors to observe the gold variable and exchange rate in investing in the stock market during COVID-19. It should be considered since the gold variable and exchange rate have a correlation toward CSPI, also the changes in gold price bring significant effect to the stock volatility.

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