# Does the Foreign Capital Flow of Indonesia Have A Relationship With Oil and Gas Stock Prices During Covid-19?

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**Abstract.** The Covid-19 pandemic has had an impact on the financial sector. The increase of Covid-19 cases disrupted the fundamental condition of the world economy, which caused panic among foreign investors to invest their capital. The volatile flow of foreign capital is usually followed by selling of shares by investors. Meanwhile, during the Covid-19 pandemic, oil and gas sector stocks were also worst affected. This study aims to examine the relationship between foreign capital flows and stock prices of oil and gas sector in Indonesia during the global shocks of the Covid-19 pandemic. The data used is daily data on foreign capital and oil and gas share prices from 02 January 2018 to 30 December 2020 as many as 782 observations using the *Vector Error Correction Model* (VECM) method. The results show that there is a one-way causality relationship, where foreign capital flows affect stock prices, but stock prices do not affect foreign capital flows. The results of the study are forecasts for the next 30 days that provide the same response and contribution as the period during the Covid-19 pandemic. The response given by oil and gas stock prices when there is a shock to foreign capital flows initially fluctuates and then responds positively towards long-term balance.

**Keywords:** foreign capital, stock prices, oil and gas, Covid-19

## 1 Introduction

Market liberalization is one of the current issues of globalization that has a major influence on economic activity. One of the effects is the easier and faster mobility of capital and investment flows across countries. In general, the movement of capital flows across countries starts from developed countries with excess capital to developing countries that lack capital, including Indonesia, are referred to as emerging markets [1].

In general, developed countries have superior and strong capital so that they tend to be more dominant and have great influence compared to emerging market countries. The flow of foreign capital becomes easier to enter and exit during global turmoil so that the large portion of foreign ownership in the Indonesian capital market causes Indonesia to be unable to completely escape

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from this condition. The current turmoil with the Corona Virus Disease virus or known as Covid-19 which has occurred since December 2019. This virus attacks the human respiratory organs and has spread massively to more than 200 countries, including [2]. The impact of this pandemic is not only on human health and welfare, but also on economic activity. The increasingnumber of Covid-19 cases has disrupted the fundamental conditions of the world economy, including Indonesia, causing panic among foreign investors. The capital outflow from the Indonesian capital market was IDR 159.3 trillion since the announcement of Covid-19 in Indonesia [3].

The entry and exit of foreign capital flows are followed by the development of stock prices in the capital market**. Figure 1** shows that the flow of foreign capital in the Indonesian capital market has started to decline since December 2019. Indonesian capital market has a strong integration with China, where China ranks 2nd as the country with the largest investment portfolio investment after Singapore [4]. The outflow of foreign capital, especially China, had an impact on the Indonesian capital market until it experienced a decline in March 2020, which was followed by a decrease in the Composite Stock Price Index (JCI) by 10.75% per day [5].

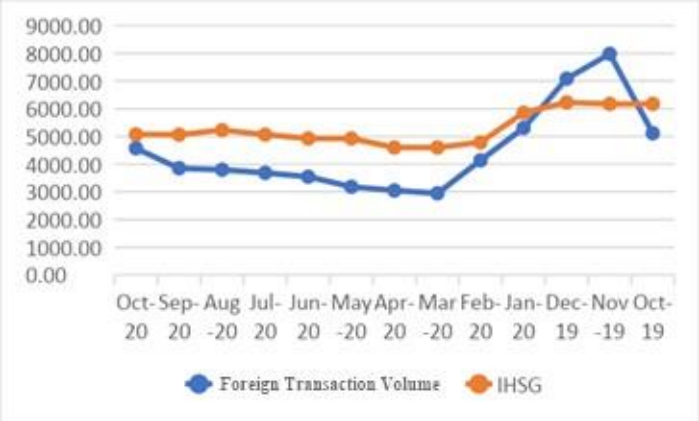


**Fig. 1** Net Foreign Transaction Volume and IHSG in the Indonesian Capital Market [6]

Prior to the Covid-19 pandemic shocks, similar incidents had occurred, namely during the 1997 Asian financial crisis, the 2008 world financial crisis, and the European crisis in 2011 where the exit of foreign investors due to the shocks caused the affect the performance of the Indonesian capital market. The crisis had an impact on the banking, property, various industries, basic industries, and mining sectors. However, the sector that was worst affected by the crisis was the oil and gas sector with the deepest decline in stock prices in history [7].

If we draw from the previous crisis Covid-19, which is a health crisis, has the same impact on the performance of the Indonesian capital market, followed the outflow of foreign capital and a decline in the JCI. Just like the previous crisis, the sectors that were most affected were the oil and gas sector. This is interesting to investigate further the relationship between foreign capital flows and share prices in the oil and gas sector during the shock of the Covid-19 pandemic.

In addition, the choice of this sector is also supported by the important role of the contribution of these sectors to the country's economy, especially to the Indonesian capital market. This sector is a sector that has a significant contribution to trading activities in the capital market and

is one of the sectors that are of interest to investors. The oil and gas sector accounts for 10% of trade transactions in the Indonesian capital market (**Figure 2**).

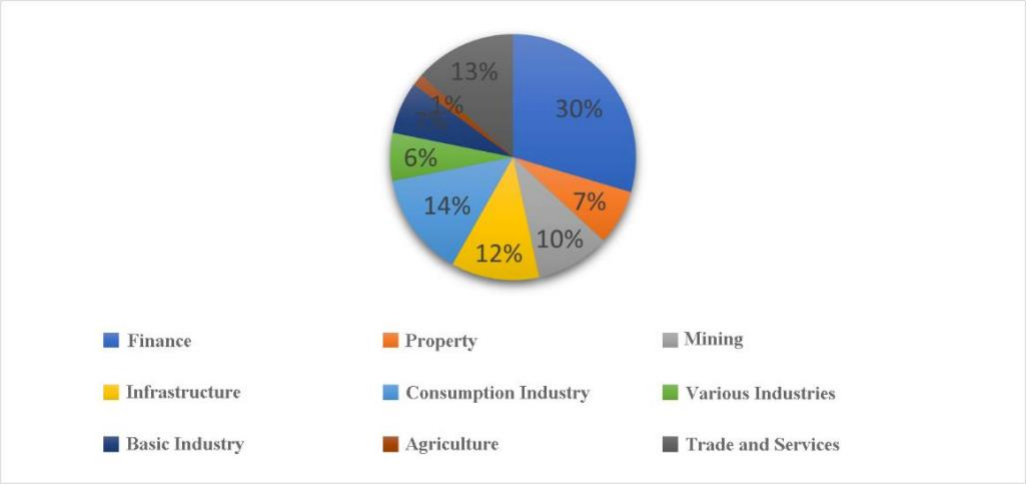


**Fig.2** Percentage of Sectoral Contribution to Trade Transactions in the Indonesian Capital Market in January-October 2020 [6]

Increasing number of Covid-19 cases disrupted the fundamentals of the world economy, causing investment panic among foreign investors. The fluctuating flow of foreign capital is usually followed by the sale of shares by investors. Meanwhile, during the Covid-19 pandemic, shares in the oil and gas sector were also hardest hit. This study aims to examine the relationship between foreign capital flows and share prices in the oil and gas sector in Indonesia during the global shock of the Covid-19 pandemic.

## 2 Method

This research was conducted in Jakarta for a period of 4 months, starting from October 2020 to January 2021. The type of data used is secondary data obtained from various reliable sources, namely the monthly reports of the Indonesia Stock Exchange. Data in this study uses daily data (time series) from January 2, 2018, to December 30, 2020.

This study applies the Bivariate *Vector Error Correction Model* (VECM) analysis method (a model with 2 variables) using EViews 10 software. The selection of this VECM model is used because it can separate the long-term and short-term components of the cointegrated and non-stationary data formation process at the first level. In addition, because the data used are daily data with a fairly large number of observations, namely 782 observations and there are shocks that are the focus of this study. The estimation results will give better results, where this method can not only provide recommendations from the results of the regression model in the short and long term but can also show the variable response to a shock based on historical data and the contribution between variables to changes between variables [8].

VECM is the development of a VAR model for a time series that is not stationary and has one or more cointegration relationships [9]. The dynamic behavior of VECM can be seen through the response of each dependent variable to shocks on these variables and other variables. There are two ways to see the characteristics of the VECM model, namely through the Impulse Response Function (IRF) and Forecast Error Variance Decomposition. The VECM model is characterized by the inclusion of an Error Correction Model (ECT) element in it [8]. The following is the general econometric equation used in this study:

$$\Delta OG_t = \beta_0 + \beta_1 e_{t-1} \sum_{i=1}^{m} \beta_i \, \Delta OG_{t-i} + \sum_{j=1} \beta_j \, \Delta NFP_{t-j} + \varepsilon_t \quad (1)$$

Where it:

| | |
|---|---|
| $\Delta$ | : operator *differencing* |
| $OG_{t-i}$ | : dependent variable of oil and gas stock price with lag to-*i* |
| $NFP_{t-j}$ | : independent variable of foreign capital flow with lag to-j |
| $\beta_0$ | : constant |
| $e_{t-1}$ | : long-term adjustment vector (ECT parameter) |
| $\varepsilon_t$ | : residual vector |

## 3 Result and Discussions

Pandemic Covid-19 has made investors panic and distrust the Indonesian market conditions. This situation led to the flow of foreign capital out of Indonesia with a total of IDR 159.3 trillion from December 2019 to March 2020 [3]. The outflow of foreign capital caused foreign investors to sell their shares in the Indonesian capital market, which was marked by a decline in sectoral share prices, particularly the oil and gas sector. The share price of the oil and gas sector from before Covid-19 was at an average price level of IDR 649.80 per share at the beginning of the year, decreased to an average price level of IDR 230.40 when the PSBB was imposed due to the virus. Covid-19 in Indonesia [6]. Statistical data analysis in this study used the *Vector Error Correction Model* (VECM) method. Before getting the results of the analysis, the stationarity test, the determination of the lag length (optimum lag) test, stability test, and cointegration test were carried out first.

### 3. 1 The Stationary Test

Test The stationary test in this study applies the *Augmented Dickey Fuller* (ADF) test, where if the data is stationary, the probability level is smaller than the level of significance (1%, 5%, and 10%), and vice versa. The following are the results of the stationarity test of research data at the level and the first difference, which are presented in **Table 1**.

**Table 1.** Stationary Test Results

| Variable | Augmented *Dickey Fuller* (ADF) | | | | | |
|---|---|---|---|---|---|---|
| | *Level* | | | *First Difference* | | |
| | ***t-statistic*** | **Prob.** | **Description** | ***of t-statistics*** | **Prob.** | **Description** |
| LN_NFP | -6,164179 | 0.0000* | Stationary | -20,74506 | 0.0000* | Stationary |
| LN_OG | -1,882158 | 0.3408* | Not Stationary | -24.84854 | 0.0000* | Stationary |

*) Significant at the 1% level

Based on **Table 1**, the results of the ADF test on variables at the level level indicate that only the foreign capital flow variable is stationary, while the other variables are not stationary. Thus, a stationary test was carried out at the first level *(first difference)* which showed the results that all the variables used in this study were stationary at the *first difference.*

### 3. 2 The Lag Optimum Test

One of the most commonly used methods to determine *lag* is to look at the *Akaike Information Criterion* (AIC), where the lowest AIC value obtained from the VECM estimation results with various *lags* indicates that the lag length is the best to use [8].

**Table 2.** AIC Value of Research Variable

| *Lag* | AIC Oil and Gas Stock Price |
|---|---|
| **0** | -5,001619 |
| **1** | -5,113113 |
| **2** | -5,186010 |
| **3** | -5,254817 |
| **4** | -5,291107* |
| **5** | -5,284320 |
| **6** | -5,289304 |
| **7** | -5,290343 |
| **8** | -5,288747 |

*Minimum AIC value *(optimum lag)*

**Table 2** shows that based on the minimum AIC value, *the optimum lag* for oil and gas stock price variables is 5. The *optimum lag* obtained will be used in the stability test, cointegration test, VECM model test, and causality test.

### 3. 3 Stability Test

To ensure that the VECM model with the chosen optimal lag is stable, a Stability Test is needed. Determination of stability can be seen from the roots of the polynomial. If the root modulus to the optimum lag has a value of less than 1, it can be said that the model is stable. Vice versa, if the modulus value is more than 1, then the model is said to be unstable. The results of the stability test in this study indicate that all the models used are stable because the modulus value is less than 1.

### 3. 4 Cointegration Test

Test Cointegration test was conducted to see whether the foreign capital flow variable has a long-term relationship with the oil and gas stock price variable. This study uses *the Johansen Cointegration Test* to perform a cointegration test that uses the *lag* according to *the optimum lag* that has been obtained from the previous stage. The presence or absence of cointegration can be seen by comparing the value *trace statistic* and *critical value.* If *the trace statistic* is greater than the *critical value,* then there is cointegration between variables. Vice versa, if *the trace statistic* is smaller than the *critical value,* it can be concluded that there is no cointegration between variables.

**Table 3.** Cointegration Test Results

| | *Hypotesized Number of CE(s)* | *Trace Statistic* | 0.005 *Critical Value* | Information |
|---|---|---|---|---|
| Foreign Capital Flow and Oil and Gas Stock Prices | *None* | 47,33164 | 15,49471 | There is 1 cointegration |
| | *At most* | 3,493220 | 3,841466 | |
| | *At most* | 4,387951 | 3.841466 | |

**Table 3.** shows that all variables in this study have a cointegration relationship. Because all variables have a cointegration relationship, the analytical method used in this study is the VECM analysis method.

### 3. 5 VECM Estimation

VECM estimation is used to see the short-term and long-term relationship, the effect of the independent variable on the dependent variable. If the t-statistic is greater than t-table, the independent variable significantly affects the dependent variable, and if the t-statistic is smaller than t-table, the independent variable does not significantly affect the dependent variable.

$$\begin{aligned}\Delta OG_t = {} & -0{,}331737 ECT_{t-1} + 1{,}991661 OG_{t-1} + 0{,}005355 \Delta OG_{t-1} + \\ & 0{,}022338 \Delta OG_{t-2} + 0{,}001761 \Delta OG_{t-3} - 0{,}017513 \Delta OG_{t-4} - \\ & 0{,}003244 \Delta NFP_{t-1} - 0{,}89434 \Delta NFP_{t-2} - 0{,}014218 \Delta NFP_{t-3} - \\ & 0{,}011618 \Delta NFP_{t-4} - 0{,}000216 \end{aligned} \quad (2)$$

**Table 4.** VECM Estimation Results on Oil and Gas Stock Prices and Foreign Capital Flows

| Variable | Coefficient | *t-statistic* |
|---|---|---|
| **Term** | | |
| LN_NFP(-1) | 1.991661 | 7.36062* |
| C | -37.73176 | |
| **Short-Term** | | |
| _CointEq1 | -0.331737 | - 6.75471* |
| D(LN_OG(-1)) | 0.005355 | 1.13525 |
| D(LN_OG(-2)) | 0.022338 | 0.56508 |
| D(LN_OG(-3)) | 0.001761 | 0.04462 |
| D(LN_OG( -4)) | -0.017513 | -0.44378 |
| D(LN_NFP(-1)) | -0.003244 | -0.89434 |
| D(LN_NFP(-2)) | -0.89434 | -0.89434 |
| D(LN_NFP(-3 )) | -0.014218 | -3.27665* |
| D(LN_NFP(-4)) | -0.011618 | -3.10551* |
| C | -0.000216 | -0.28306 |

*Significant at 5% significance level = t-table (1 ,96)

Based on the VECM estimation results in **Table 4**. not all lags are significant. According to Pindyck and Rubinfeld, this is a hallmark of VECM and VAR [10]. The results in this estimation, foreign capital flows as an independent variable have a positive and significant relationship to the share price of the oil and gas sector in the long term but have a negative relationship in the short term. In the short term, foreign capital flows affect lags 3rd and the 4thA positive relationship indicates that every increase in foreign capital flows will increase stock prices, and vice versa. If there is a decrease in the flow of foreign capital will reduce the stock price. A negative relationship indicates that when there is an increase in the flow of foreign capital it will lower the stock price, and vice versa. **Table 4.** also shows that Error Correction

Term the significant This indicates that the speed of adjustment to achieve balance from short to long term will be corrected by 0.33 percent.

### 3. 6 Analysis of Causality Relationships

Through causality testing, it can be seen whether each variable has the power to influence one another. Because this research uses the VECM method, the causality test is carried out using the Granger Causality/Wald Test which shows a stronger and more accurate relationship in this VECM estimation.

**Table 5.** VECM Causality Test

| Dependen | Independen | Probabilitas |
|---|---|---|
| **Oil and Gas Stock Price** | Foreign Capital Flows | 0.0016* |
| **Foreign Capital Flows** | Oil and Gas Stock Price | 0.3655 |

*Significant at the 10% level of significance

Based on **Table 5**, it can be seen that there is a one-way causality relationship to oil and gas stock prices, where foreign capital flows affect stock prices, but stock prices do not affect foreign capital flows. This indicates that the sale and purchase of shares by foreign investors can affect the movement of stock prices in the oil and gas sector. In accordance with the fact that the flow of foreign capital during the Covid-19 pandemic in Indonesia was quite significant,namely with an average transaction of Rp. 3.67 trillion compared to before Covid-19 occurred [6]. The results of the causality test which show a one-way causality relationship between foreign capital flows and stock prices are the same as the research conducted by Muntasir [11] and Anaswati [12] which looked at the causality and cointegration relationship between foreigncapital flows and stock prices. Stock prices do not affect the flow of foreign capital which indicates that foreign investors in this sector apply fundamental analysis, where the decision tobuy or sell shares is based on the performance of financial ratios, such as dividend distribution, sales growth, management changes. In addition, it can also be concluded that investors' decisions to buy or sell shares in the oil and gas sector are not solely due to price movements themselves, but are also influenced by other factors, such as confidence in the condition of the sector which is considered profitable or detrimental [13]. In this case, it can be said that the current Covid-19 has influenced investors decisions to buy or sell their shares and it is this foreign capital that can affect stock price movements.

## 4 Conclusion

The development of foreign capital flows will be followed by the development of stock prices during the Covid-19 pandemic, in fact, this is true. The relationship between foreign capital flows and stock prices during the Covid-19 pandemic has the same impact and relationship as the previous financial crisis. The existence of this dynamic relationship indicates that in the current global uncertainty situation, there is still the possibility of foreign capital inflows in Indonesia shaking up the performance of the Indonesian capital market, particularly in the oil and gas sector. During the study period, foreign capital inflows influenced stock price movements throughout the oil and gas sector, which means that buying and selling by foreign investors will affect stock prices. The share price of the oil and gas sector does not affect the flow of foreign capital, which means that foreign investors in this sector apply technical analysis, where the stock price is not the main consideration in deciding to buy or sell shares but there are other factors that influence it.

The shock and contribution period is still in the Covid-19 pandemic period with an estimated 30 days ahead. When there is a shock to the flow of foreign capital, the share price of the oil and gas sector gives a negative response which indicates that if the flow of foreign capital fluctuates, the stock price will decrease. When there is a shock in stock prices, the flow of foreign capital responds in a fluctuating manner which leads to a negative response. This indicates that foreign investors in the oil and gas sector apply the negative feedback trading theory. The contribution of foreign capital flows when there is a change in the share price of the oil and gas sector is smaller than the contribution given by the share price to changes in foreign capital flows.

Regarding the research results which show that there is a dynamic relationship between foreign capital flows and sectoral stock prices, it is hoped that Indonesia can increase the contribution of domestic investors in the Indonesian capital market. With the high contribution of domestic investors, it is expected to prevent high stock price volatility in the event of global shocks or shocks to macroeconomic variables that trigger shocks to foreign capital flows considering that global uncertainty (Covid-19) is still happening until now.

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