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Causality Analysis between the Foreign Investor Transaction Value and Stock Market Returns (Period 2014-2018)

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Abstract

The purpose of this study was to determine the causal relationship between the variable value of foreign investor transactions and stock market returns, given the unclear relationship between the two variables. The model of the study used the VAR (Vector Autoregressive) model. Granger Causality Test (Granger Causality Test) is conducted to test the cause and effect relationship or causality between variables, in this case the variable has a two-way or only one-way relationship. Furthermore, the impulse response and variance decomposition analysis were carried out. Based on the Granger causality test, it is found that there is a two-way (bidirectional) relationship between the transaction value of foreign investors and stock market returns. Based on the impulse response analysis, it was found that the shock effect of each variable did not result in a long-term effect, while the analysis of the variance decomposition showed that each variable could explain each other if there was a change between the two variables, although the portion of the explanation was still dominated by their respective variables.

Keywords: foreign investor transaction value, stock market return, granger causality test.

Introduction

Nowadays, investment knowledge is increasing, both investment in the form of real assets such as gold, silver, diamonds, art goods, and real estate and investment in the form of financial assets in the form of securities (Sunariyah, 2004). This is also inseparable from the increasing public awareness to invest and get profitable passive income in the future. Of the two investments, financial investments (deposits, mutual funds, bonds, stocks & other securities) are investments that show quite rapid development, because the returns provided are quite large. Financial investment is an investment that tends to be liquid so that it can be easily converted into cash at any time. Of the various kinds of financial investments, investment in the capital market is increasingly recognized and in demand by the public, especially young people (school students and college students). The capital market is a market for various long-term financial instruments such as bonds and stocks (Jones, 2013). Shares (as a sign of participation or ownership of a person or legal entity in a company or limited liability company. Darmadji dan Fakhruddin (2011) is more popular and chosen by many investors. This was evidenced by the growth of investors

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or investment participants in the Indonesian stock market continues to grow every year. Although the risk is so high, the stock return is high among other investment instruments.

An investor who wants to get a maximum stock return should conduct a fundamental and technical analysis of a stock to be purchased. All fundamental and technical analysis is of course to see and predict future stock values and prices. In terms of fundamentals, company shares can be assessed from the company performance, financial statements and ratios, industry conditions and the macro economy. Technically, it can be seen from historical prices, trading volumes, and trading values to see price developments graphically. All of these analyzes can certainly affect the psychology of investors to make purchasing decisions. So that it will form investors into two parts, namely long-term investors and short-term investors or commonly known as traders. Long-term investors will invest their capital for a long time in issuers according to the analysis. Long-term investor analysis is based on fundamental analysis before choosing to invest in an issuer's stock. While traders tend to look for profits in the short term. Traders will tend to use technical analysis to make buying and selling decisions. This difference in orientation and philosophy causes a stock market to move continuously and market participants, especially investors, can obtain abnormal returns from the market.

The Indonesian capital market consists of local investors and investors from abroad (foreign investors) in accordance with the Investment Law Rule Number 27 of 2005. The presence of foreign investors in Indonesia is certainly very good for accelerating capital growth and capital market capitalization with a large nominal so that the fulfillment of capital can be fulfilled immediately. However, if the holdings and foreign investor transactions are too high at one time, it can cause significant changes in market movements.

The influence of buying and selling of stocks by foreigners will affect the movement of stocks and the JCI. Any decrease or increase in the JCI, either long-term or short-term, will certainly not be separated from the actions taken by foreign investors. When there is an economic downturn, changes in central bank interest rates, political turmoil, or other phenomena, the stock market will respond negatively and if there is a decline, foreign parties will sell their stocks massively. It is still a question whether foreign parties who sell see the economic condition or respond because they see the condition of the JCI. Meanwhile, if economic conditions improve and when the JCI has shown improvement, they will re-enter and play a role in lifting the value of the JCI.

It is still unclear whether other than macroeconomic factors, changes in market returns are influenced by transaction actions by foreign investors. Or changes in market returns that affect the actions taken by foreign investors in making sales or purchases in large quantities. The results of research from Avci (2015) showed that there was a unidirectional effect, where foreign investor transactions significantly affected stock returns in BIST (Turkish stock index). Similarly, research by Anayochukwu (2012) on the Nigerian stock market showed that foreign transactions had a unidirectional relationship and a significant effect on stock returns in Nigeria. Meanwhile, research conducted by Adaoglu dan Katircioglu (2013) on the Turkish blue-chip stock market and Al-Amarneh (2012) on the Jordanian stock market showed the results of a bidirectional relationship (has a two-way relationship) between foreign investor transactions and stock market returns in Indonesia.

Literature Review

Technical Analysis is a technique for predicting the direction of stock price movements and other stock market indicators based on historical market data such as price and volume information (Tandelilin, 2010). Technical analysis used specific market data to analyze aggregate stock prices and individual stock prices (Jones, 2013). In general, technical analysis was based on data on stock prices or past market index and trading volumes. Price and volume are the main tools of pure technical analysis, and charts are the most important mechanism for displaying this information. Adherents of technical analysis believed that the power of supply and demand produce certain patterns of price behavior, the most important of which is the overall trend or direction in prices. Using a graph, investors hope to identify trends and patterns in stock prices that provide trading signals (Jones, 2013).

In technical analysis, the decision to sell or buy a stock is based on past historical data. Although philosophical and scientific-technical analysis is contrary to fundamental analysis, this difference allows the market to continue to move and stock market participants, both adherents of fundamental analysis and adherents of technical analysis, can get abnormal return. This study used historical data on daily net transaction values from foreign investors and return data on the combined stock price index. The net foreign value (NFV) transaction is the difference between the selling transaction of foreign investors and the buying transaction of foreign investors. The buying and selling actions of foreign investors can be an indicator for both technical analysis and fundamental analysis for all capital market participants in Indonesia.

Theoretically, several rationales supported the relationship of foreign investment to stock prices, namely, first, stock transactions by foreign investors are part of aggregate demand and supply. The increasing sale of shares by foreign investors tends to increase the number of shares offered. Likewise, if the purchase of stocks by foreign investors increases, it will also increase the number of requests for stocks; second, indirect foreign investment in the form of shareholding and other indirect investments which can be seen from the improvement in the company's fundamental factors. So, directly these price changes will cause the movement of stock returns in the JCI (Sudirman, 2015).

Methods

This study used all elements in the population. The population of this study was the transaction value of foreign investors' stock from 2014-2018. With the availability of all the required data, this study used all of the data in the population, which amounted to 1211 elements.

The type of data used in this study was secondary data of the time series type, which was in the form of daily data on the foreign investor transaction value and stock market returns in the period 2014-2018 (5 years). Sources of data were obtained from the Indonesia Stock Exchange, Financial Services Authority, scientific journals, results of previous research, and other reading sources.

The data collection method used was the documentation method, which is collecting secondary data published by related parties such as the Indonesia Stock Exchange by utilizing the internet and further processing with the Microsoft Excel application. So that the results of the foreign investor transaction value and daily market returns can be obtained from the JCI.

Analysis Techniques

Data Stationarity Test

In this study, because it used time-series data, it must use the stationarity test because in this test the data will be tested whether the data is stationary or not. Stationary data is data that does not contain unit roots, on the other hand, if the data has a constant mean, variance, and covariance all the time, the data can be said to be non-stationary data. Stationary data can be seen at a glance from data fluctuations. Data can be said to be stationary if the data moves and fluctuates around the mean, while data that is not stationary will move with a changing mean all the time.

In general, stochastic trends can be eliminated by differencing. Differencing is carried out to produce stationary data to test whether a time series data is stationary or not, it can be done by carrying out the unit-roots test developed by Dickey-Fuller, therefore this test is often called the Dickey Fuller (DF) test and its development is called the Augmented Dickey Fuller (ADF) test.

The procedure to determine whether the data is stationary or not is to compare the DF statistical value with the MacKinnon critical value reflected in the McKinnon one side p-value. If the absolute value of DF is greater than the critical value, the data shows that it is stationary. On the other hand, if the absolute value of DF is smaller than the critical value, the data shows that it is not stationary.

Optimal Lag Determination

In economics, the influence or dependence of a variable with other variables does not directly have an instant or direct impact. Very often found that the response of a variable to the influence of other variables happens after a few days (days). The time interval required to influence one variable to another is called the lag value (Granger, 1969). Determination of the optimal lag length can use criteria such as. Akaike Information Criteria (AIC), Schwartz Information Criteria (SIC), Hannan-Quin Criteria (HQ), Likelihood Ratio (LR), or Final Prediction Error. A model is said to have an optimal lag length if the criteria values have the smallest absolute values.

Granger Causality Test

The Granger causality test is an analytical method that explains whether a variable has a two-way or only one-way relationship (Nachrowi & Usman, 2006). Causality is a cause-and-effect relationship. Thus, if there is causality in an econometric model, this indicates that there are no independent variables, all variables are dependent variables. This test involved estimating the regression pairs of the two variables, as follows:

$$MR_t = \sum_{i=1}^n \alpha_i NFV_{t-i} + \sum_{j=1}^n \beta_j MR_{t-j} + u_{1t} \quad \dots\dots\dots (1)$$

$$NFV_t = \sum_{i=1}^n \gamma_i MR_{t-i} + \sum_{j=1}^n \delta_j NFV_{t-j} + u_{2t} \quad \dots\dots\dots (2)$$

Equation (1) shows that current MR is related to the past value of MR itself as well as NFV value, and (2) shows similar behavior for NFV. Based on this equation, according to Gujarati (2004), four possibilities occur:

- a) Unidirectional causality from MR to NFV is shown if the estimated coefficient on the MR lag (1) is statistically different from zero as a group ($\sum \alpha_i \neq 0$) and the estimated coefficient on the NFV lag (2) is not statistically different from zero ($\sum \delta_j = 0$).
- b) Unidirectional causality from NFV to MR is proven if the coefficient on MR lag (1) is not statistically different from zero ($\sum \alpha_i = 0$) and the lag coefficient for NFV in equation (2) is statistically different from zero ($\sum \delta_j \neq 0$).
- c) Bilateral causality is suggested when the set of M and GDP coefficients are statistically significantly different from zero in both regressions.
- d) Independent is suggested when the set of M and GDP coefficients is not statistically significant in both regressions.

To see whether there is causality among variables, it can be seen by carrying out the F test or it can also be seen from the probability value (Granger, 1969).

Impulse Response Analysis

Impulse response tracks the response rate of the dependent variable in the VAR to the shock of each variable. Thus for each variable from a separate equation, one unit of shock is applied to the error and the effect in the VAR system all the time is recorded. So if there is a variable x in the system, the total impulse response x_2 can be concluded. The impulse response output is in the form of a graphic image. The impulse response image will show the response of a variable due to the shock of other variables until several periods after the shock occurs. If the impulse response figure shows a movement that is getting closer to the equilibrium point (convergence) or returns to the previous equilibrium, it means that the response of a variable due to a shock will gradually disappear so that the shock does not leave a permanent effect on the variable.

Decomposition Variants Analysis

The next analysis is the analysis of variance decomposition. In this section, it is analyzed how the variance of a variable was determined by the role of other variables and the role of itself. Variance decomposition is used to compile forecast error variance of a variable, namely how big is the difference between the variance before and after the shock, both shocks originating from oneself and shocks from other variables to see the relative influence of research variables on other variables. The variance decomposition procedure is to measure the percentage of shocks for each variable. This decomposition variance will show or aim to separate the impact of each innovation variable individually on the response received by a variable.

Result and Discussion

From the root test results in table 1, it can be seen that the NFV variable had a t-statistic value of ADF -24.69817, where the value was smaller than the MacKinnon critical value at all levels of significance and the probability value was less than a 5%. So it can be stated that the NFV was stationary at the level stage. Furthermore, the MR variable had an ADF t-statistic value of -32.61027, this value was also

smaller than the MacKinnon critical value at all levels of significance and the probability value was less than α 5%. It can be concluded that the MR variable was independent of the unit root or was stationary at the level stage. After all the data was stated to be stationary, the next test was to determine the optimal lag. The optimal lag test is very important to be done before carrying out Granger causality test and VAR.

From the Table 2, it can be seen that all criteria values in each lag can be selected, the smallest absolute value of each criterion, except for LR which was determined based on sequential modified LR test statistics (each test at 5% level). The test results have made it easy to choose the ideal lag, by looking at the (*) mark on the criterion value. So, here you can choose the lag that has the most criteria values marked with (*) and the lag used in this study was lag 7 (with a total of three (*)).

Table 1. ADF Unit Root Test Results

Variable	ADF t-statistic value	MacKinnon Critical Value			Prob	Information
		1%	5%	10%		
NFV	-24.69817	-	-2.86384	-	0.000	Stationary
		3.43583		2.56805		
MR	-32.61027	-	-2.86384	-	0.000	Stationary
		3.43583		2.56805		

Table 2. Optimal Lag Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-20072.27	NA	6.36e+19	51.27528	51.28719	51.27986
1	-20032.12	79.98506	5.80e+19	51.18295	51.21868*	51.19669
2	-20021.54	21.02754	5.70e+19	51.16614	51.22569	51.18904*
3	-20017.98	7.071024	5.71e+19	51.16724	51.25062	51.19930
4	-20015.33	5.232432	5.73e+19	51.17070	51.27790	51.21192
5	-20007.69	15.06415	5.68e+19	51.16140	51.29242	51.21179
6	-20002.51	10.19116	5.66e+19	51.15838	51.31323	51.21793
7	-19993.79	17.09961*	5.59e+19*	51.14634*	51.32500	51.21504
8	-19992.11	3.286487	5.63e+19	51.15226	51.35475	51.23013

Table 3. Granger Causality Test Results

Null Hypothesis:	Observation	F-Statistic	Prob.
MR does not Granger Cause NFV	828	2.57726	0.0124
NFV does not Granger Cause MR		3.49804	0.0011

From the results of Table 3, the Granger causality test can be seen that the first, the null probability hypothesis on MR does not Granger Cause NFV was less than α 5%, so the null hypothesis of MR does not Granger Cause NFV was rejected, this indicated that there was Granger causality from market returns to foreign investors transaction value.

Second, the probability value on the null hypothesis of NFV does not Granger Cause MR was less than α 5%, then the null hypothesis of NFV does not Granger Cause MR was rejected. This indicated that there was Granger causality from the foreign investor transaction value to market returns.

Because all null hypotheses were rejected, it can be concluded that there was a bidirectional causality Granger relationship. In other words, there was a two-way relationship between foreign investor transaction value variables and market returns at lag 7. So with the results of this Granger causality test, the research hypothesis (H_1) was accepted or proven, namely, there was a two-way Granger causality relationship between foreign transaction values and market returns.

After the causality test, the impulse response test was carried out. The impulse response test is one of the implementations of the VAR model. The impulse response test serves to see the shock given by each variable in the relationship between the two variables of foreign investor transaction value and market returns.

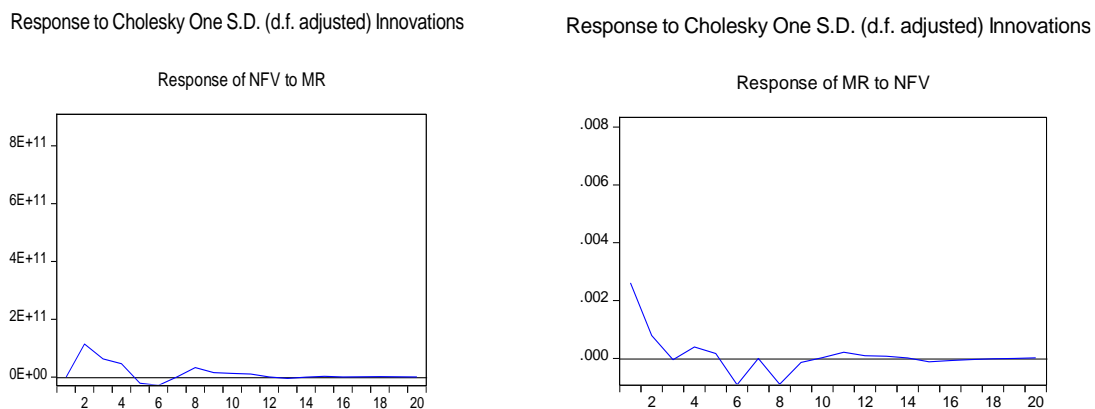


Figure 1. Impulse response function graph

Table 4. Variance Decomposition Test Results

Variance Decomposition Of NFV			Variance Decomposition of MR		
Period	NFV	MR	Period	NFV	MR
1	100.0000	0.000000	1	8.970379	91.02962
10	97.68234	2.317657	10	11.38482	88.61518
20	97.67099	2.329006	20	11.46697	88.53303
29	97.67098	2.329017	29	11.46731	88.53269
30	97.67098	2.329017	30	11.46731	88.53269
40	97.67098	2.329017	40	11.46731	88.53269
50	97.67098	2.329017	50	11.46731	88.53269

From the impulse response test results, it can be seen that the effect of the shock of each variable did not leave a permanent or long-term effect. After analyzing dynamic behavior through impulse response, the characteristics of the model will be seen through variance decomposition. In this section, it was analyzed how the variance of a variable was determined by the role of other variables and the role of itself. From the variance decomposition test results, it was found that each variable was able to explain when there is a change in these variables and other variables in the system.

Another thing that can be revealed was that all information on the variable of foreign investor transaction value and market returns in the past can be used to predict changes in the current two variables. Where past information on market returns and foreign investor transaction value was able to predict the current foreign investor transaction value. It can be said that the information from the market return and the past foreign transaction value was able to predict the decision of foreign investors to make current transactions. And past information on the foreign investor transaction value and market returns were able to predict current market returns. It can be said that information from the foreign transaction value and past market returns were able to predict current return movements. Where dynamic analysis using variance decomposition in the balance period of foreign investor transaction value can explain changes in market returns of 11.47% and market return variable can explain changes in foreign investor transaction value of 2.33%.

Judging from the results of research in this daily period, the foreign transaction value can be used as new reference material to form components of technical analysis to assist investors make a decision. This is because technical analysis, which is based on volume, is also the basis for the formation of the transaction value. Foreign investors tend to make investment decisions on a short-term basis rather than long-term fundamentals (Hamao & Mei, 2001). This statement is not surprising considering that a foreign investor who invests especially in the stock market will certainly take into account the economic factors that are running very dynamically at this time. So that the decisions of foreign investors were also influenced by the movements of existing economic factors both nationally and globally that occur every day. So, it is not surprising that foreign investors will tend to choose short-term investments in terms of stocks.

Considering that the power of foreign investors in the Indonesian stock market was still quite large, namely 51.3%, every transaction value from foreign investors every day will have a significant impact on the daily movement of market returns or in the short-term range. This was also supported by the attitude of analysts and influencers in stock investment in Indonesia who still often issue statements and analytical information by including the foreign investor transaction value. Many of the analysts still relate market movements to the foreign investor transaction value. So that it will indirectly lead to opinions from investors that foreign influences are strong enough to influence market movements. From this, it can be said that investors can make buying or selling decisions by following the movements of foreign investors which are reflected in the transaction value that occurs. Wang (2007) in his research also found that foreign trading had a dominant effect on market volatility in Indonesia and Thailand. After the market liberalization era, domestic investors were no longer price-setters but more price followers. Then enter or create a technical analysis tool by utilizing the foreign transaction value to see market movements. Of course, this tool will assist investors, especially domestic investors, to simplify or add the reference for decision-making.

This research can also be used to see the level of efficiency of the Indonesian capital market. As is well known in market efficiency, information is the key to stock pricing. Indirectly, the power of information will affect the movement of stock prices (Jones,

2013), where the effect will affect the movement of returns both individually and in the market. The more, faster, and more accurate information is obtained by almost all investors to make the right decisions, then the market can be expected to be efficient. If viewed from the results of Granger causality, past information on the foreign investor transaction value and market returns can be used to predict the foreign investor transaction value and current market returns, it can be said that the efficiency of the Indonesian capital market was weak-form. This was the same as what Jones (2013) said, a market can be said to be in a state of weak efficiency if the current price reflects past prices, where prices are influenced by transactions, and price movements will affect return movements. Therefore, information on the foreign transaction value and market returns can be used by investors to assist make better decisions to gain profits in the short-term range. This was also supported by research by Ady dan Mulyaningtyas (2017) which found that the Indonesian capital market was at a weak efficiency level and the capital market was not functioned optimally to improve the economy of the Indonesian people because most investors were foreign investors who perceived the benefits of its existence.

Conclusion

From the results of data analysis and testing, the following results and conclusions are obtained:

1. The results of the study using the Granger causality test indicated a bidirectional Granger causality relationship between the transaction value of foreign investors and market returns.
2.
 - a. The results of the impulse response graph analysis showed that the shock of market returns was responded by fluctuating the transaction value of foreign investors from positive to negative and did not leave a permanent effect on the transaction value of foreign investors.
 - b. The results of the impulse response graph analysis showed that the shock of the foreign investor transaction value was responded by fluctuating market returns from positive to negative and did not leave a permanent effect on market returns.
3. The results of the variance decomposition test showed that each variable change was still dominated or explained by each variable.

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