Determinant Factors of Jakarta Composite Index with Garch Model

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Abstract— **This research was aimed to finding out whether it's related to the Exchange Rate of Rp/USD, Net Foreign Fund (NFF), Consumer Price Index (CPI) to the Jakarta Composite Index (JCI). The population are all data on the exchange rate of Rp/USD, data on all share purchases by foreign investors, all data on the Consumer Price Index on BPS and data on the JCI on the IDX. The sample selection method is a purposive using two kinds of data (daily and monthly). The results of this study are that there is a significant difference in the IDR / USD exchange rate against the JCI, and there is no influence on the NFF and CPI on the JCI on monthly data using the OLS model, while the research studies on daily data are associated with significant IDR / USD, and NFF towards the JCI using the GARCH model. The results of by using GARCH (1,1) indicate that the NFFF variable is the most important determinant for JCI. This is based on observations testing various variations of the GARCH model, the t-test value of NFFF is always higher than the KURS. This finding confirms that the IDX is still driven by foreign investors.**

Keywords: exchange rate, net foreign fund flow, Consumer Price Index (CPI), Jakarta Composite Index (JCI)

I. INTRODUCTION

Stock investors in IDX have an important role along with the rise and fall of the Jakarta Composite Index (JCI) due to the index fluctuation affecting the value of its stock portfolio. Intuitively, generally the value of shares or portfolio of stocks moves in line with the movement of the index. The movement of the stock index in a country has certainly affected the country's economic condition on a macro basis, this has become a sure thing. If the economic conditions in the country improve, then foreign capital will enter more or usually there will be capital inflow. So that inflow capital causes the strengthening of the rupiah or the decline in the USD exchange rate against

the rupiah. The positive effect will have an impact on the stock market and its index if some foreign capital is invested in the stock portfolio. Furthermore, the movement of the stock index also follows the pessimism and the optimism of the past investors greatly determines the movement of the index towards the stock exchange which has little market capitalization especially in Indonesia [1].

The exchange rate is one of the driving factors of the Jakarta Composite Index (JCI) can be defined as a unit of foreign currency if exchanged for domestic currency or foreign currency in domestic currency. The rupiah exchange rate is the price of the rupiah against other currencies. Exchange rates are one of the indicators that affect activity in the capital market because investors tend to be careful to make investment portfolios, the depreciation of the rupiah exchange rate against foreign currencies, especially the dollar has a negative influence on the economy and capital markets [look for Sitinjak and Kurniasari, [2] and Frensidy, Budi [1] in his presentation at Bapepam-LK] stated that the purchase of shares by foreign investors also has an important role in increasing liquidity and facilitating market efficiency. This role can be expected mainly because of the strength possessed by foreign investors, in the form of
(1) greater capital, (2) broad access to world capital markets and more experience, (3) better fundamental analysis, (4) having information more and better, (5) have a better ability to interpret information. However, according to him, foreign investors also have several obstacles such as (1) exchange rate risk, (2) home bias, (3) maximum ownership limit, (4) not focusing on only one country.

The Consumer Price Index (CPI) is one of the important economic indicators that can provide information on the development of prices of goods and

services (commodities) that are paid by consumers or the public, especially the city community. Changes in CPI from time to time indicate fluctuations in the prices of goods and services consumed by the public, inflation occurs if increases and deflation in the event of a decline. The Consumer Price Index (CPI) is often used to measure a country's inflation rate and also as a consideration for adjusting salaries, wages, pensions and other contracts [3]. The results of the study of the influence of the Consumer Price Index on the Jakarta Composite Index conducted by Valadkhani, Abbas et al [4], and Gunasekarage et al [5] indicate that the Consumer Price Index has a positive effect on Jakarta Composite Index. While the results of the research by Adenike and Dadang [6] and Heriyanto and Ming [7] show that the Consumer Price Index has a negative effect on the Jakarta Composite Index (JCI).

By realizing that the movement of the stock price index tends to be influenced by many fundamental and non fundamental factors, the researcher will focus on this research is to try to predict the movement of the Jakarta Composite Index (JCI) with a causality approach (in this case OLS-ARCH or GARCH method). Based on the background above the author is interested in conducting research to predict whether these variables have an influence on the Jakarta Composite Index in the period January 2012 until October 2018 on monthly data and October 2014 until September 2018 on daily data. The uniqueness of the study is that the re-testing of the variable NFFF refers to the Frensidy [1] study which is still relevant as a JCI driving factor on the IDX.

II. THEORY DEVELOPMENT

A. Buying Shares by Foreign Investors

The positive roles of foreign investors according to Dr. Lana Soelistianingsih in OJK (ex- BAPEPAM-LK) [8] exploratory study in 2008 are such as: (a) encouraging investor confidence, (b) closing the gap between investment and savings, (c) encouraging market mechanisms, (d) encouraging market liquidity, (e) strengthening domestic exchange rates, (f) reducing asymmetric information makes the market more transparent and efficient. And also having a negative role that arises from foreign investors is (a) monetary policy facing trade offs between foreigners and domestic interests, (b) increasing instability of returns, (c) markets becoming read by foreign investors thus disrupting the level of policy independence (d) easily affected by global risk, (e) encouraging unpredictable pressure, (f) the reversal process makes country risk increase and the domestic exchange rate will be disrupted, and (g) reduce nationalism.

In general, the role of foreign investors can be divided into two aspects, namely ownership and trading. The influence of foreign ownership and foreign trade activities on the level of volatility of the topics discussed

from the research conducted by Dr. Jianxin Wang from the University of New South Wales, Australia. Jianxin Wang [9] states that trading and share ownership held by foreign investors has a different influence on the level of volatility of the stock market in Indonesia. If the level of foreign trade activity has a positive relationship to the level of stock price volatility, then the level of foreign shareholding actually has an inverse relationship, namely a negative relationship with the level of volatility of stock prices. A negative relationship is the impact of the calming effect on the volatility of the upcoming stock price.

The influx of portfolio foreign capital in the economy of a country has its own advantages and disadvantages for the country. So that it will increase the liquidity of domestic financial needs and the capital market will be increasingly bullish. But in reality, there is something to be wary of the entry of portfolio foreign capital in the economy. The large amount of portfolio foreign capital in the free floating exchange rate system will lead to an appreciation of the domestic currency, this will have an impact on the price of domestic assets, as well as increased volatility in financial markets and foreign exchange, and also higher sterilization costs in the domestic economy [10]. As long as an increase in capital inflows has resulted in an appreciation of the real exchange rate. Thus causing an impact if the capital flows are too heavy, especially the type of portfolio investment or short- term capital. Theoretically, if the economic system is open with free foreign capital flows, so that the exchange rate tends to experience appreciation due to capital inflow supported by a positive interest differential. A similar thing would happen if a sustained balance of payments surplus as a result of the flow of funds into the country made the position of the exchange rate tend to be stronger.

B. Exchange Rate and JCI

According to Heriyanto and Ming [7] there is a negative relationship between the Exchange Rate of Rp. USD and Jakarta Composite Index due to economic conditions abroad (external variables) having a more dominant level of influence on the movement of Jakarta Composite Index (JCI). Gunasekarage et.al. [5] use foreign exchange rate variables as a proxy for macroeconomic variables to explain the movement of Jakarta Composite Index. Furthermore, he stated that the increase or decrease in the exchange rate made the capital market in Sri Lanka become cheaper or more expensive for foreign investors so that fluctuations in the level of foreign exchange rates would have an impact on stock investment decisions from foreign investors.

The traditional approach that has been explained in research of Budi Frensidy [1] which states that exchange rate movements will affect international competitiveness and balance of payments. This effect will ultimately affect

the company's cash flow and the price of its shares. Where this approach suppresses the negative relationship between stock prices and exchange rates. From some of these descriptions it can be stated that the exchange rate fluctuations are not too high if under normal conditions, the exchange rate with the capital market is positively correlated. But if there is an appreciation or depreciation of the exchange rate, then the exchange rate with the capital market will be negatively correlated.

C. Net Foreign Fund Flow and JCI

Al Muntasir [12] found a relationship between the Purchase of Shares by Foreign Investors (NFF) and Jakarta Composite Index because in moving Jakarta Composite Index; the foreign capital flows will contribute greatly, it can be seen from the coefficient level which is higher than the coefficient other variables. Where it will be very relevant to the facts that have occurred in the field, where the number of foreign investors is high on the Indonesia Stock Exchange and where foreign investors have more funds than domestic investors, so selling and buying them will spontaneously affect the low level of the Jakarta Composite Index. This is very vulnerable to shocks, due to the high level of volatility in the Indonesian stock market where the source comes from external and internal sources.

Research conducted by Frensidy, Budi [1] also found a positive relationship between Stock Purchases by Foreign Investors and Jakarta Composite Index because the the flow of foreign funds is a signal of optimism or pessimism which is thought to be a determinant of stock index movements, where the optimism of foreign investors is marked with many buying and selling actions carried out by those who had a positive sentiment effect. Whereas in the research of Agarwal, et. al. [11] which states that foreign investors perform under the domestic investors in stock trading activities on the Indonesia Stock Exchange because the performance of foreign investors is better than the performance of domestic investors.

D. Consumer Price Incex and JCI

The Consumer Price Index (CPI) in a study conducted by Gunasekarage et al. [5] where the study stated that the increase or decrease in inflation would cause a decrease or increase in the purchasing power of foreign investors which would ultimately have an impact on the influence of investment decisions on local investors in capital market. Adenike and Dadang [6] in his study said that the consumer price index has a negative influence on the JCI because the Consumer Price Index is an indicator of inflation where when demand for company products is high and inflation rises, the net profit and sales of the company decreases and thus the stock price. Inflation in the economy also puts pressure on raw material costs for companies, which increases costs and reduces cash inflows, putting pressure on the company's stock price. According to Heriyanto and Ming [7] the Consumer Price Index have no significant effect on Jakarta Composite Index (JCI) and and the money supply (M1) have a negative effect on the JCI because it shows that macro variables in Indonesia have relatively no effect on the JCI movement.

E. Research Framework & Hypothesis

In life in this global economy, almost every country in the world whose economy is affected by foreign exchange movements, especially on the influence of the United States Dollar. Because the dollar exchange rate has become a kind of international currency, each country must rely on this USD currency. So that this foreign exchange factor has a very large influence on the JCI. Madura (2001) states that there is a correlation between foreign exchange rates and stock prices, namely: "*If foreign exchange dominates foreign stocks, appreciation, returns on shares that investors will receive will increase, but if the foreign exchange depreciates, stock returns will decline. Exchange rate volatility will cause the return of uncertain foreign shares.*"

The flow of foreign capital has greatly contributed to the movement of Jakarta Composite Index which can be seen from the coefficient level higher than the coefficients of other variables. On the Indonesia Stock Exchange, it can be seen that the number of foreign investors is high, which means that foreign investors have more funds than the cosmetics investors [12]. Therefore, buying and selling foreign investors can directly influence the high level of Jakarta Composite Index. It can be concluded that the higher the number of foreign investors, the higher the price level of the Stock Price Index. The increase or decrease in inflation can lead to an increase or decrease in the purchasing power of foreign investors which will have an impact on the investment decision [5]. Adenike and Dadang [6] also said that the indicator of inflation is the Consumer Price Index, which states when demand for company products is high then inflation rises because it can be concluded if inflation rises, the net profit and sales of the company will decrease, causing the stock price to fall. From the explanation above, a hypothesis that will be tested in this study is formed:

H1: There is a significant effect of the exchange rate of Rupiah/USD on Jakarta Composite Index

H2: There is a significant effect of Net Foreign Fund Flow on Jakarta Composite Index

H3: There is a significant effect of the Consumer Price Index on Jakarta Composite Index

III. RESEARCH METHOD

A. Population and Samples

The population used in this study is all data on the value of the RP/USD exchange rate, data on all share purchases by foreign investors, all data on the Consumer Price Index and data on Jakarta Composite Index on the IDX. Purposively selected samples are monthly data and daily average data on stock closing prices of JCI, Rp/USD median exchange rate, purchase of share prices by

foreign investors and Consumer Price Index in the 2012 to 2018 observation period data and November 2014 to October periods 2018 on daily data.

B. Variable Operationalization

i.   Dependent Variable

The dependent variable in this study is the Jakarta Composite Index (JCI). The Jakarta Composite Index is a value used to measure the performance of shares listed on a stock exchange [5]. The Jakarta Composite Index is an indicator of price movements for all shares listed on the Indonesia Stock Exchange (IDX). JCI is one of the benchmarks of economic and investment conditions in Indonesia. The unit is in the form of an index. The stock price used is the stock price recorded at the end of the monthly and daily closing price. Here are the calculations:

where:

H_t: The total price of all shares at the time in effect

H_0: The total price of all shares at the base time

C. Independent Variables

The independent variables in this study are:

i.   Exchange Rate

Domestic currency rates against foreign currencies. This study uses US Dollar because it refers to the literature of Gunasekarage et.al. [5], it is alleged that the United States capital market affects most capital markets in the world. Rupiah Exchange Rate is taken from the daily data of the median rupiah banknotes against the US dollar on the BI website. USD is chosen because USD is the most stable hard currency and most recognized as a currency for international transactions by all countries. Here are the calculations:

Median Exchange Rate = (Ask – Bid) /2 (2)

The exchange rate data is being accessed from the official website www.bi.go.id for the period November 2014 to October 2018 for both daily and monthly data.

ii.   Purchase of shares by foreign investors

Net Foreign Purchase (NFP) is the value of net purchases of foreign investors in the Indonesia Stock Exchange in Rupiah that is listed on the trading board of IDX. As well as published by the Financial Services Authority in daily and monthly reports, the units are in the form of billions of Rupiah. Here are the calculations:

$$\Delta NFF = NFF_t - NFF_0 \qquad (3)$$

where:

Y   = Jakarta Composite Index a = Constant

b1   = Regression Coefficient X1 X1 = Exchange rate of Rp / USD b2 = Regression Coefficient X2
where:
NFFt. Net Foreign Purchase at the time applicable
NFF_0: Net Foreign Purchase at base time

Data of Net Foreign Purchase is accessed from the website www.ojk.go.id for the November 2014 period until October 2018 for daily data. The Net Foreign Purchase data menu specifically from www.ojk.go.id is Weekly Capital Market Statistics.

iii.   Consumer Price Index (CPI)

CPI is calculated using the Modified Laspeyres method with the formula:

The Consumer Price Index (CPI) is one of the economic indicators that provide information about the prices of goods and services paid by consumers. CPI calculation is done to record changes in purchase prices at the consumer level (purchasing cost) of a fixed group of goods and services (fixed basketball) which are generally consumed by the public (Source: Metadata). The following technical compilation used is:

$$JCI = \frac{H_t}{H_0} \times 100\% \quad (1)$$

1. CPI is calculated using the Modified Laspeyres method with the formula:

$$In = \frac{\sum_{i=1}^{.k} \frac{Pni}{P(n-1)i}(P(n-1)ix\,Qoi)}{\sum_{i=1}^{k}(P0ix\,Qoi)} \times 100 \quad (4)$$

where:
In   = Nth month index
Pni   = Price of type of commodity i in nth month
P (n-1)I   = Price of commodity type i at n-1 month
P (n-1)i.Q0i = Consumption value of commodity type i n- 1 month
P0i. Q0i   = Consumption value of commodity type i in base year

2. Percentage change in CPI where the percentage change in monthly CPI (month-to-month change / mtm) is calculated by formula:

$$Monthly\ CPI_{(m-t-m)} = \frac{In}{I(n-1)} \times 100 \quad (5)$$

where:
In   = N_{th} month CPI
I (n-1)   = (N-1)th month CPI

The Consumer Price Index data is accessed from the website www.bps.go.id for the November 2014 period until October 2018 for monthly data. This data has been calculated previously by BPS.

D. Analysis Model

i.   Early Analysis Model

The initial data analysis technique is OLS multiple linear regression (Ordinary Least Square) The regression analysis process is carried out using the program Eviews 9.0 The resulting regression equation is:

$$Y = a + b1X1 + b2X2 + b3X3 + e \quad (6)$$

X2   = Purchase of shares by foreign investors (NFF)
B3 = Regression Coefficient X3

X3 = Consumer Price Index (CPI)

E = error

ii. Final Analysis i.e. GARCH model

Nachrowi [15] states that the condition of using the GARCH model is that there is heteroscedasticity in the OLS initial analysis model. So that with the existence of heteroscedasticity in error, a better and more efficient estimator will be obtained.

By testing the ARCH effect (Autoregressive Conditional Heteroskedasticity) found by Robert Engle as follows:

Regression between the dependent variable and the independent variable.

Lagrange Multiplier ARCH test for residues from point i with a hypothesis:

- $H0 = \alpha0 = \alpha1 = 0$ There is no ARCH Effect

- $H1 = \alpha0 \; \alpha1 \neq 0$ There is an ARCH Effect

If there is an ARCH Effect, then the testing is done by adding a lag until there is no ARCH effect. But if the exact model has not been found, the next step is to do trial and error (try some possible models), so that a good model is obtained

The equation of the ARCH and GARCH models introduced by Robert Engle i.e.

- ARCH (p) $\sigma^2 = \alpha0 + \Sigma\ \alpha ie2 t-1$
- GARCH (p, q) $\sigma_t^2 = \alpha0 + \Sigma\ \alpha ie2\ t-1 + \Sigma\ \lambda i\sigma q\ t-1$

where:

σ_t^2 = var (et) (a residual variant that has a volatility function and a past variant explained by 2 components)

Variable $\alpha0$ = Variable constants

$\alpha_{ie}^2{}_{t-1}$ = ARCH component

So this model, e_t. heteroscedasticity, conditional at e_{t-1}. By adding "conditional" information, the estimators of b0, b1, and b2 are more efficient. The ARCH model above, where var (et) depends on the level of volatility of the past several periods, if it is only influenced by one past period such as $\sigma t2 = \alpha0 + \alpha1e2\ t-1$ called the ARCH Model.

Variable $\lambda i\sigma q\ t-1$ = GARCH component. The purpose of this model is to overcome the increasing number of p, so that the increasing number of parameters must be estimated so that it can cause the precision of the estimator to decrease. This often happens in daily data analysis. Following are the general equations of the ARCH model and the GARCH model:

$Yi = b0 + b1\ X1 + ... bn\ Xn + e$ (7)

The error variant equation is

$\sigma_t^2 = \alpha0 + \alpha1\ e2\ t-1 + \lambda1\ \sigma2\ t-1$ (8)

where :

Yi = Variable Y
Xi, … Xn = Variable Xi until Variable Xn.
$\sigma t2$ = Error variance
e2t-1 = error or residual or volatility in period t-1
$\sigma2$ t-1 = Error variance in period t-1

IV. RESULTS AND DISCUSSION

A. Using OLS Model

This study uses 3 independent variables consisting of the exchange rate of Rp / USD, the purchase of shares by foreign investors and the Consumer Price Index and the dependent variable, Jakarta Composite Index January 2012 until October 2018 for monthly data and November 2014 until October 2018 for daily data. The tests are carried out at a 95% confidence level. The researcher used EVIEWS 9.0 software in processing the entire data to determine the effect of the independent variables on the dependent variable. So that seen from the value of Prob (F-Statistic) is 0.000000 from monthly data which is smaller than value = 0.05. It can be interpreted that simultaneously (together) the independent variable (Exchange Rate of RP/USD), purchase of shares by foreign investors and the Consumer Price Index) has a significant effect on the dependent variable.

From the results of the processed data, it can be seen based on classical assumption testing (multicollinearity test, normality test, autocorrelation test and heteroscedasticity test) that has been done, it can be seen that all results have passed the classical requirements on monthly data so that in the multiple linear regression equation model this research can be used as a basis for forecasting and can be justified accuracy. In the daily data there are also several tests that are violated on daily data, namely the Normality test, the Autocorrelation test and the Heterocedasticity test. So the author goes on to try the GARCH model. The selected GARCH processed is GARCH (1,1) because it has the lowest Akaike info criterion (AIC) and Schwarz info criterion (SCI) values, which illustrate the magnitude of the error that occurred.

Estimation results further seen from the t test on monthly data it can be concluded that the variable Exchange Rate RP/ USD affects Jakarta Composite Index while the Stock Purchase variable by Foreign Investors and the Consumer Price Index does not affect Jakarta Composite Index on monthly data and the adjusted R^2 value is 48 , 29% which means that for 48.29% Jakarta Composite Index variable can be explained by the exchange rate of Rp / USD, the purchase of shares by foreign investors, the Consumer Price Index and the remaining 51.71% can be explained by other variables not found in this study. From this final result, it can be seen that every 1% increase in the IDR / USD exchange rate will increase the JCI by 23.2% while 1% increase in foreign share purchase (NFF) will reduce the JCI by 0.78% and each index increase 1% Consumer Price (CPI) will reduce the JCI by 901.9%.

While the results of the t test on the daily data of all

independent variables (Exchange Rate of RP / USD and Purchase of shares by foreign investors) affect Jakarta Composite Index, where the adjusted R2 value is 11.70%, which means 11.70% of variable Jakarta Composite Index can be explained by the exchange rate of Rp / USD, the purchase of shares by foreign investors, the Consumer Price Index and the remaining 88.30% can be explained by other variables not found in this study. From this final result, it can be seen that every 1% increase in the RP / USD rate will reduce the JCI by 17.33% and every 1% increase in the purchase of foreign investors (NFF) will increase the JCI by 1.362%.

Based on the results of data processing conducted by researchers using EVIEWS 9.0 software, it can be seen that the variable probability value of Rp. USD is 0.0000 which is smaller than the value of = 0.05. Next is a discussion of hypothesis testing where in this study the hypotheses made by the authors are such as:

Hypothesis 1: There is a significant effect of the exchange rate / exchange rate of Rp / USD on Jakarta Composite Index (JCI).

Hypothesis 2: There is a significant effect of foreign Investor's stock purchase (NFF) on Jakarta Composite Index (JCI).

Hypothesis 3: There is a significant effect of the Consumer Price Index (CPI) on Jakarta Composite Index (JCI).

The result of the data processed is as follows:

TABLE 1. RESULTS OF MONTHLY DATA REGRESSION

Variable	Coefficient	t-Statistics	Prob.
C	1078.33	0.934	0.353
KURS	0.232	4.960	0.000
NFF	-0.007	-1.654	0.102
IHK	9.019	1.426	0.158
Adj. R-square = 0.483		F-stat = 26.215	

TABLE 2. RESULTS OF DAILY DATA REGRESSION

Variable	Coefficient	t-Statistics	Prob.
C	3.839	2.858	0.004
KURS	-0.202	-7.225	0.000
NFF	0.014	7.084	0.000
Adj. R-square = 0.118		F-stat = 59.03	

Based on table 1 on monthly data and table 2 on daily data, it can be seen that the results of testing hypothesis 1 the exchange rate variable Rp / USD against the Jakarta Composite Index is that there is a significant effect on the daily data with t-satistic value -6.575765 and P- value 0,0000 and t-satistic value 4.960433 and P-value 0.0000 on monthly data so that H0 is rejected, there is an

influence between the exchange rate of Rp / USD and the Jakarta Composite Index. This is in line with the results of Frensidy's study, Budi [1], Murwaningsih, Etty [14] and Nachrowi and Hardius [15] which state that the RP / USD exchange rate has a significant influence on Jakarta Composite Index, and is supported by Adenike research and Dadang [6], Valadkhani, Abbas, et. al. [4] and Al Muntasir [11].

On testing hypothesis 3 between the variable Consumer Price Index (CPI) against Jakarta Composite Index (JCI). Seen in the monthly data there is no significant effect with the value of t- satistic 1.425624 and P-value 0.1580. So that H0 is not rejected, which means there is no influence between the Consumer Price Index (CPI) and Jakarta Composite Index (JCI). This is in line with the results of Valadkhani's research, Abbas et al [4], Al Muntasir [1 2] which states that there is no significant influence between the Consumer Price Index (CPI) and Jakarta Composite Index (JCI) and is supported by the Gunasekarage et al [5] However, these results are not in line with the research conducted by Adenike and Dadang [6] and Heriyanto and Ming [7]. The existence of inconsistent research results is allegedly due to differences in the observation period. In addition, differences in the results of research with previous research are also possible because of differences in the tools used for testing data.

B. Using GARCH Model

   i. ARCH Effect

This ARCH effect test can be obtained using the Lagrange Multiplier test.

TABLE 3. HETEROSKEDASTICITY TEST

F-statistics = 4.946	Prob. F (1.862) = 0.0264
Obs* R-Squared = 4.929	Prob. Chi Square (1)= 0.0264

With the ARCH effect, the results obtained on the probability value on the F-statistic are 0.0264 which is smaller than the significant level of = 0.05, which is the ARCH effect which means that the data on the Jakarta Composite Index is significant to the Lagrange Multiplier value.

C. Selection of the Best GARCH Model

The next step is to look for the best Garch model and be feasible in the relationship of variables with GARCH, GARCH in means (M - ARCH), TARCH and E-GARCH *(this is not displayed because it is only a supplement).* The Jakarta Composite Index data that is predicted by the Exchange Rate of RP / USD, purchase of shares by foreign investors and the Consumer Price Index seen in the results of Ordinary Least Squared and heteroscedasticity which is a requirement before using the GARCH model. Based on EVIEWS 9.0 output, the following results are obtained:

TABLE 4. GARCH (1,1) MODEL FOR DAILY DATA

Variable	Coefficient	z-Statistics	Prob.
C	3.541	2.877	0.000
KURS	-0.173	-6.575	0.000
NFF	0.014	12.804	0.000
Variance Equation			
C	26.186	1.741	0.082
RESID(-1)^2	0.0501	3.361	0.000
GARCH (-1)	0.9337	43.616	0.000
Adj. R-square = 0.117		SIC = 10.155	
D-W = 2.139		AIC = 10.122	

It can be seen that the GARCH (1,1) model is:

$$DJCI_t = 3.541 - 0.173 DKURS_t + 0.014\ NFF_t$$

With variance or var (et):

$$\sigma^2_t = 26,186 + 0.0501\ e^2_{t-1} + 0.9337\ \sigma^2_{t-1}$$

Judging from the GARCH (1.1) model, it can be concluded that there is an influence between the exchange rate of Rp / USD and the purchase of shares by foreign investors (NFF) on Jakarta Composite Index. If we see the sign that the IDR / USD exchange rate is negative, the JCI falls while the purchase of shares by foreign investors is positive, the JCI rises. Judging from the PACF it is stated that there is no autocorrelation (appendix 2) and the data is normally distributed (appendix 1).

In the regression model above, it can be concluded that the regression coefficient for the variable RP / USD exchange rate is negative, which means that the relationship between the RP / USD exchange rate against Jakarta Composite Index (JCI) is not in the same direction. Where the variable regression coefficient of the exchange rate of Rp / USD is 0.173321, which means that every increase of 1 point of DKURS will result in Jakarta Composite Index (JCI) falling by 0.173321 points. Then the same direction is seen in the purchase of shares by foreign investors (NFF). Where the coefficient of 0.013621 means that for every increase of 1 point of purchase of shares by a foreign investor (NFF), it will result in an increase in Jakarta Composite Index (JCI) of 0.013621 points. Furthermore, it can be seen from the variance equation, which means that the conditional variance of the current period is influenced by the past square of 0.050821. The forecasting simulation results from GARCH (1,1) can be seen in appendix 3

V. CONCLUSION AND SUGGESTION

A. Conclusion

Based on the research that has been done to analyze the effect of the exchange rate of Rp / USD, the purchase of shares by foreign investors (NFF) and the Consumer Price Index (CPI) on the Jakarta Composite Index (JCI) for the period January 2012 until October 2018 on monthly data and November 2014 until October 2018 on daily data.

Based on the results in previous section it can be concluded as follows:

1. The Rupiah / USD exchange rate has a significant influence on Jakarta Composite Index (JCI) on the IDX on daily data and monthly data, with a 95% confidence level.
2. Purchasing shares by foreign investors (NFF) has a significant influence on Jakarta Composite Index (JCI) on the IDX on daily data and the Rupiah / USD exchange rate has no significant effect on Jakarta Composite Index (JCI) on the IDX on monthly data, with a level 95%
3. The Consumer Price Index (CPI) does not have a significant effect on Jakarta Composite Index (JCI) on the IDX on monthly data, with a 95% confidence level.
4. Once again we could prove that Net Foreign Fund Flow is the main determinant of JCI, it is tested in addition to the OLS model, various GARCH variations and the best proven GARCH is GARCH (1,1). This finding supports Frensidy [1], Soelistianingsih [8], Aggarwal, et.al. [11] and also Al Muntasir [12].

B. Suggestion

Based on the results of this study, it can be given some suggestions for investors in the capital market as well as for further researchers, namely:

1. For investors in the capital market i.e. based on the results, it is advisable for investors to be more careful in investing funds, especially in capital market. From the results obtained, there is a significant effect of the exchange rate of Rp / USD, the purchase of shares by foreign investors (NFF) and Jakarta Composite Index (JCI). Therefore, before investing funds, you should consider the factors that influence JCI and be aware about the rivalry of foreign investors.

2. For the next researcher, if they want to do ARCH / GARCH modeling on data that has low volatility in a period and high volatility in other periods because the pattern of data such as heteroscedasticity can occur because there are error variants that depend on the volatility of errors that occur in the future then. And extend the time span of research data so that the results of the study are more accurate. And need to add other independent variables in increasing R-Square, especially the fundamental factor variables of the public listed companies in IDX in this model.

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