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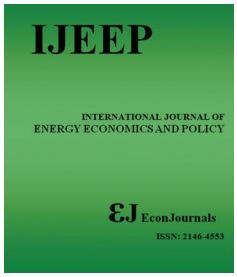

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Analysis of Oil Price and Exchange Rate in Indonesia

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ABSTRACT

This research aims to find out the long-term and short-term effects of the oil price variable on the exchange rate, as well as the variables of foreign exchange reserves, relative money supply, relative GDP, and interest rates relative to the exchange rate in Indonesia. The analytical method used is the error correction model (ECM). This study's results indicate a significant adverse effect between the variables of foreign exchange reserves, relative GDP, and relative interest rates on exchange rates in the long term and short term. There is an insignificant positive relationship between oil prices and the exchange rate in the long term and a significant positive relationship in the short term. There is a negligible negative effect between the money supply relative to the exchange rate in the long term and an essential negative relationship in the short term.

Keywords: ECM, Foreign Exchange Reserves, Oil Price, Relative Money Supply, Relative GDP, Interest Rates Relative
JEL Classifications: E4, F31, Q3

1. INTRODUCTION

Oil is an essential commodity in driving the economy and sustainable economic and social development (Nizar, 2012). From a financial point of view, oil considerably influences the economy. As one of the basic materials in production and services, the oil will be the primary driver in the industrial sector.

Research by Mishra (2016) explains that oil prices tend to have a long-term relationship with the exchange rate, and the impact of exchange rate volatility on crude oil is negative. Whereas Oluwatomisin et al. (2014) examined the effect of oil prices, external reserves, and interest rates on exchange rate volatility, that proportional changes in oil prices cause exchange rate changes more than proportional volatility in Nigeria, which means that the exchange rate is vulnerable to changes in oil prices.

Indonesia has experienced a significant increase in imports yearly because oil consumption continues to increase. An increase in total production does not accompany this. Indonesia can only export or produce crude oil, which requires lengthy processing to become the oil that the public can directly use. Oil refineries in Indonesia can only process some crude oil because the specifications of crude oil and refineries are different. So that, to meet domestic oil needs, Indonesia still depends on imported refined oil.

The gap between production and consumption will create high levels of oil imports. High import financing will burden Indonesia's foreign exchange reserves because it will require more foreign currency to pay for these imports. The percentage of oil imports to foreign exchange reserves fluctuates and is unstable. In 2008, oil imports burdened foreign exchange reserves by 49.64%. In line with the increase in imports, Indonesia's foreign exchange reserves increased more than the increase in oil imports. In 2013, when the second economic crisis occurred, the burden of oil imports on foreign exchange again increased to 42.64%.

Research for Oluwatomisin et al. (2014) in Oil Price And Exchange Rate Volatility In Nigeria examines the effects of oil prices, external reserves, and interest rates on exchange rate volatility

using annual data for the period 1970-2011 that proportional changes in oil prices cause changes in exchange rates more than proportionate volatility in Nigeria, which means that the exchange rate is vulnerable to changes in oil prices.

2. LITERATURE REVIEW AND HYPOTHESIS DEVELOPMENT

2.1. Theoretical Basis

2.1.1. Theory of determination of exchange rates

Determination of the exchange rate through two approaches, namely the monetary approach and the asset approach. According to Appleyard and Field (2014), the economic system with flexible exchange rates assumes that BOP deficits and surpluses will be eliminated by exchange rates but by examining changes in exchange rates in the context of money supply and demand.

Branson (1989) first put forward the asset approach, which assumed that people would diversify their money into several forms of portfolios to avoid taking risks. In this theory, the demand for foreign exchange is determined by using public wealth as assets. This model has four portfolio concepts: Domestic money, foreign money, domestic debt securities, and foreign debt securities. The selection of the four concepts depends on each individual. The level of risk is a factor in asset selection decisions (Salvatore, 2014).

2.1.2. Theory of demand and supply of forex

The theory of foreign currency demand measures a country's demand for foreign currency in terms of the need to import goods and services from other countries and invest abroad. The theory of supply of foreign currency measures the supply of foreign currency by a government in terms of the need for exports of goods and services from other countries and investment inflows from abroad.

2.2. Development of the Hypothesis

In Yuliyanti (2014), Indonesia has a foreign exchange influence significant to score exchange rupiah/US dollar in the short and long backup terms. The exchange rate is a factor important in the economy open because be one liaison between countries through trading internationally. According to Salvatore (2014), the score swap among two currencies from two countries is determined by the size of selling ongoing goods and services between the two countries. Fluctuation score swaps in trading internationally will affect the demand and supply of foreign exchange. It will show domestic currency appreciated or depreciated to foreign currency.

Oil prices and exchange rates can affect each other. Amin and El-Sakka (2016), in their research, said that there is long-term causality between oil prices and exchange rates, whereas, in the short term, oil prices cause changes in real exchange rates. Adeniyi et al. (2012) said that oil prices and exchange rates have a positive relationship in oil-exporting countries.

In the process of determining the exchange rate, other variables can affect changes in exchange rates. In terms of the monetary approach and assets, the researchers took variables according to the theory discussed in the previous sub-chapter: domestic and foreign income, domestic and foreign interest rates, domestic and foreign money supply, and foreign exchange reserves.

Domestic and foreign income influences exchange rates through international trade mechanisms, namely the export-import activities of a country. Increased imports will reduce income and encourage increased demand for foreign exchange to finance imports. Meanwhile, an increase in exports will increase a country's revenue and foreign exchange supply. Domestic interest rates and the domestic money supply will affect capital outflows through the purchase of foreign assets, payment of government and private foreign debt, and withdrawal of foreign capital. An increase in domestic interest rates and the domestic money supply will increase demand for foreign currency and weaken the domestic exchange rate.

Meanwhile, an increase in foreign interest rates and the foreign money supply will affect capital inflows through the sale of domestic assets and receipt of foreign debt. An increase in foreign interest rates and the foreign money supply will increase the supply of foreign currency and the domestic exchange rate. Foreign exchange reserves will affect the exchange rate through foreign exchange offerings by intervention or sale of foreign exchange reserves by the central bank. An increase in foreign exchange reserves will increase the country's ability to overcome external shocks to reduce speculation on the domestic currency and increase the supply of foreign exchange and household money.

3. METHODOLOGY AND DATA

This research is descriptive and quantitative. This study uses the dependent variable, namely the exchange rate. In contrast, the independent variables are oil prices, changes in foreign exchange reserves, relative money supply, gross domestic product, and relative interest rates. In this study, the type of data needed is secondary data in the form of time series data. The following is an equation using the Error Correction Model (ECM) technique used in this study.

$$\Delta lnNT_t = \beta_0 + \beta_1 \Delta PHM_t + \beta_2 \Delta PCD_t + \beta_3 \Delta \ln JU$$
$$+ \beta_4 \Delta \ln PDBre_t + \beta_5 \Delta Rre_t + \beta_6 EC_t + \varepsilon_t$$

Information:
NT = Exchange rate of RP/USD
β0 = Intercept
β1,. 6 = Coefficients of the independent variables
PHM = Change in oil prices (USD/barrel)
PCD = Change in foreign reserves (percent)
JUBre = Relative money supply (percent)
PDBre = Relative gross domestic product (percent)
Rre = Relative interest rate (percent)
ln = Natural logarithm
Δ = Variable proportional change
EC_t = previous period error correction
ε_t = error term

Table 1: Variable descriptive statistics

Descriptive statistics	Ln exchange rates	Changes in oil prices (USD/barrel)	Change in foreign exchange reserves (percent)	Ln JUB relatively	ln relative GDP	Relative interest rate (percent)
Minimum	9.05	−30.69	−7	0.00	−0.04	−1.21
Maximum	9.63	18.17	13	0.35	0.30	4.93
Average	9.34	0.28	2	0.21	0.13	1.71
Variety	0.03	103.09	26.38	0.006	0.007	2.13
Baku Devi	0.18	10.15	5.14	0.075	0.09	1.46
Coefficient of variation	1.97	3.605	234.5	35.71	69.23	85.38

GDP: Gross domestic product

Table 2: ADF test results at level

Variable	ADF	MacKinnon's critical value			Conclusion
	t-statistics	1%	5%	10%	
LnNT	−0.138	−3.596	−2.933	−2.604	Not stationary
PHM	−5.760***	−3.596	−2.933	−2.604	Stationary
PCD	−3.456**	−3.596	−2.933	−2.604	Stationary
lnJUBre	−3.284**	−3.596	−2.933	−2.604	Stationary
lnPDBre	−1.848	−3.615	−2.941	−2.609	Not stationary
Rre	−2.989**	−3.596	−2.933	−2.604	Stationary

***Stationary at level 1%; **stationary at 5% level. ADF: Augmented dickey-fuller

Table 3: ADF test results at first-difference level

Variable	ADF	MacKinnon's critical value			Conclusion
	t-statistics	1%	5%	10%	
lnNT	−4.686***	−3.600	−2.935	−2.605	Stationary
PHM	−7.062***	−3.600	−2.935	−2.605	Stationary
PCD	−8.111***	−3.600	−2.935	−2.605	Stationary
lnJUBre	−5.836***	−3.605	−2.936	−2.606	Stationary
lnPDBre	−3.303**	−3.621	−2.943	−2.610	Stationary
Rre	−7.027***	−3.600	−2.935	−2.605	Stationary

***Stationary at level 1%; **stationary at 5% level. ADF: Augmented dickey-fuller

Table 4: Cointegration equation regression results

Bound variable: LNNT			
Variable	Coefficient	t-statistics	Conclusion
PHM (−1)	0.000759	(0.444314)	Not significant
PCD	−0.009898	(−2.903395)**	Significant
LNJUBre (−1)	−0.321277	(−1.189256)	Not significant
LNPDBre	−1.380434	(−5.202920)**	Significant
Rre (−1)	−0.022981	(−1.788139)**	Significant
C	9.651275	(179.7275)**	Significant
R-squared 0.712983		F-statistics 17.88561	

**stationary at a 5% level

Table 5: Results of the engle-granger cointegration test at level level

Variable	Intercepts	Trends and intercepts	None	Conclusion
Residual	−3.345**	−5.056***	−3.407***	Cointegrated

***Stationary at level 1%; **Stationary at 5% level

Time series data the quarterly data selected is the period 2009:Q1 to 2019:Q3. The data was obtained from Bank Indonesia (BI), the Central Bureau of Statistics (BPS), the International Monetary Fund (IMF), the Organization of the Petroleum Exporting Countries (OPEC), the Federal Reserve Bank of St. Louis (FRED), Department of Statistics Singapore (Singstat) and the Bank for International Settlements (BIS).

Table 6: Short-term ECM estimation results

Dependent variable: D (LNNT)			
Variable	Coefficient	t-statistics	Conclusion
DPHM (−1)	0.000727	(2.272117)**	Significant
DPHM (−3)	0.000376	(1.321545)*	Significant
D (PCD)	−0.001440	(−1.735010)**	Significant
DPCD(−1)	−0.001403	(−1.752276)**	Significant
D (lnJUBre)	−0.522688	(−4.877639)**	Significant
DlnJUBre (−3)	−0.229859	(−2.486828)**	Significant
D (lnPDBre)	−0.126513	(−1.722884)*	Significant
DRre (−1)	−0.007986	(−2.386360)**	Significant
DRre (−2)	−0.005272	(−1.692128)*	Significant
DRre (−3)	0.004813	(1.468584)	Not significant
ECT	−0.092915	(−1.915502)**	Significant
C	0.011438	(3.262439)**	Significant
R-squared 0.730261		F-statistics 6.645174	

**Stationary at 5% level; *Stationary at 10% level. ECM: Error correction model

Table 7: Heteroscedasticity test results

Obs*R-squared	Chi-square	Conclusion
3.6303	9.49	Homoscedasticity

Table 8: Autocorrelation test results

Obs*R-squared	Chi-square	Results	Conclusion
5.009	9.49	Accept H_0	There is no autocorrelation

Table 9: T-test results

Variable	t-statistics	t-table	Conclusion
DPHM (−1)	2.272117	1.701	Significant
DPHM (−3)	1.321545	1.313	Significant
D (PCD)	−1.735010	−1.701	Significant
DPCD (−1)	−1.752276	−1.701	Significant
D (lnJUBre)	−4.877639	−2.048	Significant
DlnJUBre (−3)	−2.486828	−2.048	Significant
D (lnPDBre)	−1.722884	−1.701	Significant
DRre (−1)	−2.386360	−2.048	Significant
DRre (−2)	−1.692128	−1.701	Significant
DRre (−3)	1.468584	1.701	Not significant

4. RESULTS

4.1. Descriptive Statistical Analysis

Descriptive statistics provide an overview or description of data from the minimum, maximum, average (mean), variance (standard deviation), and coefficient of variation. The following in Table 1 are presented descriptive statistics of this study.

Ln exchange rate shows a minimum value of 9.05, a maximum weight of 9.63, and an average value of 9.34. The measure of

variability, as measured by the variance and standard deviation, shows the values for Ln exchange rates are 0.03 and 0.18. The coefficient of variation for ln of the exchange rate is 1.97, which indicates that the variable data fluctuates little. Changes in oil prices show a minimum value of −30.69 USD/barrel, a maximum value of 18.17 USD/barrel, and an average of 0.28 USD/barrel. The variability of changes in oil prices for the variety is 103.09 USD/barrel, and the standard deviation is 10.15 USD/barrel. The coefficient of variation for changes in oil prices is 3.605, which indicates that the variable data fluctuates wildly.

Changes in foreign exchange reserves show a minimum value of −7%, a maximum value of 13%, and an average value of 2%. The variability of changes in foreign exchange reserves for the variance is 26.38%, and the standard deviation is 5.14%. The coefficient of variation for changes in foreign exchange reserves is 234.5, which indicates that the variable data fluctuates wildly.

The relative ln JUB variable shows a minimum value of 0.00, a maximum value of 0.35, and an average of 0.21. The relative JUB ln variability for the variance is 0.006, and the standard deviation is 0.075. The coefficient of variation for ln JUB is relatively 35.71, which indicates that the variable data fluctuates moderately.

Ln relative GDP shows a minimum value of –0.04, a maximum value of 0.30, and an average value of 0.13. The variability of ln GDP is relative to the variance of 0.007 and the standard deviation of 0.09. The coefficient of variation for ln close GDP is 69.23, which indicates that the variable data fluctuates quite a lot.

Relative interest rates show a minimum value of –1.21%, a maximum weight of 4.93%, and an average of 1.71%. The relative interest rate variability for the variety is 2.13%, and the standard deviation is 0.09%. The coefficient of variation for the relative interest rate is 85.38, indicating that the variable data fluctuates wildly.

4.2. Selection of the Error Correction Model (ECM)

4.2.1. Stationarity test

In fulfilling one of the assumptions in the time series data test using the ECM model analysis, it is necessary to do a stationarity test first. The stationary test used in this study uses the augmented dickey-fuller (ADF) method at the same degree (level or difference) until stationary data is obtained. Stationary tests at the level are shown in Table 2. At the same time, stationary tests at first different are shown in Table 3.

4.2.2. Cointegration test

To see whether the regression equations in Table 4 are cointegrated, a unit root test is performed on the residual equation with the unit root test using the ADF method. The unit root test is shown in Table 5, and it appears that this research model is cointegrated.

4.2.3. Estimation of the engle-granger (EG) error correction model (ECM)

The ECM test in this study used the Engle-Granger (EG) ECM test by including adjustments (ECT) to carry out the correct imbalance. Table 6 are presented the results of the regression of the ECM model.

4.3. Classical Assumption Test

4.3.1. Normality test

The normality test results in Figure 1 shows that the statistical value of JB (1.1212) is smaller than the chi-square value (9.49), so it can be concluded that the data is normally distributed.

4.3.2. Heteroscedasticity test

Table 7 shows the results of the heteroskedasticity test, and it is seen that the obs*R-squared value is smaller than the chi-squared value, so there is no heteroskedasticity or homoskedasticity.

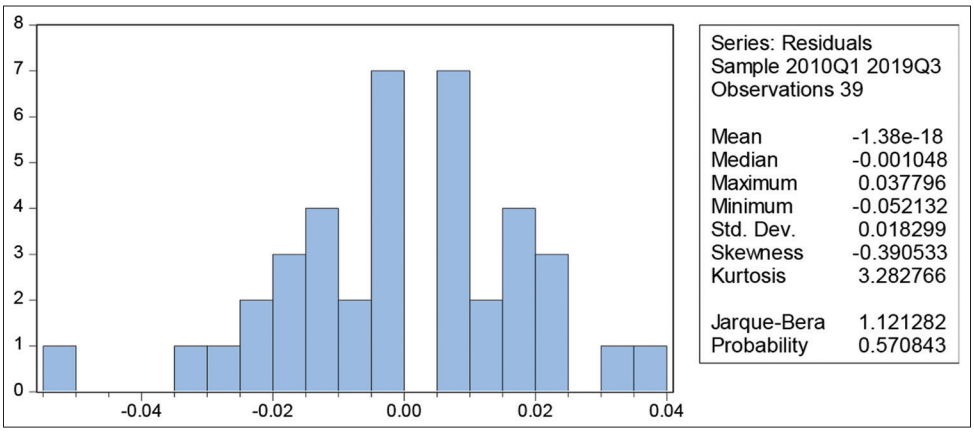
4.3.3. Autocorrelation test

This study used the Breusch-Godfrey method to develop an autocorrelation test, more commonly known as the Lagrange Multiplier (LM) test Table 8. The Obs*R-squared value is smaller than the chi-squared value, so there is no correlation between the interference variables.

Table 10: F-test results

F-statistics	F-table	Conclusion
6.645	2.53	Significant

Figure 1: Error correction model normality test



4.4. Hypothesis Testing

4.4.1. T-test

This t-statistic test is used to see the significance of the effect of each independent variable on the dependent variable assuming other variables are considered constant. To test the impact of each independent variable, it must be done by comparing the t-count with the t-table. The t-table values can be obtained by looking at the t-distribution table for $\alpha = 0.05$ with degrees of freedom nk. The t-test in this study is shown in Table 9.

4.4.2. F-test

The F-statistic test is used to see the relationship or influence of the independent variables jointly on the dependent variable. The F-table value can be obtained by looking at the f-distribution table with a 95% confidence level. Based on Table 10 shows that changes in oil prices, changes in foreign exchange reserves, relative JUB, relative GDP, and relative interest rates have a combined effect on the exchange rate in Indonesia.

4.4.3. Coefficient of determination (R^2)

The coefficient of determination (R^2) indicates the ability of variable X to explain variable Y. Based on the regression results in Table 6, the coefficient of determination (R^2) is 0.730261. This implies that the ability of variable X (changes in oil prices, changes in foreign exchange reserves, relative money supply, relative gross domestic product, relative interest rates) to explain variable Y (the rupiah/US dollar exchange rate) is 73.03261 percent and the rest 26.96739 percent is explained by other variables outside the model studied.

5. DISCUSSION

The results of long-term effect estimation show that changes in oil prices in the previous quarter were not significant at the 90% confidence level. This is not following the hypothesis because, based on a theoretical review, when oil prices increase, as a net importer country, it will affect domestic income due to increased imports. Increased imports will encourage increased demand for foreign exchange to finance these imports. In line with the theoretical description above, an increase in demand for foreign exchange will cause the domestic currency to depreciate. This study's results align with the research of Narayan (2013) that the long-term results between oil prices and exchange rates show a positive and insignificant effect in several Asian countries such as Bangladesh, India, Indonesia, Japan, Malaysia, Thailand, and Vietnam. This is due to the oil price subsidy policy so that changes in oil prices do not affect the exchange rate.

The long-term estimation results for the variable changes in foreign exchange reserves have a negative and significant effect on the exchange rate at the 95% confidence level. These results follow the hypothesis, and according to Gandhi (2006), in a country that adheres to a free-floating exchange rate system, adequate foreign exchange is needed to smooth out fluctuations in the currency exchange rate so that it is not too volatile and creates uncertainty. Foreign exchange reserves can even be a measure of credibility for the exchange rate of a currency. This is especially true for developing countries whose economies are still relatively vulnerable to shocks, both from within the country and from abroad.

The money supply variable (JUB) relative to the previous one-quarter period was insignificant at the 90% confidence level. These results do not follow the hypothesis, which shows that the gross domestic product variable has a relatively negative and significant effect on the exchange rate. The difference in the natural logarithm of JUB Indonesia and the five research countries shows that the average JUB of Indonesia is lower than the average JUB of the five countries.

In the long run, increasing the foreign JUB does not affect the rupiah/US dollar exchange rate. In his book, Salvatore (2014) argues that in the monetary approach in a floating exchange rate system, the balance of payments imbalances can be corrected immediately by automatic exchange rate changes without involving money flows or international reserve assets. So in a floating exchange rate system, each country has dominant control over its money supply and monetary policy in seeking external balance. When Indonesia experiences a balance of payments deficit due to excess domestic money supply, it will depreciate the exchange rate in the short term, increasing prices and demand for domestic money. This will reabsorb the excess money supply and automatically erase the balance of payments deficit. As a result, in the long run, the money supply does not affect the exchange rate due to the adjustment process in the floating exchange rate system.

The variable gross domestic product (GDP) has a relatively negative and significant effect at the 90% confidence level. These results follow the hypothesis, which shows the negative impact of the gross domestic product variable relative to the exchange rate. The difference in the natural logarithm of the GDP of Indonesia and the five research countries shows that the average GDP of Indonesia is higher than the average GDP of the five countries. An increase in income will increase the demand for equilibrium, which causes the need for domestic money to be higher than foreign money and encourages exchange rate appreciation.

Appleyard and Field (2014) states that when income rises, it causes consumers to look for a better combination of consumption (tends to increase) so that countries where consumers are located, want international trade, the rise and fall of income will affect the demand for imported goods which will affect the demand for foreign currency. When income rises, the domestic currency will appreciate. Conversely, if income falls, the domestic currency will depreciate.

The relative interest rate variable for the previous one-quarter period has a negative and significant effect at the 95% confidence level. These results follow the hypothesis, which shows a negative impact of the interest rate variable relative to the exchange rate. The difference in the natural logarithm of interest rates in Indonesia and the five research countries shows that the average interest rate in Indonesia is higher than the average interest rate in the five countries. An increase in domestic interest rates will provide a high rate of return to investors. It will cause an increase in capital flows into Indonesia so that the exchange rate decreases (strengthens) or the exchange rate appreciates.

In a theoretical review, Mishkin (2011) suggests that an increase in domestic interest rates will increase the estimated relative rate of

return on assets, increasing the demand for assets at each exchange rate. So when the actual domestic interest rate increases, domestic money appreciates.

The changing variable from changes in oil prices in the previous quarter and three quarters has a positive and significant effect. These results follow the hypothesis that oil price changes positively affect the exchange rate. In Narayan (2013) research for Vietnam, we find a positive predictive slope coefficient, suggesting that current high oil prices predict future depreciation. Since Vietnam is a net oil importer, these results are consistent with the theory.

Variable changes from changes in foreign exchange reserves and changes from changes in foreign exchange reserves in the previous quarter had a negative and significant effect. These results follow the hypothesis that changes in foreign exchange reserves hurt the exchange rate, or the rupiah appreciates when there is an increase in changes in foreign exchange reserves, in line with research by Yuliyanti (2014) and Yanah (2014) that foreign exchange reserves in the short term have a negative and significant effect on the value of exchange rupiah against the US dollar. In Kasman and Ayhan (2008), the results show that foreign exchange reserves have a significant influence in reducing the volatility of real and nominal exchange rates in the short term, which is very important for market participants.

The relative JUB variable in the short term and the relative JUB change in the previous three quarters show negative and significant results at the 95% confidence level. This result is also in line with Iskandarsyah (2013), which shows that the foreign JUB variable negatively and significantly affects the rupiah/US dollar exchange rate.

The money supply relatively affects domestic and foreign exchange rates, and a currency will decrease in value if the money supply is more (Lindert et al., 1995). Money is a medium of exchange in domestic and international trade whose movements will affect the demand for money. High demand for foreign exchange will cause the domestic currency to depreciate, so the level of the money supply will affect the exchange rate.

In the short term, the relative GDP change variable shows a negative and significant effect at the 10% confidence level. These results align with the research by Mardiana et al. (2016) and Murdayanti (2012), which show that the GDP variable has a negative and significant effect on the exchange rate.

The amount of real output growth in a country significantly affects the demand for domestic money from abroad, making the money supply more valuable and triggering an appreciation of the domestic currency (Salvatore, 2014). GDP is the value of goods and services produced in a country using production factors owned by residents of that country and residents of other countries (Sukirno, 2016).

Estimating the relative interest rate change variable for the previous quarter and the relative interest rate change variable for the last two quarters in the short term show negative and significant results at the 90% confidence level. This result is also in line with the research of Oktavia et al. (2013), which states that domestic interest rates have a significant effect on exchange rates in a negative or opposite direction to the Indonesian exchange rate. According to Krugman et al. (2015), if other conditions remain the same, an increase in domestic interest rates will cause an appreciation of a country's exchange rate, while an increase in foreign interest rates will cause the domestic exchange rate to depreciate against the exchange rates of other countries.

The variable of changes in interest rates relative to the previous three-quarters period in the short term is insignificant. These results align with research by Hazizah et al. (2017), which states that the difference in interest rates has no significant effect but has a positive direction. This shows that interest rate decreases and increases will not necessarily increase or decrease the exchange rate.

6. CONCLUSION AND SUGGESTIONS

Based on the cointegration equation (long-term) estimation results, the variable change in oil prices in the previous one-quarter period and the natural logarithm of the relative money supply in the last one-quarter period do not affect the exchange rate. Variable changes in foreign exchange reserves, the natural logarithm of comparable gross domestic product, and relative interest rates in the previous one-quarter period negatively affect the exchange rate.

Based on the estimation results of the ECM equation (short term), the change variable from changes in oil prices in the previous one quarter and three last quarters has a significant positive effect on the exchange rate. Variable changes in relative interest rates in the last three quarters do not affect the exchange rate. Variable changes from changes in foreign exchange reserves, changes from changes in foreign exchange reserves in the previous one-quarter period, changes in the natural logarithm of the relative money supply, changes from the natural logarithm of the relative money supply in the last three-quarter period, changes in the natural logarithm of the comparable gross domestic product, changes in relative interest rates in the previous one-quarter period, and changes in similar interest rates in the last two-quarter periods had a significant adverse effect on the rupiah/US dollar exchange rate.

The ECM shows that the ECT coefficient has a statistically significant negative effect at the 95% confidence level. This indicates that the specification of the ECM model used in this study is valid. The ECT value with a coefficient of −0.0929, or only 9.29%, suggests that the speed of adjustment of the exchange rate variable towards a long-term balance is 9.29% per quarter, or in general, it takes about 11 quarters to reach a long-term equilibrium.

Implementing the government's policy to reduce the level of oil imports in Indonesia and the use of domestic currency as a means of payment in oil export transactions can be implemented in stages and receive full attention from the government and related agencies. In addition, Bank Indonesia, in collaboration with the government, can formulate policies that will encourage an increase in foreign exchange reserves so that the rupiah exchange rate is

not easily depressed by international market conditions. Based on the research results indicate that other factors affect the exchange rate. For further research, it is expected to add different variables that affect the exchange rate.

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