

Analysis of Oil and Gas Exports Imports on the Indonesian Rupiah Exchange Rate in 1980-2020

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Abstract

International trade is important activities for the economy. The advantages and benefits in international trade that can be obtained by a country is that it allows the opportunity to specialize in obtaining goods and services at lower prices. Therefore, the contribution of this study is to analyze exports, imports, inflation, and economic growth against the Indonesian rupiah exchange rate. The dependent variable used is the rupiah exchange rate variable, and the independent variables include oil and gas exports, oil and gas imports, inflation, and economic growth. Data that used is secondary data obtained through the official website of the World Bank, and the Central Statistics Agency (BPS). The method used is the Multiple Linear Regression model. Based on the results of the regression calculations show that the variable oil and gas exports have no significant effect, oil and gas imports have a positive and significant, inflation has no significant effect, and economic growth negative and significant effect on the rupiah exchange rate.

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Introduction

According to Safitriani (2014) international trade are two important activities for the economy that are related to each other. The advantages and benefits in international trade that can be obtained by a country is that it allows the opportunity to specialize in obtaining goods and services at lower prices. According to Sitorus (2020); Pershin et al., (2016) international trade is defined as a transaction of buying and selling commodities with other countries whose payment processes use foreign currencies. With trade between countries, it will improve good relations and establish cooperation in terms of meeting the needs of goods from one country to another. Export-import activities are motivated by different resource conditions, each country has its own criteria in terms of available resources, these differences are not the same for each country and this is what causes international trade interactions.

Exports are one of the important measures that can be seen in knowing how much the comparison of economic growth over time. Then, figure 1 define main focuses of the government is exports in boosting the economy, along with the development of strategies in industrialization, improvements can be found from imports to export promotion. Exports are an effort by the government in carrying out its duties to maximize export activities so that they can be better known in the world for the commodities that are distributed and result in better economic growth. Existing imports can help, the activities of meeting the needs of a country's goods and services can be fulfilled, although not completely. Imports can be useful to fill the shortage of goods and services that are not found in the country.



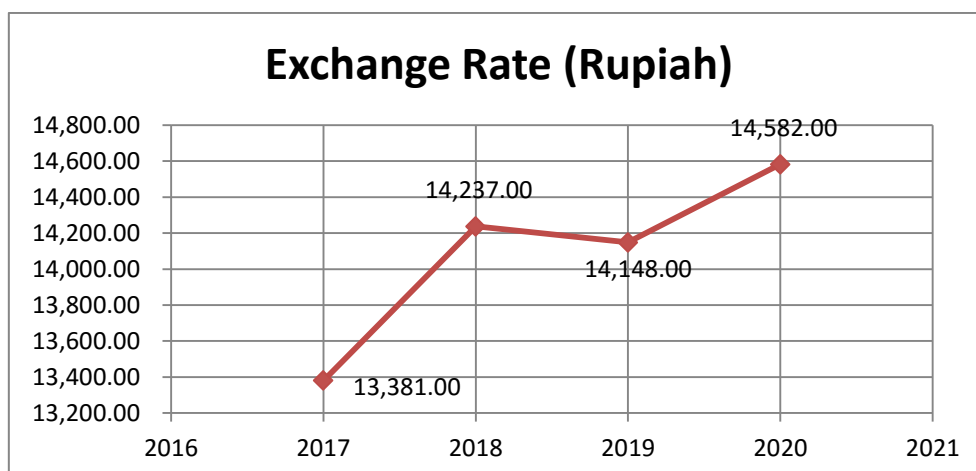
Source: satudata.kemendag.go.id (2022)

Figure 1. Indonesia Export Import Year 2017-2020

In 1980, the price of oil throughout the world experienced a sharp decline, when oil was produced on a large scale in 1970 and was accompanied by a slowdown in world economic activity in 1973 due to the energy crisis at that time. The dollar strengthened drastically, world oil prices were low, and there was a shale gas revolution carried out by the United States. Making international crude oil prices touch at 45 USD/barrel produced. The fall in oil prices at that time was able to reduce inflation and unemployment in the world (Queye et al. 2007). The decline in oil prices that occurs can provide benefits for countries that are majority oil consumers, such as Europe, Japan, the United States, and developing countries. However, it has a detrimental impact on oil-producing countries such as Northern Europe, Latin America including Venice and Mexico, and the Soviet Union (Falianty, 2015).

Graph 1 explains that after the monetary crisis in 1998, Indonesia's economic development began to change so that the inflation rate between 1999-2019 could be controlled by the government through various policy instruments. In 2020, based on World Bank (World Bank) data, Indonesia's economic growth also experienced a significant decline, namely -2.07%, the inflation rate in 2020 was at the lowest value compared to several previous years, namely

1.9%, while the exchange rate the rupiah soared higher than the previous years, which was Rp 14,582. In contrast to the decline in 1998, the decline that occurred in 2020 was caused by a pandemic.



Source: World Bank (2022)

Graph 1. Indonesian Rupiah Exchange Rate 2017-2020

Graph 1, after the monetary crisis in 1998, Indonesia's economic development began to change so that the inflation rate between 1999-2019 could be controlled by the government through various policy instruments. In 2020, based on World Bank (World Bank) data, Indonesia's economic growth also experienced a significant decline, namely -2.07%, the inflation rate in 2020 was at the lowest value compared to several previous years, namely 1.9%, while the exchange rate the rupiah soared higher than the previous years, which was Rp. 14,582. In contrast to the decline in 1998, the decline that occurred in 2020 was caused by a pandemic.

This issue is very interesting to study further because of the weakening of the rupiah against the US dollar, and to study further on exports, imports, inflation, and economic growth against the rupiah exchange rate. This research has nothing in common with previous research such as the study of Silitonga & Ishak (2017); Yudha & Hadi (2019); and Fordatkosu et al. (2021) because this study uses a slightly different variable from the previous study, which uses the variables of exports, imports, and inflation against the rupiah exchange rate against the United States dollar. Therefore, the contribution of this study is to examine the analysis of oil and gas exports and imports of the Indonesian rupiah exchange rate in 1980-2020.

Research Method

The quantitative approach in this study aims to examine whether oil and gas exports, oil and gas imports, inflation, and economic growth have an influence on the Indonesian rupiah exchange rate variable in 1980-2020. The data in this study is secondary data collected directly by researchers through the official website of the Central Statistics Agency, the World Bank,

government agencies and other official websites. The data used is the time span between 1980-2020. This study will use the Multiple Linear Regression model. A regression model with more than one explanatory variable is called a multiple linear regression model, why is it called multiple because there is more than one factor or variable that can affect the dependent variable. The model used in this study is by equation (1).

$$\ln NT = \alpha + \beta_1 \ln EM + \beta_2 IM + \beta_3 PE + u_t \quad (1)$$

From equation (1), $\ln NT$ is Log Natural Rupiah Exchange Rate, $\ln EM$ is Log Natural Oil and Gas Export Value, IM is Oil and Gas Import Value, Inf is inflation, PE is Economic Growth. Exchange Rate (NT) An exchange rate can be defined as an agreement on the exchange rate of a currency against a current payment, or payment at a later date, involving two currencies of a country or region. While in this research process the exchange rate used is the exchange rate of the rupiah against the dollar from 1980 to 2020. Oil and Gas Exports (EM) Oil and gas exports are activities that sell domestic oil and gas commodities that are sold to other countries. The aim is to specialize in the international market, and fulfill oil and gas goods for the destination country.

Oil and gas imports (IM) Oil and gas imports are the opposite of oil and gas exports, namely a process of purchasing oil and gas commodity goods from other countries for domestic consumption. Inflation (Inf) is a continuous increase in the prices of goods and services that are comprehensive. The consumer price index or (CPI) is an indicator of inflation, where the consumer price index is an index used in calculating inflation through the average change in prices consumed in households. Economic Growth (PE) Economic growth is a process of changing economic conditions that occur in a country that is sustainable towards a better state in a certain period of time, the measure that is always used is the growth rate of real national income achieved.

Result and Discussion

Before performing multiple linear regression test, the data in the study must meet the classical assumption test first. The purpose of the classical assumption test is to see whether the model used in analyzing the data and testing the hypothesis in this research is feasible or not. The classical assumption test has the aim of ensuring valid research results with the data used and theoretically unbiased, efficient and consistent regression interpretation. The model can be said to be good when in classical assumption testing there are no problems of normality, multicollinearity, and heteroscedasticity.

Table 1 is a table of normality test results using the STATA 16.0 application with the Shapiro-Wilk test:

Table 1. Normality Test (*Shapiro-Wilk*)

Variabel	Observation	Prob > Z
Res	41	0.65583

Normality test on table 1 results show a probability value of 0.65583 which means it is above the 5% level or more than > 0.05 . Then the data tested concluded that there was no problem of normality in the research data. After normality test, then we need to estimate the multicollinearity test. The results of multicollinearity test using the VIF test are in Table 2

Table 2. Multicollinearity Test (VIF)

Variabel	VIF	1/VIF
LN_EM	3.05	0.327520
IM	3.18	0.314426
INF	2.38	0.419963
PE	2.42	0.412758
Mean Vif	2.76	

Based on table 2. showing the value of VIF and tolerance for the variables of oil and gas exports, oil and gas imports, inflation, and economic growth, it can be concluded that there is no multicollinearity problem in the four independent variables. After multicollinearity test, then we need to estimate the heteroscedasticity test. The results of heteroscedasticity test using the Glestjer test are in Table 3:

Table 3. Heteroscedasticity Test (Glestjer)

LN_RES	Coef.	Std. Err.	t	P> t
LN_EM	1.732779	1.34172	1.29	0.215
IM	-0.0000358	0.0000468	-0.76	0.456
INF	0.040838	0.0765318	0.53	0.601
PE	-0.1937588	0.1883487	-1.03	0.319
_cons	-16.45468	11.97515	-1.37	0.188

Based on table 3. the results of the Glestjer test on the variables of oil and gas exports, oil and gas imports, inflation, and economic growth, with these probability results, it can be concluded that all variables in the study are free from heteroscedasticity problems. The classical assumption requirement for a good regression model is that it is free from heteroscedasticity

problems. Then, the Table 4 is a table of autocorrelation test results using the Breusch-Godfrey test:

Table 4. Autocorrelation Test

Lags (p)	Prob > chi2
1	0.8021

Based on the Breusch-Godfrey test table 4, it can be concluded that in the regression model there is no autocorrelation symptom. This is indicated by a probability value of 0.8021 > 0.05. So it can be proven that the regression model is free from autocorrelation problems.

Multiple linear regression model is a model with more than one independent variable. Because there are several variables that can affect the dependent variable. The Table 5 is multiple linear regression test results:

Table 5. Multiple Linear Regression Test

LN_NT	Coef.	Std. Err.	t	P> t
LN_EM	-0.6737842	0.4249646	-1.59	0.122
IM	0.000068	0.0000144	4.72	0.000
INF	-0.0192297	0.0189887	-1.01	0.318
PE	-0.1244695	0.0474434	-2.62	0.013
_cons	14.7153	3.789183	3.88	0.000
F (4, 36)		14.51		
Prob > F		0.0000		
R-squared		0.6172		

Based on table 5, the constant value (a) = 14.7153. If all variables are held constant, the rupiah exchange rate will remain or increase by 14.7153.

Then, the simultaneous testing is carried out in the study due to find out whether the independent variables jointly affect the dependent variable. Where, the result of table 6 shows that the F count is more than F table that is 14.51 > 2.63 and is proven by a probability value of 0.000 < 0.05. So it can be concluded that the variables of oil and gas exports, imports of oil and gas, inflation, and economic growth simultaneously have an influence on the rupiah exchange rate.

Table 6. Simultaneous Test (F)

Source	df	Mean Square	F	Prob > F
Model	4	6.780153		
Residual	36	0.467303	14.51	0.0000
Total	40	1.098588		

Table 7. Determinant Coefficient Test (R^2)

Obs	R-squared	Adj R-Squared	Root MSE
41	0.6172	0.5746	0.6836

R square is a value that shows how much the independent (exogenous) variable affects the dependent (endogenous) variable. from table 7 it can be seen that the independent variable affects the dependent variable by 0.61 or 61%. The remaining 39% is influenced outside the model. Then about the partial test or t-test is in table 8:

Table 8. Partial Test

LN_NT	T	P> t	Hasil
LN_EM	-1.59	0.122	Not significant
IM	4.72	0.000	Significant
INF	-1.01	0.318	Not significant
PE	-2.62	0.013	Significant

Based on table 8, the conclusion is that the oil and gas export variable has no significant effect on the rupiah exchange rate. The variable value of oil and gas imports also has a positive and significant effect on the rupiah exchange rate. The inflation variable has no significant effect on the rupiah exchange rate. The results of the t-value test indicate that the variable economic growth has a negative and significant effect on the rupiah exchange rate.

The Effect of Oil and Gas Exports on the Rupiah Exchange Rate

Based on the results of the analysis of the value of the multiple linear regression coefficient, it is explained that the oil and gas export variable has no significant effect on the rupiah exchange rate. The movement of oil and gas exports from 1980 to 2020 was very volatile, with these movements resulting in oil and gas exports having no significant effect on the rupiah exchange rate, which means that shocks that occur in oil and gas exports will be accepted and responded negatively by the rupiah exchange rate variable. Where the increasing export of oil and gas will cause the rupiah exchange rate to decrease, namely to appreciate.

This study is not in line with that conducted by Djulius & Nurdiansyah (2014) regarding "Short-Term and Long-Term Balance of the Rupiah Exchange Rate against the US Dollar", the results of the study indicate that in the longterm exports have a significant positive effect on the rupiah exchange rate, where the increase in export activities will be followed by a decrease in the rupiah exchange rate. In accordance with research conducted by (Yudha & Hadi, 2019) where exports of oil and gas and non-oil and gas have no significant effect on the rupiah exchange rate, it is also in line with research by Dzakiyah et al., (2018) that the export value has no significant effect on the rupiah exchange rate.

According to Dankiw (2004) in (Dzakiyah et al., 2018) the balance of payments does not only contain sales of goods and services but there are also corporate transactions and state assets. When the value of exports experiences a surplus in the balance of payments, it can have an impact. This insignificant relationship was caused by the export value which tended to fall in line with the weakening rupiah exchange rate. For a country the value of exports is income from the results of international trade carried out, the value of exports has an influence on income, through the balance of payments which will be converted into domestic exchange rates or fixed in foreign currencies.

The Effect of Oil and Gas Imports on the Rupiah Exchange Rate

Based on the results of data processing using regression analysis, it shows that oil and gas imports have a positive and significant effect on the rupiah exchange rate. Where the coefficient value is 0.000068, it can be interpreted that if oil and gas imports increase by 0.001 million US\$, the rupiah exchange rate will increase by Rp. 0.000068/US\$. The higher the value of oil and gas imports, the weaker the rupiah exchange rate. It can be interpreted that shocks that occur in oil and gas imports will be responded positively by the rupiah exchange rate, so that the higher the import of oil and gas from abroad, the higher the demand for foreign exchange which causes the rupiah exchange rate to tend to increase, *ceteris paribus*.

The results of this study are in accordance with research conducted by Djulius & Nurdiansyah (2014) where imports have a positive and significant effect on the rupiah exchange rate both in the short and long term. This study is also in line with Hazizah et al. (2017) the results show that the difference in imports has a positive and significant effect on the rupiah exchange rate. In accordance with the expectation that the increase in imports will certainly be accompanied by an increase in the need for foreign exchange in the country which causes the balance of supply and demand for foreign currencies to change, which will have an impact on the depreciation of the rupiah exchange rate. With an increase in imports, it will increase payments to exporters so that the amount of foreign currency in the country increases in number which causes the rupiah exchange rate to weaken.

The Effect of Inflation on the Rupiah Exchange Rate

Based on the results of the analysis of the value of the multiple linear regression coefficient, it shows that the inflation variable has no significant effect on the rupiah exchange rate. Based on the theory of purchasing power parity (PPP), this theory explains that high inflation rates can cause a country's currency exchange rate to weaken. In line with research conducted by Istiqamah & Septiana (2018) and Silitonga & Ishak (2017) inflation has no significant effect on the rupiah exchange rate against the United States dollar.

In the new year, Ningsih (2021) conducted a study on "The Movement of the Rupiah Exchange Rate (Against the US Dollar) in the Free Floating System in Indonesia." Theoretically, the influence of inflationary movements with the movement of the rupiah exchange rate against the United States Dollar is inversely proportional. So it can be interpreted that when the inflation rate increases, the rupiah exchange rate will weaken and vice versa when inflation decreases, the rupiah exchange rate will strengthen. This insignificant relationship was caused by the movement of the inflation rate in 1998 which experienced a sharp increase, reaching 58.5 percent which was classified as heavy inflation, which resulted in an increase in the prices of goods and services in the economy (World Bank, 2022). Inflation does not always have a bad impact on the economy of a country, if the inflation rate is classified as mild inflation, which is below 10 percent per year so that it can help economic development, because the price of goods and services has increased, it can increase profits for business actors in the economy.

The Effect of Economic Growth on the Rupiah Exchange Rate

Based on the results of the analysis of the value of the multiple linear regression coefficient, it is explained that the economic growth variable has a negative and significant effect on the rupiah exchange rate. When economic growth increases by 1% it will cause the rupiah exchange rate to decrease by Rp. 0.1244695/US\$. Economic growth has a negative and significant effect due to the crisis that occurred in 1998 where the economic growth rate touched the figure of - 13.13 percent, the crisis that occurred in 1998 was caused by the maturity of large foreign debts, where the availability of foreign exchange reserves was not sufficient, so that This causes the rupiah exchange rate to be far from its real value or depreciate. In addition, it was also exacerbated by the increase in the prices of goods and services or inflation in 1998, inflation touched 58.5 percent, with the weakening of the rupiah exchange rate causing the cost of production of goods and services to increase, and the prices of goods and services traded in the community became increasingly expensive. In addition, economic growth in 2020 also decreased at -2.07 percent (World Bank, 2022).

In accordance with the research of Mardiana & Lenysuzan (2016), and Bato et al. (2017) the regression results show that economic growth has a significant negative effect on the value of the rupiah, when economic conditions in a country change, it will be accompanied by changes in the exchange rate. This indicates that any shocks that occur in economic growth will be responded negatively by the rupiah exchange rate. Economic conditions in a country are said to be stable, one of which is by showing good economic growth. According to the mercantilism theory, a country must conduct import-export trade and optimize the trade surplus, where exports are much larger than imports. High export activities can absorb more labor so that unemployment is reduced, this situation can increase per capita income which reflects prosperity and people's purchasing power also increases. The development of gross

domestic product which experiences a high increase every year can cause the rupiah exchange rate to strengthen and vice versa.

Conclusion

Oil and gas exports partially have no significant effect on the rupiah exchange rate.. This insignificant relationship was caused by the export value which tended to fall in line with the weakening rupiah exchange rate. Oil and gas imports partially have a positive and significant effect on the rupiah exchange rate.. The higher the value of oil and gas imports, the weaker the rupiah exchange rate. The increase in imports will be accompanied by an increase in the need for foreign exchange in the country so that the balance of supply and demand for foreign currencies changes, which will have an impact on the depreciation of the rupiah exchange rate. Inflation partially has no significant effect on the rupiah exchange rate. The insignificant relationship was caused by heavy inflation in 1998 where the inflation rate touched 58.5 percent. The crisis that occurred in 1998 where the economic growth rate touched -13.13 percent, the crisis that occurred in 1998 was caused by the maturity of large foreign debts, where the availability of foreign exchange reserves was insufficient, causing the rupiah exchange rate to be far from its real value. or depreciated.

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