Analysis of the Effect of Foreign Debt, Trade Balance and Foreign Investment on the Amount of Foreign Exchange Reserves in Indonesia

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Abstract. Foreign exchange reserves are one of the macroeconomic indicators that play a role in determining national economic stability through its role as a medium of exchange for international economic activity and its influence on the stability of currency exchange rates. Through this study, researchers want to see the effect of Foreign Debt, Trade Balance Value, and Foreign Investment on the amount of Indonesia's Foreign Exchange Reserves in 2010-2022. By using the Ordinary Least Square (OLS) analysis method. Subsequently, the findings indicated that over the 2010–2022 period, every variable had an important effect on Indonesia's foreign exchange reserves. The foreign debt variable and the value of the trade balance have a positive influence while the foreign investment variable has a negative impact. The value of R^2 in the OLS model shows a figure of 89% so all variables are correlated with the value of R^2 while the remaining 11% is another variable that affects foreign exchange reserves outside the modeling.

Keywords: External Debt, Trade Balance, Foreign Investment, Foreign Exchange Reserves.

1 Background

A country has wealth contained within it. This wealth can be in the form of natural wealth or wealth in the quality of its population. The wealth owned by each country is very important for meeting the needs of every citizen. Fulfilling the needs of life for every country is an obligation that must be done. A country will avoid the phenomenon of scarcity. Scarcity can create a social conflict that affects the economic stability of a country [1]. So cooperation between countries is required in terms of fulfilling needs of both goods and services as well as the need for financing and funding. In international relations, Indonesia itself has implemented an open economic system since 1982 [2]. The open economic system requires Indonesia to be able to open up more opportunities for cooperation in various fields with various countries. In the economic field, Indonesia organizes cooperation through international trade activities, foreign investment and foreign debt financing. These three activities are carried out as a form of Indonesia in accelerating the process of development and economic growth.

In international cooperation activities, One of the points that needs to be agreed between countries is related to the payment instrument for each international

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transaction. The payment instrument is known as foreign exchange reserves. Foreign exchange reserves are liquid assets of a country with internationally recognized value, and high prices, and can be used as a means of payment in international commercial transactions or international trade [3]. The stability of a country's currency exchange rate can be influential in maintaining macroeconomic stability, foreign exchange reserves are one of the important indicators in influencing the currency's rate of exchange. Maintaining a nation's reserves of foreign currency is mostly dependent on the movement of foreign currency into and out of that nation. Indonesia's own foreign exchange reserves are subject to change. Many influences and factors contribute to the amount of reserves of foreign currency each year.

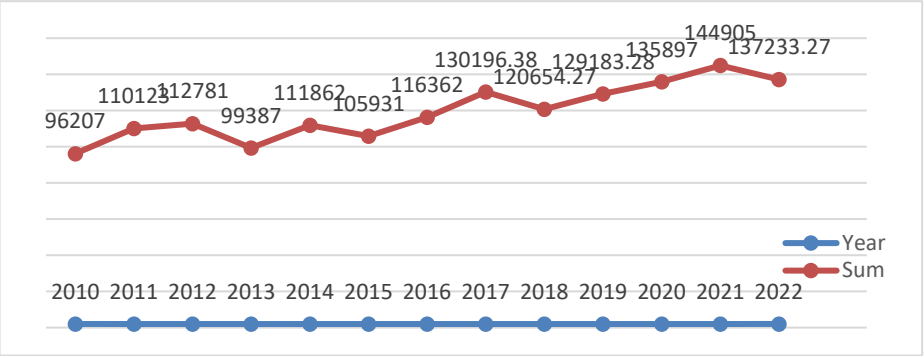

Fig. 1. The graph of Indonesia's foreign exchange reserves from 2010-2022 shows fluctuations caused by many things. The amount of foreign exchange reserves has an important effect on stabilizing the rupiah exchange rate.

When it comes to international trade activities, reserves of foreign currency play a very important role in launching these activities. Every amount reserves of foreign currency that decreases or increases in this activity is recorded in the trade balance. So that a surplus or deficit condition can be seen. According to BPS data, Indonesia's trade balance in 2012 to 2014 experienced a deficit, then continued in 2018 and 2019 also experienced a trade balance deficit. A prolonged trade balance deficit can result in poor stabilization of a country's economy. The trade balance deficit forces the amount of foreign exchange reserves to be drained in import activities. Meanwhile, from 2020 to 2022 or during the Covid-19 crisis and economic recovery, the value of Indonesia's trade balance actually showed a surplus consecutively.

In addition, foreign debt is also often associated with changes in the amount of reserves of foreign currency in Indonesia. In the theory of debt dependence, in the long run the accumulation of debt will be higher than the ability to pay a country's debt [4]. According to BPS data in the period 2010 to 2022 the amount of debt in Indonesia has increased on average every year below 10%. This increase can clearly increase the accumulation of foreign exchange reserves every year. But that does not mean that the expenditure of foreign exchange reserves is greater and exceeds it. As in 2018 foreign exchange reserves have decreased but the country's debt has increased. An uncontrolled amount of debt can create debt dependence.

To reduce dependence on foreign debt, the government needs to be able to increase foreign investment into the country to increase the amount of development funds that

increase every year [5]. Foreign investment is a very important instrument for foreign exchange reserves in influencing currency exchange rates. According to BPS data, the amount of foreign investment realization in Indonesia has almost always increased in the range of 2010-2022. However, under certain conditions, such as during the COVID-19 disaster, the value of foreign investment has decreased from 2020 to 2021. On the other hand, when there was a decrease, the foreign exchange reserves in that year increased. Various factors play an important role in providing decisions for foreign investors when investing in Indonesia.

Foreign debt, Trade Balance and Foreign Investment are fundamental variables in determining the current amount of foreign exchange reserves. Through the explanation above that there are various problems and data fluctuations from each variable. The degree of influence that foreign debt, trade balance value, and foreign investment have on Indonesia's reserves of foreign currency between 2010 and 2022 is something that researchers hope to investigate more.

2 Literature Review

Based on several previous studies that examined the determinants that affect the amount of foreign exchange reserves in Indonesia. Among them in research on the Effect of Exports, Foreign Investment, and Foreign Debt on Foreign Exchange Reserves in Indonesia in 1996-2015. It was concluded that all variables simultaneously had a significant effect on foreign exchange reserves, but if partially it turned out that exports and foreign debt had a significant positive effect while foreign investment had a significant negative effect on the growth of foreign exchange reserves [6]. Other similar studies explain the negative effect that arises precisely by investing in the amount of foreign exchange reserves, such as in research on the topic of the Effect of Exports, Rupiah Exchange Rates, and Foreign Investment on Indonesia's Foreign Exchange Reserves in 2004-2018. [The negative effect arises for several reasons such as an increase in interest rates, a global economic crisis, geopolitical turmoil in developed countries can make investment in developing countries less attractive, encouraging foreign investors to withdraw their funds. In addition, foreign investment can increase production costs and reduce state revenues so that it can reduce foreign exchange reserves and have a negative effect. In other studies examining the analysis of the oil and gas and non-oil and gas trade balance on the volatility of foreign exchange reserves in Indonesia. 1975-2016 [8]. The results showed that the trade balance variable had a positive but insignificant effect on increasing the amount of foreign exchange reserves at that time. This influence but insignificant can occur because, among others, such as

3 Research Methods

This research is classified into a form of quantitative research, by presenting data sources in the form of numbers as material to be processed and analyzed. Using the time series data with quarterly frequency starting from 2010 to 2022 with a total of 52 observations. The research variables used are divided into 2 variables, namely the Independent variable consisting of Total Indonesian Foreign Debt (in million USD),

Trade Balance Value (in million USD), and Foreign Investment Realization (in million USD). Then for the dependent variable of this research, namely Indonesia's Foreign Exchange Reserves (in million USD) as the affected variable. research data comes from second sources or those that have been published. From the Indonesian Central Bureau of Statistics (BPS), and Ministry of Trade data. Furthermore, the data is processed using Stata V-17 software.

The data analysis method used is the Ordinary Least Square (OLS) method. Using this method will reduce the number of errors (errors) squared. Furthermore, the classical assumption test is also used in order to produce a regression model that matches the BLUE (Best Linear Unbiased Estimator) criteria. These criteria provide assurance of certainty, accuracy and avoid bias in data estimation. In the OLS method, the classical assumption tests that need to be carried out include Heteroscedasticity Test, Autocorrelation Test, Normality Test, and Multicollinearity Test.

To explain how modeling in OLS for this research can be seen through the following equation:

$$LNCD = \beta_0 + \beta_1 LNULN + \beta_2 LNNRC + \beta_3 LNINVA + et$$

Where:
CD = Foreign Exchange Reserves
External Debt = Foreign Debt
NRC = Balance of Trade
INVA = Foreign Investment
LN = Natural Logarithm
β_0 = Constant
β_1 $\beta_2\beta_3$ = Regression Coefficient
et = error term

4 Results and Discussion

4.1 Classical Assumption Test

The classical assumption test is carried out as a requirement so that the model formed can have unbiased estimation results, if each classical assumption test result has met the rules, it is certain that the regression model is in accordance with the BLUE (Best Linear Unbiased Estimator) criteria.

Table 1. Heteroscedasticity Test Results

Test	chi2(1)	Prob > chi2
Breusch-Pagan/Cook-Weisberg test	1.98	0.1593

Heteroscedasticity Test. Because the chi-square probability value of 0.1593 is greater than the 5% or 0.05 significance level, it can be concluded that there is no heteroscedasticity problem based on the results of the heteroscedasticity test conducted using the Breusch-Pagan method.

Table 2. Autocorrelation Test Results

Test	Results
Durbin-Watson	0.5200937

Autocorrelation Test, according to the Durbin-Watson autocorrelation test findings**.** The DW result is 0.5299937. Because this value is between -2 to +2, according to Ghozali (2016) there are no autocorrelation symptoms.

Table 3. Normality Test Results

Test	Adj chi2(2)	Prob > chi2
Skewness and kurtosis tests	0.74	0.6908

Normality Test. The chi2 probability value, which is 0.6908 based on the normality test results, surpasses the significance level of 0.05 or 5%, indicating that the data utilized in this study are normally distributed.

Table 4. Multicollinearity Test Results

Variables	Vif	1/Vif
LNULN	1.12	0.892351
LNNRC	1.11	0.900816
dLNINVA	1.06	0.945284
Mean VIF	1.10	

Multicollinearity Test. Based on the decision rules where if the mean VIF value < 10, it is concluded that there are no symptoms of multicollinearity. While the mean VIF> 10 then there are symptoms of multicollinearity. To overcome the symptoms of multicollinearity, one of them is to differentiate one of the independent variables [. By looking at the *Variance Inflation Factor* (VIF) results in Table 6 which are less than 10, it can be concluded that the regression model does not have multicollinearity symptoms.

4.2 Multiple Linear Regression

The accuracy of the multiple linear regression model can be measured in the Coefficient of Determination Test (R-squared), F Test (goodness of fit test) and T Test (partial test).

Table 5. Results of R Test^2 and F Test

Source	**SS**	**df**	**MS**
Model	0.640729122	3	0.213576374
Residuals	0.074063684	48	0.001542993
Total	0.714792806	51	0.014015545
F(3,48)	**Prob > F**	**R^2**	**Adj. R^2**
138.42	0.0000	0.8964	0.8899

The Adjusted R Squared value of 0.8899 means that the variables of foreign exchange reserves can be described by the variables of foreign debt, trade balance, and foreign investment by 88.99%. The F test is employed to ascertain whether there is a statistically significant correlation between the independent and dependent variables. It is evident from the F test findings above that the F statistical value of 138.42 is higher than the value of 2.80 for the F table (3.48). The probability of 0.0000 is lower than 0.05 or 5%, which means that the external debt factor, trade balance, and foreign investment have a significant effect on reserves of foreign currency,.

Table 6. T-test Results

Variable	Coefficient	Std. Err.	T	P>|t|
EXTERNA	0.7112381	0.0938528	7.58	0.000
L DEBT	0.0333316	.005072	6.57	0.000
NRC	-0.0749587	.0246092	-3.05	0.004
INVA	3.095713	.9681563	3.20	0.002
CONS				

Based on the table above, the results of partial testing using the t-test can be obtained which is focused on the urgency of the research as follows:

The Effect of Foreign Debt on Foreign Exchange Reserves

It is evident from the preceding data that, at 5% significance, the foreign debt t-statistic value of 7.58 is greater than the t table of 2.01063. The significance level of the probability value of 0.000 is less than 5%. Thus, it can be said that reserves of foreign currency, are positively and significantly impacted by the amount of foreign debt. This is in line with other studies which explain that if foreign debt increases, it can increase reserves of foreign currency because there are factors that influence it, namely if a foreign debt is managed properly, it can increase investor confidence and exports to increase state revenue and foreign exchange reserves [9]. In addition, it is also caused, among others, during this period the government to issue a lot of bonds and sign a lot of foreign debt cooperation to support national development plans.

The Effect of Trade Balance Value on Foreign Exchange Reserves

As can be observed, the probability value of 0.000 is less than 5% significance, and the t value of the trade balance statistic, which is 6.57, is larger than the t table, which is 2.01063, at 5% significance. Thus, it can be said that reserves of foreign currency,are positively and significantly impacted by the trade balance. This is consistent with the idea explaining whether an increase in the trade balance, it will increase foreign exchange reserves. This research is by other studies which explain that oil and gas exports are the main factor for increasing foreign exchange reserves because demand is increasing and stable, but fluctuations in oil and gas prices increase such that the amount of exports of gas and oil increases which results in an increase in foreign exchange reserves for exporting countries. [10].

The Effect of Foreign Investment on Foreign Exchange Reserves
At 5% significance, the foreign investment t-statistic value of -3.05 is less than the t table of 2.01063. 0.004 is a probability number that is less significant than 5%. Thus, it may be said that foreign investment value significantly and negatively affects foreign exchange reserves, which means that there is a non-linear relationship so that when investment decreases, foreign exchange reserves will increase or vice versa. This happens because portfolio investors tend to more easily withdraw their investments if economic conditions worsen, so that it can cause a decrease in foreign exchange reserves. In addition, foreign companies that invest in a country often send some of their profits (dividends) to their home countries. Even so, the increase in foreign investment is basically in line with the increase in foreign exchange reserves. This is by other studies which suggest that Indonesia's capital flow or investment will improve the economy and economic growth so as to generate more foreign exchange reserves for the country. [11] There are influencing factors including exports, infrastructure development that has a positive impact, taxes paid by foreign companies, dividend payments, technology transfer, payment of business operations and labor so that foreign exchange reserves will increase.

5 Conclusion

Talking of the study that was done with the Ordinary Least Square (OLS) approach. The research results regarding the effect of Foreign Debt, Trade Balance Value, and Foreign Investment on the amount of Indonesia's Foreign Exchange Reserves in 2010-2022 are as follows; Foreign debt has a positive and significant effect on reserves of foreign currency, then the trade balance value variable has a significant and positive effect on reserves of foreign currency in Indonesia and the Foreign Investment variable has a negative but significant effect on the amount of Indonesia's reserves of foreign currency in the period 2010 to 2022. The results showing the influence of the independent variables are following and supported by several previous studies and theories which reveal that the variables of Foreign Debt, Trade Balance Value and Foreign Investment are fundamental in influencing the amount reserves of foreign currency. Together all independent variables have an influence of 89% on the increase or decrease in the dependent variable, while the rest are other variables that are not included in the research model.

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