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The Influence of Exports, Exchange Rates, Inflation, and Foreign Debt on Foreign Exchange Reserves in Indonesia in 2011-2021

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Abstract: The purpose of this study is to determine the effect of exports, exchange rates (exchange rates), inflation, and foreign debt on foreign exchange reserves in Indonesia with a vulnerable time from 2011 to 2021. This study uses secondary data, specifically *time* series data in a period of 11 years. This research is *exploratory* research because it tries to test the hypothesis between variables. [1] The approach used is quantitative with annual secondary data obtained from official sources of the Central Statistics Agency (BPS), Bank Indonesia (BI) and the *world bank* from 2011 to 2021. This study uses the *Ordinary Least Square* (OLS) model using the *Eviews 10* application. The results of this study indicate that there is a significant influence of all variables on foreign exchange reserves in Indonesia. However, researchers found inconsistencies with the results that researchers have done on the inflation variable, that the results of the partial test of the inflation variable have a positive and significant effect on foreign exchange reserves.

Keywords: exports, exchange rate, inflation, external debt, foreign exchange reserves

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Ramadhan, (2021) the most dominant variable affecting foreign exchange reserves is the export variable. However, researchers found differences in results from research conducted by (Eulia *et al.*, 2021) found that foreign exchange reserves in Indonesia and Malaysia were not influenced by the export variable.

1. Introduction

International trade is closely related to countries that implement an open economic system, it plays an important role in improving and helping countries to meet their domestic needs. The open economic system has also been applied in Indonesia since the beginning of independence. The realization of an international trade is of course that countries are able to exchange resources. Which each country can contribute from the side of economic growth both in terms of world economic and domestic economic growths. This is to be done for no other reason than to fulfill needs. In order to achieve this goal, it cannot be avoided from a financing for the implementation of international trade, where these activities are spent from country's foreign exchange reserves as has been done by Indonesia which is under Bank Indonesia which has responsibility for it, and transactions are recorded in the BI balance of payments. [2].

Discussing foreign exchange reserves will always be related to export and import activities. From export activities it will generate a certain amount of income or income, such as money in the form of foreign exchange or foreign exchange which of course can be used as a transaction tool for financing in trade activities that occur internationally or between countries involved in it. The increase or increase in foreign exchange reserves in a country is strongly influenced by the level of exports of goods that continue to increase. [3]. The above statement is also supported by the results of research conducted by Fortuna *et al.*, (2021) the results of his research show that foreign exchange reserves in Indonesia are influenced by the level of exports and have a positive and significant effect. Research conducted



Graphic 1. Foreign Exchange Reserves in Indonesia 2011-2021. Source: World Bank, 2022.

Based on the graphic 1, by the period 2011-2021 Indonesia's foreign exchange reserves were volatile. Even in 2013, 2015 and 2018 foreign exchange reserves were negative. This is because at that time it was strongly influenced by the stabilization of the exchange rate and the amount of expenditure obligations in the interest of meeting foreign debt paid in large enough amounts. As for Indonesia's highest foreign exchange reserves in 2014. Of course, a country's foreign exchange reserves indicate that economic conditions tend to be better and the country's readiness to face economic problems is mature.

Sonia & Setiawina (2016) revealed in their research that exchange rate is a factor that possibly affect the high and low levels of foreign exchange reserves in a country. The price of goods that are part of exports in a country will decrease if the exchange rate of the country increases. Vice versa, if the price of local goods in the international market will increase if the exchange rate depreciates. Therefore, foreign exchange earnings in the country will be more. When the price of an item experiences a significant increase, it has an impact that makes the country experience such an obstacles where the country really needs a much larger amount of foreign exchange so that transactions between countries occur. [8]. This is supported by research conducted by Fortuna *et al.*, (2021), Ramadhan (2021), Stefani *et al.*, (2021), and Febri Anisa *et al.*, (2021) which shown that the exchange rate has a negative and significant effect on foreign exchange reserves. However, Eulia *et al.* (2021) argued that the exchange rate or exchange rate has a positive and significant impact on foreign exchange reserves. A strong exchange rate of a country's currency is certainly able to control and minimize inflation in that country.

Excess money supply in society causes the phenomenon of inflation, as well as the price of goods in the long term will increase. The amount of money supply in society referred to here is the total amount of money in circulation in a certain period. [11]. Research conducted Sanusi *et al.*, (2019) found the results that in the long run inflation can affect foreign exchange reserves, but in the short term reserves in South Africa are not affected by inflation. According to Atmadja (2000) the increase in the amount of foreign exchange reserves in the country as well as investment is influenced by external debt, so that it is able to stimulate economic growth in a country. In line with that Andriyani *et al.* (2020) found that foreign debt has a significant influence and has a positive impact on foreign exchange reserves in Indonesia. However, here the author finds inconsistencies in the results of the research conducted. E. Ayunku & Markjackson (2020) with the research findings that foreign debt has a negative and significant effect on foreign exchange reserves in Negeria.

Based on the description and exposure of the background above, there is a *research gap* in the *research*, for this reason the authors try to contribute an empirical study of the Effect of Exports, Exchange Rates (Exchange Rates), Inflation, and Foreign Debt on Foreign Exchange Reserves in Indonesia 2011-2021.

1.1 Literature References

1.1.1 Foreign Exchange Reserves

Tambunan (2001) expressed that foreign exchange reserves are foreign currencies that can be used for development funds and repayment of foreign debt including import financing and others, which are managed by the central bank. Based on the concept of international *reserves and foreign currency liquidity* (IRFCL) by the

IMF, foreign exchange reserves are the activities of all external activities by monetary authoritarians, which can be transferred at any time for the purposes of funding the balance of payments by intervening in the foreign exchange market [17]. There are two terms of foreign exchange reserves that are widely recognized in Indonesian economic development. First, the *official foreign exchanges reserve* is a national foreign exchange reserve managed by based on Law No. 13 1968. [18]. The second is the *country foreign exchanges reserve* which includes all foreign exchange held by proprietary entities that are part of national wealth. [19].

1.1.2 Export

Todaro (1983) argues that exports are goods and services which sold to residents in other countries plus services used such as transportation of product delivery, capital and others that support exports to residents in other countries. According to Amir (2004) Export is the activity of removing a number of goods from domestic circulation and transporting them abroad to obtain payment in the form of foreign exchange determined by the government. Export activities are highly dependent on the ability to compete for products in foreign markets. In this regard, exports have a direct impact on national income. However, an increase in national income does not always help increase the quantity of exports because there are other external variables that are not related to export activities. [22].

1.1.3 Exchange Rates

According to Mankiw (2007) the exchange rate between two countries is the result of an agreement between two parties to conduct international trade. The exchange rate can be understood as the domestic currency required to obtain one unit of foreign currency or the price of one country's currency in relation to the currency of another country. (Krugman & Maurice, 1991).. One of the important variables in an open economic system is the exchange rate or commonly referred to as the exchange rate, this is because the variable can affect variables such as prices, interest rates, the balance of payments, and the current account balance. [25].

1.1.4 Inflation

Muchtolifah (2010) defined inflation as a state of general price increases related to macroeconomic objectives to maintain price stability. When general prices jump up dramatically, it will greatly affect the inflation rate which will also rise. Because this rate is part of a percentage change in the price level. (Samuelson & Nordhaus, 1994).

1.1.5 External Debt

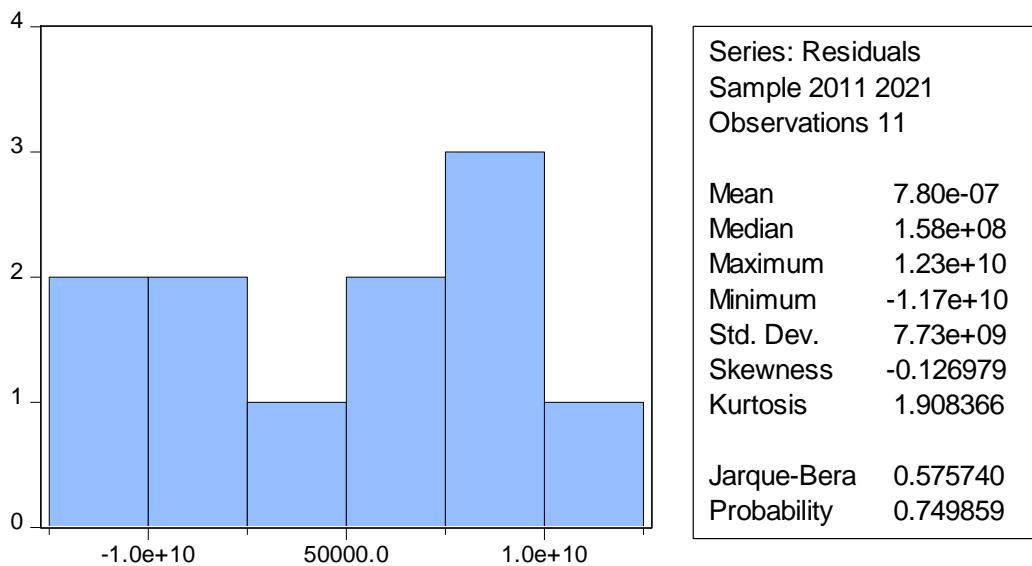
One of the government's efforts to increase foreign exchange reserves that can be done is by providing loans and increasing natural resource export activities abroad. [28]. The surplus that is obtained in export activities is not fully able to fill foreign exchange reserves in a country, and most of the country's foreign exchange reserves are obtained from external debt or foreign debt, with the aim of paying the ongoing transaction deficit and to pay the principal loan that has not been paid off, this is proof that foreign debt cannot be directly used or utilized to increase foreign exchange reserves in a country. [29].

2. Results

2.1. Uji Asumsi Klasik

2.1.1. Normalitas

With the normality test we can find out whether the data we get has a normal distribution or not. We can see this from the Jarque Bera value. Thus, a picture of the results of the normality test that the researcher did is below.

**Graphic2.** Normality Test Result

From the results of the normality test above, it can be seen that the Jarque-Bera value is 0.575740 with a probability of 0.749859, the probability value is 0.749859, > 0.05 , which means the residuals are normally distributed.

2.1.2. Multicollinearity

Multicollinearity test is conducted to determine whether the data contains a high correlation between the independent variables in the model. We can see the results of the test that the researcher did in the table below.

Variance Inflation Factors
 Date: 12/28/22 Time: 02:15
 Sample: 1 11
 Included observations: 11

Variable	Coefficient	Uncentered	Centered
	Variance	VIF	VIF
C	1890022.	298581.3	NA
X1	94.96900	53.10388	4.95368
X2	1.40E-05	136.9139	6.836831
X3	2.840108	9.375555	2.128087
X4	39.60335	98.31032	9.16843

Table 1. Multicollinearity Test Output

The export variable has a VIF value of $4.95368 < 10$, this condition means that the export variable is not exposed to multicollinearity problems. Furthermore, the rupiah exchange rate also has a VIF value of $6.836831 < 10$, which means that the VIF value is still below 10 thus, the rupiah exchange rate variable is also not exposed to multicollinearity problems. Meanwhile, the inflation variable we can see the VIF value of $2.128087 < 10$ which means the value is still below 10 and it can be ascertained that the inflation variable is not exposed to multicollinearity. Inaddition, the foreign debt variable has a VIF value of $9.16843 < 10$, the value is still below 10 and it can be concluded that the foreign debt variable is not exposed to multicollinearity problems.

2.1.3. Heteroscedasticity

Heteroscedasticity test is conducted to find out whether the data is inconsistent between variants and residuals in other observations. The following are the results of the heteroscedasticity test is depicted bellow.

F-statistic	1.040800	Prob. F(6,6)	0.6586
Obs*R-squared	7.505983	Prob. Chi-Square(6)	0.7418
Scaled explained SS	4.821417	Prob. Chi-Square(6)	0.5881

Table 2. Heteroscedasticity Test Output

From the table 2 it can be seen that the heteroscedasticity test has a *Prob* value. *Chi-Square (6)* *Obs * R-squared* is 0.7418, and the *Obs * R-squared* value is still greater than 0.05 atasu $0.7418 > 0.05$. Thus, it can conclude that from the test of the data that the researchers tested was not exposed to heteroscedasticity problems.

2.1.4. Autocorrelation

In the autocorrelation test, we can find out whether the regression model that the researcher is trying to test occurs the correlation ratio between errors in period t and confounding errors in the previous period (t-1). The following below can be seen in table 3.

R-squared	0.489263	Mean dependent var	44709.09
Adjusted R-squared	0.148771	S.D. dependent var	90443.05
S.E. of regression	8.344464	Akaike info criterion	31.84029
Sum squared resid	417.7805	Schwarz criterion	43.64890
Log likelihood	-45.61216	Hannan-Quinn criter.	50.70021
F-statistic	71.36929	Durbin-Watson stat	4.266164
Prob(F-statistic)	0.328777		

Table 3. Autocorrelation Test Output

Refers to the table, it can be seen that it has a Durbin-Watson test value of $4.266164 > 0.05$, which means that we can conclude that there is no problem with autocorrelation.

2.2. Hypothesis Test

2.2.1 Simultaneous Significance Test (F Test)

Based on the results of statistical testing, it can be obtained that the F-value is $= 71.36929 > F_{table} = 4.53$ which we can see that the F-value is greater than the F-table value and it can be confirmed that the export variable, rupiah exchange rate (exchange rate), inflation, and foreign debt simultaneously or together have a significant influence on foreign exchange reserves in Indonesia.

2.2.2 Partial Significance Test (T Test)

By doing the t, it can be seen that the probability value with a significance level (α) of 0.05 below is the result of the statistical t-test in table 4 below.

Variable	T-Statistic Value	Probability
Ekspor	1.842107	0.0436
Nilai Tukar	-2.204981	0.0296
Inflasi	2.337524	0.0472
Utang Luar Negeri	.1.110128	0.0359

Table 4. T-Statistic Output

Judging from the results of data processing in the table above, it can be explained as follows:

1. The Effect of Exports on Foreign Exchange Reserves

From the test results that researchers have done the probability value with a significance of $\alpha = 0.05$, the acquisition of the probability value of the export variable is $0.0436 < \alpha$ of 0.05, which means that partially the export variable has a positive and significant effect on foreign exchange reserves in Indonesia.

2. The Effect of Exchange Rate on Foreign Exchange Reserves

From the test results that researchers have done the probability value with a significance of $\alpha = 0.05$, getting results with a probability value of the exchange rate variable of $0.0296 < \alpha$ of 0.05, which means that partially the exchange rate variable has a negative and significant effect on foreign exchange reserves in Indonesia.

3. The Effect of Inflation on Foreign Exchange Reserves

From the test results that researchers have done the probability value with a significance of $\alpha = 0.05$, by obtaining the probability value of the inflation variable of $0.0472 < \alpha$ of 0.05, it means that partially the inflation variable has a positive and significant effect on foreign exchange reserves in Indonesia.

4. The Effect of Foreign Debt on Foreign Exchange Reserves

From the test results that researchers have done the probability value with a significance of $\alpha = 0.05$, the results of obtaining the probability value of the foreign debt variable with an amount of $0.0359 < \alpha$ equal to 0.05 means that it can be concluded that partially the foreign debt variable has a positive and significant effect on foreign exchange reserves in Indonesia.

3. Discussion

3.1 The Effect of Exports on Foreign Exchange Reserves in Indonesia

According to Amir (2004), Export is the activity of sending a number of goods from domestic circulation and transporting them abroad to obtain payment in the form of foreign exchange determined by the government. Export activities are highly dependent on the ability to compete for products in foreign markets. In this regard, exports have a direct impact on national income. However, an increase in national income does not always help increase the quantity of exports because there are still other external variables that are not related to export activities. [22]. This is also supported by research conducted by Fortuna *et al.*, (2021) which the results of his research exports have a positive and significant effect on Indonesia's foreign exchange reserves. Research conducted Ramadhanty, (2021) the most dominant variable affecting foreign exchange reserves is the export variable. When the level of exports of goods increases, a country's foreign exchange reserves will also increase. [3]. Therefore, it can be concluded that the first hypothesis is accepted.

3.2 The Effect of Exchange Rate on Foreign Exchange Reserves in Indonesia

According to Mankiw (2007) the exchange rate between two countries is the result of an agreement between two parties to conduct international trade. The exchange rate can be understood as the domestic currency required to obtain one unit of foreign currency or the price of one country's currency in relation to the currency of another country. (Krugman & Maurice, 1991).. One of the important variables in an open economic system is the exchange rate or commonly called the exchange rate, it is because the variable can affect other variables such as prices, interest rates, balance of payments, and current account balance [25]. This is supported by research conducted by Fortuna *et al.*, Ramadhanty (2021), Stefani *et al.*, (2021), and Febri Anisa *et al.*, (2021) in their research shows that the exchange rate has a negative and significant effect on foreign exchange reserves. This means that it can be concluded that the second hypothesis can be accepted.

3.3 The Effect of Inflation on Foreign Exchange Reserves in Indonesia

Muchtolifah (2010) defines inflation as a condition of price increases in general related to macroeconomic objectives to maintain price stability. When the general price soars dramatically, it will greatly affect the inflation rate that will also rise. Because at this level is part of a percentage change in the price level (Samuelson & Nordhaus, 1994). However, this is not in line with research conducted by Sanusi *et al.*, (2019) found that inflation can affect foreign exchange reserves in the long run, but in the short term inflation has no influence on foreign exchange reserves in South Africa. In line with research conducted by Faridatussalam (2022), the results of his research show that inflation has a negative and insignificant effect on foreign exchange reserves in Indonesia. Thus, it can be concluded that the third hypothesis that inflation has a negative influence on foreign exchange reserves in Indonesia is rejected.

3.4 The Effect of Inflation on Foreign Exchange Reserves in Indonesia

Muchtolifah (2010) defined inflation as a state of general price increases related to macroeconomic objectives to maintain price stability. When general prices jump up dramatically, it will greatly affect the inflation rate which will also rise. Because this rate is part of a percentage change in the price level. (Samuelson & Nordhaus, 1994). However, this is not in line with research conducted by Sanusi *et al.*, (2019) found that inflation can affect foreign exchange reserves in the long term, but in the short term inflation has no effect on foreign exchange reserves in South Africa. In line with research conducted by Faridatuzzalam (2022) the results of his research show that inflation has a negative and insignificant effect on foreign exchange reserves in Indonesia. Thus it can be concluded that the third hypothesis that inflation has a negative influence on foreign exchange reserves in Indonesia is rejected.

4. Materials and Methods

This research is *exploratory* research (explanation) because it tries to test the hypothesis between variables [1]. The approach used is quantitative, with annual secondary data (*time series*) obtained from official sources of the Central Statistics Agency (BPS), Bank Indonesia (BI), and the World Bank from 2011 to 2021. This study uses the *Ordinary Least Square* (OLS) model using the *Eviews 10* application, with the model below:

$$CD = \alpha + \beta_1 EKS_1 + \beta_2 KURS_2 + \beta_3 INF_3 + \beta_4 ULN_4 + \epsilon$$

Description:

CD : Foreign Exchange Reserves

EKS : Export

KURS : Exchange Rates

INF : Inflation

ULN : External Debt

$\beta_1 - \beta_4$: Short-Term Parameters

ϵ : Error Term

5. Conclusions

From the results of the discussion and analysis that the researchers have done regarding the research variables, which are the effect of exports, exchange rates, inflation, and foreign debt on foreign exchange reserves in Indonesia, it is concluded that there is a significant influence of all variables on foreign exchange reserves in Indonesia. However, researchers found inconsistencies with the results that researchers have done on the inflation variable, that the results of the partial test of the inflation variable have a positive influence on foreign exchange reserves. In future research, researchers recommend adding variables that can affect foreign exchange reserves and can use panel data by involving many countries so that the range of research is wider, as well as adding variables such as imports, investment from other countries, and can also add more research objects such as in OIC or ASEAN countries and so on. as well as the need for a reassessment related to the inflation variable because the current research has significant differences from previously conducted research.

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