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The Effect of Interest Rate and Export on Foreign Exchange Reserves in Indonesia

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ABSTRACT

Good management of foreign exchange reserves during a crisis has the effect of improving the performance of the domestic economy and adding to the welfare gains from optimal management of foreign exchange reserves is reducing the welfare costs of liquidity shocks. Research on exchange reserves should be developed, because it shows the economic power of a country to do more international transactions and face an economic crisis. Foreign exchange reserves were developed using macroeconomic variables such as foreign interest rates, bi rate, exports, and foreign loans with an ordinary least square (OLS) approach. The results of the analysis show that foreign interest rates, exports and foreign loans have a positive influence on foreign exchange reserves, while the domestic interest rate variable has a negative influence on foreign exchange reserves. The government needs to implement policies that are appropriate and appropriate to the situation in order to minimize the reduction in foreign exchange reserves.

Keywords*: Foreign exchange reserve; Interest rate; Export; OLS.*

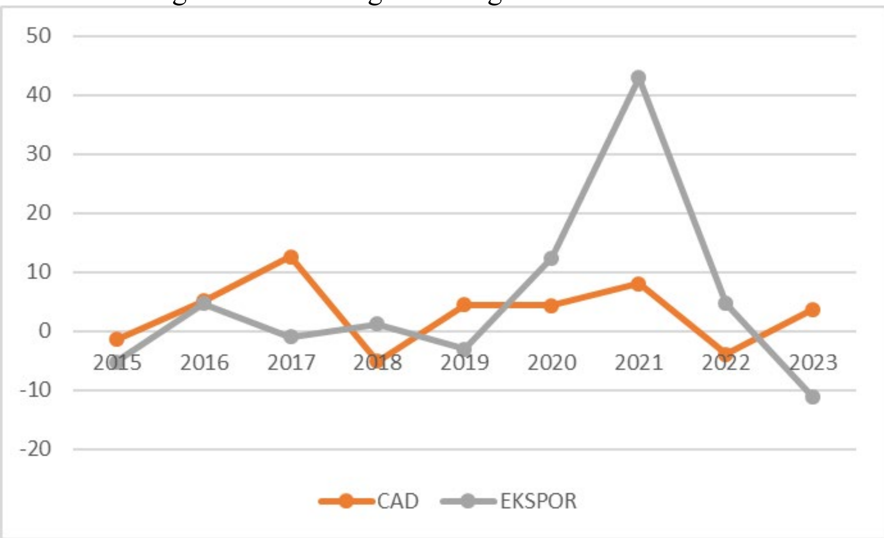
INTRODUCTION

Sayoga & Tan (2017) argued that foreign exchange reserves are state savings and a means of international payment obtained from exports and debt lending to other countries. Foreign exchange reserves need to be managed well because they show the strength of a country's economy. The economic strength of a country depends on the amount of foreign exchange reserves it has. As a developing country, Indonesia is vulnerable to economic crises. When an economic crisis occurs, foreign exchange reserves can be used as a means of protection because funds for development and other transactions are taken from foreign exchange reserve funds so that foreign exchange reserves play an important role in avoiding economic crises. Adhitya (2021) states that the higher the foreign exchange reserves a country has, the more capable the country is in managing the economy and making international payments. Foreign exchange reserves are managed by Indonesian banks as regulated in article 13 of Law No. 23 of 1999. Theoretically, a large precautionary demand for foreign exchange reserves appears as self-insurance to avoid expensive liquidation of long-term projects when the economy is vulnerable to sudden shutdowns (Aizenman & Lee, 2007).

Management of foreign exchange reserves during an economic crisis is different from normal economic conditions, but research by Dominguez (2012) shows that there are no significant changes in the stock of foreign exchange reserves in many countries, even those that had high foreign exchange reserves before the crisis, because these countries were reluctant to to use it in times of crisis. Dominguez et al (2012) stated that good management of foreign exchange reserves during a crisis has an impact on increasing domestic economic performance and Aizenman & Lee (2007) added that the welfare benefits of optimal management of foreign exchange reserves are reducing welfare costs from liquidity shocks. This research aims to analyze the influence of macroeconomic variables through exports, foreign debt and monetary variables such as domestic interest rates and foreign interest rates on foreign exchange reserves in Indonesia.

Rasyidin et al (2023) stated that the relationship between interest rates and foreign exchange reserves is dynamic. According to Keynesians in *Balance of Payment Theory*, if a country's interest rate rises then this will encourage decreased investment and have an effect on decreasing aggregate income and reducing the ability to import. If the import value is lower than the export value, it can cause a surplus in the international balance of payments (NPI) through the trade balance and increase the position of foreign exchange reserves (Restanti, 2022). Efiza (2017) states that interest rates play an important role in the accumulation of foreign exchange reserves. These studies explain that interest rates have an influence on foreign exchange reserves through their dynamic nature and there is debate regarding that influence *direct* And *indirect* to foreign exchange reserves.

Islami & Rizki (2018) state that if interest rates rise, foreign exchange reserves will fall, this is because the public and private sector prefer to keep their funds in banks because banking interest rates also increase so that economic activity experiences a decline resulting from a reduction in the amount of money in circulation. When JUB decreases, the capital balance also decreases, thereby reducing domestic and international economic activity which has a negative impact on foreign exchange reserves. Penelitian Jena & Sethi (2021) states that in short-term estimates there is an indirect relationship between interest rates and foreign exchange reserves in Brazil. Meanwhile, research by Bosnjak et al (2020) shows that there is a co-movement between monetary policy and economic fluctuations on foreign exchange reserves in Serbia and North Macedonia. This shows that monetary policy needs to implement stable interest rates which can increase economic growth and foreign exchange reserves.



Picture 1. Growth in Foreign Exchange Reserves and Exports 2015-2023

The theory of comparative advantage in international trade shows that countries that can optimize comparative advantage can increase their exports so that there is a trade surplus which has an impact on increasing foreign exchange reserves. Sayoga & Tan (2017) state that exports have an important role in national development, because foreign exchange obtained from exports will increase foreign exchange reserves. Fadlillah & Kurniawan (2024) stated that the role of Indonesian exports which rely on raw materials is experiencing serious challenges in a situation of high global uncertainty. Even though trade surpluses have occurred several times, the high role of imports cannot be separated from meeting domestic needs in Indonesia (Azzahra & Kurniawan, 2023). Figure 1 shows that there was a co-movement between export growth and foreign exchange reserve growth that occurred during the Covid-19 crisis, but the pattern of movement occurred other than in 2020-2022. The increase in exports after the Covid-19 crisis was followed by an increase in foreign exchange reserves, but there will be a decline in 2022.

Figure 1 also shows that there is an inverse movement pattern between exports and foreign exchange reserves. This can occur because there is fraud between income from exports and the use of foreign exchange reserves which aims to stabilize domestic economic conditions. Fawaiq (2023) states that exports have a significant effect on foreign exchange reserves in Singapore but exports do not have a significant effect on foreign exchange reserves in Indonesia, this happens because income from exports for Indonesia settles in Singapore rather than entering as income to Indonesia. Hariadi et al (2020) stated that exports can have a positive and negative effect on foreign exchange reserves in Indonesia based on the lag length used in the research model. Research from Isramaulina & Ismaulina (2021) tates that increasing exports will have an impact on increasing foreign exchange reserves in Indonesia. Meanwhile, research by Suripto et al (2022) states that exports have an effect on foreign exchange reserves in the short term and not in the long term.

The research also applies foreign interest rate variables, because several domestic interest rate policies also refer to global conditions, which in this case are based on foreign interest rates (Kurniawan et al., 2023). The use of foreign interest rates is also an update in this research relating to foreign exchange reserves. Another control variable in the research model is the foreign debt variable, where the foreign exchange reserve instrument can be used as payment for foreign debt (Dinul & Kurniawan, 2024). debt fluctuations can have an impact on the rise and fall of foreign exchange reserves.

METHOD

This research analyzes foreign exchange reserves which are influenced by foreign interest rates, domestic interest rates, exports and foreign debt. The research uses time-series data from 2015Q1-2023Q4. Research data comes from Bank Indonesia and BPS. This research uses the method *Ordinary Least Square (OLS)* to determine the influence of independent variables on the dependent variable, in this research to determine the influence of macroeconomic variables on foreign exchange reserves in Indonesia. The OLS method equation is as follows:

$$L_n\gamma = \beta_0 + \beta_1 X_1 + \beta_2 L_n X_2 + \beta_3 X_3 + \beta_4 X_4 + \varepsilon_t$$

Where γ are the foreign exchange reserves, X_1 is domestic interest rate, X_2 is the foreign interest rate (The Fed), X_3 is the export, X_4 is debt, β_0 is the constanta, $\beta_1 - \beta_4$ are the coefficient of independent variables, ε_t is error term and L_n notation in logarithm form. The coefficient of determination test is used to see the effect of the independent variable variation on the dependent variable variation. The F test serves to see the effect of the independent variable on the dependent variable simultaneously. To fulfill the *BLUE* concept *(best linier unbiased estimator)* So the research applies classical assumption tests consisting of normality, autocorrelation, multicollinearity and heteroscedasticity (Alif & Kurniawan, 2024).

RESULT AND DISCUSSION

Table 1 shows that the average value of variable Y or foreign exchange reserves is 126717.0 billion USD with the highest value of 146870.0 billion USD occurring in 2021 where the condition of the Indonesian economy in that year grew positively because the number of exports in that year reached 28711.72 thousand USD. When the economy grows positively, the trade balance experiences a payments surplus, which indicates that the amount of exports is greater than imports(Bank Indonesia, 2023). Increases the amount of foreign exchange reserves because the foreign currency obtained increases and becomes state savings. The highest number of exports is dominated by the manufacturing processing industry and basic materials. Export activities in 2021 are also supported by post-Covid-19 recovery and the Ukrainian-Russian war, so there is a need for basic goods from Indonesia. The lowest foreign exchange reserves were 101720.0 billion USD which occurred in 2015 when there was a weakening of the world economy which put pressure on domestic economic growth. In 2015, the Indonesian economy grew by 4.8 percent, lower than in 2014 which reached 5.0 percent, which had an impact on the performance of the external sector which decreased sharply, marked by a significant decline in the number of exports, including manufacturing exports, which experienced a decline in demand from global demand. The decline in exports caused a deficit in Indonesia's balance of payments so that foreign exchange reserves fell. Apart from being influenced by exports, the decline in foreign exchange reserves in 2015 was also due to Indonesian banks using foreign exchange reserves to maintain the rupiah currency and spending on foreign debt payments by the government.

Table 1. Descriptive Statistics

Variable	Mean	Max	Min	Std Dev
Y	126717.0	146870.0	101720.0	12269.53
X1	1.63	5.50	0.25	1.66
X2	5.13	7.50	3.50	1.25
X3	214444	3407223	1347141	528286.6
X4	371853.9	423351.5	299025.2	39502.08

Source: data processed

The average value of the variable When interest rates rise, the government implements a contractionary monetary policy with the aim of reducing inflation and the money supply which has an impact on reducing people's purchasing power so that output and exports produced also fall (Warjiyo & Juhro, 2019). If this continues, the balance of payments will become a deficit, which will result in a decrease in foreign exchange reserves. The lowest BI rate of 3.50 occurred in 2021 and 2022 when the economy was recovering from the decline in economic activity due to Covid-19. Bank Indonesia lowered interest rates to boost public and private purchasing power by implementing expansionary monetary policy. When interest rates fall, the public and private sector will increase output and exports which will have an impact on increasing the amount of foreign exchange reserves.

Table 1 shows that the average value of variable Exports increased due to the recovery during the Covid-19 period which had a positive impact on international trade. When international trade can be carried out slowly and normally, exports will increase. An increase in the number of exports will also increase Indonesia's foreign exchange reserves. Indonesia's exports in 2022 will be dominated by the industrial sector at 98.5 percent, the other 1.5 percent will be agriculture, mining and oil and gas. In 2019, exports were the lowest at 134,741 thousand USD, where in that year Covid-19 occurred which resulted in a decline in economic activity both domestically and internationally. Decreasing economic activity both domestically and internationally will have an impact on a country's income and balance of payments (Az-zakiyah et al., 2024). If income is less, the government will use foreign exchange reserves for external transactions. This will reduce the foreign exchange reserves it has and a balance of payments deficit will also reduce the amount of foreign exchange reserves.

Table 2. The Result of Multiple Regression

Variable	Coefficient
C	5.79 (4.97)***
X1	0.01 (3.50)***
X2	-0.02 (-3.82)***
X3	0.08 (2.72)***
X4	0.37 (4.03)***
Adj R-Squared	0.875
F-stat	62.06***
Classical Assumption	
Normalitas	0.77
Autokorelasi	0.11
Heteroskedastisitas	0.87
Multikolinearitas	*Free from multicolinearity problem*

Source: data processed

Table 2 shows that foreign interest rates have a positive effect with a coefficient value of 0.01 and a t-statistic value of 3.50. This means that if the Fed raises interest rates, Indonesia as a developing country must be alert because it will have several impacts on the Indonesian economy. When the Fed maintains high interest rates, it will suppress domestic interest rates. Bank Indonesia responded to the increase in global interest rates by raising domestic interest rates, but Bank Indonesia did not use foreign exchange reserves for exchange rate stability. Export performance also helps in increasing foreign exchange reserves. When exports are high, the trade balance will have a surplus and have a positive impact on foreign exchange reserves. So that when the Fed increases, Indonesia's foreign exchange reserves can also continue to increase. When foreign interest rates increase by 1 percent, foreign exchange reserves will also increase by 0.01 percent.

The domestic interest rate variable has a negative effect with a coefficient value of -0.02 and a t-statistic value of -3.82. When Bank Indonesia raises its benchmark interest rate, people will save their funds in the bank. This reduces people's purchasing power which has a negative impact in the long term, including on the amount of foreign exchange reserves. In accordance with research by Islami & Rizki (2018) states that an increase in domestic interest rates will reduce foreign exchange reserves and in line with research by Restanti (2022) which states the same thing, that domestic interest rates have a negative effect on foreign exchange reserves. In this case, the government needs to provide credit at low interest rates so that people are interested in borrowing funds from banks. Funds borrowed by the public can increase economic activity which has an impact on increasing the amount of output and export activity. This is what allows Indonesia's foreign exchange reserves to increase. Based on the data processing results in table 2, when domestic interest rates increase by 1 percent, the amount of foreign exchange reserves will decrease by -0.02 percent.

The export variable has a positive effect with a coefficient value of 0.08 and a t-statistic value of 2.72. Exports are carried out to make Indonesia's balance of payments surplus which will increase foreign exchange reserves and Indonesia's economic growth. High exports will increase profits for Indonesia because Indonesia has more foreign exchange, resulting in an increase in Indonesia's foreign exchange reserves. This research is in line with Isramaulina & Ismaulina (2021) which states that exports have a positive effect on foreign exchange reserves. Apart from that, another study by Suripto et al (2022) juga revealed that when the government continues to encourage export activities which results in a balance of payments surplus, foreign exchange reserves can be increased through international trade, namely exports, where exports have a positive and unidirectional effect on increasing foreign exchange reserves. When exports increase by 1 percent, foreign exchange reserves will increase by 0.08 percent.

Table 2 shows that the foreign debt variable has a positive effect with a coefficient value of 0.37 and a t-statistic value of 4.03. in 2021 foreign debt can increase foreign exchange reserves. Foreign debt is used to cover the shortfall in domestic financing for infrastructure development, but the total amount of debt can reduce foreign exchange reserves so that foreign debt must be managed as well as possible. Foreign debt can also increase Indonesia's capital balance which has a positive impact on economic activity, such as increasing the amount of production, increasing the number of machines and improving technology. The greater the amount of production produced so that it can cover all demand for the goods, the more goods will be exported.

CONCLUSIONS

Foreign exchange reserves are state savings and a means of international payment obtained from exports and debt borrowing from other countries. Foreign exchange reserves need to be managed well because they show the strength of a country's economy. Good management of foreign exchange reserves during a crisis has an impact on improving domestic economic performance and adds to the welfare benefits of optimal management of foreign exchange reserves, namely reducing welfare costs from liquidity shocks. This research analyzes foreign exchange reserves which are influenced by foreign interest rates, domestic interest rates, exports and foreign debt. The research uses time-series data from 2015Q1-2023Q4. This research uses the method *Ordinary Least Square (OLS)* to determine the influence of independent variables on the dependent variable, in this research to determine the influence of macroeconomic variables on foreign exchange reserves in Indonesia.

The research results show that increasing foreign interest rates has an impact on increasing Indonesia's foreign exchange reserves, while the domestic interest rate variable has a negative effect with a coefficient value of -0.02 and a t-statistic value of -3.82. When Bank Indonesia raises its benchmark interest rate, people will save their funds in the bank. This reduces people's purchasing power which has a negative impact in the long term, including on the amount of foreign exchange reserves. The export variable has a positive effect with a coefficient value of 0.08 and a t-statistic value of 2.72. The export and foreign debt variables have a positive effect on foreign exchange reserves so that an increase in these two variables will increase foreign exchange reserves. The government needs to increase exports and maintain the stability of domestic interest rates to increase foreign exchange reserves and domestic economic performance.

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