LONG-TERM RELATIONSHIPS OF MACROECONOMIC VARIABLES ON INDONESIAN FOREIGN EXCHANGE RESERVES

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Abstract

This study aims to prove the long-term relationship of variable economics to Indonesia's foreign exchange reserves. The data used in this study for 24 years began from 1995 to 2018 using the Error Correction Model (ECM) method. The results of this study indicate that in the short and long term exports and foreign debt have a positive and significant relationship with foreign exchange reserves. The rupiah exchange rate has a negative and significant relationship in the short term, but in the long run has a positive relationship. Foreign investment has a negative and insignificant relationship in the short term and a positive and insignificant relationship in the long run.
Keywords: Foreign exchange reserves, exports, rupiah exchange rate, foreign debt and foreign investment.

Introduction

International trade is one of the important aspects in the economy of every country in the world (Budiono, 1982). The international trade of each country requires foreign exchange reserves to be obtained overseas which are managed by Bank Indonesia as stipulated in Law No. 3 of 2004. Foreign exchange reserves are also one of the guarantees for achieving a country's monetary and macroeconomic stability (Tambunan, 2011). The foreign exchange index supports the use of a weighted amount of an index based on the level of liquidity of each component of a financial asset. Jauhari Dahalan. (2005), suggesting that different financial aggregates are more likely to be used but rather a better alternative to replace the easy addition method to build financial aggregates.

Priadi and Sekar (2008) explained that foreign exchange reserves are the main key for a country to be able to avoid economic and financial crises. The impact of the economic crisis when viewed from a balance of payments perspective is the depletion of the country's foreign exchange reserves. The depletion of foreign exchange reserves due to the use of foreign exchange reserves to intervene in order to continue to reduce the value of the Rupiah exchange rate against the US dollar. Countries affected by the foreign exchange crisis, in fact the economic resilience of the country depends on the size of foreign exchange reserves held.

The size of a country's foreign exchange reserves is determined by the export and import trade activities and the country's capital flows (Gandhi, 2006). Flow of capital can be in the form of foreign aid, foreign investment, and foreign debt (Tambunan, 2011). A country's foreign exchange reserves are affected by current transactions and imports. The development of a country's current account needs to be watched carefully, because the current account deficit that takes place in the long term can reduce foreign exchange reserves. Therefore the current account deficit is often seen as a signal of macroeconomic imbalances that require adjustment of exchange rates or tighter macroeconomic policies (Tambunan, 2004).

The state is said to experience crisis seen from the ability of foreign exchange reserves to meet short-term obligations, current account deficits, protect the exchange rate and of course payments to foreign debt. Based on the above phenomenon, researchers assume that with the Indonesian state's dependence on other countries, foreign exchange reserves as one of the monetary indicators play an important role in increasing and accelerating economic development. So that changes in Indonesia's foreign exchange reserves need attention from the government / monetary authorities so that economic stability is maintained. Therefore, this study aims to prove the long-term relationship of variable economics to Indonesia's foreign exchange reserves.

Literature Review

According to Gandhi (2006) Foreign exchange reserves are central bank assets stored in various currencies. Frederic S. Mishkin (2001) explains the relationship between the exchange rate against foreign exchange reserves is that the more foreign exchange or foreign exchange held by the government and the population of a country, the greater the ability of the country to carry out international economic and financial transactions and the stronger the value of the currency. Besides that, with the increasing exchange rate of the country's own currency, it shows that the economy of the country is getting stronger, so that it can get more foreign exchange.

The research, Edo and Bendesa (2014) with the research title "The effect of rubber production, United States dollar exchange rate and rubber exports on Indonesian foreign exchange reserves for the period 1995-2012" This research uses multiple linear regression methods with the results of research are rubber production, US dollar exchange rate and rubber exports simultaneously have a significant effect on Indonesia's foreign exchange reserves in the period 1995-2012. Partially rubber production does not have a positive and significant effect on Indonesia's foreign exchange reserves in the period 1995-2012, partially the US dollar exchange rate does not have a positive and significant effect on Indonesia's foreign exchange reserves in the period 1995-2012 and partially rubber exports have a positive and significant effect on Indonesia's foreign exchange reserves period 1995-2012.

Furthermore, Benny's research (2013) entitled "Exports and imports affect the position of foreign exchange reserves in Indonesia". This study uses multiple linear analysis methods. The results of this study conclude that the partial effect of exports has a positive and significant effect on Indonesia's foreign exchange reserves, imports have a negative and significant effect on Indonesia's foreign exchange earnings and simultaneously exports and imports have a significant effect on foreign exchange reserves.

According to Todaro (2002) foreign debt is the total of all loans officially in the form of cash and in other assets, in addition to flowing funds from developed countries to developing countries to analyze development and distribute income. Amin (2008), Foreign debt has a positive relationship with foreign exchange reserves. The higher the foreign debt or foreign loans, the more foreign exchange reserves will increase. The use of foreign debt is expected to increase state investment so that it can stimulate the country's economic growth faster. However, foreign debt will be a problem when the debt is not managed properly.

The research,Putra and Indrajaya (2013) which explained two findings, namely First, the inflation rate, foreign debt and credit interest rates simultaneously have a

significant effect on foreign exchange reserves in Indonesia, and Second, inflation has no partial effect, foreign debt has a positive and significant effect credit interest rates have a positive and significant effect.

The research, Adiyadnya (2017) entitled "Analysis of the influence of inflation, us dollar exchange rate, credit interest and foreign debt against Indonesia's Foreign Exchange Reserves in 1996-2015". This study uses multiple linear regression methods, with the results of Inflation research, the exchange rate of the US dollar, lending rates and foreign debt has a significant simultaneous effect on Indonesia's foreign exchange reserves in 1996-2015. Partially Inflation and exchange rates do not partially affect Indonesia's foreign exchange reserves from 1996 to 2015, lending rates have a negative and partially significant effect on Indonesia's foreign exchange reserves and foreign debt partially and have a positive and significant effect on Indonesia's foreign exchange reserves from 1996-2015.

Foreign investment has a role in the economy and also has a positive influence on the monetary sector, which will boost the country's foreign exchange reserves (Tambunan, 2011). The research of Trisna and Wayan (2016) with the title "The effect of foreign investment on foreign exchange reserves in Indonesia study before and after the global crisis". The method used in this study with multiple linear regression methods and using exchange rate variables, net exports and foreign investment, and also uses variable dummy is to see before and after the economic crisis. The results of this study explain together the variables of net exports, the US dollar exchange rate, and foreign investment have a significant effect on foreign exchange reserves and it is known that net exports, US dollar exchange rates, foreign investment have a positive and significant effect on foreign exchange reserves partially.

Methodology

This study uses time series data from 1995-2018. The variables used are export, rupiah exchange rate, foreign debt foreign investment and Indonesian foreign exchange reserves. Data sources were obtained from the Central Statistics Agency (BPS), Bank Indonesia (BI), and the Republic of Indonesia Capital Investment Coordinating Board. The data analysis method used in this study uses the error correction model (ECM). The model specifications used in this study are:

$$DCD_t = \gamma_0 \beta_0 + \gamma_1 DLEXP + \gamma_2 DLKURS + \gamma_3 DLULN + \gamma_4 DLPMA + \gamma_5 LEXP + \gamma_6 LKURS + \gamma_7 LULN + \gamma_8 LPMA + ECT$$

The error correction model mechanism above identifies the long-term balance between the dependent variable and the independent variable but if the ECT coefficient is not zero, then the long-term influence as desired by the model cannot be estimated. If there is an imbalance and a period will be corrected in the next period. How to find out the valid ECM model is to look at the results of the residuals from the first regression, or what is called the Error Corection Term (ECT). If the ECT results are significant, the model specifications used are valid.

Empirical Results and Discussion

Table 1.
Results of the Domowitz- El Badawi Model Estimation

Variable	Coefficient	Stand Error	t-Statistict	Probabality	Results
Short Term Estimation Results *Dependent variable:* DLCD					
DLEXP	0.6497	0.1771	3.6112	0.0041	H1.accepted
DLKURS	-0.4032	0.1037	-3.8845	0.0025	H2.accepted
DLULN	2.3219	0.6015	3.8596	0.0027	H3 accepted
DLPMA	-0.0219	0.1004	-0.2084	0.8387	H4. rejected
BLEXP	-0.3504	0.1154	-3.0356	0.0113	H5.accepted
BLKURS	0.0105	0.0779	0.1350	0.8950	H6. rejected
BLULN	0.2142	0.1335	1.6044	0.1369	H7. rejected
BLPMA	0.0950	0.1251	0.7598	0.4633	H8. rejected
ECT	-0.8931	0.1862	-4.7962	0.0006	H9.accepted
C	0.4159	1.3393	0.3105	0.7619	H10. rejected
R-Square : 0.8881; F-statistic : 9.7040 (0.0004); Adjusted R-squared : 0.7966					
Long Term Estimation Results *Dependent variable:* BLCD					
BLEXP	0.8237	0.1040	7.7113	0.0000	H1. accepted
BLKURS	0.0335	0.0914	0.3643	0.7204	H2. rejected
BLULN	0.5491	0.1720	3.1920	0.0057	H3. accepted
BLPMA	0.0555	0.0944	0.5883	0.5645	H4. rejected
C	-5.8406	1.3841	-4.2196	0.0007	H5. accepted
R-Square : 0.9686; F-statistic : 115.4121 (0.0000); Adjusted R-squared : 0.9581					

Source: Data processed

Table 1 the export relationship to foreign exchange reserves shows the estimation results of Error Correction Model (ECM) indicating that the export variables in the short and long term have a positive and significant effect on foreign exchange reserves. This positive relationship is in accordance with the initial hypothesis of the study which states that the export variable has a positive relationship to foreign exchange reserves. In the short term, the export variable has a positive and significant effect on foreign exchange reserves. In this short term, the export variable partial regression coefficient is equal to 0.6497. This means that if exports increase by 10 percent while other variables are considered permanent, foreign exchange reserves increase by 6.497 percent. This is also supported by the results of a partial test which shows the significant effect that is given by exports on foreign exchange reserves with a significant value of 5percent.

The long-term relationship also shows that the export variable has a positive and significant influence on foreign exchange reserves. In this length, the export variable partial regression coefficient is equal to 0.8237. This means that if exports increase by 10 percent while the variables are considered constant, foreign exchange reserves will

increase by 8.237 percent. This is also supported by the results of a partial test which shows the significant effect that is given by exports on foreign exchange reserves with a significant value of 5 percent. The results of this study are in line with the results of research by Sri Wahyuni, (2011). If the export level decreases, the foreign exchange reserves owned will also decline and vice versa if the export level increases, the foreign exchange reserves will also increase. For Indonesia the export of goods and services is one source of foreign exchange (Sasono and Herman Budi, 2013). Export activities will increase the country's foreign exchange reserves, which in turn can strengthen Indonesia's economic fundamentals.

The results of this study are in line with the research ofPutri's, Hana (2017) with the title "Effects of exports, foreign investment, and foreign debt on foreign exchange reserves in Indonesia". The results of this study state that exports have a positive and significant effect on foreign exchange reserves in Indonesia.This research is also in line with the research of Agustina and Reni (2014) examining the "Effects of exports, imports, rupiah exchange rates, and inflation rate on Indonesian foreign exchange reserves". The results of this study state that exports have a positive and significant effect on foreign exchange reserves in Indonesia.

The effect of the rupiah exchange rate (exchange rate) on foreign exchange reserves from the estimation results of the Error Correction Model (ECM) shows that the rupiah exchange rate variable in the short term has a negative and significant effect on foreign exchange reserves. This negative relationship is not in accordance with the initial hypothesis of the study which states that the rupiah exchange rate variable has a positive effect on foreign exchange reserves. In this short term, the foreign investment variable partial regression coefficient is equal to -0.4032. This means that if the rupiah exchange rate rises by 10percent per dollar (depreciated) while exports, foreign debt and foreign investment are considered constant, foreign exchange reserves will decrease by 4.0302percent. This is also supported by the results of a partial test which shows the significant influence given by the rupiah exchange rate on foreign exchange reserves with a significant value of 5percent.

The research of Frederic S. Mishkin (2001) explains that the higher the exchange rate of the country's own currency, shows that the stronger the economy of the country concerned, so that it can get more foreign exchange. For example: when the Indonesian rupiah exchange rate weakens (appreciates), the foreign exchange reserves will increase, the rupiah is now 14,000/ USD, there will be a IDR-USD comparison. Foreign exchange reserves in the form of dollars are automatically high compared to rupiah. If the rupiah continues to experience depreciation it will result in a reduction in foreign exchange reserves. To stabilize the value of the rupiah, the solution to Bank Indonesia's policy is to pour or issue foreign exchange reserves and go down directly to intervene in the foreign exchange market.

This research is in line with the research of Sayoga and Tan (2017) with the results of the study showing that the rupiah exchange rate significantly affected foreign exchange reserves, but the exchange rate negatively affected foreign exchange reserves during the period 2000-2015. Whereas in the long run it shows that the rupiah exchange rate variable (exchange rate) has a positive and not significant effect on foreign exchange reserves. In this length, the variable regression coefficient of the rupiah exchange rate is 0.0335. This means that if the rupiah exchange rate rises by 10percent per dollar (depreciated) while exports, foreign debt and foreign investment are considered permanent, foreign exchange reserves increase by 0.3335percent. But from

the partial test conducted, the effect of the rupiah exchange rate on foreign exchange reserves is not a significant influence, this is indicated by a significant value of 5percent.

The exchange rate has an influence or greatly influences foreign exchange reserves. The government in an effort to maintain its volatile exchange value will fluctuate due to international trade devaluation several times to maintain the performance of foreign trade. So that the rupiah exchange rate has no partial effect on Indonesia's foreign exchange reserves significantly due to fluctuations in exchange rates during the period (Nopirin, 2008).

This research is in line with research of Agustina and Reni (2014) examining the "Effects of exports, imports, rupiah exchange rates, and inflation rates on Indonesian foreign exchange reserves". The results of the study show that the Rupiah Exchange Rate variable does not affect foreign exchange reserves.

Effect of Foreign Debt on Indonesia's foreign exchange reserves. shows that the variables of foreign debt in the short and long term have a positive influence on foreign exchange reserves. This positive relationship is in accordance with the initial hypothesis of the study which states that the variable foreign debt has a positive relationship to foreign exchange reserves.

In the short term, the foreign debt variable has a positive and significant influence on foreign exchange reserves. In this short term, the foreign debt variable partial regression coefficient is 2.3219. This means that if foreign debt rises by 10percent while exports, the exchange rate of the rupiah (exchange rate), and foreign investment are considered constant, foreign exchange reserves will increase by 23.219percent. This is also supported by the results of a partial test which shows the significant effect of foreign debt on foreign reserves with a significant value of 5percent. In the long run it also shows that the foreign debt variable has a positive and significant influence on foreign exchange reserves. In this length, the foreign debt variable partial coefficient is equal to 0.5491. This means that if foreign debt rises by 10percent while exports, the exchange rate of the rupiah (exchange rate) and foreign investment are considered constant, foreign exchange reserves will increase by 5.491percent. This is also supported by the results of a partial test which shows the significant effect of foreign debt on foreign reserves with a significant value of 5percent. It can be concluded that in the short and long term the foreign debt variable has a positive and significant relationship with Indonesia's foreign exchange reserves.

The use of foreign debt is expected to increase state investment so that it can increase economic growth faster. Foreign debt expenses can be paid only by looking at the proportion of foreign exchange receipts in the current account received from exports absorbed by all debt services containing interest and bad installments (Atmadja, 2000). The relationship of foreign debt to foreign exchange reserves is the presence of foreign loans, the allocation of foreign loans, the balance of overall payments to be a surplus, this means that more foreign exchange enters more than the foreign exchange that comes out. In addition, foreign loans invested are fully productive, resulting in high returns. Furthermore this research is also in line with the researchof Putri's (2017) with the title "The effect of exports, foreign investment, and foreign debt against foreign exchange reserves in Indonesia". The results of this study state that foreign debt has a positive and significant effect on foreign exchange reserves in Indonesia.

The effect of foreign investment on Indonesian foreign exchange reserves shows that the variable foreign investment in the short term has a negative and not significant

influence on foreign exchange reserves. In this short term, the variable investment regression partial coefficient is equal to -0.0219. This means that if foreign investment rises 10percent while exports, the exchange rate of the rupiah and foreign debt is considered constant, foreign exchange reserves will decrease by 0.219percent. But from the partial test conducted, the effect of foreign investment on foreign exchange reserves is not a significant influence, this is indicated by a significant value of 5percent. This effect has an effect or impact in the medium term, long term not in the short term. Foreign investment is a form of investment, because foreign investment is a form of investment, therefore the effect or impact cannot be directly felt but requires time. In the short term, foreign investment actually reduces foreign exchange for semi-finished goods and capital goods from multinational companies. This research is in line with Putri's research (2017) and Febriyenti, et al (2013) which said that foreign investment had a negative and not significant effect on foreign exchange reserves in Indonesia.

Whereas in the long run it shows that the variable of foreign investment has a positive and not significant influence on foreign exchange reserves. In this length, the foreign investment variable partial regression coefficient is 0.0555. This means that if foreign investment rises 10percent while exports, the exchange rate of the rupiah (exchange rate), and foreign debt are considered constant, foreign exchange reserves will increase by 0.555percent. According to Golam, et. al. (2010), direct foreign investment entering has a positive impact on economic development. The impact of foreign investment can be as an increase in the gap or foreign exchange gap through the addition of foreign exchange. The foreign exchange exchanged will increase the amount of foreign exchange. The availability of foreign exchange is very helpful in exchanging with outside partners, especially in the procurement of domestic needs that support development. Increasing foreign exchange means that the amount of foreign exchange owned has increased.

If a country wants investors to enter, the country must maintain economic and political conditions to make it look attractive. Some criteria are used to attract foreign direct investment. These are: political stability, national economic stability, a favorable business environment, infrastructure development, and credibility of government policies. Unstable regional politics can attract only speculative investment opportunities for quick profits (Ivanovic, 2015),

The role of foreign investment has been able to increase the value of foreign exchange reserves. The increase in value is not only obtained from investment activities that are exchanged with domestic currencies, but in the long term investment can increase the value of the economic sector, namely goods and services.

Conclusion

Based on the estimation results it can be concluded that the test results show that simultaneously Exports, the exchange rate of the rupiah, foreign debt and foreign investment jointly affect foreign exchange reserves with R-Square of 0.9686. This means that 96.65 percent of the variation in fluctuations in foreign exchange reserves is determined by exports, exchange rates, foreign debt and foreign investment while the remaining 4percent is influenced by other variables other than this research model.The Export variable used in this study shows partially the influence in the short and long term. The Export variable has a positive and significant relationship to Indonesia's foreign exchange reserves. Partially the rupiah exchange rate variable has a negative

and significant relationship to Indonesia's foreign exchange reserves in the short term. Whereas in the long term it has a positive and insignificant relationship to Indonesia's foreign exchange reserves. Furthermore, the foreign debt variable used in this study shows partially the influence in the short and long term. The foreign debt variable has a positive and significant relationship to Indonesia's foreign exchange reserves.

From the research results, the variables of foreign investment have a negative and insignificant relationship to Indonesia's foreign exchange reserves in the short term. Whereas in the long term it has a positive and insignificant relationship to Indonesia's foreign exchange reserves. Based on the results of the Cointegration Test it has been shown that there is a long-term relationship. Whereas from ECT which is significant, it shows that the Error Correction Model approach can be said to be valid or valid and can be explained in the relationship between variables from short-term balance to long-term balance.

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