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The Autoregressive Analysis of Indonesian National Foreign Exchange Reserves 2000-2019 Period

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A B S T R A C T

This study intends to assess the shock from national foreign exchange's primary variables, such as exports, imports, and exchange rates, for the period 2000-2019. The data utilized in this study came from the Indonesian Statistics Bureau (BPS), the Bank of Indonesia (BI), and the World Bank 2021. For this analysis, we utilize an autoregressive framework to capture the shock and explain its long-term influence on a country's foreign exchange reserves. The results of the VECM study indicate that exports have a large, long- and short-term positive influence on foreign exchange reserves, whereas imports have no effect on foreign exchange reserves and the exchange rate has a considerable effect on Indonesia's foreign currency reserves. On national foreign exchange reserves, exports have a positive impact, imports a negative impact, and the exchange rate has a substantial impact.

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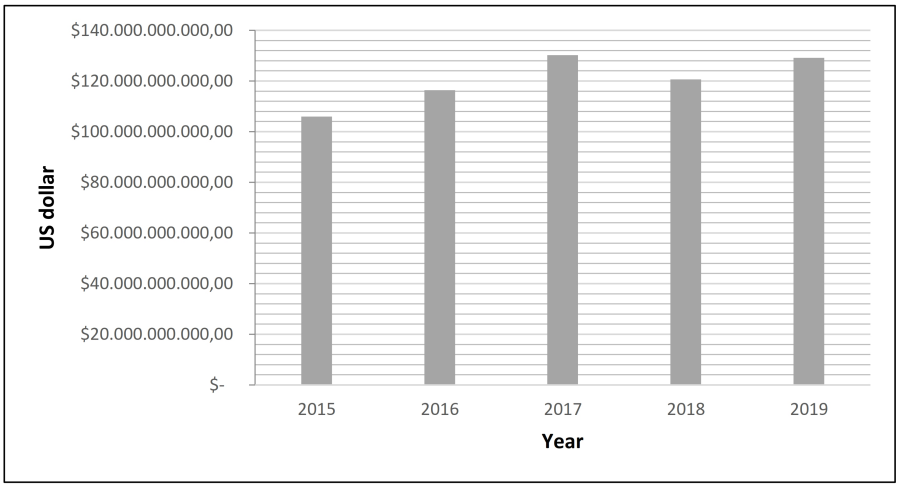
INTRODUCTION

Indonesia is currently categorized as a developing country by the World Bank; this can be seen through several macroeconomic variables, including low per capita income, a high middle class, a relatively low Human Development Index (IPM), and infrastructure capacity that is not optimal in terms of supporting development. The government is trying to carry out an even better economic improvement program toward an advanced Indonesia based on principles that create equal social justice for all its people. Thus, to realize these economic goals, strong economic fundamentals, especially macroeconomic variables, are needed.

One important variable is foreign exchange reserves. Foreign exchange reserves have an important role, among others, in maintaining exchange rate stability as an instrument to fulfill international financial obligations and convince foreign investors to invest capital in the form of investments, which can then have a multiplier effect on the economy (Stefan Ellerbeck, 2022).

A country's foreign exchange reserves can be said to be in a safe position if these reserves are able to meet import financing needs for a period of at least three months (Farhi & Maggiori, 2018). The following is data on Indonesia's foreign exchange reserves in 2015–2019:



Source: Analysis Results (2018)

Figure 1.
National Foreign Exchange Reserves 2015-2019 (billions of US$)

Figure 1. shows that the position of Indonesia's largest foreign exchange reserves was in 2017, when foreign exchange reserves were at approximately $130 billion, while the lowest was in 2015. In general, there are several macroeconomic variables that have an important role in the development of foreign exchange reserves (Andriyani et al., 2020). In his research, he stated that there are several variables that affect foreign exchange reserves, including exports, imports, and exchange rates (exchange rates). These three variables are considered to have an important role because policy transmission, especially good international trade, will directly affect the balance of payments (Roy, 2016) or the national balance of payments, thereby increasing foreign exchange reserves. An increase in foreign exchange reserves will be followed by a stable currency value (Sukirno, 2003).

Furthermore, there is research from Ahmed et al. (2023) and Benigno et al. (2022) providing an image of the importance of national foreign exchange reserves because they will be able to increase a country's economic capacity, especially in supporting monetary policy when there is a global spillover or shock in the economy. Thus, we can see that foreign exchange reserves have a very important role in the design of national economic development. So the main purpose of writing this article is to see how the influence of several important macroeconomic variables, including exports, imports, and the rupiah exchange rate, has affected the development of foreign exchange reserves in Indonesia.

In Indonesia itself, there are several studies regarding the condition of national foreign exchange reserves, including Pinem (2009), Agustina (2014), and Kuswantoro (2017), who used multiple linear regression analysis to state that exports, imports, and exchange rates have a positive influence and are significant to Indonesia's foreign exchange reserves. The use of multiple regression analysis in the three studies above can directly describe the effect of these macroeconomic variables on national foreign exchange reserves, but in practice, it can lead to omitted variable bias because if you use the Ordinary Least Square (OLS) approach, variables such as imports, exports, and exchange rates will cause endogeneity problems because there is a relationship between the regressor and the error term (Wooldridge, 2011), so that the results of this study can be concluded simply as causing bias, which can lead to misinterpretation. Therefore, a different approach is needed that is not only able to describe the relationship between variables but also provides the ability to provide predictions regarding the development of the relevant variable in the future, making it easier for policymakers to anticipate any shocks that might arise in this research period.

Uli (2016), in his article, uses the vector autoregressive (VAR) approach and finds that with the Granger causality test, there is a one-way relationship between the variable foreign exchange reserves and exports and between variables that do not have a long-term relationship. Furthermore, this study in the analysis of impulse response and variance decomposition also did not get good results between foreign exchange reserves and other variables. On the other hand, there is also research conducted by Juliensyah et al. (2020) that uses autoregressive distributed lag (ARDL) analysis to see the causal relationship between exports, exchange rates, the BI rate, and inflation in Indonesia's foreign exchange reserves. The results of the study show that there is a cointegration or long-term relationship between the variables of foreign exchange reserves, exports, exchange rates, the BI Rate, and inflation.

Based on some of the previous studies above, the contribution that we can make to broaden the literature on foreign exchange reserves is that the authors decided to use the vector autoregressive (VAR) approach to see the relationship between exports, imports, and exchange rates on foreign exchange reserves. However, in contrast to the approach taken in previous studies, we will try to analyze the shocks of each regressor variable in the research period.

METHODOLOGY

VAR is usually carried out to explain phenomena that have a tendency to time series or time series from year to year with the aim of analyzing the impact that occurs from several factors that might affect variables that may interfere with a variable that might be studied. To determine which VAR scheme to use, the data stationarity test procedure is used, where if the data is not stationary at the level but stationary

at the first difference, the VECM method will be used, while if it turns out that it is not stationary at the level, the SVAR model will be used (Rijoly, 2019). The basic VAR model (Greene, 2012) is as follows:

$$y_t = A_1.y_{t-1} + A_2.y_{t-2} + \cdots + A_p.y_{t-p} + \\ + \beta.x_t + \varepsilon_t$$

Furthermore, the variables used in this study are exports, imports, exchange rates, and foreign exchange reserves. Using the above equation, transform it into the following equation:

$$Foreign\ Reserve_t = \alpha_1 + \sum_{j=1}^{k} \beta_{1j}\ export_{t-j} + \sum_{j=1}^{k} \gamma_{1j} Import_{t-j}$$

$$\sum_{j=1}^{k} \lambda_{1j} Exchange\ Rate_{t-j} + u_{jt}$$

The estimation results of this equation will then be tested for stationarity of the data using the augmented Dickey Fuller approach, the Johansen cointegration test, and the lag length criteria, which will be explained in the next section.

In this study, the data stationarity test used was the ADF (Augmented Dickey-Fuller) Test. The Augmented Dickey-Fuller (ADF) test is a statistical hypothesis test used to determine whether a time series is stationary or not. Stationarity refers to a property of a time series where the statistical properties (such as mean and variance) of the time series do not change over time. Non-stationary time series can show seasonal trends or patterns, which can make it difficult to identify the underlying pattern or relationship (Gujarati, 2004). The ADF test is an extension of the Dickey-Fuller test, which tests for the presence of unit roots in a time series. The unit root refers to a property of the time series where the statistical property of the series changes over time, indicating nonstationaryness. The ADF test takes into account the probability of multiple unit roots in the time series and includes a lagging term to account for any autocorrelation in the series.

The test computes a test statistic, which is compared to a critical value to determine whether the null hypothesis of non-stationarity can be rejected. The null hypothesis assumes that the time series has a unit root, while the alternative hypothesis assumes that the time series is stationary. In short, the ADF test is a statistical test used to determine whether a time series is stationary or not. It is an extension of the Dickey-Fuller test, which tests for the presence of unit roots in a time series and takes into account the possibility of multiple unit roots and autocorrelation.

Cointegration test In this study, we use the Johansen cointegration test. Guirguis (2018) explains that the Johansen cointegration test is a statistical test used to determine the presence of cointegration among a set of variables. Cointegration is a phenomenon in which two or more time series are linked by a long-run equilibrium relationship, meaning that they move together over time even if they diverge from each other in the short run. The Johansen cointegration test is widely used in econometrics and finance to analyze long-run relationships between economic variables. It is often used in the context of modeling and forecasting macroeconomic variables such as GDP, inflation, and interest rates. To perform the Johansen cointegration test, one needs to estimate an autoregression vector model (VAR) and then use the estimated parameters to calculate the test statistic. Statistical tests are compared with the critical values of the distributions to determine whether there is evidence of cointegration. There are several different versions of the Johansen cointegration test, including the trace test and the maximum eigenvalue test.

Ng & Perron (2001), in their paper, explain that the lag length criterion refers

to a set of methods used to determine the appropriate number of lags to be included in the autoregressive model. The autoregressive model is a statistical model commonly used to analyze time series data, in which the value of a variable at a certain time is modeled as a function of its previous value. There are several commonly used lag length criteria. Akaike Information Criterion (AIC), AIC is a measure of the relative quality of a statistical model for a given data set. The model with the lowest AIC is generally considered the best. In the context of selecting the lag length, AIC is used to select the number of lags that minimize the AIC value.

Bayesian Information Criterion (BIC), BIC is a criterion similar to AIC but places a stronger penalty on models with more parameters. BIC is used to select the number of lags that minimize the BIC value. Hannan-Quinn Information Criterion (HQIC): HQIC is another lag length selection criterion that is similar to AIC and BIC but tends to select a slightly smaller number of lags than AIC or BIC. Schwarz Criterion (SC), SC is another lag length selection criterion that is similar to AIC and BIC but places a stronger penalty on models with more parameters than BIC. These criteria are based on different principles and assumptions and may not always correspond to the optimal amount of lag. Therefore, in this study, we used the AIC approach because we think it can provide maximum results.

Greene, (2012) explains that Impulse Response Function (IRF) and Forecast Error Variance Decomposition (FEVD) are two important tools used in econometrics and time series analysis to understand the dynamic relationship between variables and to analyze the relative importance of various factors in explaining variations in time series. Impulse response function (IRF) is a tool used in econometrics to analyze how the surprise or innovation of a variable affects the value of other variables in the system over time. The impulse response function shows how the effect of a one-time shock to a variable propagates through the system over time. It shows the impact of shocks on each variable in the system over time, and how these impacts dissipate over time. IRF can be calculated using various statistical methods, including the VAR (Vector Autoregression) model, which is commonly used in econometrics.

Forecast Error Variance Decomposition (FEVD) is a method used in econometrics to analyze the relative importance of various factors in explaining variation in a time series. It decomposes the variance of the forecast error of the time series into the proportions attributable to various surprises or innovations. FEVD is calculated using the VAR model, which estimates the contribution of each shock or innovation to the variance of the system's forecast error. The FEVD can be used to answer questions such as: How much variation in a given variable can be explained by changes in other variables in the system? Which variables are most important in explaining the variation in a given variable? By understanding the relative importance of various factors in explaining variation in time series, policy makers can make better informed decisions about economic policies, such as setting interest rates, fiscal policy, and monetary policy.

RESULTS AND DISCUSSION

The initial procedure for testing the feasibility of VAR is to test the stationarity of the data (Gujarati, 2003). The testing approach used in this study is to use a stationarity test based on the Dickey-Fuller test. The Dickey-Fuller test procedure was then applied to test the stationarity of the differing data. The next Dickey-Fuller test procedure in Table 1 is:

Table 1.
Stationary Test Results (Unit Root Test)

Variable	I(1)	P-Value	Note
Export	-3,496797	0.0206	stationary
Import	-3,742248	0.0126	stationary
Exchange Rate	-4,363345	0.0036	stationary
Foreign Reserve	-4,181356	0.0052	stationary

The results of the cointegration test of the VECM equation with stationary data at the level for all research variables.

Table 2.
Cointegration Test

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.938840	97.84969	47.85613	0.0000
At most 1 *	0.899243	53.14154	29.79707	0.0000
At most 2 *	0.539013	16.42081	15.49471	0.0362
At most 3 *	0.222690	4.030649	3.841466	0.0447

Source: Research Results, Data processed

Table 2 above shows the tests carried out by cointegration testing using the Johansen method, indicating that at a significant level of 95%, there is a cointegration relationship between variables of 2 equations. this study will continue to use the model with VECM. There are two criteria for the lag length test using the AIC method for the VECM model in this study. After obtaining the optimal lag value based on the AIC Lag criterion test, the 2nd lag is obtained, namely the smallest AIC of 163.6204. Furthermore, based on the optimal lag, the estimation results of the Vector Autoregression Error Correction Model are as follows:

Table 3.
Autoregression Estimation Results

Error Correction:	D(FOREIGN RATE,2)	D(EXPORT,2)	D(IMPORT,2)	D(EXCHAGE RATE,2)
CointEq1	-0.456855	-0.125240	0.622082	3.42E-08
	(0.19793)	(0.46039)	(0.55156)	(1.0E-08)
	[-2.30819]	[-0.27203]	[1.12786]	[3.30378]
D(FOREIGN RATE(-2),2)	1.115225	-1.871424	-3.630538	-1.83E-07
	(0.53286)	(1.23945)	(1.48491)	(2.8E-08)
	[2.09290]	[-1.50988]	[-2.44496]	[-6.59042]
D(EXPORT(-2),2)	-1.100951	-0.215890	0.215907	9.66E-08
	(0.27972)	(0.65063)	(0.77948)	(1.5E-08)
	[-3.93596]	[-0.33182]	[0.27699]	[6.61079]
D(IMPORT(-2),2)	0.728836	0.212261	0.408150	-4.80E-08
	(0.24161)	(0.56199)	(0.67329)	(1.3E-08)
	[3.01657]	[0.37769]	[0.60620]	[-3.80206]
D(EXCHAGE RATE(-2),2)	7897067.	-15849050	-29718257	-1.275919
	(3919026)	(9115797)	(1.1E+07)	(0.20470)
	[2.01506]	[-1.73864]	[-2.72119]	[-6.23301]
C	6.31E+08	-78473541	-2.29E+08	-7.619164
	(3.0E+09)	(6.9E+09)	(8.3E+09)	(155.461)
	[0.21201]	[-0.01134]	[-0.02757]	[-0.04901]
R-squared	0.647362	0.476566	0.449255	0.886720
Adj. R-squared	0.471043	0.214849	0.173883	0.830079

Source: Research Results, Data processed

The output of the VECM model is voluminous and is often graphically illustrated. Therefore the table above only summarizes the estimation results from the VECM. According to the table above, the R2 value (the coefficient of determination is an indicator used to describe how much variation is explained in the model) The DEVISA variable explains the dependent variable in the VECM model by 64.73% and 35.27% is explained by other variables outside the model, the KURS variable explains the dependent variable in the VECM model of .88.67% and 11.33% is explained by other variables outside the model. The EXPORT variable explains the dependent variable in the VECM model at 47.65% while 52.35% is explained by other variables outside the model. While the IMPORT variable is able to explain the dependent variable in the VECM model of 44.92% and the other 55.08% is explained by other variables outside the model.

Research (Jalunggono et al., 2020) looks at the relationship between macroeconomic variables such as exports, imports, and exchange rates and foreign exchange reserves. it is necessary to use the Granger Causality test to see the magnitude of the effect that occurs both in the short and long term. In the output produced by the authors above, based on the t-stat value, many variables in the model are not significant when compared to the t-table with a 95% confidence level. In the VECM model, there are stochastic trends and cointegration which cause data to not move freely and data imbalances occur at different time periods. However, all variables in the study have positive Adj R2 values. This indicates that there is no misspecification in the research model (Ristuningsih, 2016).

Impulse response function analysis is one of the important analyzes in the VECM model. Impulse Response analysis tracks the response of endogenous variables in the VECM system due to shocks or changes in disturbance variables so that it can be used to see the dynamic behavior of the VECM model by observing the shocks given to the variables tested as a whole.

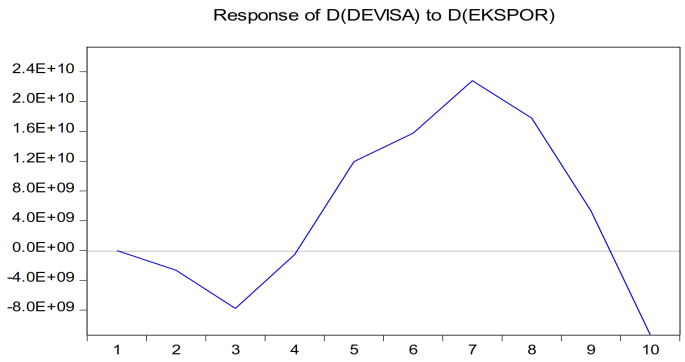


Figure 2.
Foreign Exchange Impulse Response to Export Shocks

Based on Figure 2 above, we can see that if there is a shock of 1 standard deviation in the Export growth variable it will cause fluctuations in the Foreign Exchange Reserves variable. The shock to the Export variable was responded to by a decrease in the Foreign Exchange Reserves variable from lag 1 to lag 3, then it increased to lag 7 but in the end, it dropped again to lag 10. Next is the impulse response of foreign exchange reserves to import shocks:

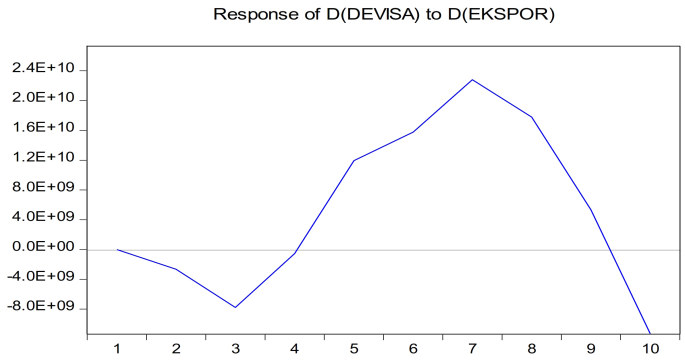


Figure 3.
Impulse Response of Foreign Exchange Reserves Import Shocks

Based on Figure 3 above, it can be seen that when there is a shock of 1 standard deviation to imports, it will cause foreign exchange reserves to fluctuate where in the 1st period the foreign exchange reserves show a fixed value, but the response of foreign exchange reserves in the 2nd to lag period 5th has an increasing trend and then on the 6th to 8th lag it experiences a quite drastic decline, then the 9th lag crawls up to the 10th lag. The shock here means that the value of imports has increased, if imports are too large it will result in reduced foreign exchange reserves and allow for a deficit in the existing trade balance.

Based on Figure 4, it can be seen that when there is a shock of 1 standard deviation to the exchange rate, it will cause foreign exchange reserves to fluctuate where in the 1st period the foreign exchange reserves show a decreasing value until the 2nd lag, but the response of foreign exchange reserves in the 2nd lag period -3 to 4th lag has an increasing trend, continued in the 5th lag period to the 6th lag period it has increased and in the 7th to 10th lag period it has experienced a significant decrease. The shock here means that the rupiah exchange rate has depreciated. If the value of the rupiah currency depreciates, the price of Indonesian domestic products will become relatively cheaper, so this will encourage exports.

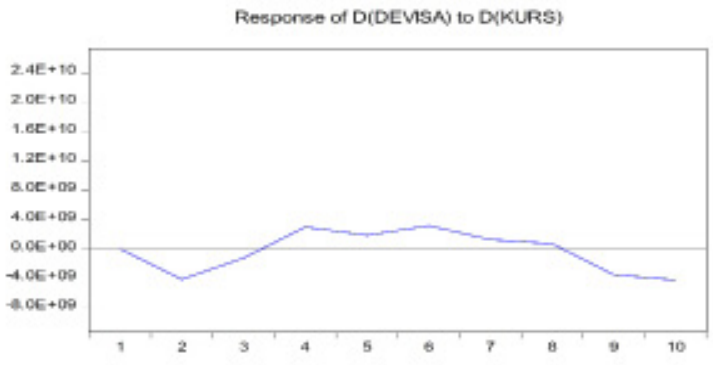


Figure 4.
Impulse Response of Foreign Exchange Reserves to Exchange Rate Shocks

After the impulse response test, the VAR model also provides the ability to estimate the Forecast Error Decomposition of Variance, or what is often called the Variance Decomposition. Basically, impulse response function analysis and variance decomposition are often used as good analytical tools in explaining the relationship between economic variables. If the correlation between economic variables has a small value, it means it is too important (Hadi et al., 2020). The difference between the FEVD analysis and the Variance Decomposition analysis illustrates how important each variable is in the VAR estimation due to shocks or shocks (Rijoly, 2019). The following is a table showing the results of the Variance Decomposition analysis.

Table 4.
Variance Decomposition

Variance Decomposition of D(FOREIGN RESERVE):					
Period	S.E.	D(FOREIGN RESERVE)	D(EXPORT)	D(IMPORT)	D(EXCHANGE RATE)
1	1.18E+10	100.0000	0.000000	0.000000	0.000000
2	1.69E+10	91.43867	2.455521	0.022349	6.083463
3	2.69E+10	83.16335	9.262505	4.977154	2.596989
4	3.94E+10	86.97152	4.361246	6.874816	1.792418
5	4.98E+10	82.82778	8.484875	7.428047	1.259300
6	5.55E+10	76.49062	14.94243	7.223516	1.343431
7	6.04E+10	65.83308	26.87464	6.115275	1.177001
8	6.31E+10	60.34091	32.54913	6.019315	1.090644
9	6.43E+10	59.48892	32.07872	7.080326	1.352038
10	6.57E+10	57.14452	33.66229	7.485115	1.708073

Based on the variance decomposition of foreign exchange, it can be seen that in the first period, apart from being influenced by the foreign exchange reserves variable itself, the size of the foreign exchange reserves was also influenced by the export, import, and exchange rate variables. The contribution of the effect of the export variable to the foreign exchange reserve variable changes by a fraction of a percent in each period, starting from increasing to decreasing and the ability of the export variable to explain the foreign exchange reserve variable from the initial period to the third period is 9%, then it decreases by 4% in the third period. 4 until slowly starting to increase to 33% until the end of the period significantly. the ability to export explains the variable foreign exchange reserves are getting bigger, but in the first period, it cannot be explained by the ratio of the exports themselves (Li & Law, 2020).

Same with the export variable, the imported variable also in the first period cannot explain the movement of foreign exchange reserves. The contribution of the import variable to the foreign exchange reserve variable changes by a fraction of a percent in each period from increasing to decreasing and the ability of the import variable to explain the foreign exchange reserve variable from the first period from the beginning to the 6th period it increased to 7% and fell back to 6% in the 7th and 8th periods until at the end of the period it will again touch 7%. This is due to the main characteristics possessed by imports depending on domestic needs.

Based on the results of the variance decomposition, it can be seen that the exchange rate variable (exchange rate) is able to explain the fluctuating movement of the foreign exchange reserve variable,

having experienced an increase in the 2nd period which reached 6%, the exchange rate variable then began to decrease in the 3rd period to 2% until the next period until the end of the 4-10 period, it fluctuated but remained stable within a ratio of 1% in explaining the variable movement of foreign exchange reserves.

As for this phenomenon, it can be seen that the export variable is considered more capable of driving the growth of foreign exchange reserves because the export variable has a longer lag. So that in a shorter period, the growth performance of national foreign exchange reserves is driven by minimal import activity and stability of the exchange rate (exchange rate), which is used as a control. This is because considering the export mechanism that affects foreign exchange reserves is in accordance with existing economic laws. if there are more exports then what happens to foreign exchange reserves will experience a process of increasing foreign exchange reserves (surplus) and if there are more imports then what will happen is a deficit or a decrease in foreign exchange figures in the trade balance.

The research results of this study show that in general, these three variables have a significant influence on foreign exchange reserves. IRF analysis shows that the export variable in the initial period experienced negative conditions and then only showed positive results in the next lag. This is actually understandable because when export activities occur, foreign exchange reserves will not immediately increase but will wait until the exported goods arrive at their destination and receive direct income so that in the end this will directly increase foreign exchange reserves. The results of this impulse-response analysis are consistent with the research (Batubara & Saskara, 2015) where exports have a more positive long-term influence on national foreign exchange reserves.

In the impulse-response results obtained by the author, it is known that exports have a positive influence in the 3rd lag period and start to peak in the 7th lag. However, the increase in foreign exchange reserves did not last continuously, the impact of the increase in variable foreign exchange reserves began to disappear from the 8th to the 10th lag periods. The thing that causes this loss of influence is caused by several perceptions that the foreign exchange reserve variable does not only depend on exports but is also influenced by other components, namely foreign loans/loans, gifts, foreign aid or donations, receipt of dividends or services, and interest from abroad. , the results of exports of goods and services, foreign exchange remittances from abroad, tourists shopping domestically, and levying import duties (Jeanne, 2016). Moreover, in the context of national foreign exchange reserves driven by results, if more export values greatly affect a large number of foreign exchange reserves, then this will have an impact on the condition of a surplus or deficit in foreign exchange reserves obtained by the state. This result is also in line with research (Firdaus et al., 2019) which states that the large number of export activities has an influence on the amount of foreign exchange reserves owned by the country where the effect is in the long term caused by adjustments by macroeconomic variables others that directly affect foreign exchange reserves.

The import variable itself can be explained as follows. A balance deficit can cause currency depreciation which will weaken further, inflation, interest rates will rise, and the prices of various export products will be more competitive so that export volume will increase and allow for a decrease in employment opportunities. It is cause and effect that the amount of imports has affected the amount of national foreign exchange reserves in recent years. This is in line with the results of research (Iftime

Nielsen et al., 2010) that macroeconomic variables such as imports have a negative effect on the number of foreign exchange reserves because the depreciation in imports will have an impact on the decline in the existing trade balance. If imports are suppressed, it will create a tendency towards foreign goods and increase foreign exchange reserves in addition to export activities which are always prioritized so that in the future foreign exchange reserves will continue to grow or increase. Other research also explains (Agusalim & Pohan, 2017) saying that imports are usually done to cover deficiencies that are in the country and some benefits rather than imports or purchases of goods and services from abroad as too much is done but have a positive impact such as increasing welfare consumers because their needs are fulfilled, the domestic industry has also increased, the transfer of technology, for example, Indonesia imports electronic goods such as TVs, refrigerators, laptops, and mobile phones so that they can keep up with the development of the globalization era.

While the impact of imports also has a number of disadvantages that will actually create losses such as the emergence of competition for domestic industries which actually makes those unable to compete may not survive (go out of business), there appears to be an increase in spending figures used by the state, as well as the occurrence of social symptoms of a high increase in unemployment and the emergence of many layoffs or termination of employment (Oktaviani (University of Indonesia) & Djamaluddin (University of Indonesia), 2020).

The exchange rate itself can be explained as follows, Indonesia's negative trade conditions put pressure on exports while imports continued to increase causing the rupiah to continue to depreciate. This is indicated to be the cause of the depreciation of the rupiah, then the issue of competitiveness and the phenomenon of the impact of the global crisis in Europe has reduced the absorption of Indonesian exports so that the depreciation of the rupiah has affected foreign exchange reserves in recent years (Flood et al., 1998).

This is in line with research results (Silaban & Rejeki, 2020) where macroeconomic variables such as exchange rates have an influence on foreign exchange reserves. because if the exchange rate increases then it becomes an indicator of strengthening foreign exchange reserves. If the price of domestic goods falls relatively, it will make domestic goods competitive compared to imported products so that if exports increase, it will automatically be proportional to the increase in the amount of existing foreign exchange reserves (Maggiori et al., 2019). This will be very useful as a basis for financing domestic development.

And finally, we can generally conclude that these three macroeconomic variables did have an important influence on Indonesia's foreign exchange reserves in the 2000-2019 period. This increase in foreign exchange reserves has important implications for the national economy because it can have a multiplier effect, especially on the sustainability of economic growth (Crespo Cuaresma et al., 2019).

CONCLUSION

In this study, exports have a significant positive effect in the long and short term on the National Foreign Exchange Reserves. Because if the value of imports increases, foreign exchange reserves also increase. Imports have a significant negative effect in the long and short term on the National Foreign Exchange Reserves. Because if imports are carried out it will result in a reduction of the amount of foreign exchange reserves. The exchange rate (exchange rate) has a significant effect on Indonesia's foreign

exchange reserves. Because if the exchange rate (Rupiah Exchange Rate) strengthens against the US$, the foreign exchange reserves will also increase at the same time. Exports have a positive effect, while imports have a negative effect while the Exchange Rate (Exchange Rate) has a significant effect on the National Foreign Exchange Reserves.

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