THE EFFECT OF COFFEE AND RUBBER IMPORTS EXPORTS ON FOREIGN EXCHANGE RESERVES IN INDONESIA

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Abstract

This study aims to determine the effect of exports and imports of coffee and rubber on short run and long run of foreign exchange reserves in Indonesia. The study uses a time series data in the year 1990-2021 obtained from the world bank and Food and Agriculture Organization (FAO). This study employs the Autoregressive Distributed Lag (ARDL) model. The results showed that in the short run coffee exports have a positive and significant effect on Indonesia's foreign exchange reserves, whereas in the long run coffee exports have no effect on Indonesia's foreign exchange reserves. The coffee import has a negative and significant effect on Indonesia's foreign exchange reserves in the short run but in the long run it has a positive and significant effect on Indonesia's foreign exchange reserves. The rubber exports in the short run, it has a positive and significant effect on Indonesia's foreign exchange reserves, while in the long run rubber exports have no effect. While rubber imports in the long run and short run have a positive and significant effect on foreign exchange reserves in Indonesia.

Keywords : *Export, Import, Coffee, Rubber, Austoregressive Distributed Lag*

1. INTRODUCTION

Foreign exchange reserves have an important role and are an indicator to show the strength and weakness of a country's economic fundamentals. Apart from that, foreign exchange reserves can also overcome the economic and financial crisis of a country within a period of time in balance with the capacity of the amount of foreign exchange reserves held (Ramadhan et al, 2015). Several factors that can influence foreign exchange reserves include exports, imports, exchange rate, inflation rate and others. These exports are one of the main sources of foreign exchange reserve. When a country carries out export activities, the country will receive a certain amount of money in the form of foreign currency or also known as foreign exchange (Agustina & Reny in Guampe et al, 2023). Foreign exchange reserves obtained through export activities can then be reused to meet domestic needs through import transactions. Research on foreign exchange reserves in Indonesia has been examined by Pangesti (2023) showing that the exchange rate variable has a large influence on foreign exchange reserves, while the export and import variables have a small influence on foreign exchange reserves. Isramaulina and Ismaulina (2021) also examines the influence of exports, imports, exchange rates and the Consumer Price Index (CPI) on Indonesia's Foreign Exchange Reserves (FER) for the 2014-2018 period. This research uses quantitative descriptive research methods with multiple linear regression models.

The development of foreign exchange reserve research is directed at oil and gas exports and imports in Indonesia. Study Yanuar and Akbar (2022) studies the Effect of Oil and Gas Exports and Imports on Indonesia's Foreign Exchange Reserves. The analytical method used in this research is multiple linear regression analysis. Researchers attention to foreign exchange reserves develop within the scope of the export-import agricultural commodities is already published. Andriyani (2020) obtaines the results that cocoa and rubber exports did not have a significant and negative effect on foreign exchange reserves in Indonesia, while rubber cocoa imports had a significant and positive effect on foreign exchange reserves in Indonesia. This study want's to research further with different commodities and a longer period of time in foreign exchange reserve. We can analyze how exports and imports such as coffee and rubber contribute to the

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acquisition of foreign exchange reserves in Indonesia. Below is presented data on foreign exchange reserves, exports and imports of coffee and rubber.

Table 1.1 Foreign, exchange reserves Export Import Coffee and Rubber
in Indonesia 2012-2021

Year	Foreign Exchange Reserves (US$)	Exports (US$)		Import (US$)	
		Coffee	Rubber	Coffee	Rubber
2012	112.797.627.833	1,244,147	15,996	113,009	38,966
2013	99.386.826.239	1,166,244	9,343	34,278	32,927
2014	111.862.594.562	1,030,807	8,496	41,287	31,141
2015	105.928.847.089	1,189,725	8,237	27,440	30,522
2016	116.369.601.851	1,001,068	8,196	44,173	25,669
2017	130.215.330.383	1,175,755	9,727	26,801	30,861
2018	120.660.974.091	809.140	7,376	147.151	26,828
2019	129.186.464.020	872,727	6,474	55,733	23,352
2020	135.915.917.616	809.679	6,559	31,483	30,137
2021	144,907,809,744	843,248	4,479	25,341	39,056

Source: FAO & World Bank, 2023

Based on Table 1.1 above, it can be seen that the development of exports, imports of coffee and rubber and foreign exchange reserves from 2012-2021. Where exports, imports and foreign exchange reserves fluctuate every year. Table 1.1 above shows that coffee exports are more dominant at US$9,595,844 compared to coffee imports, while rubber imports are more dominant at US$224,576 compared to rubber exports, this will certainly affect foreign exchange reserves. The highest coffee exports occurres in 2016 to 2017, there is an increase of US$ 174,687 from a value of US$ 1,001,068 in 2016 to US$ 1,175,755 in 2017. Foreign exchange reserves also increases US$ 13,845,728,532 of the value US$ 116,369,601,851 in 2016 became US$ 130,215,330,383 in 2017. This condition is certainly in accordance with David Hume's within classical theory. The highest rubber exports occurres from 2016 to 2017 amounting to US$ 1,535 from US$ 8,196 in 2016 to US$ 9,727 in 2017 but foreign exchange reserves also increases by US$ 13,845,728,532 from US$ 116,369,601,851 in 2016. to US$ 130,215,330,383 in 2017.

Apart from exports, the indicator that influences a country's foreign exchange reserves is imports. From table 1.1 above, it can be seen that the highest coffee imports are from 2017 to 2018, namely US$ 120,350 from US$ 26,801 in 2017 to US$ 147,151 in 2018 but foreign exchange reserves decreases by US$ -9,554,356,292 from the value US$ 130,215,330,383 in 2017 to US$ 120,660,974,091 in 2018. Rubber imports also experience the same thing as coffee imports, where the highest increase in rubber imports occurre from 2020 to 2021, namely US$ 8,919 from US$ 30,137 in 2020 to US$ 39,056 in 2021 but foreign exchange reserves increase by US$ 8,991,892,128 from a value of US$ 135,915,917,616 in 2020 to US$ 144,907,809,744 in 2021. Based on this description, this research aims to see how much influence exports and imports of both coffee and rubber have on foreign exchange reserves in Indonesia.

LITERATURE REVIEW
Foreign exchange reserves

Foreign exchange reserves are foreign currency reserved by the Central Bank (Bank Indonesia) for financing and foreign obligations, including financing imports or other payments to foreign parties (Ulfa and Andriyani, 2019). As a country that actively engages in international trade, Indonesia certainly must have foreign exchange reserves. Indonesia's foreign exchange reserves are obtained from various sources. According to Safitri, (2014) it is explained that the source of Indonesia's foreign exchange reserves is obtained through two sources, namely domestic

and abroad. The foreign exchange reserves that Indonesia collects domestically come from profits from sales of exported products and services, including plywood, rubber, coffee, oil, tin, textiles, shrimp, seafood and other rattan goods. Meanwhile, mining revenues, employment, banking commissions and services rendered, insurance premiums, and hotel and tourism industry proceeds are all considered export services. Even income from foreign investments, such as money transferred abroad by Indonesian citizens and government-owned enterprises. and Income from overseas travel activities, including mining, travel, lodging, and tour guide fees. The foreign exchange reserves obtained by Indonesia come from foreign sources, namely gifts and assistance from foreign governments, international organizations and the United Nations such as UNESCO and UNDP. Apart from that, loans from foreign banks, international organizations and foreign private companies, such as IGGI.

Export

Exports are efforts to sell commodities that we own to other countries with government regulations that expect payment in foreign currency (Pridayanti, 2014). The proceeds from the sale of exported goods in the form of foreign currency are called foreign exchange. The relationship between exports and foreign exchange reserves is that when carrying out export activities you will obtain a certain amount of money in foreign currency which is also called foreign exchange, which is one of the country's income. (Sonia and Setiawina, 2016). According to Mankiw (2010), there are two categories of export activities, namely direct exports and indirect exports. As for direct exports, for example, selling products or services to clients directly, without using exporters, export destination countries, or intermediaries, is known as direct exports. The company's distributors and sales representatives handle sales. And indirect exports are the process of selling goods indirectly first through the exporter's country of origin or an intermediary, then the intermediary sells the goods through the exporting company and the export management company (export trading company).

Import

Import is the activity of importing foreign goods in accordance with government regulations into public circulation which is paid for using foreign currency. Import tariffs (import tariffs), namely taxes imposed on every commodity imported from another country (Amir 1999 in Marisa 2012). Individuals carry out import activities when they purchase goods from abroad. Imports are influenced by various factors, such as inadequate labor and technology to manage the natural resources we have in order to maximize the effectiveness and efficiency of household production activities, as well as products and services being imported partly due to inability or lack of domestic production, and the country not producing the goods in sufficient quantities. Basically, importing activities arise because a country has the awareness that no country can meet the living needs of its population. For this reason, bringing in goods or services from other countries is very necessary because each country certainly has differences in natural resource wealth.

Conceptual framework

In this research there are 4 independent variables, namely coffee exports (X1), coffee imports (X2), rubber exports (X3), rubber imports (X4) and one dependent variable, namely foreign exchange reserves (Y). To facilitate research, a conceptual framework for this research was created and can be seen in the following picture:

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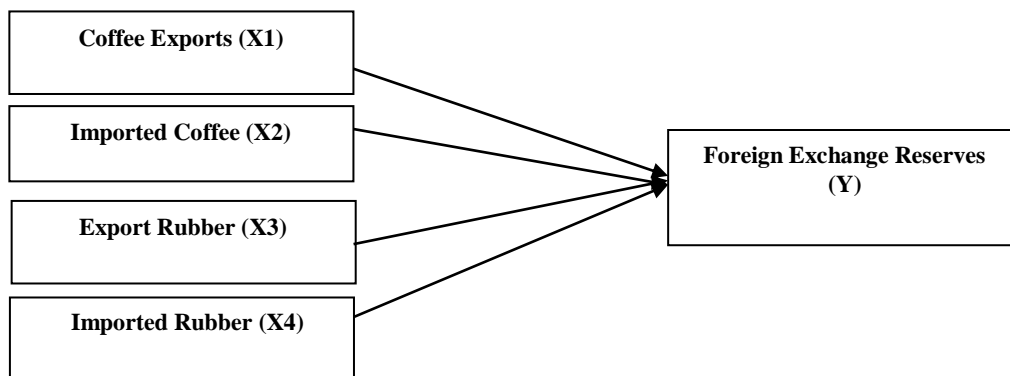*Hijri Juliansyah, Muhammad Ikram, Ratna, Umaruddin Usman, Ahmad Zubair*

Figure 2.1 Framework for thinking

The following are possible hypothesis formulations based on the problem formulation and objectives of this research:

H1 : Suspected of export Coffee influences Indonesia's foreign exchange reserves in the short and long run.

H2 : Allegedly imported Coffee influences Indonesia's foreign exchange reserves in the short and long run.

H3 : Suspected of export Rubber influences Indonesia's foreign exchange reserves in the short and long run.

H4 : Allegedly imported Rubber influences Indonesia's foreign exchange reserves in the short and long run.

2. RESEARCH METHOD

Data and Data Sources

In this research, the data used is secondary data in form of time series data from 1990-2021. The data obtains from the Food and Agriculture Organization (FAO) and World Bank data bases. This data includes data on imports and exports of coffee and rubber as well as foreign exchange reserves.

Operational Definition of Variables

The operational definition is an explanation of the variables in the research model to be carried out. The variables in this research consist of independent variables and dependent variables as follows:

Foreign Exchange Reserves (Y)

Foreign exchange reserves here are the amount of assets in the form of foreign currency held by the BANK INDONESIA. Which consist of foreign currency, securities, deposits in foreign banks, and other financial instruments that can be liquidated easily. To measure the unit of foreign exchange reserves unit in this research uses the United States Dollar (USD).

Coffee Exports (X1)

Exports variable here focus on all of the coffee commodity in Indonesia that sell abroad. The unit in this research is the United States Dollar (USD) uses to measure the unit of coffe exports.

Imported Coffee (X2)

Imports as variable X2 in the study focus on buying coffee from other countries in Indonesia, where the unit in this research is the United States Dollar (USD).

Rubber Export (X3)

Rubber exports as variable X3 here focus on rubber commodities that sell abroad from Indonesia. The United States Dollar (USD) in used in measuring the unit of X2.

Imported Rubber (X4)

Imports in variable X4 focus on rubber commodities which is bought by Indonesia, where the measuring unit is the United States Dollar (USD).

Data analysis method

This research uses the Autoregressive Distributed Lag (ARDL) method. This method can estimate a linear regression model that can differentiate the long run and short run responses of the dependent variable from one unit change in the value of the independent variable. And can analyze long run relationships involving cointegration tests between time series variables (Yahya, 2015).

Stationarity Test

In this research, the unit root test will be used by employing the Philips-Perron (PP) method. Testing of the Philips-Perron (PP) method is a development of the Dickey Fuller (DF) by allowing for the assumption of an error distribution. In the DF test, the assumption of homogeneous and independent errors is used. Meanwhile, PP can accommodate errors that are dependent and heterogeneously distributed (Mufidah, 2011). If the absolute value of the t-statistic is smaller than the critical value in the Mackinnon table at various levels of confidence (1%, 5%, and 10%) then it indicates that the data has a unit root or is not stationary and vice versa. Apart from that, it can also be seen that the t-statistic probability which is greater than 0.05 also indicates that the data has roots or is not stationary and vice versa.

Determination of Optimum Lag

Determination of lag in the ARDL model is in accordance with the information criteria recommended by Likelihood Ratio (LR), Akaike Information Criterion (AIC), Schwarz Information Criterion (SIC), Hannan-Quinn (HQ) and Final Prediction Error (FPE). The criterion that has the smallest LR, AIC, SIC, HQ or FPE is the lag that will be used. This lag test is used so that there are no autocorrelation problems in the system (Yahya, 2015).

Granger Causality Test

The causality test is carried out to find out whether the variables have a reciprocal relationship or not. And see the influence of the past on current conditions. This Granger causality test initially assumes that accurate information for predicting the independent and dependent variables only exists in the two time series data for these two variables. The Granger Causality Test is a method of knowing where a dependent variable can be influenced by other variables (independent variables) and on the other hand, the independent variable can occupy the position of the dependent variable. This kind of relationship is called causality or two-way (Basuki, T. B, 2017).

Cointegration Test

According to Tanjung & Devi (2013), the cointegration test is used to determine the existence of a long run relationship between non-stationary variables, where although individually they are not stationary, the linear combination of two or more variables is stationary. Cointegration testing is carried out using a bound test. The requirement for decision making in the cointegration test using the bounds test is to compare the F-statistic value with the critical value of the lower bound and upper bounds. If the F-statistic value is higher than the critical value of the upper bound then Ha is accepted (Ha = There is cointegration between variables), and if the F-statistic value is smaller than the critical value then Ho is accepted as Ho (Ho = There is no cointegration between variables).

ARDL Method Test

The Autoregressive Distributed Lag (ARDL) model represents the interaction between variables X and Y over time, including the impact of the past value of variable Y on the current value of Y (Fadhilah Nu, 2017). An Autoregressive Distributed Lag (ARDL) model is used in this investigation. The following is a general model of ARDL:

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$$\Delta Y_t = \beta_{\circ} + \sum_{i=1}^{n} \beta_1 \Delta y_{t-1} + \sum_{i=0}^{n} \delta_1 \Delta x_{t-1} + \varphi_1 y_{t-1} + \varphi_2 x_{t-1} + \mu_t$$

Where:

β_t, = Short run coefficientδ_t

β_t, = long run ARDL coefficientδ_t

μ_t= Disturbance error (white noise)

As has been shown, ARDL has the advantage of being able to identify long run and short run dynamics. The short run relationship equation in the general ARDL model is found in equation (1) (Zeretta 2019).

$$\sum_{i=1}^{n} \beta_1 \Delta y_{t-i} + \sum_{i=0}^{n} \delta_1 \Delta x_{t-i}$$

The long-term relationship is shown by

$$\varphi_1 y_{t-1} + \varphi_2 x_{t-1} + \mu_t$$

Autoregressive Distributed Lag (ARDL) methodology is the estimation technique used. The ARDL model is chosen because it is sometimes possible to observe the effects of Y and X as well as the impact of the previous Y variable on the current Y.

ARDL Model Stability Test

The ARDL model stability test in this study used the CUSUM test with a confidence level of 95%. CUSUM test results for the ARDL model in this study. The stability of the model is determined from the position of the blue CUSUM line between the two red 5% significance lines. For the ARDL model the CUSUM line is between the significance lines which proves that the ARDL model is stable

3. RESULTS AND DISCUSSION
Stationarity Test Results

The stationary test is the first step before estimating the time series model. Time series data directly analyzed without running stationarity test will cause to spurious results because these variables still contain unit roots. Therefore, a unit root test is needed to see the stationarity of time series data. The unit root test is carried out using the Philips-Perront (PP) Test. Whether it is stationary or not will be seen from the probability value (Critical Value) which is compared at the alpha level (1%, 5%, or 10%). We can see the Unit Root Test Results based on the Philips-Perront (PP) method in the following table:

Table 4.1 Unit Root Test Using Philips-Perront (PP)

Variable	Root Unit	Philips-Perront (PP)Test Statistics	Critical Value5%	Prob	Information
LNCADEV	Levels	-1.601762	-2.960411	0.4698	Not Stationary
	First difference	-5.950348	-2.963972	0.0000	Stationary
LNEX_COFFEE	Levels	-1.544391	-2.960411	0.4983	Not Stationary
	First difference	-5.001984	-2.963972	0.0003	Stationary
LNIM_COFFEE	Levels	-2.828974	-2.960411	0.0658	Not Stationary
	First	-10.39367	-2.963972	0.0000	Stationary

	difference				
LNEX_RUBBER	*Levels*	-1.399909	-2.960411	0.5695	Not Stationary
	First difference	-7.150557	-2.963972	0.0000	Stationary
LNIM_RUBBER	*Levels*	-1.782075	-2.960411	0.3820	Not Stationary
	First difference	-7.380961	-2.963972	0.0000	Stationary

Source: Research Results (processed data, 2023)

Based on Table 4.1 above, it can be concluded that at the level it has the probability of foreign exchange reserves is 0.4698, the probability of coffee exports is 0.4983, the probability of coffee imports is 0.0658, the probability of rubber exports is 0.5695 and the probability of rubber imports is 0.3820, all variables are not stationary at the level due to probability above 0.05, but all are stationary in the first difference seen from all variable probabilities below 0.05. So it can be concluded that the data in this study uses a stationary first difference level for further data processing.

Optimum Lag Determination Test Results
The information requirements suggested by the minimum values of the Akaike Information Criterion (AIC), Schwarz Criterion (SC), and Hannan-Quinn Criterion are used to calculate the number of lags (time duration) in the ARDL (HQC) model. The ideal lag test looks like this:

Table 4.2 Optimum Lag Test

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-119.5541	NA	0.002779	8.303604	8.537136	8.378313
1	-25.79541	150.0138*	2.92e-05*	3.719694*	5.120891*	4.167949*
2	-1.833601	30.35162	3.64e-05	3.788907	6.357769	4.610708

Source: 2023 Data Processing Results

Based on Table 4.2, the five goodness criteria show the smallest value at the 1st lag. The lag value suggested by each goodness criterion is the smallest value, marked with a star (*) after the criterion value for each lag. Where the criterion value with the Akaike Info Criterion (AIC) model is 1.215, Schwarz Criterion (SC) is 0.597, and Hannan-Quinn Criter (HQC) is 1.026.

Granger Causality Test
Test Granger Causality intended to find out whether there is a reciprocal relationship between variables or not. In this research, the causal relationship is seen between the independent variable and the dependent variable and vice versa. Analyzing the Granger causality of observed variables is by using the Granger causality test. In general, a Granger equation can be interpreted as research or a reference to see the interrelationship of the results being processed. The following are the results of the Granger Causality Test in table 4.3, as follows:

Table 4.3 Granger Causality Test
Pairwise Granger Causality Tests
Date: 08/14/23 Time: 16:18
Sample: 1990 2021
Lags: 1

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Null Hypothesis:	Obs	F-Statistics	Prob.
LNEX_C does not Granger Cause LNCDV	31	1.01840	0.3215
LNCDV does not Granger Cause LNEX_C		1.54198	0.2246
LNEX_R does not Granger Cause LNCDV	31	0.33312	0.5684
LNCDV does not Granger Cause LNEX_R		3.46978	0.0730
LNIM_C does not Granger Cause LNCDV	31	0.12543	0.7259
LNCDV does not Granger Cause LNIM_C		22.5737	5.E-05
LNIM_R does not Granger Cause LNCDV	31	0.63700	0.4315
LNCDV does not Granger Cause LNIM_R		8.28532	0.0076
LNEX_R does not Granger Cause LNEX_C	31	0.08518	0.7725
LNEX_C does not Granger Cause LNEX_R		0.69866	0.4103
LNIM_C does not Granger Cause LNEX_C	31	1.83460	0.1864
LNEX_C does not Granger Cause LNIM_C		6.78820	0.0145
LNIM_R does not Granger Cause LNEX_C	31	0.00234	0.9618
LNEX_C does not Granger Cause LNIM_R		7.48794	0.0107
LNIM_C does not Granger Cause LNEX_R	31	4.85410	0.0360
LNEX_R does not Granger Cause LNIM_C		0.19574	0.6616
LNIM_R does not Granger Cause LNEX_R	31	6.01706	0.0207
LNEX_R does not Granger Cause LNIM_R		0.17755	0.6767
LNIM_R does not Granger Cause LNIM_C	31	16.2403	0.0004
LNIM_C does not Granger Cause LNIM_R		1.71399	0.2011

Source: 2023 Data Processing Results

Based on Table 4.3, the results of the Granger causality test can be seen that there is no reciprocal relationship between all variables because the independent variables and dependent variables do not influence each other, but there is a one-way relationship between several variables, namely the variable foreign exchange reserves for coffee imports worth 5.E-05, reserves. foreign exchange to rubber imports worth 0.0076, coffee exports to coffee imports worth 0.0145, coffee exports to rubber imports worth 0.0107, coffee imports to rubber exports worth 0.0360, rubber imports to rubber exports worth 0.0207, and rubber imports to coffee imports worth 0.0004.

Bound Test Results

Error correction models are necessary when conducting cointegration tests to determine whether short run or long run relationships or possible imbalances exist. By using the limit test, the cointegrity test decision making process compares the F-value statistics with the lower bound (I0) and upper bound (I1) critical values. If the F-statistic value is between the upper bound and the lower bound, no conclusions can be made. If the F-statistic value is greater than the critical value, then Ha is accepted (Ha = there is cointegration between variables). When it comes to bound test in this study as follows:

Table 4.4 Bounds Test

F-Bounds Test			Null Hypothesis: No level relationship	
Statistical Tests	Value	Signifi cant.	I(0)	I(1)
			Asymp totic: n=1000	
F-statistic	9.257 135	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
			Finite Sample: n=35	
Actual Sample Size	28	10%	2.46	3.46
		5%	2,947	4,08 8
		1%	4,093	5,53 2
			Finite Sample: n=30	
		10%	2,525	3.56

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			4,223
5%	3,058		
1%	4.28		5.84

Source: 2023 Data Processing Results

In accordance with Table 4.4 above, the results showed that cointegration occurred in this research. This can be seen from the F-statistic values > I (0) and I (1) at the 10%, 5% and 1% significance levels. Namely with a value of 9.257 > 2.525, 3.058, 4.28 as compared to lower bound, and more than the value of upper bound, namely 9.257 > 3.56, 4.223, 5.84.

ARDL Stability Test Results

After obtaining the results of the stationarity test which is in the first difference, the results of determining the optimum lag length are at lag 1, the results of the cointegration test as previously reported in the respective sections, next the researchers will present the results of the ARDL stability test in both the short and long run.

Short Run ARDL Model Estimation Results

The results of short run relationships can be seen as follows:

Table 4.5 Short Run Estimation Results

ECM Regression Case 2: Restricted Constant and No Trend				
Variables	Coefficient	Std. Error	t-Statistics	Prob.
D(LNEX_C, 2)	0.203393	0.072111	2.820552	0.0129
D(LNEX_R, 2)	0.173377	0.039506	4.388621	0.0005
D(LNEX_R(-1), 2)	0.077967	0.036433	2.140003	0.0492
D(LNIM_C, 2)	0.045843	0.020245	2.264366	0.0388
D(LNIM_C(-1), 2)	-0.124692	0.023027	-5.414986	0.0001
D(LNIM_C(-2), 2)	-0.051111	0.016989	-3.008457	0.0088
D(LNIM_R, 2)	0.077714	0.033863	2.294935	0.0366
CointEq(-1)*	-1.549542	0.180061	-8.605642	0.0000
R-squared	0.813264	Mean dependent var		-0.000672
Adjusted R-squared	0.747907	SD dependent var		0.195223
SE of regression	0.098019	Akaike info criterion		-1.572352
Sum squared	0.19	Schwarz criterion		-

resid	2155			1.191722
	30.0	Hannan-Quinn		-
Log likelihood	1293	Criter.		1.455990
Durbin-Watson	1.88			
stat	1553			

* p-value is incompatible with t-Bounds distribution.
Source: Data Processing Results, 2023

Based on Table 4.5, the short run results can be summarized as follows:

ΔLNCADEVt = 0.203 + 0.173 LNEX_Rt + 0.045 LNIM_CtΔ〖LNEX_C〗_t Δ Δ+ 0,078 Δ〖LNIM_R〗_t

Based on this model, it can be seen that the CointEq value is -1.549 and is significant at the 1% level, which means that short run and long run cointegration occurs in this model. Coefficient of coffee export variable in the current yearhas a value of 0.203, which means that if coffee exports increase by 1%, foreign exchange reserves in Indonesia will increase by 0.203%. Coffee exports have a positive and significant effect on foreign exchange reserves because the probability value is 0.0129<0.05. This means that during the current year, if coffee exports increase, foreign exchange reserves will also increase. Then, the coefficient for the rubber export variable in the current yearhas a value of 0.173, which means that if rubber exports increase by 1%, foreign exchange reserves will increase by 0.173%. Rubber exports have a positive and significant effect on foreign exchange reserves at lag 1 because the probability value is 0.0005<0.05. This means that during the current year, if rubber exports increase, foreign exchange reserves will also increase.

Coefficient of coffee import variable in the current yearhas a value of 0.046, which means that if coffee imports increase by 1%, foreign exchange reserves in Indonesia will increase by 0.046%. Coffee imports have a positive and significant effect on foreign exchange reserves because the probability value is 0.0388<0.05. This means that during the current year, if coffee imports increase, foreign exchange reserves will also increase. Coefficient of rubber import variable in the current yearhas a value of 0.078, which means that if rubber imports increase by 1%, foreign exchange reserves in Indonesia will increase by 0.078%. Coffee exports have a positive and significant effect on foreign exchange reserves because the probability value is 0.0366<0.05. This means that during the current year, if rubber imports increase, foreign exchange reserves will also increase.

Long Run ARDL Model Estimation Results

The results of the Bound Test cointegration test in this research have obtained long run estimation results on the variables coffee exports, coffee imports, rubber exports and rubber imports on foreign exchange reserves. The long run relationship based on the ARDL model can be estimated in the following table:

Table 4.6 Long Run Estimates Results

Levels Equation
Case 2: Restricted Constant and No Trend

Variables	Coefficient	Std. Error	t-Statistics	Prob.
D(LNEX_C)	-0.003293	0.105576	-0.031191	0.9755
D(LNEX_R)	0.070051	0.086438	0.810428	0.4304
D(LNIM_C)	0.134762	0.059743	2.255685	0.0395

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D(LNIM_R)	0.169544	0.068070	2.490719	0.0250
C	0.051181	0.019461	2.629863	0.0189

$$EC = D(LNCDV) - (-0.0033*D(LNEX\_C) + 0.0701*D(LNEX\_R) + 0.1348*D(LNIM\_C) + 0.1695*D(LNIM\_R) + 0.0512)$$

Source: Data Processing Results, 2023

Based on the results of long run testing with the ARDL model in Table 4.6 above, the formula is as follows:

$$\Delta LNCADEVt = 0.051 - 0.003 + 0.070LNEX\_Rt + 0.169LNIM\_Rt \, \Delta 【LNEX\_C】\_t \, \Delta + 0,135 \, \Delta 【LNIM\_C】\_t \, \Delta$$

The interpretation of the equation in the long run is at a constant or fixed value of 0.051, meaning that if coffee exports, coffee imports, rubber exports and rubber imports have a constant or fixed value in the long term, then foreign exchange reserves are 0.051 and this result is significant at the 5% level. For the coffee export variable, the coefficient value is -0.003, meaning that if coffee exports increase by 1% in the long run, foreign exchange reserves will decrease by 0.003% assuming the coffee import, rubber export and rubber import variables are constant values. The results of this test showed that when coffee exports increase, foreign exchange reserves will decrease. In the long run, where the probability value is 0.97>0.05, the coffee export variable has a negative and insignificant effect on foreign exchange reserves. For the rubber export variable, the coefficient value is 0.070, meaning that if rubber exports increase by 1% in the long run, foreign exchange reserves will increase by 0.070%, assuming that the coffee export, coffee import and rubber import variables are constant values. The results of this test showed that when rubber exports increase, foreign exchange reserves will also increase. In the long run, where the probability value is 0.43>0.05, rubber exports have a positive and insignificant effect on foreign exchange reserves.

For the coffee import variable, the coefficient value is 0.135, meaning that if coffee imports increase by 1% in the long run, foreign exchange reserves will increase by 0.135% assuming the coffee export, rubber export and rubber import variables are constant values. The results of this test showed that when coffee imports increase, foreign exchange reserves will also increase. In the long run, the probability value is 0.04<0.05 coffee import variable has a positive and significant effect on foreign exchange reserves. For the rubber import variable, the coefficient value is 0.169, meaning that if rubber imports increase by 1% in the long run, foreign exchange reserves will increase by 0.169%, assuming that the coffee export, coffee import and rubber export variables are constant values. The results of this test show that when rubber imports increase, foreign exchange reserves will also increase in the long run, where the probability value is 0.02<0.05. Rubber imports have a positive and significant effect on foreign exchange reserves.

Model Stability Test

Structural stability testing of the model can be divided into two, namely the CUSUM (Cumulative Sum of Recursive Resedual) test and CUSUM Q (Cumulative Sum of Square of Recursive Resedual). The following are the results of the CUSUM test with the export volume variable as the dependent variable. The Cusum test is as follows:
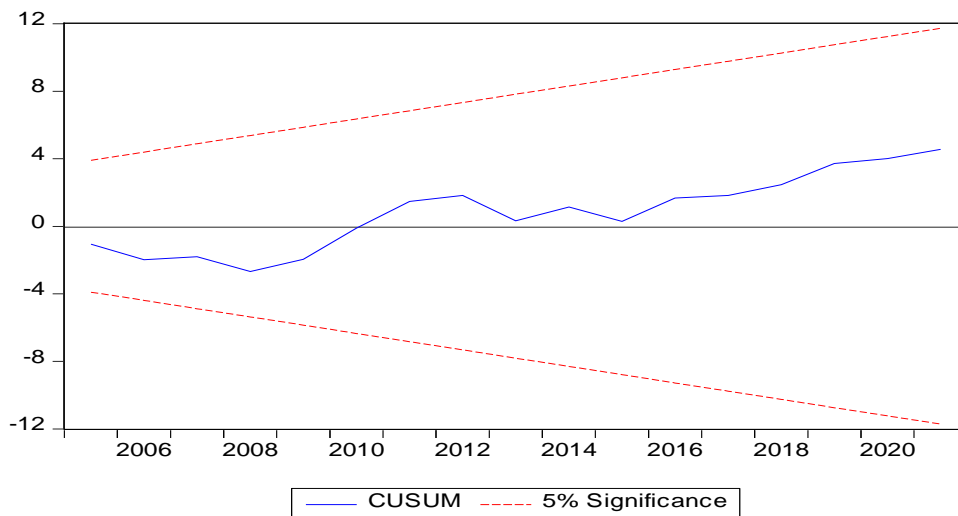
Source: Data Processing Results, 2023

Figure 4. 1 CUSUM Test

Based on the image, the CUSUM test results at the 5% level can be explained, namely that the WR quantity plot does not cross the model stability dividing line. So the CUSUM test is stable.
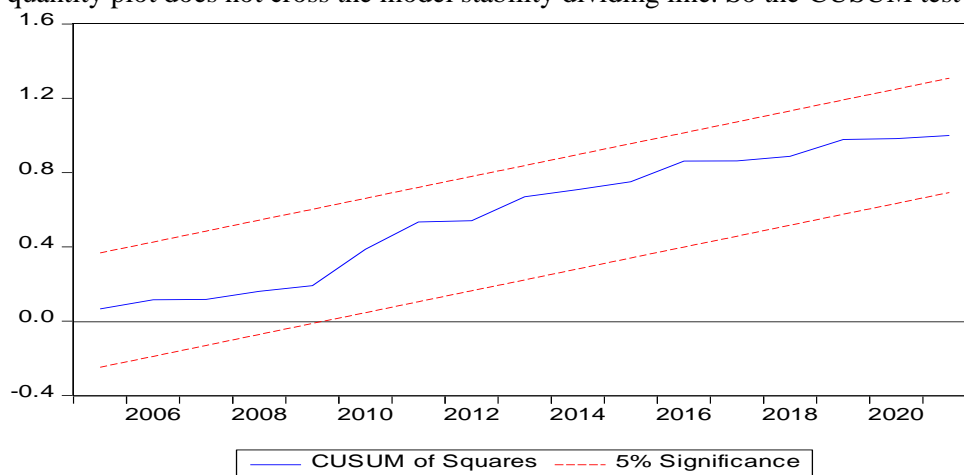
Source: Data Processing Results, 2023

Figure 4. 2 CUSUM Q test

Based on the test results imageCUSUM Qat the 5% level it can be explained, namely that the Sr quantity plot is not above the limit line. At the 5% significant level the plot forms a linear line. Based on the results of the two model stability tests above, it can be concluded that the regression coefficient results are stable.

DISCUSSION

The discussion between the independent variable and the dependent variable that will be explained is the short-term and long-term discussion as follows:

The Influence of Coffee Exports on Foreign Exchange Reserves in Indonesia

Based on the results of the tests that have been carried out, it can be concluded that in the short run coffee exports have a positive and significant effect on Indonesia's foreign exchange reserves. This is in line with research (Apriadi & Setiawina 2022).The reason coffee exports have a positive and significant impact on Indonesia's foreign exchange reserves is because if Indonesia frequently exports raw coffee to other countries, Indonesia will earn foreign exchange from the importing country, so the more coffee it exports, the more foreign exchange it earns. (Mustafa & Andriyani, 2020), (Citra, 2018).

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In the long run, the coffee export variable has a negative and insignificant effect on foreign exchange reserves in Indonesia. In theory, exports increase foreign exchange reserves, but coffee exports have a positive but not significant effect because coffee exports are one part of exported commodities whose quantity is not so large as to affect foreign exchange reserves, if coffee exports can be increased further in the form of finished or processed materials. post-harvest will certainly affect foreign exchange reserves. This research is in line with the results of research conducted by (Apriadi & Setiawina, 2022) entitled "The Influence of Exports, Imports, Inflation and ACFTA Policy on ASEAN-5 Foreign Exchange Reserves for the 2015-2019 Period" the results of this research partially had a positive and insignificant effect on foreign exchange reserves before and after the enactment of ACFTA in the ASEAN-5 Period 2015-2019.

The Effect of Coffee Imports on Foreign Exchange Reserves in Indonesia

Based on the test results that have been studied, it can be concluded that in the short run the coffee import variable has a negative and significant effect on foreign exchange reserves in Indonesia. The results of this study are in line with research (Dani, et al, 2020) and (Hanum, et al, 2020). In importing coffee, the Indonesian government will finance these imports with Indonesia's foreign exchange reserves, where if the amount of coffee imports increases, foreign exchange reserves in Indonesia will decrease because the import financing is funded from foreign exchange (foreign currency). In the long run, the coffee import variable has a positive and significant effect on foreign exchange reserves. This means that if imports increase, foreign exchange reserves will increase. In carrying out imports, the Indonesian government will finance these imports with Indonesia's foreign exchange reserves. However, the fact is that when coffee production in Indonesia decreases causing prices to increase, Indonesia will prefer to import coffee from abroad because the price is relatively cheaper. So because of this, Indonesia will increase domestic coffee production which will attract investors to invest in foreign capital in Indonesia to finance this production. This resulted in a surplus in Indonesia's trade balance so that foreign exchange reserves also increased (Yanuar & Akbar, 2022).

The Influence of Rubber Exports on Foreign Exchange Reserves in Indonesia

Based on the test results that have been studied, it can be concluded that in the short run rubber exports have a positive and significant effect on foreign exchange reserves in Indonesia and in the long run rubber exports have a positive and significant effect on foreign exchange reserves in Indonesia. This is in line with research (Apriadi & Setiawina, 2022).The reason why rubber exports have a positive and significant effect on Indonesia's foreign exchange reserves is because if Indonesia frequently exports raw rubber to other countries, Indonesia will receive foreign exchange from the importing country, so the more rubber it exports, the more foreign exchange it will earn. With the increasing value of rubber exports, it shows that the country is receiving more and more income from foreign countries, or what is usually called receiving foreign exchange or foreign exchange which is a source of state income (Mustafa & Andriyani, 2020), (Citra, 2018). The results of this research are in line with previous research, namely (Khusnatun & Hutajulu, 2021) and (Uli, 2016), which states that exports have a negative and in significant effect on foreign exchange reserves.

The Effect of Rubber Imports on Foreign Exchange Reserves

Rubber imports have a positive and significant effect on foreign exchange reserves in Indonesia in the long run and a positive and significant effect on foreign exchange reserves in Indonesia in the short run. The results of this research are in line with the results of research conducted by (Mustafa & Andriyani, 2020) in his research, it was found that the rubber import variable had a positive and significant effect on Indonesia's foreign exchange reserves. In research (Amalia & Titik, 2021) and (Apriadi & Setiawina, 2022) the results presented are also in accordance with this research, namely that imports have a positive and significant effect on foreign

exchange reserves. In theory, when importing, the Indonesian government will finance these imports with Indonesia's foreign exchange reserves, where if the amount of imports increases, the value of foreign exchange reserves will also decrease. However, the increase in rubber imports was triggered by strong domestic demand for rubber imports. This was followed by a decline in raw rubber production, causing domestic prices to be more expensive than the price of raw materials from abroad. This is in accordance with the theory of comparative advantage by David Ricardo where according to this theory, comparative advantage occurs when a country produces goods at cheaper prices and if goods in Indonesia are more expensive and foreign goods are cheaper then it is more efficient and effective if Indonesia imports. the goods are from abroad. Similarly, importing rubber when rubber production in Indonesia decreases causes prices to increase, Indonesia will prefer to import rubber from abroad because the price is relatively cheaper. So because of this, Indonesia will increase domestic rubber production which will attract investors to invest in foreign capital in Indonesia to finance this production. This resulted in a surplus in Indonesia's trade balance so that foreign exchange reserves also increased (Yanuar & Akbar, 2022).

4. CONCLUSION

The aim of this research is to evaluate the short run and long run influence of coffee exports, coffee imports, rubber exports and rubber imports on foreign exchange reserves in Indonesia. The following conclusions can be drawn from studies using the approach Autoregressive Distributed Lag (ARDL):

1. Coffee exports have a negative and insignificant effect on foreign exchange reserves in Indonesia in the long run, while in the short term coffee exports have a positive and significant effect on foreign exchange reserves in Indonesia.
2. Coffee imports have a positive and significant effect on foreign exchange reservesin Indonesia in the long run, while in the short term coffee imports have a negative and significant effect on foreign exchange reserves in Indonesia.
3. Rubber exports have a positive and insignificant effect on foreign exchange reserves in Indonesia in the long run and a positive and significant effect on foreign exchange reserves in Indonesia in the short run.
4. Rubber imports in the long and short run have a positive and significant effect on foreign exchange reserves in Indonesia.

Suggestion

1. The government, through the Ministry of Trade, should further optimize exports of agricultural commodities, one of which is coffee exports, and also provide convenience in structural policies such as licensing which will benefit exporters. In this way, foreign exchange reserves will increase. Apart from that, government policies and strategic steps are needed to continue to boost the increase in domestic production of goods and services, especially export commodities.
2. The government, through the Ministry of Trade, is implementing a policy of limiting coffee imports, either by tightening policies regarding import activities, such as reducing import quotas, reducing imports of branded products, increasing import tariffs and not importing domestically produced commodities. By decreasing imports, including imports of coffee commodities, it will be possible to keep foreign exchange reserves safe.
3. The government and private sector need to work together in managing natural resources, namely agricultural commodities, one of which is rubber, to increase the value of exports in Indonesia with the aim of strengthening foreign exchange reserves. The strategy that can be taken is to encourage exports and build industrial centers and learn from external industries in order to get maximum results and production results that are able to compete in international markets.

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