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Author : Agnes Delvia and Sukma Hayati Hakim
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Analysis of The Effect of Exports, Exchange, and Foreign Debt on Devisa Reserves (Case Study of 11 Southeast Asian Countries)

Agnes Delvia, Sukma Hayati Hakim

Program Studi Ekonomi Pembangunan, Fakultas Ekonomi dan Bisnis Universitas Sumatera Utara, Medan 20155, Indonesia

agnesdelvia2002@gmail.com

Abstract

This study aims to analyze the effect of exports, exchange rates, and foreign debt both partially and simultaneously on foreign exchange reserves in 11 Southeast Asian countries. The type of research used is descriptive quantitative, which is a descriptive approach with a quantitative approach. In this study the data used is panel data. The focus of the study locations selected in this study amounted to 11 countries in Southeast Asia. Data collection in this study used secondary data in the 2018-2022 period sourced from the IMF and World Bank. The results showed that simultaneously the independent variables of Exports, Exchange Rates, and Foreign Debt jointly affect the Foreign Exchange Reserves of Southeast Asian countries. Partially, it is known that the Export variable has a positive and significant effect on Foreign Exchange Reserves. The exchange rate partially has no significant effect on foreign exchange reserves. Foreign Debt has a positive and significant effect on Foreign Exchange Reserves.

Keywords: Export; Exchange Rate; Foreign Debt; Foreign Exchange Reserves

1. Introduction

Southeast Asia is geopolitically and geoeconomically strategic. Since the formation of the United Nations in 1945, the idea of establishing a regional cooperation has emerged to become a supporting tool in responding to global cooperation undertaken by various parties. The main assumption of this regional cooperation is based on geographical proximity which is expected to facilitate efforts to understand each other in neighboring countries so that they can coexist quietly [1]. Southeast Asia is undeniably a region with a strong economic strength with an economic growth of 5.6%, which is in third place from several other regional countries in 2022. Proven gross domestic income in 2022 from eleven member countries reached 3.9 trillion US dollars (USD). Strategic Southeast Asia is also recognized in the circulation of world trade, this is due to the location of Southeast Asia on the Pacific trade route to Asia, Europe, and Africa.

In the process of international trade, foreign exchange reserves are used as a source of financing in conducting international transactions. Foreign exchange reserves are financial assets or liabilities used in foreign transactions [2] which consist of foreign exchange, namely currencies that can be accepted by almost all countries in the world such as the US Dollar, Euro, Japanese Yen, and other currencies that are widely accepted and recognized by the international world. Foreign exchange reserves can also be said to be state revenue, therefore foreign exchange reserves can be used in the implementation of development as additional capital to drive economic activity. A small amount of foreign exchange reserves can have an impact on the vulnerability of the country's economic stability to changes that occur in the international economy. Foreign exchange reserves can be said to be safe if they can finance import needs for a minimum of three months of imports. Foreign exchange reserves are used as an important indicator that shows the extent to which a country can conduct international trade and as a measure of the strength and weakness of the economic fundamentals of a country. Therefore, the amount of foreign exchange reserves owned by a country can illustrate the resilience of macroeconomic and external stability and financial system, as well as the economic growth of a country.

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In essence, export activities are one of the sources of state revenue, especially foreign exchange reserves. This is because, countries that export will get payments in the form of foreign exchange. So that if the level of exports decreases, it will be followed by a decrease in foreign exchange reserves owned by the country. Exports are one of the factors that can affect a country's foreign exchange reserves. The higher the export value, the greater the foreign exchange reserves owned by the country. This is This is because exports generate foreign exchange earnings in the form of foreign exchange. Conversely, the lower the export value, the smaller the foreign exchange reserves owned by the country. In Southeast Asian countries, exports have an important role in increasing foreign exchange reserves. This is evidenced by the positive correlation between exports and foreign exchange reserves in Southeast Asian countries.

The exchange rate also has an impact on foreign exchange reserves. The ability of a country to transact economically and financially internationally is influenced by the amount of foreign exchange and foreign exchange held by the government and the population. This results in the value of the country's currency also getting stronger. The higher the exchange rate of a country's currency, the stronger the country's economy. This can be an opportunity to increase foreign exchange reserves as well. Conversely, the exchange rate currency exchange rate can reduce the country's foreign exchange reserves.

In addition to exports and exchange rates, foreign debt can also play an important role in dealing with the problem of lack of funds, especially foreign exchange reserves, so that foreign debt can increase foreign exchange reserves [3]. If foreign debt is invested productively, it will generate a high rate of return on foreign exchange.

2. Literature Review

2.1. Export

Export is a trade activity carried out by the release of commodity goods from within the country to foreign countries with the fulfillment of applicable regulations. Exports come from a domestic production that is sold and used by foreign residents, so exports are an injection into the income stream similar to investment.

2.2. Exchange Rate

The exchange rate is the difference in the price value of the Rupiah currency using another country's currency rupiah using another country's currency. In trade between countries where each country has its own means of exchange, it forces a comparison number between the value of a currency using other currencies or referred to as foreign exchange rates.

2.3. External Debt

External debt is a portion of a country's total debt obtained from creditors outside the country. Foreign debt receipts can be in the form of receipts from governments, companies, or individuals. The form of debt can be in the form of money obtained from private banks, other governments, or international financial institutions such as the IMF and the world bank.

2.4. Foreign Exchange Reserves

Foreign exchange reserves or commonly known as foreign exchange reserves are foreign currency deposits that are managed and regulated by a country's central bank and monetary authority country.

3. Research Method

The type of research used in this study is quantitative research. Quantitative research method is one type of research that is systematic, planned and clearly structured from the beginning to the creation of its research design. The quantitative method aims to test the effect of the independent variable on the dependent variable.

In this study the authors took 11 Southeast Asian countries as research sites. This study includes three independent variables, namely, exports, exchange rates, and foreign debt and one dependent variable, namely foreign exchange reserves. This research uses secondary data and this research is in the period 2018-2022.

$$Yit = \alpha + \alpha i + Xit\beta + €it$$

4. Results and Discussion

4.1. Descriptive Statistics

Descriptive statistics are a description of data that can be seen from the average value, standard deviation, maximum and minimum on each variable studied. The variables used are exports, exchange rates, foreign debt and foreign exchange reserves and the results are as follows:

Table 1. Descriptive Statistics Results

Descriptive Analysis	Export	Exchange Rate	External Debt	foreign exchange reserves
Mean	138.03	57.20	73.55	90.30
Median	73.00	23.71	36.00	83.00
Maximum	482.20	268.65	485.00	337.20
Minimum	0.30	0.16	2.06	0.40
Std. Dev.	139.25	73.93	116.08	99.91
Observations	55	55	55	55

Source: Output Eviews 13

Based on the table above:

1. In table 1 it can be seen that the Mean value for exports (X1) is 138.03 billion USD, the Median value is 73.00 billion USD, the standard deviation value is 139.25 billion USD and the Maximum level is 482.20 billion USD and the Minimum level is 0.30 billion USD. This means that the export level in 2018-2022 in 11 Southeast Asian countries has an average value of 138.03 billion USD with the largest value in 2022 of 482.20 billion USD in Singapore and the smallest value of 0.30 billion USD in Timor Leste.
2. In table 1 it can be seen that the Mean value for the exchange rate (X2) is 57.20 billion USD, the Median value is 23.71 billion USD, the standard deviation value is 73.93 billion USD and the Maximum level is 268.65 billion USD and the Minimum level is 0.16 billion USD. This means that the exchange rate in 2018-2022 in 11 Southeast Asian countries has an average value of 57.20 billion USD with the largest value of 268.65 USD in Malaysia and the smallest value of 0.16 USD in the country of East Leste.
3. In table 1 it can be seen that the Mean value for Foreign Debt (X3) is 73.55%, the Median value is 36.00%, the standard deviation value is 116.08% and the Maximum level is 485.00% and the Minimum level is 2.06%. This means that the level of foreign debt in 2018-2022 in 11 Southeast Asian countries has an average value of 73.55% with the largest value of 485% in Singapore and the smallest value of 2.06% in Brunei Darussalam.
4. In table 1 it can be seen that the Mean value of foreign exchange reserves (Y) is 90.30 billion USD, the Median value is 83.00 billion USD, the standard deviation value is 99.91 billion USD and the Maximum level is 337.20 billion USD and the Minimum level is 0.40 billion USD. This means that the level of foreign exchange reserves in 2018-2022 in 11 Southeast Asian countries has an average value of 90.30 billion USD with the largest value of 337.20 billion USD in Singapore and the smallest value of 0.40 billion USD in Timor Leste.

4.2. Chow Test

The detailed results of the chow test with Eviews 13 software can be seen in the following table:

Table 2. Chow Test

Redundant Fixed Effects Tests
Equation: Untitled
Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	161.685764	(10,41)	0.0000
Cross-section Chi-square	203.484017	10	0.0000

Source: Output Eviews 13

The results of the Chow test analysis obtained the Cross-Section F probability of 0.0000 which means less than the value of 0.05 (0.0000 <0.05). It can be concluded that the Fixed Effect Model is used. Furthermore, the Hausman test is carried out to determine the Fixed Effect Model or Random Effect Model to be selected in the study.

4.3. Hausman Test

The detailed results of the hausman test with Eviews 13 software can be seen in the following table:

Based on the calculation of the Hausman test, the probability value at the random cross-section is 0.4151, when compared to the significance level of 0.05, the value is smaller (0.4151> 0.05). Based on these results, the best model used is the Random Effects Model.

Table 3. Hausman Test

Correlated Random Effects - Hausman Test

Equation: Untitled
Test cross-section random effects

Test Summary	*Chi-Sq. Statistic*	*Chi-Sq. d.f.*	*Prob.*
Cross-section random	*2.851744*	*3*	*0.4151*

Source: Output Eviews 13

4.4. Lagrange Multiplier (LM) Test

Based on the LM test calculation, it can be seen from the breussh-pagan probability value of 0.0000 <0.05, which means that the best model is the Random effect Model.

Table 4. Lagrange Multiplier

Lagrange Multiplier Tests for Random Effects
Null hypotheses: No effects
Alternative hypotheses: Two-sided (Breusch-Pagan) and one-sided (all others) alternatives

	Test Hypothesis		
	Cross-section	*Time*	*Both*
Breusch-Pagan	*102.5939*	*2.276261*	*104.8702*
	(0.0000)	*(0.1314)*	*(0.0000)*
Honda	*10.12887*	*-1.508728*	*6.095358*
	(0.0000)	*(0.9343)*	*(0.0000)*
King-Wu	*10.12887*	*-1.508728*	*4.138998*
	(0.0000)	*(0.9343)*	*(0.0000)*
Standardized Honda	*12.49479*	*-1.343662*	*4.433222*
	(0.0000)	*(0.9105)*	*(0.0000)*
Standardized King-Wu	*12.49479*	*-1.343662*	*2.237296*
	(0.0000)	*(0.9105)*	*(0.0126)*
Gourieroux, et al.	--	--	*102.5939*
			(0.0000)

Source: Output Eviews 13

4.5. Random effect Model (REM)

After conducting the model specification test, the most appropriate model used in this study is the Random effect Model. The equation results are as follows:

$$\text{LogY} = 0.014 + 0.533\ \text{LogX1} + 0.357\ \text{LogX2} + 0.002\ \text{X3} + \text{e}$$

Table 4. Lagrange Multiplier

Dependent Variable: LOG(Y_CADEV)
Method: Panel EGLS (Cross-section random effects)
Date: 08/07/24 Time: 10:50
Sample: 2018 2022
Periods included: 5
Cross-sections included: 11
Total panel (balanced) observations: 55
Swamy and Arora estimator of component variances

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	*0.014031*	*0.418270*	*0.033546*	*0.9734*
LOG(X1)	*0.533451*	*0.102348*	*5.212132*	*0.0000*
LOG(X2)	*0.357559*	*0.155019*	*2.306543*	*0.0252*
*X3_*	*0.002534*	*0.001231*	*2.058140*	*0.0447*

Source: Output Eviews 13

Based on the regression results above, it can be seen in the coefficient C column of 0.9734 which is the value of foreign

exchange reserves. The export variable has a positive direction of relationship to foreign exchange reserves with a coefficient value of 0.533451 and has a probability value of 0.0000 <0.05, which means that there is a significant influence between the export variable on foreign exchange reserves. This proves that when exports increase, foreign exchange reserves will also increase.

Furthermore, the exchange rate variable has a coefficient value of 0.357559. These results can be interpreted that the exchange rate variable has a positive direction of relationship to foreign exchange reserves, if the exchange rate increases, the foreign exchange reserves variable will also increase by 0.357559 assuming other variables are constant. At a probability value of 0.0252 <0.05, the exchange rate variable has a significant effect on foreign exchange reserves, meaning that the more foreign exchange or foreign exchange owned by the government and residents of a country, the greater the country's ability to conduct international economic and financial transactions and the stronger the value of the country's currency.

The Foreign Debt variable and foreign exchange reserves have a positive relationship direction with a coefficient value of 0.002534 and will have a positive impact on the foreign exchange reserves variable due to a one-unit increase in debt which will increase foreign exchange by 0.002534 assuming other variables are constant. The debt variable with a probability of 0.0447 <0.05 indicates that the debt variable has a positive and significant effect on the foreign exchange variable.

4.6. Determination Test (R^2)

The coefficient of determination is the contribution of the influence given by the independent variable on the dependent variable, or in other words, the coefficient of determination measures how far the model's ability to explain or explain the variation of the independent variable on the dependent variable. The details can be seen in the following table:

Table 6. R^2 Test

R-squared	*0.654441*
Adjusted R-squared	*0.634113*

Source: Output Eviews 13

Based on Table 6, the results of the coefficient of determination test above explain that the R-squared value is 0.654441, which means that the independent variables (exports, exchange rates, and foreign debt) are able to explain the variation in the dependent variable (foreign exchange reserves) by 65.44%, while the remaining 34.56% can be explained by other variables outside this study.

4.7. Partial Test (t-test)

The t test is used to test the significance of the model partially between the independent variables, namelyExports (X1), Exchange Rates (X2), Foreign Debt (X3), and the dependent variable Foreign Exchange Reserves (Y). The following are the following are the results of t test data processing:

Tabel 7. T-test Result

Variable	*Coefficient*	*Std. Error*	*t-Statistic*	*Prob.*
C	*0.014031*	*0.418270*	*0.033546*	*0.9734*
LOG(X1_EKSPOR)	*0.533451*	*0.102348*	*5.212132*	*0.0000*
LOG(X2_KURS)	*0.357559*	*0.155019*	*2.306543*	*0.0252*
X3_ULN	*0.002534*	*0.001231*	*2.058140*	*0.0447*

Source: Output Eviews 13

The data obtained in the table above can be explained as follows:

1. From the research results in the t test, the export variable has a probability value of 0.0000 <0.05, which means that the export variable partially has a positive and significant effect on foreign exchange reserves.
2. The exchange rate variable has a probability value of 0.0252> 0.05, which means that the exchange rate variable partially has a significant effect on foreign exchange reserves.
3. The foreign debt variable has a probability value of 0.0447 <0.05, which means that the foreign debt variable partially has a positive and significant effect on foreign exchange reserves.

From the explanation above, it can be concluded that the export and foreign debt variables partially have a positive and significant effect on foreign exchange reserves in Southeast Asia, but the exchange rate variable partially has no significant effect on foreign exchange reserves in Southeast Asia.

4.8. Simultaneous F test (Simultaneous Test)

Simultaneous F test (Simultaneous Test) is used to determine whether or not there is a joint or simultaneous influence between the independent variables on the dependent variable.

Table 8. F Test Result

F-statistic	*32.19558*
Prob(F-statistic)	*0.000000*

Source: Output Eviews 13

The table above shows the F-statistic probability value of 0.000000 where the value is smaller than the significance level α = 5% (0.000000 <0.05), which means that there is an influence between exports, exchange rates, and foreign debt on foreign exchange reserves simultaneously in 11 Southeast Asian countries in the period 2018-2022.

5. Conclusions

Based on the results of the research and the previous discussion, the conclusions that can be formulated to answer the problem formulation are as follows:

1. The results showed that the export variable (X1) has a positive relationship direction to the foreign exchange reserves variable in Southeast Asian countries with a coefficient of 0.533451, which means it has a positive effect on foreign exchange reserves. The export variable has a probability value of 0.0000 <0.05, so the export variable has a significant effect on foreign exchange reserves. This means that the higher the value of exports carried out by a country, the higher the amount of foreign exchange reserves of that country. Exports have a significant effect on foreign exchange reserves because basically the means of payment used to export uses foreign exchange, where directly any increase in exports made by a country will directly have an impact on increasing the amount of foreign exchange reserves in that country.
2. The results showed that the exchange rate variable (X2) had a significant effect on the foreign exchange reserves variable in Southeast Asian countries. The exchange rate variable has a probability value of 0.0252 <0.05, so the exchange rate variable has a significant effect on foreign exchange reserves.This means that the more forex or foreign exchange owned by the government and the population of a country, the greater the country's ability to conduct international economic and financial transactions and the stronger the value of the country's currency.
3. The results of this study indicate that the foreign debt variable (X3) has a positive relationship direction on foreign exchange reserves with a coefficient value of 0.002534, this will have a positive impact on foreign exchange reserves. The foreign debt variable has a probability value of 0.0447 <0.05, so the debt variable has a positive and significant effect on the foreign exchange variable. This means that foreign debt has a positive influence on foreign exchange reserves, when there is a one unit increase in debt it will increase foreign exchange reserves.
4. The results showed that the Export, Exchange Rate, and Foreign Debt Variables simultaneously had a significant influence on Foreign Exchange Reserves in the Southeast Asian Region.

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