

Balance of Payments and Exchange Rates in ASEAN Countries: Granger Causality Test

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ABSTRACT

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Fluctuations in the balance of payments are a reflection of the instability of the exchange rate; crisis factors also greatly affect the deficit or surplus in the balance of payments. If the exchange rate depreciates, a country will increase exports because domestic prices are relatively cheaper than foreign prices so that it is one of the competitive forces to increase exports, and vice versa if a country experiences appreciation, the country will increase imports. This study aims to analyze and compare whether there is a causal relationship between the balance of payments and currency exchange rates in ASEAN countries. This study uses the Granger Causality Test method, therefore the data of this study is in the form of a time series, namely the years 2005-2019. Only Myanmar and the Philippines have the exchange rate and balance of payments variables which have a causal relationship. This is in line with the curve in the introduction where the exchange rates of the two countries are relatively higher than those of Indonesia and Vietnam, which reach tens to tens of thousands of rupiah. This means that no matter how low the exchange rate (depreciation) is, there is no or little possibility for the countries of Indonesia and Vietnam to export, which reduces the current account, which is part of the balance of payments)

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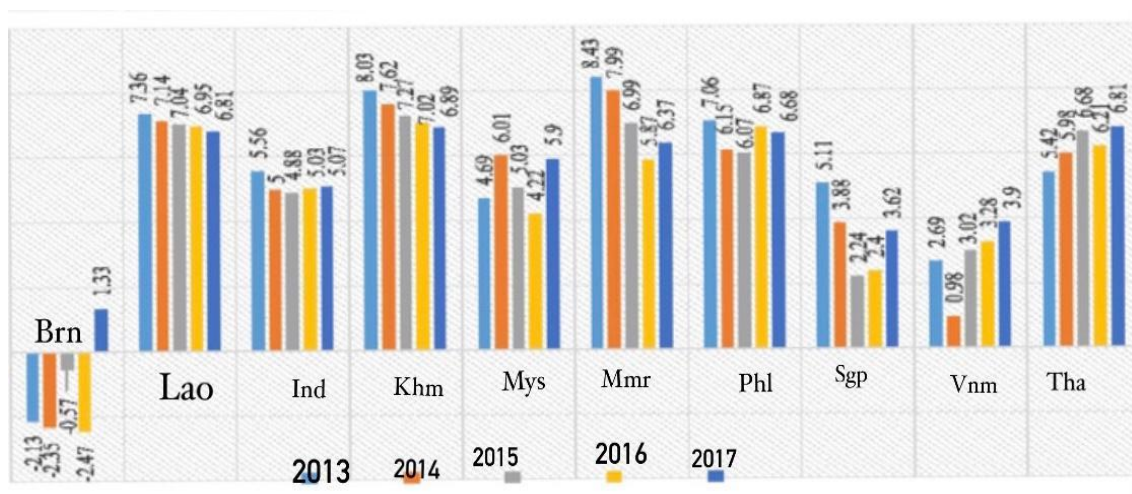
Introduction

Balance of Payment, commonly called the balance of payments, is a record of trade transactions between citizens of a country and citizens of other countries within a certain period of time, provided that the inflow of funds due to exports is the same as the outflow of funds due to imports (Afrizal, 2020). In addition, the balance of payments is a tool in determining economic conditions that occur as a result of international trade activities. The general pattern of economic activity of a country that conducts trade relations with other countries can be known by observing the development of the balance of payments. Thus it can be known whether a country has a dependence on a product or source of financing from a partner country. So that if it is known that there is a surplus or deficit in the balance of

payments in a certain year, the amount of foreign exchange needs for the next year's budget will be known (Machpudin, 2013).

According to Tijani (2014) developments in the balance of payments are influenced by the volatility of currency exchange rates. The strength of a country's currency can be reflected in the exchange rate of the currency itself with the currencies of other countries. A higher exchange rate can lower export prices and lower import prices, thereby reducing the country's export capability (Sek, S. K., & Chuach, 2011). Net exports refer to the value of exports that have reduced the value of imports. Net exports in the trade balance containing records of exports and imports are labeled with a minus sign if it is intended for consumption, it should be labeled a plus sign if it is intended for investment and government spending (Mankiw, 2010). According to Amalia (2007) There are two factors that determine a country's balance of payments, namely goods and capital. The two groups greatly affect fluctuations in the balance of payments of a country which greatly affects international trade activities, especially in Southeast Asian countries.

In the ASEAN region, there is a forum to accommodate international trade activities which are the source of the country's economy, namely the ASEAN Economic Community (AEC). The formation of the AEC is expected to accelerate economic growth in ten ASEAN countries, by establishing a flexible flow of trade without obstacles and initiating the freedom of each member country in various economic sectors (Dyomina, 2014). International trade that is carried out can be a benchmark for the state of economic growth in each country. The following is an overview of economic growth in 10 ASEAN countries in 2013-2017:



Source: World Bank, 2020

Figure 1. Economic growth of ASEAN countries in 2013-2017

Based on Figure 1, it can be seen that the economic growth of each country in Southeast Asia in 2013-2017. The worst economic growth among ASEAN countries is Brunei Darussalam. In Figure 1, Brunei Darussalam's economic growth in 2016 depreciated quite badly and could be improved in the following year with a growth percentage of 1.33. The average range of economic growth of each ASEAN country fluctuates, but Cambodia and Laos appear to have the highest economic growth. In 2013, the economic growth of Cambodia and Laos was 8.03% and 7.36%, in 2017 it decreased by 6.37% and 6.81%, respectively. Indonesia places a position behind Cambodia and Laos for economic growth, where in 2013 was the highest growth of 5.56% compared to the other 4 years where there was a decline. highest in 2013 at 5.56% and decreased in the following year. The lowest decline occurred in 2015 of 4.88%, then corrected the following year. From the figure above, it can be concluded that the country with the lowest growth was Brunei Darussalam with an average of -1.24%, followed by Singapore at 3.45%. Meanwhile, the highest average economic growth for 5 years was Laos at 7.37%, followed by Myanmar and Cambodia.

The stability of international trade that is carried out is a supporting aspect in the international economy. Export-import activities in a country are trade activities between countries that contribute to the economy. These activities are recorded in a report called the balance of payments, so that it can be seen how far the contribution of trade between countries to the economy in that country can be (Romadhoni, Dwi Rohmah & Cahyono, 2017). The balance of payments is a tool to see the extent to which the flow of funds and the value of trade transactions in a particular year in which a country interacts with other countries (Sukirno, 2013). The balance of payments has several components that can show the prevailing international economic relations. The components of the balance of payments include: current transactions (goods, services, income), financial transactions, capital transactions, and foreign exchange reserves.

According to Fitri (2014) the recording of the balance of payments is carried out as general bookkeeping is carried out. The note consists of two sides, namely, debits and credits which are entered into an entry. The results of transactions in each record produce a value in the form of a surplus or a deficit. Where a surplus means that the value of imports is smaller than the value of exports and the capital inflow is greater than the capital outflow. On the other hand, a deficit means that the value of exports is less than the value of imports and that capital inflows are smaller than capital outflows. Whereas Krugman & Obstfeld (2003) states that the balance of payments is an activity of recording the state in every payment and receipt transaction. Transactions recorded in the balance of payments will be

marked with a negative sign (-) if they are debit transactions, and transactions marked with positive (+) signs if they are credit transactions.

According to research of Anisa (2017) each country will strive to maintain economic stability, especially in maintaining a balance of payments balance. The balance between the inflow of funds from exports and the outflow of funds from imports can create a balance of payments balance. While the research results, Effendy (2014) analyze Indonesia's balance of payments in the short term and long term which can be explained by the Keynesian approach (elasticity and absorption) and the monetary approach. The exchange rate level and GDP are used in the Keynesian approach so that they can, while the exchange rate reserve proxy is used in the monetary approach to know its effect on the balance of payments. This study shows that the exchange rate has a positive and significant effect in the short and long term on the balance of payments.

Duasa (2004) analyze Indonesia's balance of payments in the short term and long term which can be explained by the Keynesian approach (elasticity and absorption) and the monetary approach. The exchange rate level and GDP are used in the Keynesian approach so that they can, while the exchange rate reserve proxy is used in the monetary approach to know its effect on the balance of payments. This study shows that the exchange rate has a positive and significant effect in the short and long term on the balance of payments. more emphasis on the monetary approach, namely analyzing the Effect of Monetary Variables on International Reserves on Indonesia's Balance of Payments with the regression results of domestic credit, real GDP, domestic prices and domestic interest having a positive effect on the real exchange rate and also a positive effect on international reserves (Warijan, 2017).

According to research Muhammad (2010) on the factors affecting the balance of payments in Pakistan. The results show that in addition to the exchange rate, the balance of payments is influenced by foreign investment and domestic household consumption. As well as with Kennedy (2013) mentioned that the factors that influenced the balance of payments in Kenya between 1963-2012 were the exchange rate, the level of trade transactions, and the inflow of foreign investment. Further research by (Ajayi, 2014) with A partial adjustment analysis, obtained the results that there has been a decrease in transactions in open trade, the largest percentage of investment is held by the private sector, a decrease in the money supply, high exchange rates and loosening of monetary policy have resulted in an increase in the balance of payments in Nigeria.

To achieve a balance of payments balance, the current account must maintain a balance between exports and imports, so as not to run into a deficit (Ekananda, 2015). Export is trade by removing goods from outside the region in accordance with applicable regulations.

An increase in exports can make the economy better. Meanwhile, import is trade by importing goods from abroad into the country in accordance with the provisions of the applicable laws and regulations (Destiandy, R., Amaliah, I. & Rocheati, 2014).

Fluctuations in the balance of payments are a reflection of exchange rate volatility. The crisis factors also greatly affected the deficit or surplus in the balance of payments, as we know that the crisis occurred in 1998 and 2008 due to the subprime mortgage factor. The balance of payments is one of the macroeconomic indicators that is considered as an assessment of the stability of a country's economy (Utami, 2008). A positive balance is an indicator that there is a trade surplus because the value of exports is higher than imports, and conversely a negative balance is a reflection that there is a trade deficit.

Depreciation of the exchange rate (the price of domestic goods is relatively cheaper for foreign countries), increasing the price of a foreign currency or reducing the domestic currency due to market mechanisms. Appreciation occurs in a country when the price of foreign currency decreases, or the country has experienced an increase in the value of the currency. If the exchange rate depreciates, a country will increase exports because domestic prices are relatively cheaper than foreign prices so that it becomes a competitiveness to increase exports, and vice versa if a country experiences appreciation then the country will increase imports (Machmud, 2016).

Government policy in general can use several implications for monetary control by changing the exchange rate system to a fully floating system, which was previously a controlled floating system. In theory, in a fully floating exchange rate system, monetary policy will be more effective, especially if it is followed by increasingly perfect international capital mobility. If monetary policy causes pressure on the exchange rate, adjustments should be made through capital flows that are influenced by interest rates and exchange rates on trade transactions between countries. Through this mechanism, the current account balance serves as an important adjustment mechanism so that the overall balance of payments (BOP) is always balanced (Machpudin, 2013).

According to Indratno (2009) The world economy which began to improve during 2004 had a positive impact on the balance of payments in ASEAN and particularly in Indonesia. The surplus in payments was due to an increase in exports due to an increase in world trade volume and commodity prices. Meanwhile, the surplus in capital flows is related to increased investor confidence in the economic prospects of destination countries and is in line with the trend of increasing capital flows to developing countries, namely Southeast Asia. Given the problems described above, this study aims to analyze and compare whether there is a causal relationship between the balance of payments and currency exchange rates

in ASEAN countries. By using Granger causality, this study tries to observe whether in ASEAN countries there has been a currency appreciation that has led to a balance of payments surplus or a balance of payments surplus has driven currency appreciation, or both mechanisms run concurrently.

This study is expected to determine the state of the balance of payments in each ASEAN country, so that a country will be able to know the inflows and outflows of funds for economic transactions. In this way, it can be seen whether the financial sector is running well and how international market players act. The balance of payments is influenced by the exchange rate which is the cause of the high or low prices of exported and imported goods. In the face of unstable economic developments lately, a series of cooperation between countries, especially Southeast Asian countries, namely the ASEAN Economic Community (AEC) has been formed. The members cooperate and compete dynamically, as well as take coordinated joint actions in shaping the stability and sustainability of the economies of each ASEAN country. Overall, the most important thing is that the governments of each country can determine policies or strategic steps to increase state revenues from international trade activities by knowing the state of the balance of payments.

Method

The selection of 10 ASEAN countries is due to the existence of the ASEAN Economic Community (AEC) which has the aim of accommodating the needs of international trade in ASEAN countries so that its members can compete dynamically and improve connectivity and cooperation between members (Winantyo, R., Saputra, R. D., & Fitriani, 2015). The study used secondary data, namely Balance of payment (IMF.org) and exchange rate (Worldbank.org).

The identification process and research model is carried out in 3 stages, namely: First, Stationary Test (Unit Root Test) is a test carried out to see if the data is stationary or not, if the data is not stationary at the level level, the examiner can perform a unit root test at the 1st level. different to the level of 2nd Different and using ADF (Augument Dickey – Fuller Test). If the research is not stationary, it can lead to a spurious regression. Second, the Cointegration Test is a continuation of the cointegration test and is carried out to find out whether there is a long-term relationship between the independent variable and the dependent variable. If the variable is cointegrated, there is a long-term relationship between the independent variable and the dependent variable. The Engl-Grenger cointegration test (EG) is based on or the ADF (C, n), ADF (T, 4) test and CDRW cointegration regression statistics (Cointeggartion Regression Durbin Waston). Third, Determination of Optimum

Lag is used to find out how much optimum lag can be used in the estimation. Determination of the optimum lag is obtained from the Akaike Information Crititorion (AIC) value.

This study uses the Granger Causality Test method, therefore the research data is in the form of a time series. Causality is a two-way relationship (reciprocal), if there is a two-way relationship then there are no longer independent variables or dependent variables, all of them are dependent variables. To see the relationship between these variables, F statistic can be used with a confidence level of 1%, 5%, 10% or compare the probability levels. If the variable has a statistical F value > F table, then the two variables have a causal relationship.

The research period starts from 2005 to 2019. The research period used is from 2005-2019 because the volume of imports and exports in ASEAN countries tends to fluctuate. Based on data from the ASEAN Secretariat, ASEAN Imports in 2005 were dominated by Singapore, Indonesia, Malaysia, and Thailand and similarly until 2019. Singapore remains in first place with a share of 25.39 percent in 2019. The same thing also happened to the export share of ASEAN member countries in ASEAN, where Singapore, Malaysia, Thailand, and Indonesia still dominate exports in ASEAN. In 2010 Indonesia's exports were recorded at 12.61 percent and in 2017 it increased by 0.04 percent to 12.65 percent, a very small number compared to the increase in export shares experienced by Malaysia and Thailand. In 2017 Indonesia remained in fourth place under Singapore, Malaysia, and Thailand.

The type of data used is secondary data, namely data that is published in general. Data on both dependent and independent variables in this study can be collected from the World Bank and the International Monetary Fund. The following details of research variables are presented in Table 1.

Table 1. Research variables

<i>Countries</i>	<i>Balance of Payment (NP)</i>	<i>Exchange Rate (EX)</i>
Brunei Darussalam	Percent of GDP	Brunei Dollar/USD
Indonesia	Percent of GDP	Rupiah/USD
Cambodia	Percent of GDP	Riel/USD
Lao PDR	Percent of GDP	Kip/USD
Myanmar	Percent of GDP	Kyat/USD
Malaysia	Percent of GDP	Ringgit/USD
Philippines	Percent of GDP	Peso/USD
Singapore	Percent of GDP	Singapore Dollar/USD
Thailand	Percent of GDP	Bath/USD
Vietnam	Percent of GDP	Dong/USD

The definition of the variables used is, the balance of payments (NP) is a trade transaction between countries which is calculated every period (year). Data obtained from the IMF website in units (%) of GDP, while the exchange rate (EX) is a measure of a country's currency against other countries' currencies, this study uses official exchange rate data obtained from the data.worldbank.org website which is stated in original value.

The balance of payments has components of the current account balance (export-import flows) and the capital flow balance (government capital flows, private sector in this case FDI and others). The balance of payments reflects a number of international trade activities with respect to several countries. The exchange rate greatly affects the amount of transactions, when the currency depreciates, the country will increase exports because it is profitable to increase the current account surplus. The five countries adopt a controlled floating exchange rate system where the exchange rate is generated by market mechanisms but there is still intervention from the government. Capital inflow and outflow are also closely related, if there is an outflow of capital, there will be depreciation and if there is an outflow, there will be an appreciation.

Indicators in international trade that can show the strength of a country's economy are foreign exchange reserves. Exchange rates, exports, and imports are factors that affect the amount of foreign exchange reserves. The higher the number of goods exported by a country, the more foreign exchange reserves. This is because the state obtains foreign exchange which is a source of state income so that it is able to make payments while strengthening the exchange rate or is appreciated as a result of a balance of payments surplus (Agustina & Reny, 2014). From the description above, there is a causal relationship between the balance of payments and the exchange rate and can be explained as follows:

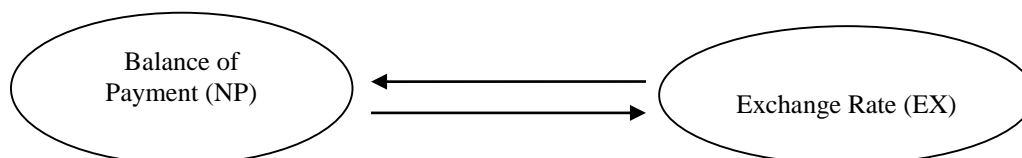


Figure 2. Causality relationship between the Balance of payments and the exchange rate

Results and Discussion

The results of the unit root test using the Augmented Dickey-Fuller (ADF) method in this study can be seen in Table 2a (Balance of Payment) and Tabel 2b (Exchange Rate). At the level level, the balance of payments variable is partially stationary, as well as for the exchange rate variable. In order for the non-stationary variables to be free from the unit root with a P-Value below 0.05, the first or second level reduction is carried out.

Table 2a. Stationerity Test Results: Balance of Payment

<i>Countries (BOP)</i>	<i>Level</i>		<i>First Difference</i>		<i>Second Difference</i>	
	<i>P-value</i>	<i>Stationer</i>	<i>P-value</i>	<i>Stationer</i>	<i>P-value</i>	<i>Stationer</i>
Brunei Darussalam					0,0015	Yes
Indonesia	0,0002	Yes				
Cambodia	0,0001	Yes				
Lao PDR	0,0064	Yes				
Myanmar	0,0074	Yes				
Malaysia					0,0000	Yes
Philippines					0,0008	Yes
Singapore					0,0002	Yes
Thailand	0,0065	Yes				
Vietnam			0,0143	Yes		

Table 2b. Stationerity Test Results: Exchange Rate

<i>Countries (EX)</i>	<i>Level</i>		<i>First Difference</i>		<i>Second Difference</i>	
	<i>P-value</i>	<i>Stationer</i>	<i>P-value</i>	<i>Stationer</i>	<i>P-value</i>	<i>Stationer</i>
Brunei Darussalam	0,0005	Yes				
Indonesia					0,0870	Yes
Cambodia	0,0398	Yes				
Lao PDR	0,0009	Yes				
Myanmar			0,0024	Yes		
Malaysia					0,0069	Yes
Philippines					0,0172	Yes
Singapore					0,0045	Yes
Thailand	0,0319	Yes				
Vietnam			0,0081	Yes		

Source : E-views, 2021

Cointegration test was carried out in this study because the results of the stationary test showed that all data were free from unit roots at the second derivative level. Thus, it is possible whether all the variable data in this study remain related in the long term (Juanda, 2012)

Table 3. Cointegration Test Results

<i>Countries</i>	<i>Trace-Sta</i>	<i>Prob</i>	<i>Keterangan</i>
Brunei Darussalam	21,7012	0,0005	Kointegrasi
Indonesia	16,3686	0,0036	Kointegrasi
Cambodia	37,5758	0,0000	Kointegrasi
Lao PDR	19,1739	0,0013	Kointegrasi
Myanmar	17,0423	0,0002	Kointegrasi
Malaysia	16,1597	0,0032	Kointegrasi

<i>Countries</i>	<i>Trace-Sta</i>	<i>Prob</i>	<i>Keterangan</i>
Philippines	68,7505	0,0000	Kointegrasi
Singapore	25,0491	0,0014	Kointegrasi
Thailand	16,3337	0,0037	Kointegrasi
Vietnam	17,2716	0,0026	Kointegrasi

Source: E-views, 2021

Determination of the optimum lag has the aim of overcoming the autocorrelation problem and knowing how long it takes to react to other variables. The Akaike Information Criterion (AIC) criterion is the reference for the length of the lag. The test results show that only Thailand reacts the longest, namely in the fourth lag.

Table 4. Optimum Lag Test Results

<i>Countries</i>	<i>Lag</i>	<i>Nilai AIC</i>
Brunei Darussalam	3	13,0411
Indonesia	1	37,7661
Cambodia	2	25,8443
Lao PDR	2	26,6349
Myanmar	3	35,0442
Malaysia	1	22,8759
Philippines	3	33,7012
Singapore	3	17,9565
Thailand	4	34,3751
Vietnam	3	35,6337

Source: E-views, 2021

After testing the cointegration and optimum lag, the model is determined, namely the VECM model. The purpose of this method is as an approach to estimate the long-term and short-term relationship of one time series data to other time series data (Satria, 2005). Based on these tests, the Chi-square values are obtained as follows:

Filipina : $dNP = 0.22EX(-1) - 0.21NP(-1)$ dan $dEX = 0,04NP(-2) + 002EX(-2)$

Myanmar : $dNP = -0,36EX(-1) - 0,36NP (-1)$ dan $dEX = 0,26NP(-2) -0,52EX(-2)$

Granger's Causality Test is used to see the causality of the relationship between a research variable, namely the exchange rate (EX) and balance of payments (NP). As it is known that there are two forms of hypotheses, namely:

H_0 : EX does not affect NP

H_1 : EX affects NP

H_0 : NP does not affect EX

H_1 : NP affects EX

From the estimation results, the causality relationship only has one direction, because when using a probability value of 5%, only a few states are smaller than the probability level. In Myanmar, the probability value of 0.0117 on the trade balance does not cause the exchange rate and vice versa with a value of 0.0009. This means that we accept H_1 or the balance of payments has a clauseal relationship with the two-way exchange rate in Myanmar. Similarly, the Philippines which has a probability value of 0.0094 on the balance of payments does not cause an exchange rate and is equivalent to a probability of 0.0022. This means that we accept that H_1 or balance of payments has a causal relationship with the two-way exchange rate in the Philippines. In contrast to the two countries, Brunei Darussalam, Indonesia, Laos, Malaysia, Singapore, Thailand, and Vietnam have values that are not significant or have no causal relationship.

Changes in exchange rates cause changes in payment transactions relative to the opposite direction. The relative decline in the current account was due to an increase in the exchange rate, and conversely, the relative increase in the current account was due to the strengthening of the Peso and Kyat against the United States dollar. This explains that an increase in the exchange rate that drives an increase in imports causes a decrease in a country's payment transactions over a certain period of time.

Table 5. Granger Clausity Test Results

<i>Countries</i>	<i>Prob.</i>	<i>Observation</i>	<i>Causality</i>
Brunei Darussalam	0,7498	11	No
Indonesia	0,8457	12	No
Cambodia	0,8207	12	No
Lao PDR	0,5668	12	No
Myanmar	0,0117	12	Yess
Malaysia	0,7107	12	No
Philippines	0,0094	12	Yess
Singapore	0,4284	12	No
Thailand	0,7231	11	No
Vietnam	0,7379	12	No

Source: E-views, 2021

One of the theories in international economics is the Marshall-Lerner condition or also called the Marshall-Lerner-Robinson condition which states that a country's balance of payments can be improved or increased by depreciation of the exchange rate system. The depreciation in question can be in the form of a floating exchange rate system or a fixed exchange rate system. In the short-term currency depreciation has a negative impact on the balance sheet. On the other hand, in the long term, the improvement in the balance of payments situation can be overcome by currency depreciation because it can increase the

balance of transactions. This can happen because depreciation causes a change in price after a time adjustment. The Marshall-Lerner condition theory can be justified if the foreign exchange market conditions are stable (Snowdon, B. & Vane, 2002) assumes the Marshall-Lerner condition, namely the balance of services, investments and unilateral transfers is zero. In the end, the condition of the trade balance which records export-import flows will be in balance with the current account balance in a country in the period (Amalia, 2007). The existence of a balance in the long-term relationship between the exchange rate, balance of payments and real income of a country can identify that the country is cointegrated.

An example is the case of trade relations between Indonesia and Malaysia, which have trade partners with America and Japan. In a different case, the bilateral relationship between Thailand and Japan found a J-curve effect. Depreciation initially worsened the trade balance for about four quarters but would be followed by developments in the long run. But the case of Thailand is the opposite, initially the balance of payments can be corrected by a shock currency devaluation, but after that it worsens and the balance of payments returns afterward. This pattern does not support the classical hypothesis of the J curve but is consistent with the S curve described by (Backus, D. k., Keheo, J. P. & Finn, 1994).

The J curve or the J curve effect is an illustration of the depreciation of the balance of payments which is influenced by changes in the exchange rate of a country's currency. Basically, the relationship between the balance of payments and the exchange rate is positive. However, the relationship between the exchange rate and the current account balance is not always positive, it can be explained that the balance of trade and balance of payments are often factors that can push up or down the exchange rate of a country's currency. This statement is in accordance with the results of research which states that only two countries where the two variables have a quality relationship or have a positive reciprocal effect.

In the short term, the effect of currency depreciation will indeed have a negative impact on the economy but will have a positive impact on the balance of payments. In the long-term current account, this positive impact can occur through increasing international competitiveness which has an impact on increasing the value of exports (Pugel, 2004). However, depreciation will also have an impact on a decrease in imports as a result of the diversion of spending by domestic residents as well as an increase in aggregate demand for foreign residents for domestic products, which in turn will increase exports (Darwanto, 2007).

Conclusion

From the results of the discussion, it can be concluded that only Myanmar and the Philippines have exchange rate and balance of payments variables that have a causal relationship in line with the curve in the introduction where the exchange rates of the two countries are relatively higher than Indonesia and Vietnam which reached tens of thousands of rupiah. This means that no matter how small the exchange rate (depreciation), there is no or little possibility for Indonesia and Vietnam to export, which reduces the current account which is part of the balance of payments.

The governments of ASEAN countries, in particular the Indonesian government, must start to carry out incentives to encourage existing companies such as subsidies, relief from export regulations, and other things that encourage increased exports. Then the central bank specifically provides a policy to reduce deposit interest rates so that the level of investment becomes higher and stimulates the economy, as well as controlling the value of the rupiah properly to attract investors to invest in FDI and portfolios, so that there is capital inflows and improve the balance of capital. Reducing imports is the main key to improving the exchange rate.

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