The Foreigner Currency Market Analysis: Emerging Market of Muslim Countries

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Abstrak: Penelitian ini menganalisis hubungan antara Ekspor, Inflasi, Jumlah Uang Beredar, PDB, Impor, dan Pendapatan Per kapita terhadap nilai tukar. Dimana variabel kebijakan moneter (Nilai Tukar, PDB, Jumlah Uang Beredar, Inflasi, Pendapatan Per kapita) dan kebijakan makro (Ekspor dan Impor). Menggunakan data deret waktu dari 2010 hingga 2019. Model analisis data adalah metode Vector Autoregression yang dilihat dan dipertajam oleh analisis Impulse Response Function dan Forecast Error Variance Decomposition. Hasil analisis IRF mengetahui bahwa stabilitas respons semua variabel terbentuk pada periode lima atau menengah atau menengah dan jangka panjang, dimana respon variabel lain terhadap perubahan dalam satu variabel menunjukkan variasi yang berbeda dari respon positif ke negatif atau sebaliknya. Beberapa variabel menunjukkan reaksi positif atau tetap negatif dalam jangka pendek hingga panjang. Hasil analisis FEVD menunjukkan bahwa nilai tukar variabel dalam jangka pendek dan menengah direkomendasikan oleh Variabel Nilai Tukar itu sendiri dan Jumlah Jumlah Uang Beredar. Pada saat yang sama, jangka panjang dipengaruhi oleh Impor. Nilai tukar menunjukkan variabel ekspor dalam jangka pendek, sedangkan jangka menengah dan panjang dipengaruhi oleh Pendapatan Per kapita. Kemudian, variabel impor pada Impor jangka menengah dan panjang jangka pendek dipengaruhi oleh Ekspor. Dalam jangka pendek dan menengah, PDB variabel dipengaruhi oleh PDB itu sendiri dan nilai tukar, sedangkan dalam jangka panjang dipengaruhi oleh pendapatan Per kapita. Inflasi dalam jangka menengah dan panjang dipengaruhi oleh impor. Jumlah uang beredar dalam jangka menengah dan panjang dipengaruhi oleh Inflasi dan impor, sedangkan ekspor mempengaruhi pendapatan per kapita dalam waktu pendek, menengah, dan panjang. Sehingga dapat direkomendasikan dalam penelitian ini adalah sebagai masukan bagi pemerintah, yaitu melalui Bank Indonesia, Kementerian Keuangan, dan Bank Sentral Negara, yang menjadi objek penelitian dalam pengendalian nilai tukar sebagai upaya menjaga stabilitas pasar mata uang di emerging market Negara Muslim melalui pengendalian inflasi untuk meningkatkan stabilitas harga yang dapat mendorong pertumbuhan ekonomi.

Kata Kunci: *Currency*, *Emerging*, Nilai Tukar, Pasar.

Abstract: This study analyzes the relationship between Exports, Inflation, Money Supply, GDP, Imports, and Per capita Income to exchange rates. Where variable monetary policy (Exchange Rate, GDP, Money Supply, Inflation, Per capita Income) and macro policy (Export and Import). Using time-series data from 2010 to 2019. The data analysis model is a Vector Autoregression method viewed and sharpened by Impulse Response Function analysis and Forecast Error Variance Decomposition. The results of the IRF analysis know that the response stability of all variables is formed in the five or medium or medium-term and long-term periods, where the response of other variables to changes in one variable shows different variations from positive to negative responses or vice versa. Some variables show a positive reaction or remain negative in the short to long term. The results of the FEVD analysis show that variable exchange rates in the short and medium term are recommended by the Variable Exchange Rate itself and the Money Supply Amount. At the same time, the long term is affected by Imports. The exchange rate suggests export variables in the short term, while the medium and long term is affected by Per capita Income. Then, import variables in the medium and long short term Imports are affected by Exports. In the short and medium-term, variable GDP is influenced by GDP itself and the exchange rate, while in the long run, it is influenced by Per capita income. Inflation in the medium and long short term is affected by imports. The money supply in the medium and long term is affected by Inflation and imports, while exports influence per capita income in the short, medium, and long time. So that can be recommended in this study is as input for the government, namely through Bank Indonesia, the Ministry of Finance, and the Central Banks of the State, which is the object of research in controlling exchange rates as an effort to maintain currency market stability in emerging markets of Muslim Countries through inflation control to increase price stability that can boost economic growth.

Keywords: Currency; Emerging; Exchange Rate; Market; Muslim

INTRODUCTION

Economic stability is a condition reflected by the size of currency stability. In support of more optimal macroeconomic stability and creating a solid monetary policy framework, appropriate monetary policy is needed to achieve stability goals in the long run. The ultimate goal of monetary policy is to maintain the rupiah value's stability, one of which is reflected in the low and stable inflation rate (Rusiadi, 2018). There are various factors that affect the trade balance so that it cannot run smoothly is the exchange rate (Christianto & Setiawan, 2014). In its development, the currency market today that money serves not only as a medium of exchange but also as a commodity that is traded and speculated.

According to (Ekananda & Mahyus, 2014), the exchange rate or exchange rate is one of the tools to analyze a country's economy. Currency exchange rate movements will impact the value of commodities and assets because the exchange rate can affect the amount of cash inflows received from exports and the number of cash outflows used to pay imports. Depreciation of a country's currency against another country's currency will result in increased costs to import goods such as consumer goods, capital goods, and raw materials for production. To cover the cost of imports that become expensive domestic producers will increase the price of their manufactured goods to result in price increases at the level of domestic prices, which is a reflection of the inflation rate. It can be concluded that there is a positive relationship between the exchange rate and the inflation rate.

This study discusses several Muslim-majority countries that belong to the emerging market group. An emerging market is a market that has some characteristics of a developed market but does not fully meet its standards. The country is still a developing country that initially had a low economy, but now it can be said to be rapidly developed. There are eight countries with the highest Muslim population here. The author only examined eight countries, namely, Indonesia, Turkey, Saudi Arabian, Egypt, Pakistan, Bangladesh, United Arab Emirates, and Malaysia. Here are the exchange rate movements grouped in Moslem countries' emerging markets from 2010 to 2019.

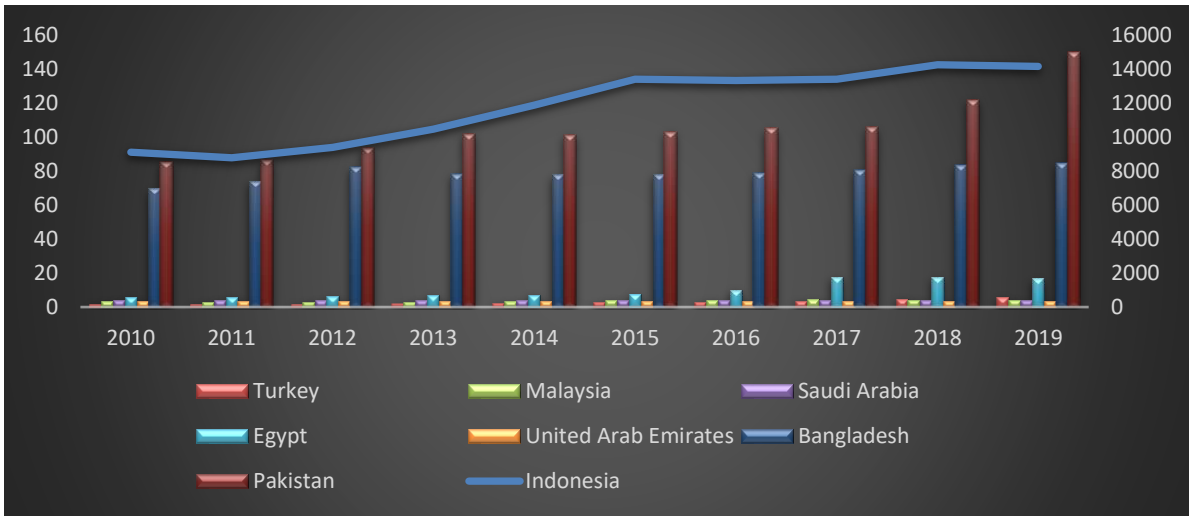

Figure 1. the Exchange Rate Emerging Market of Moslem Countries 2010 to 2019 (Billion US$)

Source: www.worldbank.org.id

Exchange rates influence the continuity of international trade between countries. International trade activities will affect the rate of money circulation in each country which causes fluctuations in currency flows. Fluctuations in exchange rate changes will cause risks where the higher the fluctuations, the greater the risk; the lower the fluctuations, the smaller the risk. This happens to all Muslim countries, namely Indonesia, Turkey, Malaysia, Egypt, Bangladesh, and Pakistan. In 2015, Indonesia's exchange rate increased to 13,389.41 billion US$ from the previous year of 11,865.21 billion US dollars, the country of Turkey rose to 2.72 billion US$ from 2.19 billion US$ during the last year, Malaysia increased 3.91 billion US$ from 3.27 billion US$ from the previous year, Egypt increased 7.69 billion US$ from the previous year 7.08 billion US$, Bangladesh increased by 77.95 billion US$ of the prior year 77.64 billion US$, Pakistan increased from 102.77 billion US$ from 101.10 in the previous year. Suppose the Saudi Arabian state and the United Arab Emirates remain at the same price in the same year. In that case, this impacted the economic crisis in European countries, especially America.

If the rupiah exchange rate weakens, there is an inequality in export goods and companies oriented to raw materials imported from abroad, where export goods are more competitive. Still, on the other hand, the cost becomes higher if Indonesian producers use more imported raw materials from abroad. If the U.S. dollar exchange rate depreciates, the value of the domestic currency weakens, which means that the value of foreign currency strengthens. The exchange rate (price) will cause exports to increase, and imports tend to decline. So the foreign exchange rate has a relationship that is in the direction of export volume. Suppose the domestic currency appreciates against foreign currency. In that case, the import price for the domestic population becomes cheaper. Still, if the value of

the domestic currency depreciates, the value of the foreign currency becomes more expensive, resulting in its exports to foreign parties becoming cheaper. Muslim populations are a location gap in this research.

LITERATURE REVIEW

Theoretically, the influence of exports on the exchange rate has a negative relationship where the strengthening of the rupiah exchange rate with the higher export value. Receipts from exports of goods and services by other countries are getting bigger, resulting in the amount of foreign exchange owned by a government getting more significant so that the exchange rate of the rupiah against the US dollar tends to strengthen.

Inflation also affects the exchange rate because Inflation is a reflection of changes in the price level of goods that occur in the market and lead to the level of demand and supply of money. At the world level, Inflation is a benchmark for a country's economy, whether a country's economy is in good or bad condition (Margareni et al., 2016). If a country's Inflation increases, the demand for that country's currency will fall because the country's exports fall due to higher prices. Besides that, consumers and companies within that country tend to increase their imports.

Imports will be responded to positively by the exchange rate. Short- and long-term implications also significantly favorably influence the rupiah exchange rate. Research (Agustin, 2009) states that the variable relationship between total import value and the exchange rate is unidirectional or positive. The higher import value will result in a weaker exchange rate where an increase will follow the expectation of imports in forex used to pay for imported goods. The existing theory considers the results of this study where the growth of imports means increasing payments to foreign exports so that it will increase foreign exchange in the country, which causes the rupiah exchange rate to depreciate.

The Money Supply is very closely related to the movement of the exchange rate because the position of the Money Supply will significantly affect the

performance of the value of a domestic currency assessed in foreign exchange currency (Pratiwi & Santoso, 2012).

According to (Sukirno, 2010), the economy can be said to grow if the genuine reciprocity for its production factors in a given year is more significant than in previous years. A rough picture of the size of a country's economic growth usually uses the level of GDP achieved by that country. Suppose the economic conditions are advanced, but the progress causes the demand for foreign goods to grow faster than domestic goods. In that case, the need for the domestic currency will decrease, resulting in the exchange rate weakening.

Per capita income can influence exchange rates through international trade mechanisms. Rising incomes cause consumers to look for a better combination of consumption (tend to increase) so that countries where consumers are located, want international trade. The rise and fall of income will affect the demand for imported goods which will affect the demand for foreign currency.

METHODS

This research approach is quantitative research with secondary cross-section data, a type of data consisting of variables collected on many individuals or categories at a given time. The data analysis technique used in the research is the VAR (Vector Auto Regression) method. This research was conducted in emerging markets of Muslim countries, namely Indonesia, Turkey, Malaysia, Saudi Arabian, Egypt, United Arab Emirates, Bangladesh, and Pakistan, from 2010 - 2019 (10 years).

Here are the stages in this research method.

1) Stationary Test

Time series data usually has problems, mainly stationary or stationary. Analyzing data that is not stationary will produce spurious regression results and less meaningful conclusions (Enders, 1995). Therefore, the first step is to test and make the data stationary. This stationarity test is done to see if the time series data contains the root unit (root unit). The commonly used methods are the Dickey-Fuller (DF) test and the Dickey-Fuller Augmented test (ADF). The data is said to

be stationary, assuming the mean and its variance are constant. In conducting the stationarity test, the analysis tool used is the root unit test. The root test unit was first developed by Dickey-Fuller and is known as the Dickey-Fuller (DF) root test unit.

2) Cointegration Test

(Granger, 1988) explains that if two variables integrate at degree one, I (1), and integrate, then there is at least one direction of Granger causality. Whether or not co-integration is based on the Trace Statistic and Maximum Eigenvalue tests. If the calculated value of Trace Statistic and Maximum Eigenvalue is greater than the critical value, there is co-integration in many variables. Otherwise, there is no co-integration if the trace statistic calculation value and maximum Eigenvalue are smaller than the critical value.

3) Granger's Causality Test

The Granger causality test is a statistical hypothesis test to determine whether one-time series helps estimate another (Granger, 1969). According to (Gujarati, 2003), causality relations are divided into three categories: (1) One-way causality relationships. If one of the variables is influential, in the sense that only the variable z affects y or variable y affects z. (2) The two-way causality relationship. In the event of a reciprocal relationship between the two variables, z affects y, and y also affects z. (3)There is no reciprocal relationship. If the two variables do not affect each other, z does not affect y, and y also does not affect z.

4) VAR Structure Lag Stability Test

According to (Arsana, 2004), the stability of the VAR system will be seen from the inverse roots characteristics of polynomial AR. This can be seen from the modulus value in the AR-nomial table. If the entire AR-roots value is below 1, then the VAR system is stable. Var stability test is done by calculating the roots of the polynomial function, known as the roots of polynomial characteristics. If all the sources of the polynomial function are inside the circle unit or if the absolute value is < 1, then the VAR model is considered stable so that the resulting IRF and FEVD will be regarded as valid.

5) Optimal Lag Rate Determination

Optimal lag determination can use schwarz criterion (SC), Hannan-Quinn Information Criterion (HQ), Akaike Information Criterion (AIC). In this study using AIC criteria, according to Eviews user guide (2000) the definition of AIC, SC and HQ is as follows:

Akaike Information Criteria = -2(l /T)+ 2 (k/ T)

[1]

Schwarz Criterion = -2(l /T)+ k log (T)/ T

[2]

Hannan-Quinn Information Criterion = -2(l /T)+ 2k log (log(T)) / T

[3]

Where l is the log value of the likelihood function with k estimation parameters with many observation T's, to establish the most optimal lag, the estimated VAR model is sought maximum lag. Then the lag rate is lowered. The most optimal lag is sought and combined with a VAR stability test from the different lag levels.

a. Impulse Response Function (IRF) Model

Impulse Response Function (IRF) is performed to determine the dynamic response of each variable to one standard deviation of innovation. (Ariefianto, 2012) states that IRF searches for the impact of a shock on a variable on the system (all variables) at any given time.

b. Forecast Error Variance Decomposition (FEVD) Model

Forecast Error Variance Decomposition (FEVD) is done to determine the relative importance of various shocks to the variable itself and other variables. According to (Manurung, 2005), FEVD analysis aims to determine the influence or contribution between transmit variables. The FEVD equation can be derived as follows:

$E_tX_{t+1} = A_0 + A_1X_1$

[4]

This means that the values A_0 and A_1 are used to estimate the future value of X_{t+1}

$$E_t X_{t+n} = e_{t+n} + A_1{}^2 e_{t+n-2} + \ldots\ldots\ldots\ldots\ldots + A_1^{n-1} e_{t+1}$$

[5]

This means that the FEVD value is always 100 percent. The higher FEVD value explains the contribution of the variance of one transmit variable to another transmit variable is higher.

The formula of the VAR analysis model is as follows:

$$ERt=\beta 10EXPt\text{-}p + \beta 11MSt\text{-}p + \beta 12GDPt\text{-}p + \beta 13INFt\text{-}p + \beta 14IpCt\text{-}p + \beta 15IMPt\text{-}p + et1$$ [6]

$$EXPt=\beta 20MSt\text{-}p + \beta 22GDPt\text{-}p + \beta 23INFt\text{-}p + \beta 24IpCt\text{-}p + \beta 25IMPt\text{-}p + \beta 26ERt\text{-}p + et2$$ [7]

$$MSt=\beta 30GDPt\text{-}p + \beta 31INFt\text{-}p + \beta 32IpCt\text{-}p + \beta 33IMPt\text{-}p + \beta 34ERt\text{-}p + \beta 35EXPt\text{-}p + et3$$ [8]

$$GDPt=\beta 40INFt\text{-}p + \beta 41IpCt\text{-}p + \beta 42IMPt\text{-}p + \beta 43ERt\text{-}p + \beta 44EXPt\text{-}p + \beta 45MSt\text{-}p + et4$$ [9]

$$INFt=\beta 50IpCt\text{-}p + \beta 51IMPt\text{-}p + \beta 52ERt\text{-}p + \beta 53EXPt\text{-}p + \beta 54MSt\text{-}p + \beta 55GDPt\text{-}p + et5$$ [10]

$$IpCt=\beta 60IMPt\text{-}p + \beta 61ERt\text{-}p + \beta 62EXPt\text{-}p + \beta 63MSt\text{-}p + \beta 64GDPt\text{-}p + \beta 65\ INFt\text{-}p + et6$$ [11]

$$IMPt=\beta 71ERt\text{-}p + \beta 71EXPt\text{-}p + \beta 72MSt\text{-}p + \beta 73GDPt\text{-}p + \beta 74INFt\text{-}p + \beta 75IpCt\text{-}p + et7$$ [12]

Where:

ER	= the Exchange Rate
EXP	= Export
MS	= Money Supply
INF	= the Inflation
IpC	= Income per Capita
IMP	= Import
GDP	= Gross Domestic Product
i	= cross-section
t	= time-series
α	= intercept
β	= coefficient

e = error term

Table 1. Operational Definition Variables

No	Variabel	Operational Definition	Keterangan
1.	the Exchange Rate *(ER)*	The exchange rate used in this study is the dollar exchange rate.	World Bank
2.	Export *(EXP)*	The export used in this study is national export.	CEIC Data
3.	Import *(IMP)*	The import used in this study is national imports.	CEIC Data
4.	The Inflation *(INF)*	The Inflation used in this study is the consumer price index.	World Bank
5.	Gross Domestic Product *(GDP)*	The GDP used in this study is the total constant price GDP in 2000 (Billion US$)	World Bank
6.	Money Supply *(MS)*	The amount of Money Supply used in this study is M2, which is the number of requests for money Kartal + Giral money	World Bank
7.	The income per Capita *(IpC)*	Per capita income used in this study is per capita income dollar	CEIC Data

RESULTS AND DISCUSSION

The global economy is still showing a slowdown, as reflected in the forecast of a decline in the economies of developed countries that are larger than initially estimated. Global financial market conditions are also still fragile, with many reports of losses of world financial institutions. This harms economic development in the region, especially for countries that rely on exports to developed countries, including Indonesia. Meanwhile, global liquidity's tightness is still ongoing, followed by increasing perceptions of emerging market risks.
However, although Indonesia's economic system is still slightly ups and downs, if viewed on a global scale or the International scale, Indonesia's economic growth is developing quite well, step by step, continue to surpass various countries that should have a stable monetary system.

The condition of the global economy that has not recovered and the possibility of expanding the intensity and scale of the crisis makes us all have to remain vigilant and careful in responding to existing developments. Maintaining

the stability and strength of economic fundamentals through improving the investment climate by building infrastructure and revamping the path of investment bureaucracy, as well as improving the quality of government spending, are some of the main policy agendas that must be carried out to maintain and enhance the trend and quality of economic growth this year. Here are the economic developments saw from gross domestic product from 2010 to 2019 in the Eight Emerging Markets Of Moslem Countries.

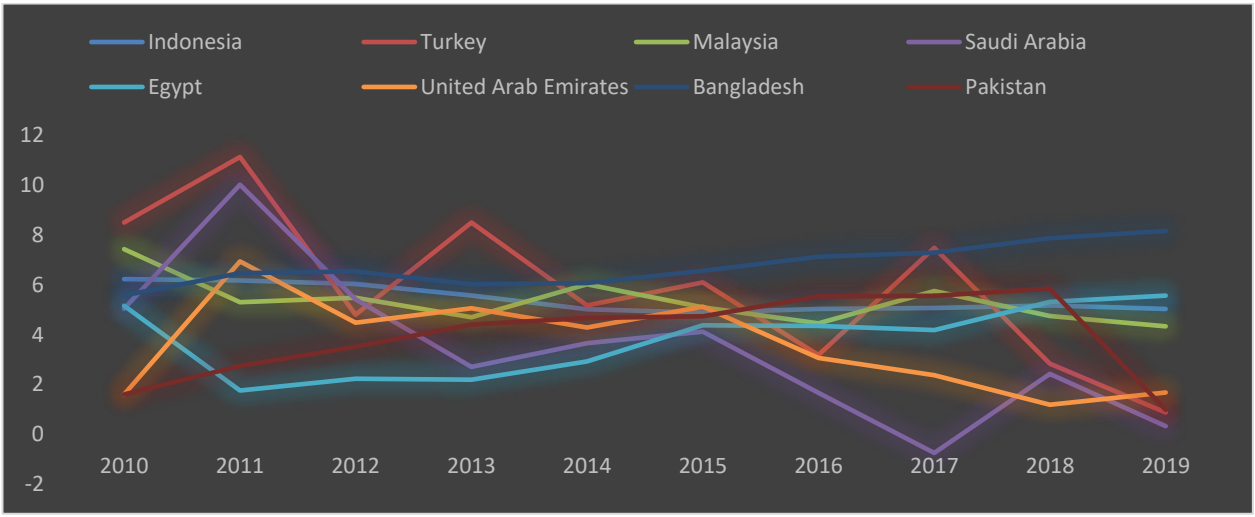

Figure 2. GDP Emerging Market of Moslem Countries Year 2010 to 2019

Source: www.worldbank.org.id

Based on figure 2 above, it is known that the decline in GDP growth of developing Muslim countries such as Indonesia occurred in 2015, down to 4.88 US$ from 5.01 US$ the previous year, as well as in Malaysia, down 5.09 US $ from 6.01 US $ the last year, which is the impact of the economic crisis. However, the effect in the same year in Turkey increased to 6.09 US $ from 5.17 US $ a year earlier, and the Saudi Arabian country increased to 4.11 US $ from 3.65 US $ the previous year. Egypt increased to $4.37 from $2.92 a year earlier, with the United Arab Emirates rising to $5.11 from $4.28 a year earlier. Bangladesh increased to $6.55 from $6.06 a year earlier, and Pakistan's last raised

to $4.73 from $4.67 a year earlier, as the country was able to cope with the economic crisis that year.

Economic growth is a long-term financial problem. According to (Sukirno, 2010), the economy can be said to grow if the genuine reciprocity for its production factors in a given year is more significant than in previous years. A rough picture of the size of a country's economic growth usually uses the level of GDP achieved by that country. Suppose the economic conditions are advanced, but the progress causes the demand for foreign goods to grow faster than domestic goods. In that case, the need for the domestic currency will decrease, resulting in the exchange rate weakening.

Here are the results of the study that can be explained as follows.

Tabel 2. The Result of the Stationary Test

Variables	***level***	***1st difference***
ER	-2.340709	-8.541997
	(-3.515536)	(-3.516676)
	0.1621	0.0000*
EXP	-1.432749	-7.787956
	(-3.515536)	(-3.516676)
	0.5622	0.0000
IMP	-1.751957	-7.541602
	(-3.515536)	(-3.516676)
	0.4015	0.0000*
INF	-4.690064	
	(-3.515536)	-
	0.0002*	
GDP	-5.924460	
	(-3.515536)	-
	0.0000*	
MS	-4.411831	
	(-3.515536)	-
	0.0000*	
IpC	-0.690822	-8.477065

	(-3.515536)	(-3.516676)
	0.8424	0.0000*

*denote significance at 5% level, respectively

Source: Processed Data (2022)

Dickey Fuller's Augmented test results show that almost all variables are not stationary at levels or on actual data, except for GDP, Inflation, and Money Supply (MS) data, as indicated by Dickey Fuller's statistical value, which is below Mc Kinnon's critical value at 5% confidence. Variables not stationary at the solution level are created as new variables by first difference, then retested with the ADF test. The variable data rate, EXP, IMP, and IpC are stationary at 1st difference so that analysis can continue.

The next stage is the Granger Causality Test. The results of this test can be seen as follows:

Tabel 3. The Result of Granger CausalityTest

Variables		**Variables**	
ER 0.9144*	EXP 0.1461*	MS 0.5788*	ER 0.8512*
(does not Granger Cause)	IMP 0.6850*	(does not Granger Cause)	EXP 0.1631*
	GDP 0.0097*		GDP 0.3189*
	INF 0.9059*		IMP 0.0311*
	MS 0.8512*		INF 0.9555*
	IpC 0.9820*		IpC 0.8120*
EXP 0.1461*	KURS 0.9144*	GDP 0.9379*	ER 0.0097*
(does not Granger Cause)	IMP 0.0078*	(does not Granger Cause)	EXP 0.2811*
	GDP 0.2043*		MS 0.2759*
	INF 0.1066*		IMP 0.5997*
	MS 0.1963*		INF 0.3034*
	IpC 0.7541*		IpC 0.2677*
IMP 0.9970*	ER 0.6850*	IpC 0.9729*	ER 0.9820*
(does not Granger Cause)	EXP 0.0078*	(does not Granger Cause)	EXP 0.4735*
	GDP 0.5348*		MS 0.0085*
	INF 0.0034*		IMP 0.6498*
	MS 0.0088*		INF 0.0178*

	IpC 0.8781*	GDP 0.0712*
INF 0.9375*	ER 0.9059*	
(does not Granger Cause)	EXP 0.1378*	
	GDP 0.4335*	
	IMP 0.0179*	
	MS 0.7807*	
	IpC 0.7821*	

*denote significance at 5% level, respectively

Source: Processed Data (2022)

Based on the results of the Causality Test, it is known that each variable, namely ER, IMP, EXP, INF, GDP, MS, and IpC does not have a causality relationship that can be seen from the prob value > α = 0.05.

The next stage is the Johansen Co-integration Test. The results of this test can be seen as follows:

Table 4. The results of the Johansen Cointegration Test

Hypothesized No. of CE(s)	None *	At most 1 *	At most 1 *
(1 to 2)	165.7731	111.4283	71.67758
	125.6154	95.75366	69.81889
	0.0000*	0.0027*	0.0353*

*denote significance at 5% level, respectively

Source*:* Processed Data (2022)

It can be known from this test that there are three integrated equations (such as the description at the bottom of the table) at a 5 percent level, which means the assumption of a long-term relationship between variables is proven.

The next stage is the VAR Structure Lag Stability Test. The results of this test can be seen as follows:

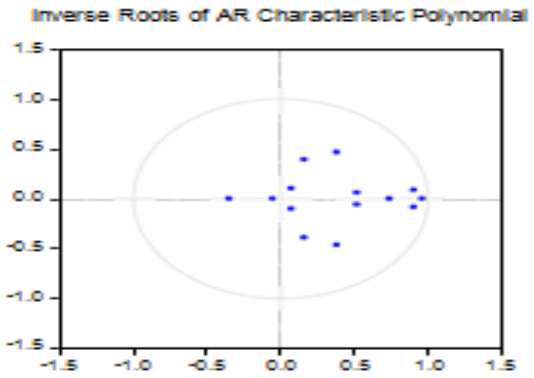

Figure 3. Stability Lag Structure Test

Source: Processed Data 2021

The figure shows the roots point being in a circular line. Where the specifications of models formed using Roots of Characteristic Polynomial and Inverse Roots of AR Characteristic Polynomial obtained stable results, it can be seen that almost all roots units are in the inverse roots of AR Characteristic Polynomial picture circle. Lag stability has been met, so VAR analysis can be continued.

Table 5. The Results of the Stability Lag Structure Test

Vector Autoregression Estimates Lag 1		**Vector Autoregression Estimates Lag 2**	
Akaike information criterion	97.39048	Akaike information criterion	96.40932

Source*:* Processed Data 2022

The results of the lag determination above show that at lag one, the AIC value (97.39048) is greater than the AIC value at lag 2, namely (96.40932). The conclusion is that the use of VAR at lag 2 is more optimal compared to VAR at lag 1. So this study used lag 2 to analyze it.

After the assumption test, namely the stationarity test, the co-integration test, the structure lag stability test, and the optimal lag rate determination, the next step is to analyze the VAR. This analysis is done to determine whether there is a simultaneous relationship (interrelated or mutually contributing) between variables, such as exogenous and endogenous variables, by including the element of time (lag).

Table 6. Summary of VAR Analysis Results

	Variables						
	ER	**EXP**	**IMP**	**INF**	**MS**	**GDP**	**IpC**
Largest Contribution 1	MSt-1	GDPt-1	GDPt-1	INFt-1	MSt-1	GDPt-1	GDPt-1
	111.7893	2346.885	4215.423	0.260920	1.003889	0.248397	364.0360
Largest Contribution 2	GDPt-1	INF t-1	MSt-1	MS t-1	IpCt-1	MSt-1	INFt-1
	4.047865	335.0819	1154.836	0.186340	0.000113	0.019399	160.4447

Source: Processed Data (2022)

In table 6, the conclusions of the contribution of VAR analysis as above show the most significant contributions one and two to a variable, which is then analyzed as follows:

a. VAR Analysis of Exchange Rate (ER)

   The most significant contribution to the Exchange Rate is the Money Supply of the previous period, followed by the GDP of the last period. The weakening of a country's exchange rate (exchange rate) increases the price of goods because it takes a larger amount to get these goods, and imported raw material goods make the cost of production increase so that it becomes a threat to economic growth.

b. VAR Analysis of Export (EXP)

   The most significant contribution to Exports is GDP. The increase in total exports of each country affects GDP to increase the country's production because the high total exports per year indicate the progress of the country's economy it, will promise an increase in Inflation.

c. VAR Analysis of Import (IMP)

   The most significant contribution to imports is GDP. The decrease in import activity of each country affects GDP to increase outside products and will increase the community's economic growth. Rising Inflation will also cause Money Supply, economic development, and income in the community. The increased demand for goods also increases so that domestic production cannot meet the need for goods desired by the community so import pressure will be even greater.

d. VAR Analysis of Inflation (INF)

The most significant contribution to Inflation is Inflation itself in the previous period, followed by the Money Supply of the last period. Inflation can encourage entrepreneurs to increase their production further. Entrepreneurs are eager to expand production because, with the price increase that occurs, entrepreneurs get more profits. In addition, increased production has another positive impact, namely the availability of new jobs. If Inflation is too high, then the increase in the Money Supply in the community is also high so that economic growth will fall and cause a decrease in production costs.

e. VAR Analysis of Gross Domestic Product (GDP)

The most significant contribution to GDP is GDP itself. Stable economic growth indicates that the country has relatively good economic conditions, a rather good economy where the Money Supply in the community is challenging does not rise, nor does it fall.

f. VAR Analysis of Income per Capita (IpC)

The most significant contribution to per capita income is GDP. Per capita income, in general, has a long-term relationship to economic growth. However, this physical per capita income is not the only determinant of economic growth.

Impulse Response Function (IRF) is used to analyze the response of another variable to changes in one variable in the short, medium, and long term. The estimates made for this IRF are focused on the response of a variable to the change of one standard deviation from the variable itself and other variables contained in the model.

Table 7. The Results of Impulse Response Function (IRF)

	Period	Variables						
		ER	EXP	IMP	INF	MS	GDP	IpC
IRF ER	Short-term	+	+	+	+	+	+	+
	Medium-term	+	-	-	+	+	-	+
	Long-term	+	-	-	+	+	-	-

	Period	Variables						
		ER	EXP	IMP	INF	MS	GDP	IpC
IRF EXP	Short-term	+	+	+	+	+	+	+
	Medium-term	-	+	+	+	-	+	+
	Long-term	+	+	-	+	-	+	+

	Period	Variables						
		ER	EXP	IMP	INF	MS	GDP	IpC
IRF IMP	Short-term	+	+	+	+	+	+	+
	Medium-term	-	+	+	+	-	+	+
	Long-term	-	+	+	+	-	+	-

	Period	Variables						
		ER	EXP	IMP	INF	MS	GDP	IpC
IRF GDP	Short-term	-	-	-	+	+	+	+
	Medium-term	+	-	-	+	-	+	-
	Long-term	+	-	-	+	+	+	-

	Period	Variables						
		ER	EXP	IMP	INF	MS	GDP	IpC
IRF INF	Short-term	-	-	+	+	+	-	+
	Medium-term	-	-	-	-	-	+	-
	Long-term	+	-	-	-	+	-	-

	Period	Variables						
		ER	EXP	IMP	INF	MS	GDP	IpC
IRF MS	Short-term	+	-	+	+	+	-	+
	Medium-term	-	-	-	-	+	+	-
	Long-term	+	-	-	-	+	-	-

	Period	Variables						
		ER	EXP	IMP	INF	MS	GDP	IpC
IRF IpC	Short-term	-	+	+	-	+	-	+
	Medium-term	-	+	+	+	+	-	+
	Long-term	-	+	-	+	-	+	+

Source: Processed Data (2022)

a. Impulse response function of the Exchange Rate (ER) Variable

The increase in the exchange rate was responded to positively in the short term, the medium, and long time by The Chair itself. And the positive response is only in the short term by Exports, Imports, Inflation, MS, GDP, and per capita income, while responded negatively in the medium and long time, namely by Exports, Imports and GDP, reacted negatively in the long run by Per capita Income.

b. Impulse response function Export (EXP) Variable

Exports themselves responded to the export increase positively in the short, medium, and long term. And in the negative response, only in the middle time, the Exchange Rate and the Money Supply Amount. And responded negatively in the long run by Import and Money Supply. In the positive response in the medium and long term by Inflation, GDP, and Per capita income.

c. Impulse response function Import (IMP) Variable

The import increase was responded to positively in the short, medium, and long term by imports themselves. And reacted positively in the medium term by Per capita Income and responded negatively in the medium and long time by the Exchange Rate and Money Supply. In the positive response in the medium and long term by Exports, Inflation, and GDP and the long-term negative response by Per capita Income.

d. Impulse response function Gross Domestic Product (GDP) Variable

GDP itself responds positively to the increase in GDP in the short, medium, and long term. Responded positively in the medium and long-term by the Exchange Rate and Inflation and reacted negatively in the medium and long time by Exports, Imports, and Per capita Income. Then responded negatively in the medium term, namely by the Money Supply, And in the long run, a positive response by the money supply was returned.

e. Impulse response function Inflation (INF) Variable

Increased Inflation is responded to positively in the short term and negatively in the medium and long time by Inflation itself. And reacted

negatively in the medium and long term by Exports, Imports, Inflation, and Per Capita Income. Responded positively in the medium term by GDP, reacted negatively in the medium term by the Exchange Rate and Money Supply. Then responded positively in the long run by variable exchange rates and money supply.

f. Impulse response function Money Supply (MS) Variable

The increase in MS was responded to positively in the short term, the medium, and the long term by MS itself. Responded positively in the medium term by variable GDP and negatively in the medium and long time by Exports, Imports, Inflation, and Per capita Income. Then in the positive response by variable exchange rate long-term negative response by GDP.

g. Impulse response function Income per Capita (IpC) Variable

The increase in Per capita income is responded to positively in the short term, medium, and long term by the per capita itself. And reacted negatively in the medium term by the Exchange Rate and GDP, responded positively in the medium term by Imports and Money Supply. and in the positive response in the medium and long time by Exports, Inflation. Then reacted negatively in the long run, namely by the variables Imports back Imports and money supply, in a positive response in the long run by GDP.

Forecast Error Variance Decomposition (FEVD) aims to determine the contribution of each variable to a variable in the short, medium, and long term so that it can be used as a recommendation for policy making for the control of these variables. Using the variance decomposition method in Eviews obtained the following results:

Table 8. The Results of Forecast Error Variance Decomposition (FEVD)

Monetary Policy Variables	**Monetary Policy Indicators**		
	Short-term	**Medium-term**	**Long-term**

ER	ER (100%)	ER (79.70%)	ER (74.28%)
	–	MS (19.68%)	IMP (24.34%)
EXP	EXP (99.93%)	EXP (79.42%)	EXP (71.64%)
	ER (0.06%)	IpC (9.10%)	IpC (13.35%)
IMP	IMP (50.06%)	IMP (61.08%)	IMP (45.08%)
	EXP (44.58%)	EXP (28.39%)	EXP (38.52%)
GDP	GDP (95.89%)	GDP (75.95%)	GDP (67.10%)
	ER (1.93%)	ER (7.49%)	IpC (14.70%)
INF	INF (80.02%)	INF (56.85%)	INF (51.20%)
	IMP (10.75%)	IMP (17.86%)	IMP (18.98%)
MS	INF (79.21%)	INF (56.50%)	INF (50.19%)
	IMP (10.17%)	IMP (17.60%)	IMP (18.80%)
IpC	IpC (59.62%)	IpC (68.27%)	IpC (66.87%)
	EXP (22.54%)	EXP (19.21%)	EXP (21.34%)

***Source**:* Processed Data (2022)

a. Forecast Error Variance Decomposition (FEVD) the Exchange Rate Variable

In the short term, exchange rate control is carried out by the exchange rate itself. In the medium term, being done through the exchange rate itself is also influenced by the Money Supply, and in the long time, it is also affected by imports. This means that to strengthen the exchange rate against the US dollar the government must look at the economic conditions that occur, and thus the government must reduce the Amount of Money Supply in the community and Imports in a stable direction or reduce the trade in buying goods from outside that occurs. The results of this study are also supported by proprietary research (Muchlas, 2015) and (Aryani & Murtala, 2019). The relationship of the Money Supply amount with the exchange rate is where the Money Supply depends on the offer of the money. If the recommendation of the rupiah increases, then the value will depreciate (weaken). At the same time, if the offer on the rupiah

decreases, then the value of the rupiah currency will appreciate (strengthen). The relationship of the Money Supply to the Exchange Rate is negative.

b. Forecast Error Variance Decomposition (FEVD) EXP Variable

The exchange rate carries out export control in the short term. In the medium and long term, policies in export control are affected by per capita income. Because if exports move, the exchange rate and Inflation will also move. This is in line with research (Bristy, 2013) analyzing the relationship of exchange rates to exports in Bangladesh, showing that depreciation of the value of the domestic currency positively affects total exports. The positive influence of Inflation is that a country's exports can increase because capital from debt or loans to produce goods and services increases. Increased exports also provide guarantee the stability of a country's financial economy. However, increased Exports (Bashir et al., 2011) and (Shah et al., 2014) are beneficial to the economy and can increase inflationary pressures in the economy due to increased aggregate demand.

c. Forecast Error Variance Decomposition (FEVD) IMP Variable

In the short term, import control is carried out by imports and is influenced by exports. In the medium and long term, re-exports also affect the senses. This means that to increase imports, the government, in addition to growing imports, also needs to increase exports. To achieve the stability of domestic and foreign goods/services. Import Export transactions are an important economic activity in the economy. The current account is still a deficit if the Import Figure is higher than the Export figure. As a result, the exchange rate continues to be depressed due to the high demand for foreign currencies such as the dollar for payments. It is still difficult to strengthen the country's money if the import figure is higher than the exports. The development of import substitute industry in the country must be in line with export shepherding" (Farina et al., 2017).

d. Forecast Error Variance Decomposition (FEVD) GDP Variable

In the short and medium term, GDP control is carried out by GDP itself and influenced by the exchange rate. Then for a long time, GDP is also affected by Per capita income. This means that to increase GDP, the government, in addition to increasing the exchange rate, increases per capita income. To achieve the stability of economic growth that exists in the country. In the short term, this finding is by research (Pridayanti, 2014) exchange rates negatively and significantly affect economic growth in Indonesia.

e. Forecast Error Variance Decomposition (FEVD) INF Variable

In the short term, inflation control is carried out by Inflation itself and is influenced by Imports. Then in the medium and long term, in addition to being done through Inflation itself is also affected by imports. This means that to strengthen Inflation, the government must look at the economic conditions. Thus, the government will have to reduce imports in a stable direction or reduce trade by buying goods from outside so that the country's economy is more optimal. According to research (Ulke, 2011) in the Econometric Analysis of Import and Inflation Relationship in Turkey between 1995 and 2010, Inflation has a unidirectional relationship with import volume. The results of this study also support the research conducted by (Faisol, 2016), stating that there is no significant influence between Inflation on Imports.

f. Forecast Error Variance Decomposition (FEVD) MS Variable

In the short term, the control of the Money Supply Is carried out by MS itself and is affected by Inflation and Imports. Then in the medium and long term, in addition to being done through MS itself is also affected by Inflation and Imports. This means that if the Money Supply Increases, then what happens to cause Inflation to rise another cause is what brings the flow of funds into the country more and more it pushes the linkage of imports, so then the government must reduce imports and Inflation in a stable direction so that the country's economy is more optimal. According

to Friedman, (1969) in (Tafti, 2012) as a Monetarist Stream argues that domestic Inflation is caused by an excess of the Money Supply in the economy. The Money Supply Has a very significant influence on the number of Imports. This research is supported by proprietary research (Setyorani, 2018). The Money Supply has a very considerable effect on the amount of Export value or import value.

g. Forecast Error Variance Decomposition (FEVD) IpC Variable

In the short term, per capita revenue control is carried out by per capita income itself and is influenced by exports. Then in the medium and long term, in addition to being done through per capita income itself, exports affect it. This means that to increase Per capita income, the government, in addition to rising exports, also needs to increase stable economic growth to achieve the country's welfare. According to the research (Emilia et al., 2015), the value of exports to China has a positive and significant effect on Per capita Income and employment in Indonesia. As more and more quantities are produced, a country's export offer will increase.

From the results of FEVD, we know that from variable exchange rates, exports, imports, Inflation, money supply, GDP, and per capita income. The leading indicator variable is Import and Export, where the Import and Export variables always affect other variables. This means that in this study, both from the short, medium, and long term, that managed to stabilize foreign currencies is the policy of stabilizing foreign trade where exports must be greater than imports to increase the domestic currency.

CONCLUSION

Based on the results of the analysis and discussion that has been done, it can be concluded as follows:

a. Vector Autoregression Analysis Results

1. The most significant variable contribution to the Exchange Rate is the Money Supply Amount of the previous year period, followed by the GDP of the previous year's period.

2. The variable that contributes the most to Exports is the GDP of the previous period, and the second most significant contribution is Inflation during the last year period.
3. The most significant contribution to imports is the previous year's GDP. Then the assistance of the amount of money read last year.
4. The variable that contributes the most to Inflation is the previous year's period and then the Money Supply Period of the last year.
5. The most significant contribution to the Money Supply Amount comes from the variable Money Supply itself in the previous year, followed by per capita income in the last year.
6. The most significant variable contribution to GDP is GDP itself in the previous year's period and then by the Money Supply Period of the last year.
7. The most significant contribution to Per capita income is the GDP of the previous year's period, followed by Inflation in the last year.

b. Impulse Response Function Analysis results show that in the short term (period 1) positive exchange rate is above average, not responded to by all other variables. In the medium term (period 5), one standard deviation from the favorable exchange rate is positively responded to by Inflation, Per capita Income (IpC), and Money Supply. Then responded negatively by Export, and Import, GDP. In the long run (period 10), one standard deviation from the favorable exchange rate is responded positively by Inflation, the Money Supply. Then, Exports, Imports, GDP, and Per capita Income (IpC) responded negatively.
c. The variance decomposition analysis results show that the exchange rate recommends the exchange rate in the short term (period 1). At the same time, other variables, namely Exports, Imports, GDP, Inflation, Money Supply, and Per capita Income (IpC) do not respond at all, where the response of these variables only appears in the second period. The exchange rate is recommended in the medium term (period 5). Another variable that affects the exchange rate as a policy variable other than the exchange rate itself is the

Money Supply, then Inflation, Exports, Per capita Income, and Imports. The most minor affecting the exchange rate is GDP. In the long run (period 10), it is recommended by the Exchange Rate itself. Another variable that involves the exchange rate as a policy variable other than the exchange rate itself is the Money Supply, then Inflation, Exports, Per capita Income, and Imports. The most minor affecting the exchange rate is GDP.

d. The analysis of the interaction of each monetary policy variable in maintaining macroeconomic stability in emerging market countries in the short, medium, and long term show that monetary policy, namely inflation variables and money supply, can preserve macroeconomic stability in emerging market countries.

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