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PREDICTION OF EXCHANGE RATE INTEGRATION IN FOUR EMERGING MARKET COUNTRIES

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ABSTRACT

This study analyzes monetary policy variables on exchange rate stability. Where is the purpose of this study to see the contribution of variable inflation, the amount of money in circulation, interest rates, and foreign exchange reserves in dealing with exchange rates? The problem that has existed so far is the inaccuracy of the policies used to maintain exchange rate stability. However, this study predicts being able to use monetary policy in dealing with exchange rate problems. Four countries will be studied, namely Indonesia, Malaysia, Thailand, and the Philippines. Analysis to see leading indicators per country using the ARDL Panel method. The results of interest rates and the money supply can become the main leading indicators (Indonesia, Malaysia, Thailand, and the Philippines), but their positions are unstable in the short run and long run. The main leading indicator of the effectiveness of monetary policy which can become the leading indicator for Indonesia, Malaysia, Thailand, and the Philippines in maintaining exchange rate stability is the interest rate variable seen from a short-run and long-run stability. Where the interest rate variable in the short term and long term is significant for the stability of the exchange rate.

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1. INTRODUCTION

The existence of exchange rate system policies used by that country. Integration of the exchange rate occurs due to the volatility of several economic fundamentals with exchange rate volatility [1]. The floating exchange rate system is highly integrated with macro conditions and global developments [2]. Exchange rate integration supports the effectiveness of economic development [3]. Stability is the first criterion that a currency needs to have. The stability of a currency can be seen from two directions, namely internal and external. The internal side is defined as the value of the currency when associated with the price of goods and services. This reflects the use of the currency in a country with a closed economy type.

Currency stability is an important issue to stimulate economic activity and create economic growth. Currency exchange rate stability policy is related to the foreign exchange system applied to an economy [4]. The selection of an exchange rate system can be broadly viewed from three aspects, namely the characteristics of the economic structure, sources of volatility, and the credibility of policymakers [5].

From the external side, the value of a country's currency is compared to the value of foreign currencies. In this case, the appreciation or depreciation of a currency can occur depending on the business cycle and economic conditions of each country. The currency will depreciate if the currency decreases in value against other foreign currencies [6]. Conversely, experiencing appreciation if the value of a currency increases from its counterpart currency. Exchange Rate is a comparison of value or price between two different currencies. The creation of an exchange rate system is intended to facilitate international goods and services transactions [7]. The exchange rate or exchange rate is a comparison of the exchange rate of a country's currency with the currency of a foreign country or a comparison of foreign exchange rates between countries [8]. The exchange rate is the price level agreed upon by residents of the two countries to trade with each other [9]. Appreciation means an increase in the value of a country's currency relative to other currencies [10]. Meanwhile, depreciation means the opposite, namely according to the value of a country's currency against other currencies. Bank Indonesia's exchange rate is the rate determined by Bank Indonesia on the foreign exchange market in Jakarta [11].

Furthermore, the selling rate is the comparison of the exchange rate of a country's currency with a foreign country's currency if the bank sells it or the public buys it. The buying rate is a comparison of foreign currency exchange rates if the bank will buy it or the public will sell it. The exchange rate is the price of the local currency against foreign currency [12]. So, the exchange rate is the value of a rupiah currency that is

translated into another country's currency. Price comparison rates [13] are the exchange rate for achieving economic growth in a country, price stability, level policy values or bank loans, and balance sheet financing, for agreements to reach work. According to [14] states that the movement of the exchange rate has a positive effect on national income, which means that if the exchange rate increases, then national income should also increase unless the state's debt conditions are high. However, national income from the results of the people's economy will decrease because the increase in the rupiah exchange rate will push up the price of goods so that the economy is less productive.

Integration of the exchange rate with macroeconomic variables greatly affects the volatility and effectiveness of the exchange rate [15]. Fundamental factors are reflected by macroeconomic movements [16] Changes in the behavior of the rupiah exchange rate in other countries currencies are influenced by many factors, including macroeconomic conditions and non-fundamental risk factors of a country as well as internal and global political stability. Thus, the following are several countries that are members of Emerging Market countries with exchange rates, some of these countries are developed countries, which initially had a high economy and can now be said to be rapidly developing countries.

Figure 1. Graph of Exchange Rates in the Four Emerging Market Countries

Based on the data graph above, shows that from 2009 to 2011 there was a strengthening of the exchange rate in the four Emerging Market Countries against the dollar because the world was improving its economy due to the 2008 economic crisis and from 2014 to 2019 the exchange rate in the four Emerging Markets experienced a weakening of the dollar exchange rate which on the graph has increased which was quite passive from 2014 to 2019 and in 2020 the dollar exchange rate strengthened due to the pandemic. Based on the interest rate table and graph above, shows that in 2010 these four countries experienced a massive decline in interest rates where the interest rate for Indonesia was -1.75%, Malaysia was 0.24%, and Thailand was -2.11%. Meanwhile, in the Philippines, interest rates are quite stable, although in 2015 and 2019 interest rates in the Philippines dropped drastically by up to 6%. However, the State of Indonesia in 2020 has experienced an increase in Interest Rates. Where during the pandemic there was an increase in inflation in Indonesia, even though it was relatively low, but to avoid high inflation, the Central Bank increased interest rates high enough to maintain a stable economy during the pandemic.

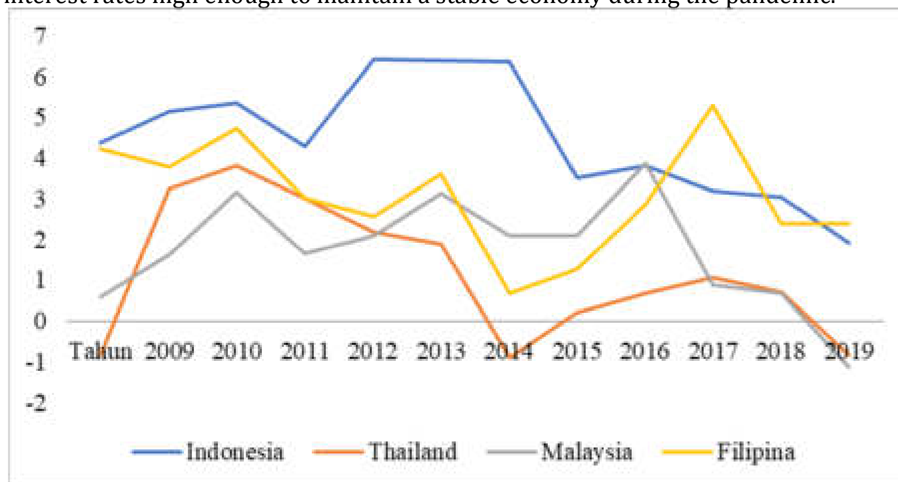

Figure 2. Graph of Inflation in the Four Emerging Market Countries

Inflation in the four countries has experienced various fluctuations over the last 12 years. However, in Indonesia, the Central Bank was able to reduce the inflation rate to 1.92%, then Thailand was also able to reduce the inflation rate to -0.84%, Malaysia was also able to reduce inflation in the last twelve years to -1.13% and the Philippines was also able to reduce inflation to 2.39%. % in 2020. Where suppressing the inflation rate aims to maintain exchange rates and the economy to be stable, almost on average in 2020 the four countries can suppress inflation, and this aims to minimize shocks that have occurred in 2020. If inflation is not maintained then can make the exchange rate weaken. if the exchange rate weakens, it will have an impact on an unstable economy and also affect the country's foreign exchange reserves. The more integrated the domestic economy with the global economy will increase the complexity of macroeconomic management.

2. METHOD

This study uses panel data, namely by using inter-temporal data and data between regions or countries. ARDL panel regression is used to obtain estimation results for each characteristic separately by assuming cointegration in the long-run lag of each variable. Distributed Autoregressive Lag (ARDL) was introduced [17]. This technique examines each variable lag located at I (1) or I (0). On the other hand, the ARDL regression result is a test statistic that can compare two asymptotic critical values.
Panel Regression Testing with the formula:
KURSit =α+β1INFit+β2JUBit+β3SBit+ β4CADEVit + e
The following is the regression panel formula based on country:
KURSINDONESIA =α+β1INFit+β2JUBit+β3SBit+ β4CADEVit + e
KURSMALAYSIA =α+β1INFit+β2JUBit+β3SBit+ β4CADEVit + e
KURSTHAILAND=α+β1INFit+β2JUBit+β3SBit+ β4CADEVit + e
KURSPHILPINA =α+β1INFit+β2JUBit+β3SBit+ β4CADEVit + e
Where :
EXCHANGE = Exchange Rate (US$)
SB = Interest Rate (%)
INF = Inflation (%)
CADEV = Foreign Exchange Reserves (US$)
JUB = Money Supply M1,M2 (%)
SB = Central Bank Interest (%)
€: error term
β: regression coefficient
α: Constant
i: number of observations (5 countries)
t: the amount of time 15 years

3. RESULT AND DISCUSSION

In table 1 below, the results of the Augmented Dickey-Fuller test show that the five variables are not stationary at that level, namely exchange rates, foreign exchange reserves, inflation, money supply, and interest rates. As this is shown by the statistical Dickey Fuller value which is below the McKinnon critical value at the 1% degree of confidence. Variables that are not stationary at the solution level are by creating new variables using the first difference, then tested again with the ADF test. The test results for the 1st difference can be seen in the following table:

Table 1. Stationarity Test Results with Unit Roots at 1st Difference

Variable	Nilai *Augmented Dickey-Fuller*	Nilai Kritis Mc Kinnon pada Tingkat Significance 1%	Prob	Information
LINKS	-9.092088	-3.581152	0.0000	Stasioner
CADEV	-2.563869	-3.592462	0.0083	Stasioner
INFLASI	-8.711148	-3.581152	0.0000	Stasioner
JUB	-11.41873	-3.581152	0.0000	Stasioner
SUKU BUNGA	-4.762713	-3.581152	0.0003	Stationer

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In the table above the results of the Augmented Dickey-Fuller test show that all Variables are stationary at 1st Difference, so the next test can be continued.

Table 2 Output Panel ARDL

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
	Long Run Equation			
SB	0.181972	0.013918	13.07479	0.0000
JUB	0.002806	0.001122	2.499765	0.0212
INFLASI	0.152077	0.010139	14.99929	0.0000
LNCADEV	0.189089	0.026819	7.050617	0.0000
	Short Run Equation			
COINTEQ01	-0.290844	0.212481	0.427540	0.0236
D(SB)	0.007068	0.010888	0.649147	0.0236
D(JUB)	-0.004364	0.003386	-1.288897	0.2121
D(INFLASI)	0.019584	0.027628	0.708852	0.4866
D(LNCADEV)	0.330365	0.194571	1.697919	0.1050
C	0.333028	0.582555	0.571669	0.5739
Mean dependent var	0.010540	S.D. dependent var		0.060576
S.E. of regression	0.047397	Akaike info criterion		-3.319482
Sum squared resid	0.044929	Schwarz criterion		-2.227948
Log-likelihood	107.6676	Hannan-Quinn criteria.		-2.906990

*Note: p-values and any subsequent tests do not account for model
Sumber: Eviews

These requirements for the ARDL Panel model: the value is negative (-0.39) and significant (0.02 <0.05) then the model is accepted. Based on the acceptance of the model, data analysis was carried out using country-by-country panels.

Based on the overall results, it is known that in the long term, significant influences on exchange rates in Indonesia, Malaysia, Thailand, and the Philippines are interest rates, inflation, total money supply, and foreign exchange reserves. Then in the short term what affects the exchange rate is interest rates. The following is a summary table of the ARDL Panel results:

Table 3 ARDL Panel Summary

	Indonesia	Malaysia	Thailand	Filipina	Short Run	Long Run
Interest rate	1	1	1	1	1	1
Inflation	1	0	1	1	0	1
Amount of Money in Circulation	1	1	1	1	0	1
Foreign exchange reserves	1	0	1	1	0	1

The country's leading indicator of exchange rate integration is Indonesia with the variables Interest Rate, Inflation, Money Supply, and Foreign Exchange Reserves. Then Malaysia in dealing with exchange rates, namely through the Amount of Money in Supply and Interest Rates. Then the countries of Thailand and the Philippines handled exchange rates, namely through interest rates, inflation, the money supply, and foreign exchange reserves. Research [18] said that expansionary monetary policy alone was acknowledged to be able to overcome exchange rates. On the other hand, the inflation rate shows a negative relationship with the exchange rate, where inflation increases as a result of expansionary (loose) monetary policy which will encourage aggregate demand which plays a positive role in reducing the exchange rate [19]. Likewise with Interest Rates and Money Supply where expansive monetary policy by lowering Interest Rates can

increase the amount of money in the hands of the public to improve their economy by stabilizing the Exchange Rate. Interest rates are one of the policies taken to overcome exchange rate stability because if interest rates decrease, foreign exchange reserves will decrease and vice versa if interest rates increase, foreign exchange reserves will increase [20]. Research [21] has that inflation has a significant and significant effect on the exchange rate, where if inflation increases it affects the stability of the exchange rate in a country.

In this case according to opinion [22] who say that lowering interest rates can increase the amount of money in the hands of the public, whereas if interest rates are low this can encourage public access to banking. This can make the economy grow and develop which has an impact on exchange rate stability. This was stated by [23] who said that a weakening exchange rate (exchange rate) in a country causes inflation and interest rates to increase as well as tightening policies on lending and weakens the purchasing power of domestic and foreign people because the prices of imported goods also increase due to a weak exchange rate.

4. CONCLUSION

From a panel perspective, interest rates and money supply are the leading indicators (Indonesia, Malaysia, Thailand, and the Philippines), but their positions are unstable in the short run and long run. The main leading indicator of the effectiveness of variables in overcoming exchange rates in four emerging market countries (Indonesia, Malaysia, Thailand, and the Philippines), namely interest rates, is seen from the stability of the short run and long run, where the interest rate variable in the short and long term significantly controls or overcomes the exchange rate. . Exchange rates and interest rates have a significant influence, where the higher the interest rate of a currency, the higher the demand for that country's currency. Interest rates are regulated by the central bank, and if in the long term, the central bank always raises interest rates, the trend of the country's currency exchange rate against other countries will tend to rise. The higher the interest rate of a currency, the higher the demand for that country's currency. Interest rates are regulated by the central bank, and if in the long term, the central bank always raises interest rates, the trend of the country's currency exchange rate against other countries will tend to rise.

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