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FORECASTING RUPIAH EXCHANGE RATE AGAINST US DOLLAR: EVIDENCE FROM INDONESIA

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Abstract

This paper uses the econometric technique of forecasting model with box jenkin (ARIMA) for rupiah exchange rate data during december 1984- December 2017. ARIMA is a linear modeling model that is widely used in high-frequency financial data forecasting model, such as daily exchange rate of Rupiah to Dollar USA. The period of this research data is through the period of crisis of the New Order era and the reforms which include the era of high volatility and the very high financial turbulence especially in 1998, 2007 and 2008. The author uses this model box in determining the linearity of the studies conducted, that the model The proposed ARIMA can explain and reflect the empirical nature of the exchange rate of the rupiah against the US dollar using the level of level.
Keywords: Rupiah exchange rate, model linearity, ARIMA. Box jenkin.

I. PRELIMINARY

The last few days rupiah exchange rate against US dollar (US) weakened, after passing long holiday Eid. According to information released from Jakarta Interbank Spot Dollar Rate, the value of today's rupiah exchange rate closes in the range of Rp 14,102 per US dollar, this figure in the value of many observers decreased compared to the previous day which was in the range of Rp 14.090 per US dollar. According to sources from the Head of the Department of Monetary Management of Bank Indonesia (BI), the authors explain if the exchange rate of rupiah experienced overshoot and many who think that the exchange rate has been out of fundamental value actually. The rise of Fed Fund Rate (FFR) can be made as one of the things due to the occurrence of global risks.

On the other hand Overshoot the rupiah value often occurs and returns to normal position, and the value globally can adjust the conditions that occur in Indonesia. Some policy models are implemented by the Indonesian monetary party (Bank Indonesia), such as cooperating with several external parties, in the medium and long term. But indirectly internal factors can also be made as the weakening value of the rupiah. Therefore, the government in this case through the governor of Bank Indonesia can control the movement of Rupiah that is not always stable. In other matters relating to the process of control, it also relates to the process framework of the macro policy framework as well as various analyzes in the exchange rate. Is the control and analysis from the fiscal or monetary side?

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II. LITERATURE REVIEW

In the concept of international trade each country incorporated in it must equate the monetary system is the means of payment, in conducting trade transactions used foreign exchange rates. The exchange rate or exchange rate indicates how much rupiah is needed to earn foreign money. According to Nazir (1988: 38):Exchange rate is the price of one unit of foreign currency in domestic currency. In other words, the exchange rate is the price of a currency if it is exchanged for other currencies. The commonly used exchange rate is the rupiah exchange rate against the dollar. Because the dollar is a relatively stable currency in the economy.

The exchange rate of a currency is the price of the domestic currency against the foreign currency. The foreign exchange rate system will depend on the nature of the market. In a free market, the exchange rate will change according to changes in demand and supply. Economists divided the exchange rate on two kinds (Mankiw, 1999: 192), namely:
a. The nominal exchange rate, ie the relative price of the two countries' currencies.
b. The real exchange rate, which is the relative price of the goods of both countries, is the stated rate of the rate at which we can trade goods from a country for goods from other countries.
In line with the objectives of exchange rate policy, it is known that various types of exchange rate systems are used by a Nellis country (2000: 217)

1. Floating exchange rate system (floating exchange rate system)

In a floating exchange rate system, the exchange rate of a country's currency is solely determined by the demand and supply of its currency in the international exchange exchange. The floating exchange rate system is defined as a result of a continuously changing balance in line with changing demand and supply in the foreign exchange market.

2. Fixed exchange rate system (fixed exchange rate system)

The government can maintain a policy that keeps its currency at a stable level by interfering in the foreign exchange market. In this fixed exchange rate system a country's currency is fixed permanently with a certain foreign currency.

3. Managed exchange rate (managed floating exchange rate system)

This system applies to situations where the exchange rate is determined on request and supply, but Bank Central from time to time intervenes in order to stabilize its value. Broadly speaking, there are two exchange rate systems used by a country that is: Boediono: 1992 (in, www.Google.co.id)

a. Flexible Exchange Rate System

In the free market, exchange rate changes are influenced by factors influencing demand and supply of foreign exchange. Foreign currency demand and supply comes from export and import transactions that are influenced by several factors, namely price, income and interest rate. In addition there are also non-economic factors that affect the exchange rate is, psychological political factors such as panic in the country that resulted in the flight of funds abroad. This flexible exchange rate system has both positive and negative impacts. Positive impacts include: increased efficiency of allocation of factors of production, reducing the government's burden in overcoming the international balance of payments imbalance, the exchange rate is more stable, because the foreign exchange market is highly competitive and supply and demand are

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very price-elastic.
In addition to positive impacts, a flexible exchange rate system also has a negative impact, namely: the emergence of speculative activities, instability in international payment traffic so as to reduce trading volume.

b. Stable Exchange Rate System

A fluctuating exchange rate system often leads to speculative action as a result of uncertainty in the foreign exchange rate. Hence many countries are applying the wisdom to stabilize the exchange rate.
In essence, a stable exchange rate may arise by: active and passive. This actively stabilized exchange rate system; the government must provide funds for the purpose of stabilization of the exchange rate (stabilization fund). While the stable exchange rate system arises passively, it is used in countries that use the gold standard.
Similar to the flexible exchange rate system, a stable exchange rate system also has a positive impact and negative impact. Positive impacts include: the exchange rate is more stable so as to maintain the stability of international payment traffic, so as to prevent the decline in trading volume, can prevent speculative actions conducted by foreign exchange traders. Negative impacts are: the government must provide enormous funds to stabilize the exchange rate, especially to prevent the rise of foreign exchange rates. In this stable exchange rate system, governments typically face the limitations of providing foreign exchange reserves.
The current exchange rate in Indonesia is a controlled floating rate system in which case the foreign exchange rate is determined by market forces to some extent and if it has crossed the line will soon be stabilized by government intervention. Exchange rate will always change, if there is an increase of foreign exchange price in domestic currency unit is called depreciation and if there is decrease of foreign exchange price in domestic currency unit will be called appreciation.

III. RESEARCH METHODS

This paper uses the rupiah exchange rate data during the period of December 1984 to December 2017. The data analysis model and techniques used in this study are the root unit model, autoreporrelation and box design. This study was conducted by the authors during the month of April 2018 until May 2018. The data in this study can and downloaded by the author through the website of Indonesian banks, BPS website and several other government websites.

Research result

Table 1 : Result for unit root test

Unit root test Null Hypothesis: SERIES01 has a			
Lag Length: 0 (Automatic - based on SIC, maxlag=8)			
		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.321998	0.9110
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	
*MacKinnon (1996) one-sided p-values.			

Sourced : Author proceed with statistic software

Based on the unit root test results as shown in Table 1 above, it is known that the EXCHANGE

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RATE variable has a root unit in the ADF value for its data level, which means the time series data is not stationary. To get the data stationary, then at the next stage is done correlation testing using autocorrelation. Test results by using autocorrelation as shown in Table 2, which shows that the Variables in this study were partially correlated at a 1% significance level. This means that economic variables in the intent are still not stationary, so the exchange rate variable is said to be integrated at a degree of 1 or I (1).

Table 2 : Result for Autocorrelation test

Autocorrelation test						
Autocorrelation	Partial Correlation		AC	PAC	Q-Stat	Prob
. |****** |	. |****** |	1	0.875	0.875	28.374	0.000
. |****** |	. | . |	2	0.767	0.010	50.896	0.000
. |***** |	.* | . |	3	0.647	-0.110	67.444	0.000
. |**** |	. |* . |	4	0.566	0.085	80.500	0.000
. |*** |	. | . |	5	0.480	-0.049	90.236	0.000
. |*** |	. | . |	6	0.410	-0.008	97.581	0.000
. |** |	. | . |	7	0.338	-0.032	102.76	0.000
. |** |	. | . |	8	0.275	-0.023	106.31	0.000
. |* . |	. | . |	9	0.209	-0.045	108.45	0.000
. |* . |	. | . |	10	0.156	-0.007	109.69	0.000
. |* . |	.* | . |	11	0.089	-0.092	110.11	0.000
. | . |	. | . |	12	0.034	-0.022	110.18	0.000
. | . |	. | . |	13	-0.022	-0.038	110.21	0.000
.* | . |	.* | . |	14	-0.085	-0.108	110.65	0.000
.* | . |	. | . |	15	-0.140	-0.027	111.91	0.000
.* | . |	. |* . |	16	-0.137	0.198	113.19	0.000

Sourced: Author proceed with statistic software

The next step is to test forecasting using ARIMA model. The ARIMA model is a model that completely ignores independent variables in forecasting. ARIMA uses past and present values of the dependent variable to produce accurate short-term forecasting. but for long-term forecasting the accuracy of forecasting is not good. The purpose of ARIMA is to determine good statistical relationships between predicted variables and the historical value of these variables so that forecasting can be done with the model as presented in table 3 below:

Table 3 : Result for ARIMA test

Dependent Variable: D(SERIES01)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	447.0743	140.6040	3.179670	0.0035
AR(1)	0.557341	0.144141	3.866645	0.0006
MA(1)	-1.402377	0.200805	-6.983778	0.0000
R-squared	0.537037	Mean dependent var		394.8125
Adjusted R-squared	0.505108	S.D. dependent var		1291.184
S.E. of regression	908.3289	Akaike info criterion		16.55015
Sum squared resid	23926781	Schwarz criterion		16.68756
Log likelihood	-261.8024	Hannan-Quinn criter.		16.59570

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F-statistic	16.81998	Durbin-Watson stat	2.405439
Prob(F-statistic)	0.000014		
Inverted AR Roots	.56		
Inverted MA Roots	1.40		
Estimated MA process is noninvertible			

Sourced: Author proceed with statistic software

Having obtained the model which is estimated to fit in table 3, the next step is to estimate the model parameters and test the significance of the parameters. Using Hypothesis: H0: parameter = 0 (parameter significant to model) or H1: parameter ≠ 0 (parameter not significant to model). So it can be concluded that the parameters significant to the proposed model.

IV. CONCLUSION

This study analyzes the volatility of rupiah exchange rate against USD in the period of 1984-2017 per annum in each year. The analysis is done by calculating quantitatively by using the appropriate model to perform the volatility analysis, ie ARIMA (1,1). At the stage of event analysis of the causes of volatility shocks, it can be concluded that volatility shocks are caused by external factors. The shocks of the 2008 to 2015 period were caused by the global crisis situation, namely the international financial crisis sourced from the US economy, and by the end of 2015, volatility occurred due to tightening of stimulus issues by the United States.

REFERENCE

[1] Corden, W, M. (1994), Economic Policy, Exchange Rates, and the International System, Oxford University Press US, ISBN 0-19-877409-5 ISBN 978-0-19-877409-9

[2] Copeland, l,S. (2005), Exchange rates and international finance, Financial Times Prentice Hall, ISBN 0-273-68306-3 ISBN 978-0-273-68306-3

[3] Frankel, J, A. (1997), On Exchange Rates, MIT Press, ISBN 0-262-06154-6 ISBN 978-0-262-06154-4

[4] Sarno, l, et all. (2002), The economics of exchange rates, Cambridge University Press, ISBN 0-521-48584-3 ISBN 978-0-521-48584-5.

[5] Nachrowi, D, N and Usman, H. (2006). ekonometrika untuk analisis ekonomi dan keuangan. Penerbit salemba empat.

Additional website

[6] http://nasional.kontan.co.id/news/bi-nilai-tukar-rupiah-sedikit-overshoot

[7] https://www.merdeka.com/uang/nilai-tukar-rupiah-makin-terpuruk-hingga-rp-14476-per-usd.html