



## Foreign Exchange On East Asia and Asean Country With ARDL

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### Abstract

*Purpose – the purpose of this study was to see how the ARDL model analysis of econometrics, in investigating regional currency exchange rates in the region of East asia and south east asia (ASEAN).*

*Design/methodology/approach – in this study data used is the exchange rates of currencies of ten countries that exist in the area of East asia (Hong Kong, China, Japan, Korea) and southeast asia (Indonesia, Malaysia, Brunei Darussalam, Singapore, Philipines, Thailand) against U \$ D. Research data used the Data Stream data base obtained from Bank Indonesia (BI), the Central Bureau of statistics (BPS) and from other sources during the period of February, Blomberg example 1, 2004 to December 31, 2014.*

*Findings – from research that has been done can be inferred that the currency exchange rate data are stationary and by using test ARDL looks in the long term effects of the exchange rate are just some of the variables are significant.*

*Originality/value – the research by using the exchange rate model for this model, the ARDL was first done in Indonesia, had previously already existed, but the analysis models used are different.*

*JEL classification: C32, F31, F33, G14, G15*

*Keywords: Foreign Exchange, ARDL, Stationerity, Time series Data.*

### I Introduction

In Granger (1981 and 1983) and then in the back with a model proposing Granger (1986) propose a model called the Granger, where this model see the movement of data to its data series and for the varibel time. However, research conducted by the Granger she apply to test the efficiency of the market in the late 1980s further Fama(1970) argues that the market price if the efficient some what speculative nature aswith the application of the price of an asset, but it could reflect all available information about a relevannya price. To be more precise, the market efficiency informationally efficient directed towards the market.



However, in a study conducted the current writers not to test the value of a market efficiency, against the use of econometric analysis of some models. Further the author does not explain how the process argument Granger (1986), where he holds a speculative market is the emergence of a pair of price not cointegrated each other in an efficient market, for in a prediktable indicating prices Granger past against the current price. With such opinion writer see how research is done by holding to the theory, the author assumes that the nominal price is the exchange rate of a currency against another currency.

Granger (1991 and 1998) mentioned that a time series data when the data is said to be cointegrated if the non-stationary-kovarian from the same order and in the linear combination of features of the data that is stationary. According to a theory inpresentation by Granger's Engel (1987) that the onset of a process of Granger if there are two or more data series time fluctuates conjointly in long term relationships, where data series can be seen as a balance Real-tionship, which automatically knownby the term error correction. Whereas in respect of short term process time seriesdata of yesteryear are experiencing a deviation from the long-term relationship resultsin an automatic adjustment process, which causes the variables from the data seriesback to kekesimbangan to last long-term relationship they have. But not in spite of the existence of error correction term that contains information about the future of amovement with one variable that is based on the data series of the past.

In applying the model application econometric analysis, actually has several advantages over other approaches but also investigate the purpose of which is not the same. In Mac Donald and Talyor (1989), Hakkio and Rush (1989), Baillie and Bollerslev (1989) are some of the authors to submit arguments from Granger (1986)for data model of the series, but the things which are done in the study was for an investigation of how the existence of market efficiency. Some input in the study, using the model of Granger almost dominant does not find the existence of Granger by MacDonald/Taylor (1989) for the exchange rate of FrancPrancis/us dollar and MarkNetherlands/United States Dollar. Meanwhile, in a study conducted by Baillie and Bollerslev (1989), is inversely proportional to the results which found cointegration in some samples of exchange rates. But in Baillie and Bollerslev (1989) showed notendency for periods of different coherent observation and different approaches overthe exchange rates of the observations made.

Another case with the results of research conducted by Sephton and Larsen (1991),Barkoulas and Baum (1997) which provides support for the denial of the occurrence ofcointegration, they say that the process depends on the period of election observation over exchange rates. In another research conducted towards the EURO currency exchange rate before and after implementation, among others: Hakkio andRush (1989) and Copeland (1991), Norrbin (1996), Woo (1999), Haug et al. (2000), Rangvid



and Sorensen (2002), and Aroskar et al. (2004), most of which can reject a null hypothesis of no cointegration for the shared currency. Further they support rejection of no cointegration in the period before the introduction of the Euro. On the contrary, there is no evidence to support the cointegration in the exchange rate, but they consider adjustments during that time, illustrated by Woo (1999), Jeon and Seo (2003), Phengpis (2006).

To evaluate or implement the introduction of a new currency is not a possibility except for countries which are in the Asian region, which can be moved to a better currency as was the case in Europe. The authors argue the guidelines remain applicable, granger as the previous implementation of the application against the most important currencies: Canadian Dollar, Australia dollar, Switzerland Franc, pound sterling, Yen, Euro United Kingdom Japan and Sweden Krona. But if we study the literature all use the United States Dollar as a tool of ukurnya.

In this study the author set into several parts namely introduction, literature review, research methodology, research results and conclusions.

## II Review of Literature

From research conducted by John (2003) using vector autoregression analysis model to see the relationship of causality in the monetary aggregates for currency exchange rates could be possible. Although vector autoregression analysis model is better used to see the relationship of causality as monetary inflation for example. Although there has not been a clear and significant proof of the discovery which aggregate is used to describe monetary conditions are best, but with the VAR model is sufficient to provide reasons that can be a measure of the demand for money for example (M3) for the better. So you can explain that the variables as explanatory variables in a model equation which is used is becoming increasingly obvious.

So also with the research conducted by Pandit, (1993) influence on the economy of India. Pandit considers that Government views India by doing a placement and the emphasis is too much on the factors that can pull the requests and make the incidence of occurrence of an emphasis can cost at tolerir. In the study also says that the dominant model or almost in the form of a fiscal and monetary policy, if implemented effectively, can make a good suatui for the efficient use of resources. In fact it could be to create and make an economy so that it is at a State of stagnation, at least in the short term.

In other research, written by Srinivasan, Mahambare and Ramachandran (2006), using a Phillips curve estimate model coupled with doing research over the impact of a shock on



a variable inflation in India. The use of Ordinary Least Square on a model that has been done, it was found that the shocks are thus has an impact only when inflation and core inflation. From the research that has been done it give a conclusion that a monetary policy in a country like India more focus to the problem of inflation that are considered core.

By using error correction model Bishnoi and Koirala (2006), learn about the existence of the resilience and stability of the process an inflation that occurred in the country of Nepal. In addition to using cointegration test between inflation and other explanatory variables, it is used to find long-term relationships between variables varvariabel variables which made the add in research with the use of error correction model (ECM). The use of this model to find a short-term relationship that exists or that there is a variable on the variables that do the research. From the results of research conducted that delivers results from make model ECM there is strong and stable inflation.

Using quarterly data for the years 1955-95 Nachane and Lakshmi (2002) conducts research on the in about of inflation that occurred in India. In a study conducted by their finding that the use of the use of the quarterly data in discover the existence of the process speed and stationary trend in India. Using almost the same model like Bishnoi and Koirala (2006), namely the technique of cointegration, the results of the study suggest that may be the case the existence of a developed a model to measure inflationary pressures in an economy in a country that in carefully. They argue that a good model by performing the calibration process for a data, and forecasts the out-of-sample that could significantly exceed the use of ARMA. And also to process gap model particularly successful.

### III Variables Used and Methodology

#### A. Variables & Model

The variables used in this study are the exchange rates of currencies of countries that are in the region of East Asia and Southeast Asia against dollar USA, where from a country in Asia which research was Indonesia, Malaysia, the Philippines, Brunei Darussalam, Thailand, Singapore, Japan, Korea, Hongkong and China. This research aims to identify empirically the relationship among exchange rates with the following equations model :

$$y_t = \beta_0 + \beta_1 y_{t-1} + \dots + \beta_p y_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + \dots + \alpha_q x_{t-q} + \varepsilon_t$$

Where Y and X is a variable exchange rates of currencies of countries in the Asia currency exchange rate against the dollar. The data used is a data exchange rate during



the period January 1, 2004 to December 31, 2014 has been in conversion against the United States dollar.

### B. Methodology

As a first step in the analysis of time series data, stationarity of the variables tested. The series is referred to as non-stationary if it means, variances, and autocovariance (at various retardation), where the process time is constantly changing as time goes by.

### C. The Augmented Dickey-Fuller Test

Depending upon the nature of the time series it may be represented as in the equation (1) or equation (2) or equation (3).

$$\Delta Y_t = \delta Y_{t-1} + u_t \quad \dots (1)$$

$$\Delta Y_t = \beta_1 + \delta Y_{t-1} + u_t \quad \dots (2)$$

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + u_t \quad \dots (3)$$

The Augmented Dickey Fuller (ADF) test under the null of non stationarity can be conducted to test whether a given series is stationary or not. This test is conducted by augmenting either of the above three equations by adding the lagged value of the dependent variable  $\Delta Y_t$ . Thus each of the above equation will be as follows:-

$$\Delta Y_t = \delta Y_{t-1} + \alpha_m \sum_{i=1}^m \Delta Y_{t-i} + e_t \quad \dots (4)$$

$$\Delta Y_t = \beta_1 + \alpha_m \sum_{i=1}^m \Delta Y_{t-i} + e_t \quad \dots (5)$$

$$\Delta Y_t = \beta_1 + \beta_2 t + \delta Y_{t-1} + \alpha_m \sum_{i=1}^m \Delta Y_{t-i} + e_t \quad \dots (6)$$

Where  $e_t$  is a pure white noise error, and the number of lagged difference term to include is determined empirically (Gujarati, 2005). In each of the above equations if  $\delta=0$  the series is non stationary. The Dickey Fuller tables can be used to test the significance of the hypothesis. The Phillips-Perron Test (PP) uses non parametric statistical methods to take care of the serial correlation in the error terms instead of adding lagged difference terms.

### D. Autoregression Distributed Lags

"ARDL" stands for "Distributed-Autoregressive Lag." This type of regression model has been widely used for decades, this model has a lot of giving evidence and can be a very valuable vehicle for testing in the presence of a long-term series of data against the related economy.





In its basic form, the regression model ARDL looks like this:

$$y_t = \beta_0 + \beta_1 y_{t-1} + \dots + \beta_p y_{t-p} + \alpha_0 x_t + \alpha_1 x_{t-1} + \alpha_2 x_{t-2} + \dots + \alpha_q x_{t-q} + \varepsilon_t$$

where  $\varepsilon_t$  is a random "disturbance" term.

Autoregressive model is "", in the sense that  $y_t$  "explained (part) olehtertinggal valuesitself. It also has a component of "didistribusikanlag", in the form of consecutive variable lags "x" explanations. Sometimes, the present value of the  $x_t$  it self excluded from the distributed structure of the lag model.

#### IV Results of Empirical Estimation

The steps of analysis: empirical analysis of the various steps is present is etc :-

- I. the Stationarity test variables that use the ADF test.
- II. Estimate models with Autoregressive model ARDL testing distributed lags.

##### Phase I

From table 2 below it is clear that all the variables under study are free stasioner at level and stationary in the first difference, i.e., the order they integrated :

Table 1 : Result test of unit root

Foreight Exchanga	Max Lags	ADF Test	1% Level	Value Prob.	Condition
D(CHINA_YUAN)	maxlag=27	-52.21675	-3.432592	0.0001	Stationerity
D(HONGKONG_\$)	maxlag=27	-20.15129	-3.432605	0.0001	Stationerity
D(INDONESIA_RUPIAH)	maxlag=27	-10.60408	-3.432608	0.0000	Stationerity
D(JAPAN_YEN)	maxlag=27	-52.34069	-3.432592	0.0001	Stationerity
D(KOREAN_WON)	maxlag=27	-10.76599	-3.432616	0.0000	Stationerity
D(MALAYSIA_RINGGIT)	maxlag=27	-13.31260	-3.432604	0.0000	Stationerity
D(PHILIPPINE_PESO)	maxlag=27	-12.68359	-3.432611	0.0000	Stationerity
D(SINGAPORE_\$)	maxlag=27	-11.84561	-3.432610	0.0000	Stationerity
D(THAI_BAHT)	maxlag=27	-9.521975	-3.432617	0.0000	Stationerity
D(BRUNEI_\$)	maxlag=27	-34.51664	-3.432594	0.0000	Stationerity

\*Sources proceed by author

Because of all the variables that were found to be non-stationary in levels using both ADF test, and stationary in the first difference, the cointegrating relationship can exist between the variables. Then the cointegration test top ARDL can do testing.

##### Phase II ARDL Model

ARDL model introduced by Pesaran et al. (2001) to enter I (0) and I (1) variable in the same approximate so if Your variable is stationary I (0) than OLS right and if



all nonstationary I (1) then it is recommended to melakukan VECM (Johanson approach) because a lot of simple models.

Table 2 : Result ARDL Model

Dependent Variable: BRUNEI\_\$(-1)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CHINA_YUAN(-1)	0.003685	0.009468	0.389234	0.6971
HONGKONG_\$(-1)	8.520005	0.002583	0.032967	0.9737
INDONESIA_RUPI				
AH(-1)	5.930007	1.030006	0.577182	0.5639
JAPAN_YEN(-1)	0.000110	9.430005	1.164108	0.2445
KOREAN_WON(-1)	3.740006	6.600006	0.566592	0.5710
MALAYSIA_RING				
GIT(-1)	0.003549	0.003668	0.967568	0.3333
PHILIPPINE_PESO(-1)	5.220005	0.000154	0.338245	0.7352
SINGAPORE_\$(-1)	0.958594	0.015873	60.39308	0.0000
THAI_BAHT(-1)	7.110005	0.000202	0.351839	0.7250
BRUNEI_\$	-0.002591	0.019348	-0.133936	0.8935
CHINA_YUAN	-0.003551	0.009438	-0.376234	0.7068
HONGKONG_\$	4.600007	0.002582	0.000178	0.9999
INDONESIA_RUPI				
AH	-4.690007	1.030006	-0.456166	0.6483
JAPAN_YEN	-0.000121	9.410005	-1.285619	0.1987
KOREAN_WON	-4.630006	6.660006	-0.695092	0.4871
MALAYSIA_RING				
GIT	-0.003366	0.003665	-0.918390	0.3585
PHILIPPINE_PESO	-0.000128	0.000154	-0.830079	0.4066
SINGAPORE_\$	0.043986	0.024872	1.768522	0.0771
THAI_BAHT	-7.750006	0.000203	-0.038154	0.9696
R-squared	0.999650	Mean dependent var	1.427608	
Adjusted R-squared	0.999648	S.D. dependent var	0.162793	
S.E. of regression	0.003056	Akaike info criterion	-8.736174	
Sum squared resid	0.024922	Schwarz criterion	-8.694482	
Log likelihood	11756.05	Hannan-Quinn criter.	-8.721093	
Durbin-Watson stat	1.998797			

\*Sources proceed by author

In the table above, it was noted that the value of the long run earnings multiplier of 0,023 and has a value of the t statistic that only a small part of a significant, yet his very high value of R that is almost 99% of close to 100%. then we can say that there is a bit of cointegration between a set of variables (I (0) & I (1)). So we can assume that there is or at



least a long run or short run relationship between these variables. If this is not the F Statistic is higher than on one of the upper-bound values critical to first tried to modify the composition of the lag so that Statistics may be the value F is very important related matters that might not appear in the table above.

## V Conclusion

In this paper an analysis of currency exchange rates was tested for cointegration between the ARDL model couples by digitally exchange rate used. Observation period includes the introduction of the currency in some countries in the region of East asia and southeast asia. The research was motivated by arguments Granger(1986), assume that there is no efficient if cointegration between couples exchange rates can be considered due to observations of cointegration means predictability of at least one Exchange rate. The empirical analysis draws on Johansen (1988, 1991) approach. It was shown that the null hypothesis can be rejected for most of the exchange rate. There are only a few of the exchange rates of some countries are significant and cannot be rejected on the basis of weak evidence.

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