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COINTEGRATED DATA IN TIME SERIES SAMPLE STUDY EXCHANGE RATE CURRENCY

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ABSTRACT

This study provides a description of an approach that is very important and relatively new to estimate the long-term economic relations by using test 'cointegration',. This test model is used in the economic modeling in particular, especially in the analysis of time series data. Any superiority attractiveness of cointegration analysis made that this test only provides a formal framework that is effective to estimate (also test and modeling) of a long-term relationship between economic data from time-series data. In this study, in particular, will describe how the estimate of cointegration test procedure, which has become increasingly popular and widely used in the literature and widely applied in modeling economic data recently.

Keyword : Cointegration, Johansen Test, Exchange Rate, Time Series.

1.INTRODUCTION

The existence of problems in a data Non-stationary nature of data (trended) time-series can be considered as a potential problem big enough for econometric analysis of empirical data. But this event is also known that trend, either stochastic or deterministic in a time series data can cause regression false, the value of student-t uninterpretable and other statistics, goodness of action fit 'too high' and, as a rule, make the regression results is rather difficult to evaluate. However, most macroeconomic time-series are subject to some kind of trend. Some researchers have suggested the drug, ie the difference consecutive series until stationary achieved. Nevertheless, it has been proven that 'differencing' results in the loss of some valuable long term information in data.

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But in a real breakthrough in the econometric time-series has come up with the name of the concept of 'cointegration' approximately in the early 1980s. Techniques or models of this concept was first introduced by Granger (1981). However, Engle and Granger (1987), in their paper provide a strong theoretical basis for a co integration of its data by making a representation, testing, estimating and modeling cointegrated nonstationary time-series variables. Given these events, has been an explosion of research on cointegration and related fields, such as those done by Utkulu (1994). Nonstationary cointegration analysis allows the data to be used can be done, so that the occurrence of a regression that result in false to say can be avoided. So that with the presence of applied econometrics it provides a formal framework that is effective for testing and estimating the long-term model of time-series data that actually.

2.COINTEGRATION THEORY AND HYPOTHESIS

2.1 Cointegration Theory

Advanced multivariate analysis is divided into two kinds, namely:

• "Testing cointegration" document testing for the presence of cointegration relationships between non-stationary variables in the regulation of non-panel and panel.

• "Factor Analysis" describes the tools for multivariate analysis using factor analysis.

But here in this study the author discusses only the first model, namely: testing cointegration.

Cointegration

If an OLS regression estimated with data on non-stationary and residual, then the regression can be considered false. So to solve this problem in the form of time series data must be tested using the unit root test (ie whether it is stationary). If both sets of data I (1) (non-stationary), then if the regression error term yield I (0), the equation is said to be cointegrated.

Data Analysis of Non-stationary time series the most fundamental is the value of a random walk, Dickey-Fuller test basically involves testing for the presence of the random walk.

$$y_t = y_{t-1} + u_t \qquad (1)$$

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Although this has a constant mean, the variance is non-constant and so the series is non-stationary. If a constant is added, it is termed a random walk with drift. To produce a stationary time series, the random walk needs to be first-differenced:

$$\Delta y_t = u_t \tag{2}$$

Augmented Dickey-Fuller (ADF) Test

The Dickey-Fuller test is used to determine if a variable is stationary. To overcome the problem of autocorrelation in the basic DF test, the test can be augmented by adding various lagged dependent variables. This would produce the following test:

$$\Delta y_t = (\rho - 1) y_{t-1} + \alpha_i \sum_{i=1}^{m} \Delta y_{t-i} + u_t \tag{3}$$

The correct value for *m* (number of lags) can be determined by reference to a commonly produced information criteria such as the Akaike criteria or Schwarz-Bayesian criteria. The aim being to maximize the amount of information. As with the DF test, the ADF test can also include a drift (constant) and time trend.

Common criticisms of these tests include a sensitivity to the way the test is conducted (size of test), such that the wrong version of the ADF test is used. The power of the test may depend on:

- The span of the data, rather than the sample size. (This is particularly important for Financial data)
- If ρ is almost equal to 1, but not exactly, the test may give the wrong result.
- These tests assume a single unit root I(1), but there may be more than one present I(2).
- If the time series contains a structural break, the test may produce the wrong result.

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Engle-Granger test for Cointegration

To test for cointegration between two or more non-stationary time series, it simply requires running an OLS regression, saving the residuals and then running the ADF test on the residual to determine if it is stationary. The time series are said to be cointegrated if the residual is itself stationary. In effect the non-stationary I(1) series have cancelled each other out to produce a stationary I(0) residual.

$$y_t = \beta_0 + \beta_1 x_t + u_t \tag{4}$$

Where y and x are non-stationary series. To determine if they are cointegrated, a secondary regression is estimated:

$$\Delta u_t = -0.56 u_{t-1} \tag{5}$$
$$(0.10)$$

This produces a t-statistic of –5.60. If the critical value for this model is –2.95 (for example), we would reject the null hypothesis of non-stationary time series and conclude the error term was stationary and the two variables are cointegrated.

The Granger Representation Theorem

According to this theorem, if two variables y and x are cointegrated, then the relationship between the two can be expressed as an error correction model (ECM), in which the error term from the OLS regression, lagged once, acts as the error correction term. In this case the cointegration provides evidence of a long-run relationship between the variables, whilst the ECM provides evidence of the short-run relationship. A basic error correction model would appear as follows:

$$\Delta y_t = \chi_0 + \chi_1 \Delta x_t - \tau(u_{t-1}) + \varepsilon_t \tag{6}$$

Where τ is the error correction term coefficient, which theory suggests should be negative and whose value measures the speed of adjustment back to equilibrium following an

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exogenous shock. The error correction term u_{t-1}, which can be written as: $(y_{t-1} - x_{t-1})$,is the residual from the cointegrating relationship in (4)

Johansen Cointegration Test

EViews supports VAR-based cointegration tests using the methodology developed in Johansen (1991, 1995) performed using a Group object or an estimated Var object.

Consider a VAR of order p :

$$y_t = A_1 y_{t-1} + \cdots + A_p y_{t-p} + Bx_t + \epsilon_t \quad (7)$$

where y_t is a k -vector of non-stationary I(1) variables, x_t is a d -vector of deterministic variables, and ϵ_t is a vector of innovations. We may rewrite this VAR as,

$$\Delta y_t = \Pi y_{t-1} + \sum_{i=1}^{p-1} \Gamma_i \Delta y_{t-i} + Bx_t + \epsilon_t \quad (8)$$

where:

$$\Pi = \sum_{i=1}^{p} A_i - I, \qquad \Gamma_i = -\sum_{j=i+1}^{p} A_j \quad (9)$$

Granger's representation theorem asserts that if the coefficient matrix Π has reduced rank $r < k$, then there exist $k \times r$ matrices α and β each with rank r such that $\Pi = \alpha\beta'$ and $\beta' y_t$ is I(0). r is the number of cointegrating relations (the *cointegrating rank*) and each column of β is the cointegrating vector. As explained below, the elements of α are known as the adjustment parameters in the VEC model. Johansen's method is to estimate the Π matrix from an unrestricted VAR and to test whether we can reject the restrictions implied by the reduced rank of Π .

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2.2 Research Hypothesis

In this study the authors used 5 assumptions contained in the hypothetical case of Johansen cointegration. The fifth option this case will be able to show the number of cointegration relationships under each of the 5 assumptions trend, where the author will be able to assess the sensitivity of the results to the assumption of trend.

We may summarize the five cases deterministic trend considered by Johansen (1995, p 80-84.) As:

1.The level data y_t have no deterministic trends and the cointegrating equations do not have intercepts:

$$H_2(r)\colon \Pi y_{t-1} + Bx_t = \alpha\beta' y_{t-1}$$

2.The level data y_t have no deterministic trends and the cointegrating equations have intercepts:

$$H_1^*(r)\colon \Pi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0)$$

3.The level data y_t have linear trends but the cointegrating equations have only intercepts:

$$H_1(r)\colon \Pi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0) + \alpha_\perp \gamma_0$$

4.The level data y_t and the cointegrating equations have linear trends:

$$H^*(r)\colon \Pi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0 + \rho_1 t) + \alpha_\perp \gamma_0$$

5.The level data y_t have quadratic trends and the cointegrating equations have linear trends:

$$H(r)\colon \Pi y_{t-1} + Bx_t = \alpha(\beta' y_{t-1} + \rho_0 + \rho_1 t) + \alpha_\perp(\gamma_0 + \gamma_1 t)$$

By identifying the parts on the error correction term setback cointegration relationship at constant kedaan (and linear trend).

3. RESEARCH METHOD

3.1 Data and Time Research

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The author conducted this study during January to March 2016. The data used in this study is the data exchange rates for countries that are in eastern and southeast Asia, which is projected against the United States dollar. The data is obtained through the website authors Bank Indonesia (BI), the Central Bureau of statistics (BPS) and from other sources such as www.Blomberg.com website during the period January 1, 2004 to December 31, 2014. The following data in the can by the author in advance at if before in software-assisted analysis with statistics. Countries in the study sample made by the authors of which east asia countries such as Hong Kong, China, Japan, Korea and Southeast Asia Indonesia, Malaysia, Brunei, Singapore, Philippines, Thailand.

3.2 Analisys Data

In economics, there are two models for testing cointegration on a Data: a. Engle Granger (1987) and b. Johansen and Juselius (1990)

But in this research the author will use Johanson cointegration method, the author considers this method may provide maximum value to estimate cointegration relationships in multivariate systems. If the vector Y has n time series, each of which is (1) and if the vector can be expressed as follows:

$$y_t = \pi_1 y_{t-1} + \dots \pi_k y_{t-k} + \varepsilon_t \quad (10)$$

where, π_1 are NxN matrices of unknown constants and the error term ε_t has the multivariate normal distribution N(0, Σ). The equation (7) can be converted into the following equation:-

$$\Delta y_t = \Gamma_1 \Delta y_{t-1} + \dots + \Gamma_{k-1} \Delta y_{t-k+1} + \pi \Delta y_{t-k} + \varepsilon_t \quad (11)$$

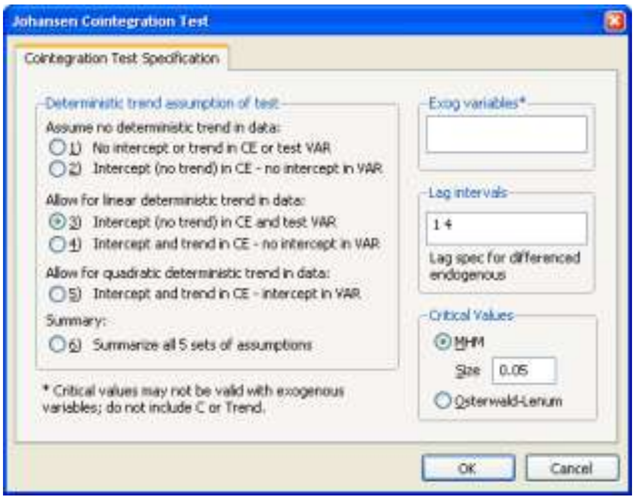
Johansen (1988) , Johansen and Juselius (1990), shows that the rank of π r in equation (11) is equal to the number of cointegrating vectors in the system (Nachane, 2006).

4. RESULT AND DISCUSSION

Johansen Cointegration Test A Performance

To perform a test of johansen, can we see the mechanism in the figure below, where there are 6 options that later writers would use 5 of them as a tool of analysis. Thus later we will be able to see how the distinction results in view of the shape of those options. The following images for 5 options in johansen's model :

Figure 1 : Johansen test spesification



Sources : Eviews web site

In the dialog box above, there are 6 options where we will do a test johansen, but here the author uses only 5 choices among existing ilihan 6. With the choice between 5 later we will see the results if there are any similarities and differences for or in the case of currency exchange rates in the sample of the study.

Cointegrating Relations Among Exchange Rate Currency

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On several sections below we can see the results for testing Granger between currency exchange rates in asia, with existing options as described in the above by the author. A report in the first table is the first block statistics report called trail 1-5 and the second block in the show at the next analysis report with the value of the unrestricted statistics. The critical value is to be taken from the table MacKinnon-Haug-Michelis (1999), by comparing the value on the trace statistics and critical value in the generate 5%, so there is no difference as reported in Johansen and Juselius (1990).

Table 1 : The level data y_t *have no deterministic trends and the cointegrating equations do not have intercepts:*

Trend assumption: No deterministic trend
Series: BRUNEI_$ CHINA_YUAN HONGKONG_$ INDONESIA_RUPIAH JAPAN_YEN KOREAN_WON MALAYSIA_RINGGIT PHILIPPINE_PESO SINGAPORE_$ THAI_BAHT
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.170912	771.1397	219.4016	0.0000
At most 1 *	0.038531	268.2681	179.5098	0.0000
At most 2 *	0.018876	162.8465	143.6691	0.0026
At most 3	0.011841	111.7185	111.7805	0.0505
At most 4	0.010383	79.75922	83.93712	0.0967
At most 5	0.009092	51.75720	60.06141	0.2061
At most 6	0.005872	27.25193	40.17493	0.5102
At most 7	0.003189	11.45156	24.27596	0.7495
At most 8	0.001038	2.880914	12.32090	0.8623
At most 9	3.48E-05	0.093317	4.129906	0.8018

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level

**MacKinnon-Haug-Michelis (1999) p-values

Sources : Proceed by author

Table 2 : The level data y_t have no deterministic trends and the cointegrating equations have intercepts:

Trend assumption: No deterministic trend (restricted constant)
Series: BRUNEI_$ CHINA_YUAN HONGKONG_$ INDONESIA_RUPIAH JAPAN_YEN KOREAN_WON
MALAYSIA_RINGGIT PHILIPPINE_PESO SINGAPORE_$ THAI_BAHT
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.170947	885.1097	251.2650	0.0000
At most 1 *	0.043912	382.1235	208.4374	0.0000
At most 2 *	0.037556	261.6418	169.5991	0.0000
At most 3 *	0.018661	158.9370	134.6780	0.0009
At most 4 *	0.011823	108.3959	103.8473	0.0242
At most 5	0.010037	76.48525	76.97277	0.0544
At most 6	0.008384	49.42041	54.07904	0.1221
At most 7	0.005787	26.83226	35.19275	0.2974
At most 8	0.003162	11.26184	20.26184	0.5171
At most 9	0.001030	2.765700	9.164546	0.6254

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Sources : Proceed by author

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Table 3 : The level data y_t have linear trends but the cointegrating equations have only intercepts:

Trend assumption: Linear deterministic trend
Series: BRUNEI_$ CHINA_YUAN HONGKONG_$ INDONESIA_RUPIAH JAPAN_YEN KOREAN_WON MALAYSIA_RINGGIT PHILIPPINE_PESO SINGAPORE_$ THAI_BAHT
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.170947	837.1748	239.2354	0.0001
At most 1 *	0.043177	334.1885	197.3709	0.0000
At most 2 *	0.026327	215.7692	159.5297	0.0000
At most 3 *	0.018137	144.1887	125.6154	0.0022
At most 4	0.011169	95.08047	95.75366	0.0556
At most 5	0.009070	64.94432	69.81889	0.1151
At most 6	0.007339	40.49879	47.85613	0.2051
At most 7	0.004567	20.73469	29.79707	0.3744
At most 8	0.003070	8.454330	15.49471	0.4182
At most 9	7.64E-05	0.204886	3.841466	0.6508

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
Sources : Proceed by author

Table 4 : The level data y_t and the cointegrating equations have linear trends:

Trend assumption: Linear deterministic trend (restricted)
Series: BRUNEI_$ CHINA_YUAN HONGKONG_$ INDONESIA_RUPIAH JAPAN_YEN KOREAN_WON MALAYSIA_RINGGIT PHILIPPINE_PESO SINGAPORE_$ THAI_BAHT
Lags interval (in first differences): 1 to 4

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Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.170964	866.2401	273.1889	0.0000
At most 1 *	0.044976	363.2001	228.2979	0.0001
At most 2 *	0.026331	239.7329	187.4701	0.0000
At most 3 *	0.020020	168.1414	150.5585	0.0034
At most 4	0.012569	113.8819	117.7082	0.0852
At most 5	0.009083	79.94449	88.80380	0.1836
At most 6	0.007393	55.46440	63.87610	0.2079
At most 7	0.006630	35.55465	42.91525	0.2230
At most 8	0.004484	17.70716	25.87211	0.3639
At most 9	0.002103	5.648710	12.51798	0.5062

Trace test indicates 4 cointegrating eqn(s) at the 0.05 level

Sources : Proceed by author

Table 5 : The level data y_t have quadratic trends and the cointegrating equations have linear trends:

Trend assumption: Quadratic deterministic trend
Series: BRUNEI_$ CHINA_YUAN HONGKONG_$ INDONESIA_RUPIAH JAPAN_YEN KOREAN_WON MALAYSIA_RINGGIT PHILIPPINE_PESO SINGAPORE_$ THAI_BAHT
Lags interval (in first differences): 1 to 4

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.170963	859.8725	259.0294	0.0000
At most 1 *	0.044957	356.8347	215.1232	0.0000
At most 2 *	0.025326	233.4189	175.1715	0.0000
At most 3 *	0.019300	164.5952	139.2753	0.0007
At most 4 *	0.012523	112.3066	107.3466	0.0227
At most 5	0.009034	78.49633	79.34145	0.0578

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At most 6	0.007370	54.14664	55.24578	0.0623
At most 7	0.006457	34.29865	35.01090	0.0595
At most 8	0.004296	16.91946	18.39771	0.0795
At most 9 *	0.001999	5.369587	3.841466	0.0205

Trace test indicates 5 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Sources : Proceed by author

To determine the number of cointegrating relations r *conditional on the assumptions made about the trend*, we can proceed sequentially from $r = 0$ to $r = k-1$ until we fail to reject. The result of this sequential testing procedure is reported at the bottom of each block.

The trace statistic reported in the first block tests the null hypothesis of r cointegrating relations against the alternative of k cointegrating relations, where k is the number of endogenous variables, for $r = 0, 1, \ldots, k-1$. The alternative of k cointegrating relations corresponds to the case where none of the series has a unit root and a stationary VAR may be specified in terms of the levels of all of the series. The trace statistic for the null hypothesis of r cointegrating relations is computed as:

$$LR_{tr}(r|k) = -T \sum_{i=r+1}^{k} \log(1-\lambda_i) \quad (12)$$

where λ_i is the *i-th* largest eigenvalue of the Π matrix in (12) which is reported in the second column of the output table.

The second block of the output reports the maximum eigenvalue statistic which tests the null hypothesis of r cointegrating relations against the alternative of $r+1$ cointegrating relations. This test statistic is computed as:

$$\begin{aligned} LR_{max}(r|r+1) &= -T\log(1-\lambda_{r+1}) \\ &= LR_{tr}(r|k) - LR_{tr}(r+1|k) \end{aligned} \quad (13)$$

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for $r = 0, 1, \ldots, k-1$.

There are a few other details to keep in mind:

•Critical values are available for up to $k = 10$ series. Also note that the critical values depend on the trend assumptions and may not be appropriate for models that contain other deterministic regressors. For example, a shift dummy variable in the test VAR implies a broken linear trend in the level series y_t.

•The trace statistic and the maximum eigenvalue statistic may yield conflicting results. For such cases, we recommend that you examine the estimated cointegrating vector and base your choice on the interpretability of the cointegrating relations; see Johansen and Juselius (1990) for an example.

•In some cases, the individual unit root tests will show that some of the series are integrated, but the cointegration test will indicate that the Π matrix has full rank ($r = k$). This apparent contradiction may be the result of low power of the cointegration tests, stemming perhaps from a small sample size or serving as an indication of specification error.

Cointegrating Relations

The second part of the output provides estimates of the cointegrating relations β and the adjustment parameters α. As is well known, the cointegrating vector β is not identified unless we impose some arbitrary normalization. The first block reports estimates of β and α based on the normalization $\beta' S_{11} \beta = I$, where S_{11} is defined in Johansen (1995). Note that the *transpose* of β is reported under **Unrestricted Cointegrating Coefficients** so that the first *row* is the first cointegrating vector, the second *row* is the second cointegrating vector, and so on.

Table 6 : Unrestricted Cointegrating Coeficients The level data y_t *have no deterministic trends and the cointegrating equations do not have intercepts :*

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Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

D(B_$)	D(C_YUAN)	D(HKG_$)	D(IDR)	D(JPY_YEN)	D(KRN_WON)	D(MLY_RGT)	D(PLP_PESO)	D(SGD_$)	D(THAI_BAHT)
-740.2951	-0.080797	1.156620	0.000131	-0.014437	-0.001339	0.150220	-0.044066	741.3953	0.029641
-0.783185	3.505931	-59.90753	-1.77E-05	0.046834	0.003628	-4.047184	-0.022206	-5.543640	-0.110571
-6.454598	4.831427	6.512097	0.000241	0.017206	0.005503	-0.902576	-0.586582	-6.401980	0.404290
10.40929	-5.098934	-1.225176	0.000724	-0.147950	-0.020359	-3.175221	0.303660	40.50678	-1.096435
1.038478	-0.756227	0.911994	0.000553	0.074195	0.003464	-19.75901	0.422591	19.26958	-0.048897
-5.700166	8.844381	5.161412	0.001435	0.020586	0.007777	2.610546	0.195046	-27.44716	-0.724980
6.735452	3.077962	4.841245	0.001287	-0.115242	-0.000245	-7.124507	-0.186406	-8.254820	0.600316
5.528180	-1.233792	3.520401	0.000211	-0.002540	-0.008572	0.476079	0.032452	-10.80856	0.378152
2.076758	0.062025	-2.660326	0.001173	-0.014344	0.000883	-2.462083	-0.254176	15.09254	-0.163695
0.333190	-0.773195	-0.495218	6.72E-05	-0.035970	-0.002206	0.363434	-0.068169	1.481464	-0.051207

Unrestricted Adjustment Coefficients (alpha):

D(B_$)	0.001254	0.000474	0.000328	-7.02E-05	-9.76E-05	0.000152	0.000142	2.19E-05	-0.000159	7.56E-06
D(C_YUAN)	-5.13E-05	-1.81E-05	0.000768	0.000320	9.15E-05	-0.000128	-0.000124	0.000113	-5.98E-06	2.00E-05
D(HKG_$)	-0.000199	0.003132	-0.000546	2.53E-05	-2.80E-05	-0.000613	-0.000264	-9.76E-05	0.000197	3.51E-05
D(IDR)	-0.285074	2.426238	2.211278	-0.725076	-0.672369	-2.281635	-0.456298	0.233637	-2.572832	-0.247169
D(JPY_YEN)	-0.004527	-0.012689	0.009465	0.023619	-0.030379	-0.000925	0.007276	-0.029608	-0.007566	0.002470
D(KRN_WON)	0.150297	0.206642	-0.273224	0.680600	-0.267408	-0.121201	0.328976	0.317549	-0.135387	0.003145
D(MLY_RGT)	0.000190	0.001283	0.001061	0.000579	0.000693	6.38E-05	0.000892	-0.000208	-0.000143	-4.45E-05
D(PLP_PESO)	0.002754	0.013675	0.028979	-0.010087	-0.024883	-0.003629	0.010476	0.002733	0.006363	-0.001287
D(SGD_$)	-0.000117	0.000446	0.000313	-6.25E-05	-8.95E-05	0.000142	0.000157	2.79E-05	-0.000150	6.26E-06
D(THAI_BAHT)	-0.003540	0.015949	0.003819	0.016579	-0.005043	0.013840	-0.008149	-0.002552	-0.002426	-0.000681

Sources : Proceed by author

Table 7 : Unrestricted Cointegrating Coeficients The level data y_t *have no deterministic trends and the cointegrating equations have intercepts:*

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Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

D(B_$)	D(C_YUAN)	D(HKG_$)	D(IDR)	D(JPY_YEN)	D(KRN_WON)	D(MLY_RGT)	D(PLP_PESO)	D(SGD_$)	D(THAI_BAHT)	
740.2951	0.080811	-1.156642	-0.000131	0.014437	0.001339	-0.150230	0.044065	-741.3953	-0.029641	7.853679
1.751144	-4.136362	55.67398	-6.76E-05	-0.046434	-0.003832	4.222636	0.113651	5.245872	0.080663	-426.7855
3.731665	-2.083881	-23.03623	-0.000303	0.006973	-0.000783	0.083063	0.362496	-1.064997	-0.163090	180.6134
-11.39946	6.079644	1.769623	-0.000660	0.139029	0.020815	3.071828	-0.468064	-40.32927	1.185776	-42.08213
0.890519	0.049573	-1.274978	-0.000400	-0.107859	-0.005317	13.66541	-0.550394	-5.960379	0.214172	9.176742
-5.258400	4.251323	1.814035	0.000149	0.029394	0.003158	14.77595	0.091655	-29.71320	-0.560058	-36.94566
0.668604	-8.517577	-6.123770	-0.001893	0.056723	-0.006504	6.220951	0.000675	17.48009	0.187010	74.13675
9.289764	-1.285614	4.145919	0.000560	-0.071114	-0.007585	-1.881852	-0.091878	-9.997704	0.742667	-26.70309
-1.544702	-0.067617	3.172677	-0.001077	0.022888	-0.002589	2.479151	0.255187	-16.44160	0.170723	-13.90801
0.188515	-1.057547	-0.455478	-0.000472	-0.039335	0.002815	0.972330	0.053910	-0.420614	0.127527	7.101415

Unrestricted Adjustment Coefficients (alpha):

D(B_$)	-0.001254	-0.000552	-0.000187	0.000141	0.000124	5.91E-05	-0.000204	4.23E-05	0.000156	3.70E-05
D(C_YUAN)	5.14E-05	-0.000326	-0.001059	-0.000215	-2.35E-05	-9.66E-05	0.000170	5.01E-05	2.32E-05	4.00E-05
D(HKG_$)	0.000199	-0.002881	0.001335	-0.000110	3.07E-05	-0.000234	0.000622	-3.74E-05	-0.000232	0.000121
D(IDR)	0.285037	-2.384322	-0.013137	1.550330	1.938191	-1.948772	1.269011	-0.559235	2.717419	-0.663609
D(JPY_YEN)	0.004527	0.013081	-0.003970	-0.016577	0.040377	-0.001706	-0.010666	-0.021180	0.000947	0.013229
D(KRN_WON)	-0.150298	-0.157308	0.217521	-0.698829	0.324804	-0.037434	-0.052583	0.441521	0.170913	9.81E-05
D(MLY_RGT)	-0.000190	-0.001457	-0.000486	-0.000256	2.22E-05	-0.001012	-0.000994	4.92E-06	0.000120	-0.000106
D(PLP_PESO)	-0.002754	-0.018239	-0.015872	0.018311	0.029743	0.001028	-0.003996	0.006927	-0.005508	-0.004893
D(SGD_$)	0.000117	-0.000518	-0.000175	0.000131	0.000122	4.37E-05	-0.000208	5.50E-05	0.000148	3.18E-05
D(THAI_BAHT)	0.003540	-0.018285	-0.004364	-0.015931	0.002280	0.012201	-0.004719	-0.009283	0.002883	-0.002554

Sources : Proceed by author

Table 8 : Unrestricted Cointegrating Coeficients The level data y_t *have linear trends but the cointegrating equations have only intercepts:*

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

D(B_$)	D(C_YUA	D(HKG_$)	D(IDR)	D(JPY_YE	D(KRN_W	D(MLY_R	D(PLP_PE	D(SGD_$)	D(THAI_B

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	N)			N)	ON)	GT)	SO		AHT
-740.2951	-0.080797	1.156620	0.000131	-0.014437	-0.001339	0.150220	-0.044066	741.3953	0.029641
-0.783185	3.505931	-59.90753	-1.77E-05	0.046834	0.003628	-4.047184	-0.022206	-5.543640	-0.110571
-6.454598	4.831427	6.512097	0.000241	0.017206	0.005503	-0.902576	-0.586582	-6.401980	0.404290
10.40929	-5.098934	-1.225176	0.000724	-0.147950	-0.020359	-3.175221	0.303660	40.50678	-1.096435
1.038478	-0.756227	0.911994	0.000553	0.074195	0.003464	-19.75901	0.422591	19.26958	-0.048897
-5.700166	8.844381	5.161412	0.001435	0.020586	0.007777	2.610546	0.195046	-27.44716	-0.724980
6.735452	3.077962	4.841245	0.001287	-0.115242	-0.000245	-7.124507	-0.186406	-8.254820	0.600316
5.528180	-1.233792	3.520401	0.000211	-0.002540	-0.008572	0.476079	0.032452	-10.80856	0.378152
2.076758	0.062025	-2.660326	0.001173	-0.014344	0.000883	-2.462083	-0.254176	15.09254	-0.163695
0.333190	-0.773195	-0.495218	6.72E-05	-0.035970	-0.002206	0.363434	-0.068169	1.481464	-0.051207

Unrestricted Adjustment Coefficients (alpha):

D(B_$)	0.001254	0.000474	0.000328	-7.02E-05	-9.76E-05	0.000152	0.000142	2.19E-05	-0.000159	7.56E-06
D(C_YUAN)	-5.13E-05	-1.81E-05	0.000768	0.000320	9.15E-05	-0.000128	-0.000124	0.000113	-5.98E-06	2.00E-05
D(HKG_$)	-0.000199	0.003132	-0.000546	2.53E-05	-2.80E-05	-0.000613	-0.000264	-9.76E-05	0.000197	3.51E-05
D(IDR)	-0.285074	2.426238	2.211278	-0.725076	-0.672369	-2.281635	-0.456298	0.233637	-2.572832	-0.247169
D(JPY_YEN)	-0.004527	-0.012689	0.009465	0.023619	-0.030379	-0.000925	0.007276	-0.029608	-0.007566	0.002470
D(KRN_WON)	0.150297	0.206642	-0.273224	0.680600	-0.267408	-0.121201	0.328976	0.317549	-0.135387	0.003145
D(MLY_RGT)	0.000190	0.001283	0.001061	0.000579	0.000693	6.38E-05	0.000892	-0.000208	-0.000143	-4.45E-05
D(PLP_PESO)	0.002754	0.013675	0.028979	-0.010087	-0.024883	-0.003629	0.010476	0.002733	0.006363	-0.001287
D(SGD_$)	-0.000117	0.000446	0.000313	-6.25E-05	-8.95E-05	0.000142	0.000157	2.79E-05	-0.000150	6.26E-06
D(THAI_BAHT)	-0.003540	0.015949	0.003819	0.016579	-0.005043	0.013840	-0.008149	-0.002552	-0.002426	-0.000681

Sources : Proceed by author

Table 9 : Unrestricted Cointegrating Coeficients The level data y_t *and the cointegrating equations have linear trends:*

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

D(B_$)	D(C_YUAN)	D(HKG_$)	D(IDR)	D(JPY_YEN)	D(KRN_WON)	D(MLY_RGT)	D(PLP_PESO	D(SGD_$)	D(THAI_BAHT	
740.2739	0.009938	-1.343555	-0.000123	0.014582	0.001255	-0.163311	0.048469	-741.5241	-0.031479	9.15E-05

2.206692	-1.590744	61.65802	-0.000185	-0.044853	-0.001028	4.564124	-0.096248	5.331581	0.182251	-0.002033
6.437698	-5.015878	-6.315698	-0.000223	-0.018329	-0.005819	0.835551	0.597481	6.699005	-0.415174	0.000142
-6.871908	7.848846	-1.118727	-0.000958	0.123119	0.021341	5.079615	-0.492703	-35.92103	1.027703	-0.003428
-5.009914	-2.395741	1.233461	0.000386	0.112822	0.005817	-15.49141	0.443292	0.611941	0.268683	0.003481
4.979692	-9.015845	-5.239633	-0.001476	-0.021038	-0.007883	-1.075444	-0.205987	24.58737	0.740762	0.000413
9.045693	3.557408	4.764309	0.001299	-0.113265	-0.000164	-10.34619	-0.194469	1.263680	0.532264	-0.001618
-7.486916	-1.733347	0.614228	4.73E-05	-0.018079	-0.000235	9.008844	0.057604	-32.87887	0.317477	0.005900
3.846420	-1.810831	3.681802	5.12E-05	0.000608	-0.008912	2.141697	0.091500	-17.49516	0.432148	0.001107
0.978442	2.299912	3.168534	-0.001285	0.011386	0.001879	-0.874992	0.159106	-1.012016	0.028774	-0.003546

Unrestricted Adjustment Coefficients (alpha):

D(B_$)	-0.001251	-0.000504	-0.000329	4.95E-05	-2.14E-05	-0.000137	8.01E-05	0.000240	7.65E-05	6.54E-05
D(C_YUAN)	5.41E-05	-5.37E-05	-0.000761	-0.000417	9.23E-05	0.000127	-0.000124	-2.54E-06	0.000124	-6.53E-05
D(HKG_$)	0.000209	-0.003224	0.000536	9.30E-05	-3.22E-05	0.000614	-0.000241	-9.86E-05	-0.000121	-0.000224
D(IDR)	0.284309	-2.295527	-2.236177	0.960395	-0.363770	2.344655	-0.614344	0.692274	0.668260	2.413745
D(JPY_YEN)	0.004784	0.006116	-0.008834	-0.029673	-0.020557	0.004049	-0.002768	0.037459	-0.022930	-0.003314
D(KRN_WON)	-0.147971	-0.267675	0.279873	-0.625634	-0.385640	0.128103	0.305215	0.114934	0.344332	0.056680
D(MLY_RGT)	-0.000186	-0.001341	-0.001059	-0.000570	0.000394	-0.000128	0.000982	-0.000114	-0.000225	0.000278
D(PLP_PESO)	-0.002995	-0.006905	-0.029626	0.023127	-0.029196	0.004128	0.011176	-0.004057	0.000167	-0.000193
D(SGD_$)	0.000119	-0.000471	-0.000314	4.69E-05	-2.33E-05	-0.000129	0.000100	0.000223	7.80E-05	6.42E-05
D(THAI_BAHT)	0.003570	-0.016406	-0.003779	-0.013027	-0.010355	-0.013793	-0.007750	-0.002802	-0.002604	0.004142

Sources : Proceed by author

Table 10 : Unrestricted Cointegrating Coeficients The level data y_t *have quadratic trends and the cointegrating equations have linear trends:*

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

D(B_$)	D(C_YUAN)	D(HKG_$)	D(IDR)	D(JPY_YEN)	D(KRN_WON)	D(MLY_RGT)	D(PLP_PESO)	D(SGD_$)	D(THAI_BAHT)
-740.2758	-0.009926	1.343154	0.000123	-0.014587	-0.001256	0.163125	-0.048494	741.5267	0.031467
-2.149032	1.585106	-61.70553	0.000182	0.045180	0.001055	-4.554033	0.098577	-5.431618	-0.182097
-7.049672	6.067142	5.723799	0.000122	0.036069	0.008562	-0.440136	-0.656371	-11.55280	0.538856

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6.164428	-7.058236	1.744336	0.001027	-0.116921	-0.020441	-5.659193	0.414745	34.74884	-0.978712
-5.163554	-2.383597	1.108002	0.000336	0.115090	0.006288	-15.30795	0.440780	-0.138079	0.302802
-5.301256	9.106180	5.288096	0.001476	0.022434	0.008469	1.041128	0.212524	-25.95226	-0.707837
9.852174	3.440505	4.669736	0.001284	-0.114484	-0.000713	-10.94884	-0.206642	4.213137	0.518428
5.970072	2.066513	-1.045738	-0.000158	0.034757	0.002035	-8.392320	-0.023273	32.19762	-0.390670
-3.809042	1.336880	-3.763066	5.89E-05	-0.014519	0.007817	-1.618492	-0.123665	16.35346	-0.403429
-1.007204	-2.217301	-2.978836	0.001268	-0.000830	-0.001656	0.864580	-0.132119	-0.183083	-0.005083

Unrestricted Adjustment Coefficients (alpha):

D(B_$)	0.001252	0.000500	0.000322	-1.74E-05	-2.15E-05	0.000146	6.02E-05	-0.000245	-6.22E-05	-6.58E-05
D(C_YUAN)	-5.36E-05	4.45E-05	0.000682	0.000505	7.25E-05	-0.000144	-0.000112	-2.24E-05	-0.000105	6.33E-05
D(HKG_$)	-0.000209	0.003229	-0.000491	-0.000147	-2.06E-05	-0.000618	-0.000224	0.000101	0.000132	0.000215
D(IDR)	-0.282054	2.265507	2.187217	-0.841270	-0.299288	-2.304627	-0.641340	-0.672025	-0.780828	-2.348508
D(JPY_YEN)	-0.004743	-0.006638	0.001082	0.026209	-0.019937	-0.002518	-0.005972	-0.035098	0.025577	0.001447
D(KRN_WON)	0.148142	0.265958	-0.375940	0.561972	-0.391403	-0.132414	0.308143	-0.179957	-0.317798	-0.049193
D(MLY_RGT)	0.000187	0.001325	0.000924	0.000660	0.000382	0.000147	0.000981	6.87E-05	0.000217	-0.000288
D(PLP_PESO)	0.003006	0.006704	0.031684	-0.020089	-0.028959	-0.004334	0.011650	0.002741	7.82E-05	8.42E-05
D(SGD_$)	-0.000118	0.000468	0.000307	-1.64E-05	-2.34E-05	0.000137	8.17E-05	-0.000230	-6.42E-05	-6.45E-05
D(THAI_BAHT)	-0.003562	0.016285	0.001729	0.013144	-0.010882	0.013293	-0.007700	0.003820	0.001893	-0.004079

Sources : Proceed by author

The remaining blocks report estimates from a different normalization for each possible number of cointegrating relations $r = 0, 1, \ldots, k-1$. This alternative normalization expresses the first r variables as functions of the remaining $k-r$ variables in the system. Asymptotic standard errors are reported in parentheses for the parameters that are identified.

5.CONCLUSION

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If we are going to implement testing for restrictions such as those in tampilankan in the Cointegration tests, then at the top of the output will display the test results is limited as described above. And for the second part of the output starts with showing the test result LR for binding restrictions. In the event of a limitation which is not binding, but has a certain rating, the corresponding row will be filled with your NAs. And vice versa if the binding restrictions in the form of the algorithm, then for output example shown above there is a such thing as a single binding restrictions only under the assumption that there is a single cointegrating relationship. Relying on only one cointegrating relationships, tests LR does not reject the restrictions imposed on the conventional level. The output also reported estimates and impose restrictions. Cointegration test because it doesn't specify the number of cointegrating relationships, results for all ranks consistent with certain restrictions are displayed.

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