



ภาคผนวก

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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## ภาคผนวก ก

### ผลการทดสอบความนิ่งของข้อมูล (Unit Root Test)

#### 1. ราคาน้ำมันเครื่องบิน

##### 1.1 ผลการทดสอบความนิ่งของข้อมูลราคาน้ำมันเครื่องบินในกรณี Intercept and Trend

Null Hypothesis: J has a unit root

Exogenous: Constant, Linear Trend

Lag length: 1 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample: 2000M01 2011M09

Included observations: 141

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-19.2415	-3.09756	0.16098	4.76185
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR) 117.2111

##### 1.2 ผลการทดสอบความนิ่งของข้อมูลราคาน้ำมันเครื่องบินในกรณี Intercept

Null Hypothesis: J has a unit root

Exogenous: Constant

Lag length: 1 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample: 2000M01 2011M09

Included observations: 141

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-2.98124	-0.97865	0.32827	7.76489
Asymptotic critical values*:				
1%	-13.8000	-2.58000	0.17400	1.78000
5%	-8.10000	-1.98000	0.23300	3.17000
10%	-5.70000	-1.62000	0.27500	4.45000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR) 115.1996

1.3 ผลการทดสอบความนิ่งของข้อมูลราคาน้ำมันเครื่องบินในกรณี Intercept and Trend  
(First Difference)

Null Hypothesis: D(J) has a unit root  
Exogenous: Constant, Linear Trend  
Lag length: 0 (Spectral GLS-detrended AR based on SIC, maxlag=13)  
Sample (adjusted): 2000M02 2011M09  
Included observations: 140 after adjustments

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-60.8189	-5.48776	0.09023	1.62299
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000
*Ng-Perron (2001, Table 1)				
HAC corrected variance (Spectral GLS-detrended AR)				47.66546

1.4 ผลการทดสอบความนิ่งของข้อมูลราคาน้ำมันเครื่องบินในกรณี Intercept (First Difference)

Null Hypothesis: D(J) has a unit root  
Exogenous: Constant  
Lag length: 0 (Spectral GLS-detrended AR based on SIC, maxlag=13)  
Sample (adjusted): 2000M02 2011M09  
Included observations: 140 after adjustments

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-61.0337	-5.49282	0.09000	0.47563
Asymptotic critical values*:				
1%	-13.8000	-2.58000	0.17400	1.78000
5%	-8.10000	-1.98000	0.23300	3.17000
10%	-5.70000	-1.62000	0.27500	4.45000
*Ng-Perron (2001, Table 1)				
HAC corrected variance (Spectral GLS-detrended AR)				47.53940

## 2. ราคาน้ำมันดิบของโลก

### 2.1 ผลการทดสอบความนิ่งของข้อมูลราคาน้ำมันดิบในกรณี Intercept and Trend

Null Hypothesis: W has a unit root

Exogenous: Constant, Linear Trend

Lag length: 2 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample: 2000M01 2011M09

Included observations: 141

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-42.7880	-4.61994	0.10797	2.15844
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR) 146.2652

### 2.2 ผลการทดสอบความนิ่งของข้อมูลราคาน้ำมันดิบในกรณี Intercept

Null Hypothesis: W has a unit root

Exogenous: Constant

Lag length: 1 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample: 2000M01 2011M09

Included observations: 141

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-3.01278	-0.96708	0.32099	7.68399
Asymptotic critical values*:				
1%	-13.8000	-2.58000	0.17400	1.78000
5%	-8.10000	-1.98000	0.23300	3.17000
10%	-5.70000	-1.62000	0.27500	4.45000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR) 80.11230

2.3 ผลการทดสอบความนิ่งของข้อมูลราคาน้ำมันดิบในกรณี Intercept and Trend  
(First Difference)

Null Hypothesis: D(W) has a unit root

Exogenous: Constant, Linear Trend

Lag length: 0 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample (adjusted): 2000M02 2011M09

Included observations: 140 after adjustments

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-55.6331	-5.27413	0.09480	1.63801
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR) 23.88357

2.4 ผลการทดสอบความนิ่งของข้อมูลราคาน้ำมันดิบในกรณี Intercept (First Difference)

Null Hypothesis: D(W) has a unit root

Exogenous: Constant

Lag length: 0 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample (adjusted): 2000M02 2011M09

Included observations: 140 after adjustments

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-54.9530	-5.24076	0.09537	0.44841
Asymptotic critical values*:				
1%	-13.8000	-2.58000	0.17400	1.78000
5%	-8.10000	-1.98000	0.23300	3.17000
10%	-5.70000	-1.62000	0.27500	4.45000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR) 24.06520

### 3. ประเทศสหรัฐอเมริกา

#### 3.1 ผลการทดสอบความนิ่งของข้อมูลปริมาณการส่งออกสินค้าทางอากาศ

ในกรณี Intercept and Trend

Null Hypothesis: U has a unit root

Exogenous: Constant, Linear Trend

Lag length: 1 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample: 2000M01 2011M09

Included observations: 141

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-13.0029	-2.53621	0.19505	7.08658
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR)	2.49E+11
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#### 3.2 ผลการทดสอบความนิ่งของข้อมูลปริมาณการส่งออกสินค้าทางอากาศ

ในกรณี Intercept and Trend (First Difference)

Null Hypothesis: D(U) has a unit root

Exogenous: Constant, Linear Trend

Lag length: 2 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample (adjusted): 2000M02 2011M09

Included observations: 140 after adjustments

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-20.0111	-3.11441	0.15563	4.85477
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR)	1.37E+11
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#### 4. ประเทศเยอรมัน

##### 4.1 ผลการทดสอบความนิ่งของข้อมูลปริมาณการส่งออกสินค้าทางอากาศ

ในกรณี Intercept and Trend

Null Hypothesis: G has a unit root

Exogenous: Constant, Linear Trend

Lag length: 1 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample: 2000M01 2011M09

Included observations: 141

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-12.1576	-2.46552	0.20280	7.49534
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR)	2.83E+10
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##### 4.2 ผลการทดสอบความนิ่งของข้อมูลปริมาณการส่งออกสินค้าทางอากาศ

ในกรณี Intercept and Trend (First Difference)

Null Hypothesis: D(G) has a unit root

Exogenous: Constant, Linear Trend

Lag length: 0 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample (adjusted): 2000M02 2011M09

Included observations: 140 after adjustments

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-68.5120	-5.84872	0.08537	1.34855
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR)	5.23E+10
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## 5. ประเทศจีน

### 5.1 ผลการทดสอบความนิ่งของข้อมูลปริมาณการส่งออกสินค้าทางอากาศ

ในกรณี Intercept and Trend

Null Hypothesis: CH has a unit root

Exogenous: Constant, Linear Trend

Lag length: 1 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample: 2000M01 2011M09

Included observations: 141

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-12.3704	-2.46982	0.19966	7.46322
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR)	1.16E+11
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### 5.2 ผลการทดสอบความนิ่งของข้อมูลปริมาณการส่งออกสินค้าทางอากาศ

ในกรณี Intercept and Trend (First Difference)

Null Hypothesis: D(CH) has a unit root

Exogenous: Constant, Linear Trend

Lag length: 0 (Spectral GLS-detrended AR based on SIC, maxlag=13)

Sample (adjusted): 2000M02 2011M09

Included observations: 140 after adjustments

	MZa	MZt	MSB	MPT
Ng-Perron test statistics	-65.9537	-5.74162	0.08706	1.38587
Asymptotic critical values*:				
1%	-23.8000	-3.42000	0.14300	4.03000
5%	-17.3000	-2.91000	0.16800	5.48000
10%	-14.2000	-2.62000	0.18500	6.67000

\*Ng-Perron (2001, Table 1)

HAC corrected variance (Spectral GLS-detrended AR)	1.67E+11
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## ภาคผนวก ข

ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะยาว (Traditional Cointegration) และผลการ  
วิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้น (Error Correction Model)

### 1. ประเทศสหรัฐอเมริกา

#### 1.1 ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะยาว (Traditional Cointegration)

Dependent Variable: LOG(U)  
Method: Least Squares  
Date: 02/09/12 Time: 13:10  
Sample: 2000M01 2011M09  
Included observations: 141

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(J)	0.281507	0.200227	1.405938	0.1620
LOG(W)	-0.196237	0.201955	-0.971687	0.3329
C	15.17775	0.114394	132.6797	0.0000
R-squared	0.079433	Mean dependent var		15.56936
Adjusted R-squared	0.066092	S.D. dependent var		0.173439
S.E. of regression	0.167610	Akaike info criterion		-0.713307
Sum squared resid	3.876849	Schwarz criterion		-0.650567
Log likelihood	53.28815	Hannan-Quinn criter.		-0.687812
F-statistic	5.953825	Durbin-Watson stat		0.457156
Prob(F-statistic)	0.003310			

## 1.2 ผลการทดสอบความนิ่งของค่าความคลาดเคลื่อน (Residual) โดยวิธี ADF

Null Hypothesis: EU has a unit root  
 Exogenous: None  
 Lag Length: 0 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.504132	0.0000
Test critical values:		
1% level	-2.581584	
5% level	-1.943123	
10% level	-1.615200	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(EU)  
 Method: Least Squares  
 Date: 02/11/12 Time: 00:28  
 Sample (adjusted): 2000M02 2011M09  
 Included observations: 140 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EU(-1)	-0.241354	0.053585	-4.504132	0.0000
R-squared	0.127099	Mean dependent var		0.001954
Adjusted R-squared	0.127099	S.D. dependent var		0.112901
S.E. of regression	0.105483	Akaike info criterion		-1.653422
Sum squared resid	1.546597	Schwarz criterion		-1.632411
Log likelihood	116.7396	Hannan-Quinn criter.		-1.644884
Durbin-Watson stat	2.211513			

### 1.3 ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้น (Error Correction Model)

Dependent Variable: DLOG(U)  
 Method: Least Squares  
 Date: 02/11/12 Time: 15:48  
 Sample (adjusted): 2000M02 2011M09  
 Included observations: 140 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(W)	0.126617	0.171222	0.739491	0.4609
DLOG(J)	0.155553	0.164675	0.944606	0.3465
EU(-1)	-0.234298	0.054116	-4.329550	0.0000
C	4.37E-06	0.008899	0.000492	0.9996
R-squared	0.156385	Mean dependent var		0.002639
Adjusted R-squared	0.137776	S.D. dependent var		0.112671
S.E. of regression	0.104621	Akaike info criterion		-1.648783
Sum squared resid	1.488605	Schwarz criterion		-1.564736
Log likelihood	119.4148	Hannan-Quinn criter.		-1.614629
F-statistic	8.403687	Durbin-Watson stat		2.346910
Prob(F-statistic)	0.000036			

## 2. ประเทศเยอรมัน

### 2.1 ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะยาว (Traditional Cointegration)

Dependent Variable: LOG(G)  
 Method: Least Squares  
 Date: 02/09/12 Time: 13:14  
 Sample: 2000M01 2011M09  
 Included observations: 141

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(J)	-0.747363	0.231915	-3.222577	0.0016
LOG(W)	1.243501	0.233916	5.316011	0.0000
C	12.46090	0.132498	94.04603	0.0000
R-squared	0.655043	Mean dependent var		14.22356
Adjusted R-squared	0.650044	S.D. dependent var		0.328170
S.E. of regression	0.194136	Akaike info criterion		-0.419471
Sum squared resid	5.201038	Schwarz criterion		-0.356732
Log likelihood	32.57273	Hannan-Quinn criter.		-0.393976
F-statistic	131.0249	Durbin-Watson stat		0.494657
Prob(F-statistic)	0.000000			

## 2.2 ผลการทดสอบความนิ่งของค่าความคลาดเคลื่อน (Residual) โดยวิธี ADF

Null Hypothesis: EG has a unit root  
 Exogenous: None  
 Lag Length: 0 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.460988	0.0000
Test critical values:		
1% level	-2.581584	
5% level	-1.943123	
10% level	-1.615200	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(EG)  
 Method: Least Squares  
 Date: 02/11/12 Time: 00:41  
 Sample (adjusted): 2000M02 2011M09  
 Included observations: 140 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EG(-1)	-0.248899	0.055795	-4.460988	0.0000
R-squared	0.125203	Mean dependent var		-0.000864
Adjusted R-squared	0.125203	S.D. dependent var		0.136044
S.E. of regression	0.127243	Akaike info criterion		-1.278316
Sum squared resid	2.250526	Schwarz criterion		-1.257304
Log likelihood	90.48210	Hannan-Quinn criter.		-1.269777
Durbin-Watson stat	2.271219			

### 2.3 ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้น (Error Correction Model)

Dependent Variable: DLOG(G)  
 Method: Least Squares  
 Date: 02/11/12 Time: 15:50  
 Sample (adjusted): 2000M02 2011M09  
 Included observations: 140 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(J)	-0.273506	0.181352	-1.508147	0.1338
DLOG(W)	0.326151	0.190579	1.711369	0.0893
EG(-1)	-0.217638	0.051795	-4.201886	0.0000
C	0.003784	0.009976	0.379350	0.7050
R-squared	0.126680	Mean dependent var		0.004471
Adjusted R-squared	0.107416	S.D. dependent var		0.124126
S.E. of regression	0.117271	Akaike info criterion		-1.420511
Sum squared resid	1.870324	Schwarz criterion		-1.336464
Log likelihood	103.4357	Hannan-Quinn criter.		-1.386356
F-statistic	6.575864	Durbin-Watson stat		2.324948
Prob(F-statistic)	0.000349			

### 3. ประเทศจีน

#### 3.1 ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะยาว (Traditional Cointegration)

Dependent Variable: LOG(CH)  
 Method: Least Squares  
 Date: 02/09/12 Time: 13:17  
 Sample: 2000M01 2011M09  
 Included observations: 141

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(J)	-1.072194	0.407126	-2.633569	0.0094
LOG(W)	2.259951	0.410639	5.503495	0.0000
C	10.21233	0.232600	43.90520	0.0000
R-squared	0.774774	Mean dependent var		14.58723
Adjusted R-squared	0.771510	S.D. dependent var		0.712971
S.E. of regression	0.340805	Akaike info criterion		0.706033
Sum squared resid	16.02840	Schwarz criterion		0.768772
Log likelihood	-46.77531	Hannan-Quinn criter.		0.731528
F-statistic	237.3588	Durbin-Watson stat		0.385774
Prob(F-statistic)	0.000000			

## 3.2 ผลการทดสอบความนิ่งของค่าความคลาดเคลื่อน (Residual) โดยวิธี ADF

Null Hypothesis: ECH has a unit root  
 Exogenous: None  
 Lag Length: 6 (Automatic - based on SIC, maxlag=13)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.560646	0.0005
Test critical values:		
1% level	-2.582334	
5% level	-1.943229	
10% level	-1.615134	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(ECH)  
 Method: Least Squares  
 Date: 02/11/12 Time: 00:43  
 Sample (adjusted): 2000M08 2011M09  
 Included observations: 134 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECH(-1)	-0.262202	0.073639	-3.560646	0.0005
D(ECH(-1))	0.096439	0.085570	1.127015	0.2619
D(ECH(-2))	0.115058	0.081414	1.413251	0.1600
D(ECH(-3))	0.099234	0.080884	1.226872	0.2221
D(ECH(-4))	0.103607	0.080248	1.291082	0.1990
D(ECH(-5))	-0.065659	0.080330	-0.817373	0.4152
D(ECH(-6))	-0.306793	0.079985	-3.835614	0.0002
R-squared	0.311955	Mean dependent var		0.008221
Adjusted R-squared	0.279449	S.D. dependent var		0.207028
S.E. of regression	0.175736	Akaike info criterion		-0.588843
Sum squared resid	3.922159	Schwarz criterion		-0.437463
Log likelihood	46.45246	Hannan-Quinn criter.		-0.527327
Durbin-Watson stat	2.068524			

### 3.3 ผลการวิเคราะห์ความสัมพันธ์เชิงคลงภาพระยะสั้น (Error Correction Model)

Dependent Variable: DLOG(CH)  
 Method: Least Squares  
 Date: 02/11/12 Time: 15:51  
 Sample (adjusted): 2000M02 2011M09  
 Included observations: 140 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(W)	0.261796	0.283141	0.924613	0.3568
DLOG(J)	-0.024818	0.265228	-0.093574	0.9256
ECH(-1)	-0.108523	0.043782	-2.478734	0.0144
C	0.007411	0.014360	0.516127	0.6066
R-squared	0.050244	Mean dependent var		0.009797
Adjusted R-squared	0.029293	S.D. dependent var		0.171306
S.E. of regression	0.168778	Akaike info criterion		-0.692307
Sum squared resid	3.874109	Schwarz criterion		-0.608260
Log likelihood	52.46147	Hannan-Quinn criter.		-0.658153
F-statistic	2.398203	Durbin-Watson stat		1.725541
Prob(F-statistic)	0.070748			

## ภาคผนวก ค

ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะยาวด้วยวิธี Threshold Cointegration  
และผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้นด้วยวิธี Threshold Error Correction  
(TECM)

### 1. ประเทศสหรัฐอเมริกา

1.1 การทดสอบค่าความคลาดเคลื่อนตามทฤษฎีและแนวคิดของ Tsay (1989)

1) กรณีเรียงค่าความคลาดเคลื่อนจากมากไปน้อย

Dependent Variable: EULM  
Method: Least Squares  
Date: 02/13/12 Time: 11:58  
Sample (adjusted): 3 141  
Included observations: 139 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.004156	0.000785	-5.291183	0.0000
EULM(-1)	1.300920	0.068870	18.88957	0.0000
EULM(-2)	-0.284367	0.069916	-4.067289	0.0001
R-squared	0.997756	Mean dependent var		-0.004884
Adjusted R-squared	0.997723	S.D. dependent var		0.162439
S.E. of regression	0.007751	Akaike info criterion		-6.860747
Sum squared resid	0.008170	Schwarz criterion		-6.797413
Log likelihood	479.8219	Hannan-Quinn criter.		-6.835010
F-statistic	30239.98	Durbin-Watson stat		2.086990
Prob(F-statistic)	0.000000			

Chow Breakpoint Test: 71

Null Hypothesis: No breaks at specified breakpoints

Varying regressors: All equation variables

Equation Sample: 3 141

F-statistic	11.96439	Prob. F(3,133)	0.0000
Log likelihood ratio	33.20949	Prob. Chi-Square(3)	0.0000
Wald Statistic	35.89316	Prob. Chi-Square(3)	0.0000



## 2) กรณีเรียงค่าความคลาดเคลื่อนจากน้อยไปมาก

Dependent Variable: EURL  
 Method: Least Squares  
 Date: 02/13/12 Time: 12:01  
 Sample (adjusted): 3 141  
 Included observations: 139 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.003895	0.000941	4.137727	0.0001
EURL(-1)	1.372740	0.095883	14.31683	0.0000
EURL(-2)	-0.381363	0.093763	-4.067289	0.0001
R-squared	0.996757	Mean dependent var		0.007127
Adjusted R-squared	0.996710	S.D. dependent var		0.156472
S.E. of regression	0.008976	Akaike info criterion		-6.567262
Sum squared resid	0.010956	Schwarz criterion		-6.503928
Log likelihood	459.4247	Hannan-Quinn criter.		-6.541525
F-statistic	20901.63	Durbin-Watson stat		1.739730
Prob(F-statistic)	0.000000			

Chow Breakpoint Test: 71  
 Null Hypothesis: No breaks at specified breakpoints  
 Varying regressors: All equation variables  
 Equation Sample: 3 141

F-statistic	18.10302	Prob. F(3,133)	0.0000
Log likelihood ratio	47.59511	Prob. Chi-Square(3)	0.0000
Wald Statistic	54.30906	Prob. Chi-Square(3)	0.0000

## 1.2 ค่า Threshold Regime

**Output**


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Using maximum autoregressive order for low regime:  $mL = 1$

Using maximum autoregressive order for high regime:  $mH = 1$

Searching on 98 possible threshold values within regimes with sufficient ( 15% ) number of observations

Searching on 98 combinations of thresholds (98) and thDelay (1)

---

Results of the grid search for 1 threshold

Conditional on  $m = 1$

thDelay	th	SSR
1	0 -0.03299040	1.501320
2	0 -0.03123015	1.506710
3	0 -0.03084956	1.508431
4	0 -0.03846293	1.508808
5	0 -0.03525553	1.509545
6	0 0.03470347	1.511830
7	0 -0.03817451	1.513976
8	0 0.01488756	1.514535
9	0 0.02415549	1.515241
10	0 -0.03066719	1.515704

th

-0.0329904

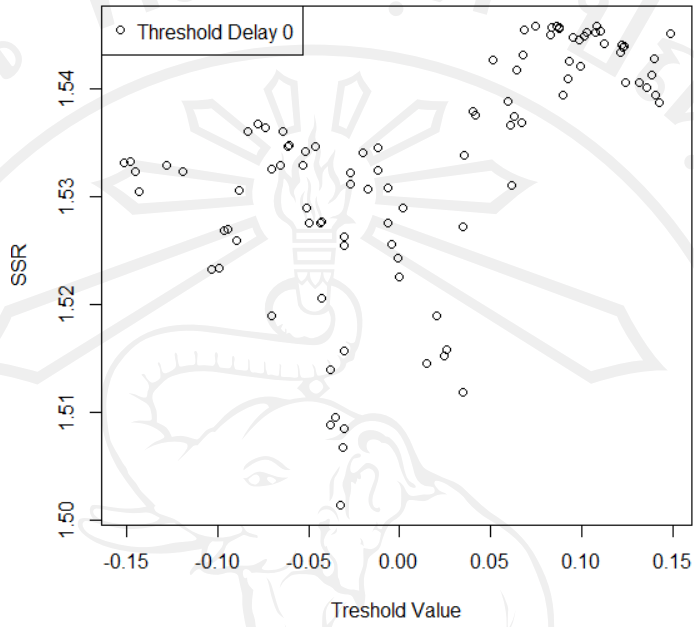
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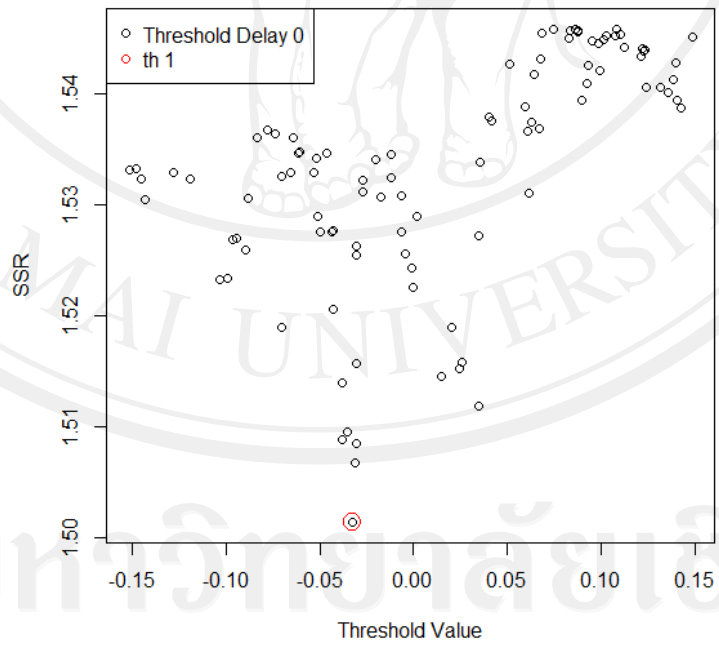
**Output of the grid search for one threshold**

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**Results of the grid search**



**Results of the grid search**



1.3 การวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะยาวโดยใช้แบบจำลอง Threshold Autoregression (TAR) ตามทฤษฎีและแนวคิดของ Balke และ Fomby (1997)

1) Upper Regime

Dependent Variable: LOG(UU)  
Method: Least Squares  
Date: 02/15/12 Time: 12:38  
Sample: 1 88  
Included observations: 88

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(UJU)	0.277153	0.159360	1.739168	0.0856
LOG(UWU)	-0.199764	0.163715	-1.220195	0.2258
C	15.30411	0.090224	169.6238	0.0000
R-squared	0.163518	Mean dependent var		15.66484
Adjusted R-squared	0.143836	S.D. dependent var		0.108856
S.E. of regression	0.100723	Akaike info criterion		-1.719380
Sum squared resid	0.862343	Schwarz criterion		-1.634925
Log likelihood	78.65271	Hannan-Quinn criter.		-1.685355
F-statistic	8.308010	Durbin-Watson stat		0.740718
Prob(F-statistic)	0.000506			

Dependent Variable: EUU  
Method: Least Squares  
Date: 02/13/12 Time: 17:06  
Sample (adjusted): 3 88  
Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002794	0.007870	0.354983	0.7235
EUU(-1)	0.598163	0.108942	5.490635	0.0000
EUU(-2)	-0.025820	0.097851	-0.263872	0.7925
R-squared	0.341648	Mean dependent var		0.006378
Adjusted R-squared	0.325784	S.D. dependent var		0.088664
S.E. of regression	0.072802	Akaike info criterion		-2.367875
Sum squared resid	0.439916	Schwarz criterion		-2.282258
Log likelihood	104.8186	Hannan-Quinn criter.		-2.333418
F-statistic	21.53622	Durbin-Watson stat		2.013713
Prob(F-statistic)	0.000000			

## 2) Lower Regime

Dependent Variable: LOG(UL)

Method: Least Squares

Date: 02/15/12 Time: 12:51

Sample: 1 53

Included observations: 53

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(UJL)	-0.484518	0.230974	-2.097719	0.0410
LOG(UWL)	0.599592	0.228677	2.622008	0.0116
C	15.05600	0.127614	117.9805	0.0000
R-squared	0.321542	Mean dependent var		15.41082
Adjusted R-squared	0.294404	S.D. dependent var		0.141836
S.E. of regression	0.119142	Akaike info criterion		-1.362062
Sum squared resid	0.709741	Schwarz criterion		-1.250536
Log likelihood	39.09465	Hannan-Quinn criter.		-1.319175
F-statistic	11.84827	Durbin-Watson stat		0.704477
Prob(F-statistic)	0.000061			

Dependent Variable: EUL

Method: Least Squares

Date: 02/13/12 Time: 17:19

Sample (adjusted): 3 53

Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000752	0.012891	-0.058319	0.9537
EUL(-1)	0.601471	0.144484	4.162894	0.0001
EUL(-2)	0.069053	0.144419	0.478146	0.6347
R-squared	0.420692	Mean dependent var		-0.002096
Adjusted R-squared	0.396554	S.D. dependent var		0.118494
S.E. of regression	0.092048	Akaike info criterion		-1.875983
Sum squared resid	0.406699	Schwarz criterion		-1.762346
Log likelihood	50.83757	Hannan-Quinn criter.		-1.832559
F-statistic	17.42873	Durbin-Watson stat		1.994033
Prob(F-statistic)	0.000002			

## 1.4 ผลการทดสอบความนิ่งของค่าความคลาดเคลื่อน (Residual) โดยวิธี ADF

## 1) Upper Regime

Null Hypothesis: EUU has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=11)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.991234	0.0000
Test critical values:		
1% level	-2.591813	
5% level	-1.944574	
10% level	-1.614315	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(EUU)

Method: Least Squares

Date: 02/13/12 Time: 17:05

Sample (adjusted): 2 88

Included observations: 87 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EUU(-1)	-0.470299	0.078498	-5.991234	0.0000
R-squared	0.293277	Mean dependent var		0.003527
Adjusted R-squared	0.293277	S.D. dependent var		0.086109
S.E. of regression	0.072389	Akaike info criterion		-2.402091
Sum squared resid	0.450657	Schwarz criterion		-2.373748
Log likelihood	105.4910	Hannan-Quinn criter.		-2.390678
Durbin-Watson stat	1.837120			

## 2) Lower Regime

Null Hypothesis: EUL has a unit root  
 Exogenous: None  
 Lag Length: 0 (Automatic - based on SIC, maxlag=10)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.271816	0.0015
Test critical values:		
1% level	-2.610192	
5% level	-1.947248	
10% level	-1.612797	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(EUL)  
 Method: Least Squares  
 Date: 02/13/12 Time: 17:18  
 Sample (adjusted): 2 53  
 Included observations: 52 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EUL(-1)	-0.351242	0.107354	-3.271816	0.0019
R-squared	0.173378	Mean dependent var		0.001111
Adjusted R-squared	0.173378	S.D. dependent var		0.099008
S.E. of regression	0.090017	Akaike info criterion		-1.958595
Sum squared resid	0.413255	Schwarz criterion		-1.921072
Log likelihood	51.92348	Hannan-Quinn criter.		-1.944210
Durbin-Watson stat	2.063795			

## 1.5 ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้นด้วยวิธี Threshold Error

## Correction Model

## 1) Upper Regime

Dependent Variable: DLOG(UU)

Method: Least Squares

Date: 02/15/12 Time: 17:33

Sample (adjusted): 3 88

Included observations: 86 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(UU(-1))	0.036699	0.097819	0.375167	0.7085
DLOG(UJU)	0.254708	0.132855	1.917194	0.0587
DLOG(UWU)	-0.094009	0.157350	-0.597449	0.5519
E(-1)	-0.424310	0.097231	-4.363913	0.0000
C	0.001390	0.007978	0.174215	0.8621
R-squared	0.271131	Mean dependent var		0.001509
Adjusted R-squared	0.235137	S.D. dependent var		0.083505
S.E. of regression	0.073031	Akaike info criterion		-2.339492
Sum squared resid	0.432012	Schwarz criterion		-2.196797
Log likelihood	105.5982	Hannan-Quinn criter.		-2.282064
F-statistic	7.532761	Durbin-Watson stat		2.027690
Prob(F-statistic)	0.000033			

## 2) Lower Regime

Dependent Variable: DLOG(UL)

Method: Least Squares

Date: 02/15/12 Time: 17:35

Sample (adjusted): 3 53

Included observations: 51 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(UL(-1))	0.024112	0.130027	0.185438	0.8537
DLOG(UJL)	-0.143520	0.205793	-0.697398	0.4891
DLOG(UWL)	0.400271	0.203079	1.971010	0.0548
E(-1)	-0.386673	0.115136	-3.358402	0.0016
C	-0.004667	0.012817	-0.364117	0.7174
R-squared	0.339655	Mean dependent var		0.002696
Adjusted R-squared	0.282234	S.D. dependent var		0.106252
S.E. of regression	0.090018	Akaike info criterion		-1.884721
Sum squared resid	0.372749	Schwarz criterion		-1.695326
Log likelihood	53.06039	Hannan-Quinn criter.		-1.812348
F-statistic	5.915135	Durbin-Watson stat		2.174425
Prob(F-statistic)	0.000631			



## 2. ประเทศเยอรมัน

### 2.1 การทดสอบค่าความคลาดเคลื่อนตามทฤษฎีและแนวคิดของ Tsay (1989)

#### 1) กรณีเรียงค่าความคลาดเคลื่อนจากมากไปน้อย

Dependent Variable: GLM  
 Method: Least Squares  
 Date: 02/13/12 Time: 12:09  
 Sample (adjusted): 3 141  
 Included observations: 139 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.004616	0.001218	-3.788519	0.0002
GLM(-1)	1.359842	0.127009	10.70662	0.0000
GLM(-2)	-0.366308	0.124496	-2.942321	0.0038
R-squared	0.996470	Mean dependent var		-0.007811
Adjusted R-squared	0.996418	S.D. dependent var		0.182632
S.E. of regression	0.010931	Akaike info criterion		-6.173131
Sum squared resid	0.016249	Schwarz criterion		-6.109797
Log likelihood	432.0326	Hannan-Quinn criter.		-6.147394
F-statistic	19194.23	Durbin-Watson stat		1.597234
Prob(F-statistic)	0.000000			

Chow Breakpoint Test: 71  
 Null Hypothesis: No breaks at specified breakpoints  
 Varying regressors: All equation variables  
 Equation Sample: 3 141

F-statistic	19.04940	Prob. F(3,133)	0.0000
Log likelihood ratio	49.68620	Prob. Chi-Square(3)	0.0000
Wald Statistic	57.14821	Prob. Chi-Square(3)	0.0000

## 2) กรณีเรียงค่าความคลาดเคลื่อนจากน้อยไปมาก

Dependent Variable: GML

Method: Least Squares

Date: 02/16/12 Time: 01:28

Sample (adjusted): 3 141

Included observations: 139 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GML(-1)	1.180546	0.054877	21.51271	0.0000
GML(-2)	-0.163378	0.055527	-2.942321	0.0038
C	0.005215	0.000729	7.150706	0.0000
R-squared	0.998522	Mean dependent var		0.005451
Adjusted R-squared	0.998501	S.D. dependent var		0.188527
S.E. of regression	0.007300	Akaike info criterion		-6.980540
Sum squared resid	0.007247	Schwarz criterion		-6.917206
Log likelihood	488.1475	Hannan-Quinn criter.		-6.954803
F-statistic	45952.36	Durbin-Watson stat		2.245028
Prob(F-statistic)	0.000000			

Chow Breakpoint Test: 71

Null Hypothesis: No breaks at specified breakpoints

Varying regressors: All equation variables

Equation Sample: 3 141

F-statistic	17.08127	Prob. F(3,133)	0.0000
Log likelihood ratio	45.30159	Prob. Chi-Square(3)	0.0000
Wald Statistic	51.24380	Prob. Chi-Square(3)	0.0000

## 2.2 ค่า Threshold Regime

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### Output

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Using maximum autoregressive order for low regime:  $mL = 1$

Using maximum autoregressive order for high regime:  $mH = 1$

Searching on 98 possible threshold values within regimes with sufficient ( 15% ) number of observations

Searching on 98 combinations of thresholds (98) and thDelay (1)

---

Results of the grid search for 1 threshold

Conditional on  $m= 1$

	thDelay	th	SSR
1	0	0.064785	2.158187
2	0	0.000502	2.159469
3	0	0.076442	2.160979
4	0	-0.061610	2.162819
5	0	-0.059462	2.162963
6	0	-0.018967	2.163456
7	0	-0.080488	2.163681
8	0	-0.083300	2.164550
9	0	-0.012310	2.165017
10	0	-0.143985	2.165247

th

0.064785

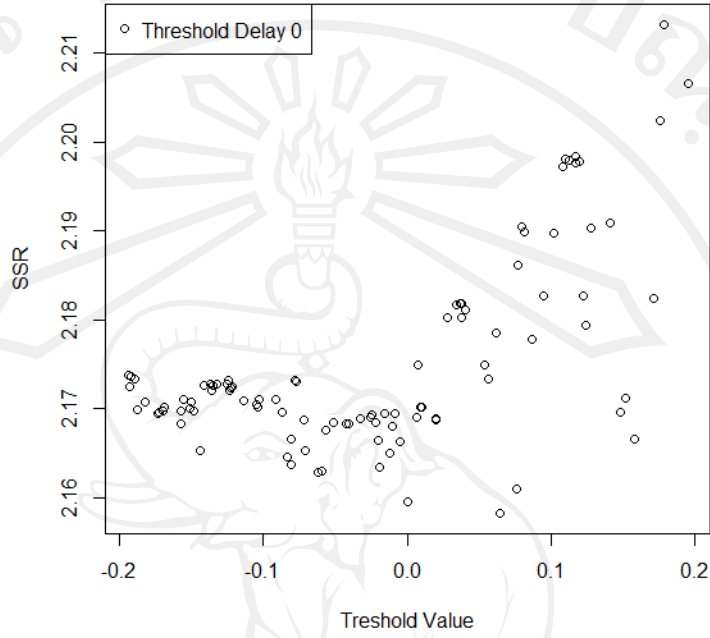
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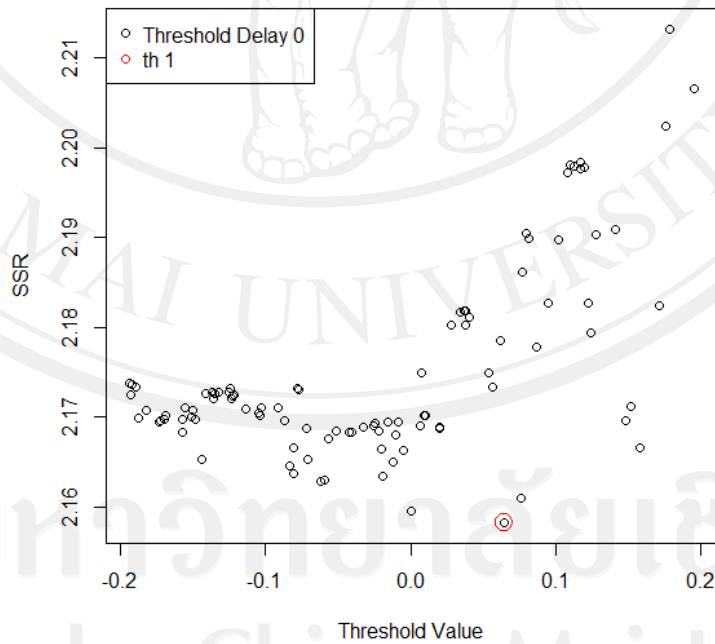
**Output of the grid search for one threshold**

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**Results of the grid search**



**Results of the grid search**



2.3 การวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะยาวโดยใช้แบบจำลอง Threshold Autoregression (TAR) ตามทฤษฎีและแนวคิดของ Balke และ Fomby (1997)

1) Upper Regime

Dependent Variable: LOG(GU)

Method: Least Squares

Date: 02/15/12 Time: 11:06

Sample: 1 47

Included observations: 47

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GJU)	-0.645187	0.346333	-1.862910	0.0692
LOG(GWU)	1.205424	0.329943	3.653434	0.0007
C	12.41409	0.189584	65.48066	0.0000
R-squared	0.884970	Mean dependent var		14.42390
Adjusted R-squared	0.879742	S.D. dependent var		0.377983
S.E. of regression	0.131078	Akaike info criterion		-1.164346
Sum squared resid	0.755984	Schwarz criterion		-1.046252
Log likelihood	30.36213	Hannan-Quinn criter.		-1.119906
F-statistic	169.2549	Durbin-Watson stat		0.896110
Prob(F-statistic)	0.000000			

Dependent Variable: EGU

Method: Least Squares

Date: 02/13/12 Time: 17:23

Sample (adjusted): 3 47

Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002096	0.016660	-0.125799	0.9005
EGU(-1)	0.508493	0.154549	3.290160	0.0020
EGU(-2)	0.090076	0.155768	0.578271	0.5662
R-squared	0.304279	Mean dependent var		0.000895
Adjusted R-squared	0.271149	S.D. dependent var		0.130743
S.E. of regression	0.111619	Akaike info criterion		-1.483108
Sum squared resid	0.523271	Schwarz criterion		-1.362664
Log likelihood	36.36993	Hannan-Quinn criter.		-1.438207
F-statistic	9.184500	Durbin-Watson stat		2.002520
Prob(F-statistic)	0.000491			

## 2) Lower Regime

Dependent Variable: LOG(GL)

Method: Least Squares

Date: 02/15/12 Time: 11:11

Sample: 1 94

Included observations: 94

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(GJL)	-0.482309	0.145837	-3.307189	0.0014
LOG(GWL)	0.959123	0.152758	6.278691	0.0000
C	12.36815	0.085549	144.5735	0.0000
R-squared	0.835874	Mean dependent var		14.12340
Adjusted R-squared	0.832267	S.D. dependent var		0.247043
S.E. of regression	0.101177	Akaike info criterion		-1.712495
Sum squared resid	0.931548	Schwarz criterion		-1.631326
Log likelihood	83.48727	Hannan-Quinn criter.		-1.679709
F-statistic	231.7255	Durbin-Watson stat		1.254516
Prob(F-statistic)	0.000000			

Dependent Variable: EGL

Method: Least Squares

Date: 02/13/12 Time: 17:27

Sample (adjusted): 3 94

Included observations: 92 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.002009	0.009786	-0.205308	0.8378
EGL(-1)	0.331187	0.105719	3.132704	0.0023
EGL(-2)	0.036435	0.105983	0.343782	0.7318
R-squared	0.119707	Mean dependent var		-0.003119
Adjusted R-squared	0.099925	S.D. dependent var		0.098860
S.E. of regression	0.093791	Akaike info criterion		-1.863439
Sum squared resid	0.782905	Schwarz criterion		-1.781206
Log likelihood	88.71818	Hannan-Quinn criter.		-1.830249
F-statistic	6.051355	Durbin-Watson stat		1.958101
Prob(F-statistic)	0.003435			

## 2.4 ผลการทดสอบความนิ่งของค่าความคลาดเคลื่อน (Residual) โดยวิธี ADF

## 1) Upper Regime

Null Hypothesis: EGU has a unit root  
 Exogenous: None  
 Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.535018	0.0007
Test critical values:		
1% level	-2.616203	
5% level	-1.948140	
10% level	-1.612320	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(EGU)  
 Method: Least Squares  
 Date: 02/13/12 Time: 17:22  
 Sample (adjusted): 2 47  
 Included observations: 46 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EGU(-1)	-0.448681	0.126925	-3.535018	0.0010
R-squared	0.217101	Mean dependent var		-0.002129
Adjusted R-squared	0.217101	S.D. dependent var		0.122677
S.E. of regression	0.108547	Akaike info criterion		-1.581773
Sum squared resid	0.530208	Schwarz criterion		-1.542020
Log likelihood	37.38077	Hannan-Quinn criter.		-1.566881
Durbin-Watson stat	2.066878			

## 2) Lower Regime

Null Hypothesis: EGL has a unit root  
 Exogenous: None  
 Lag Length: 0 (Automatic - based on SIC, maxlag=11)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.575719	0.0000
Test critical values:		
1% level	-2.590065	
5% level	-1.944324	
10% level	-1.614464	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(EGL)  
 Method: Least Squares  
 Date: 02/13/12 Time: 17:25  
 Sample (adjusted): 2 94  
 Included observations: 93 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EGL(-1)	-0.640135	0.097348	-6.575719	0.0000
R-squared	0.319728	Mean dependent var		4.82E-05
Adjusted R-squared	0.319728	S.D. dependent var		0.112706
S.E. of regression	0.092958	Akaike info criterion		-1.902637
Sum squared resid	0.794994	Schwarz criterion		-1.875405
Log likelihood	89.47264	Hannan-Quinn criter.		-1.891642
Durbin-Watson stat	2.034373			



## 2.5 ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้นด้วยวิธี Threshold Error

## Correction Model

## 1) Upper Regime

Dependent Variable: DLOG(GU)

Method: Least Squares

Date: 02/15/12 Time: 17:22

Sample (adjusted): 3 47

Included observations: 45 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(GU(-1))	-0.010333	0.116504	-0.088694	0.9298
DLOG(GWU)	1.033714	0.302751	3.414406	0.0015
DLOG(GJU)	-0.702713	0.332968	-2.110450	0.0411
E(-1)	-0.445720	0.126264	-3.530059	0.0011
C	0.005333	0.016222	0.328739	0.7441
R-squared	0.517129	Mean dependent var		0.013291
Adjusted R-squared	0.468842	S.D. dependent var		0.145936
S.E. of regression	0.106359	Akaike info criterion		-1.539550
Sum squared resid	0.452491	Schwarz criterion		-1.338810
Log likelihood	39.63988	Hannan-Quinn criter.		-1.464716
F-statistic	10.70947	Durbin-Watson stat		2.012924
Prob(F-statistic)	0.000005			

## 2) Lower Regime

Dependent Variable: DLOG(GL)

Method: Least Squares

Date: 02/15/12 Time: 17:37

Sample (adjusted): 3 94

Included observations: 92 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(GL(-1))	-0.065242	0.098655	-0.661316	0.5102
DLOG(GJL)	-0.377403	0.160573	-2.350350	0.0210
DLOG(GWL)	0.661068	0.180207	3.668380	0.0004
E(-1)	-0.576599	0.112588	-5.121301	0.0000
C	0.001297	0.009718	0.133489	0.8941
R-squared	0.353417	Mean dependent var		0.006820
Adjusted R-squared	0.323689	S.D. dependent var		0.111922
S.E. of regression	0.092043	Akaike info criterion		-1.880312
Sum squared resid	0.737052	Schwarz criterion		-1.743258
Log likelihood	91.49436	Hannan-Quinn criter.		-1.824996
F-statistic	11.88838	Durbin-Watson stat		1.951004
Prob(F-statistic)	0.000000			

### 3. สาธารณรัฐประชาชนจีน

#### 3.1 การทดสอบค่าความคลาดเคลื่อนตามทฤษฎีและแนวคิดของ Tsay (1989)

##### 1) กรณีเรียงค่าความคลาดเคลื่อนจากมากไปน้อย

Dependent Variable: CHLM  
 Method: Least Squares  
 Date: 02/13/12 Time: 12:05  
 Sample (adjusted): 3 141  
 Included observations: 139 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.007209	0.001611	-4.473356	0.0000
CHLM(-1)	1.438908	0.078045	18.43682	0.0000
CHLM(-2)	-0.421977	0.079235	-5.325601	0.0000
R-squared	0.997890	Mean dependent var		-0.010032
Adjusted R-squared	0.997859	S.D. dependent var		0.330839
S.E. of regression	0.015307	Akaike info criterion		-5.499698
Sum squared resid	0.031864	Schwarz criterion		-5.436364
Log likelihood	385.2290	Hannan-Quinn criter.		-5.473961
F-statistic	32166.09	Durbin-Watson stat		2.109830
Prob(F-statistic)	0.000000			

Chow Breakpoint Test: 71  
 Null Hypothesis: No breaks at specified breakpoints  
 Varying regressors: All equation variables  
 Equation Sample: 3 141

F-statistic	16.84046	Prob. F(3,133)	0.0000
Log likelihood ratio	44.75551	Prob. Chi-Square(3)	0.0000
Wald Statistic	50.52138	Prob. Chi-Square(3)	0.0000

## 2) กรณีเรียงค่าความคลาดเคลื่อนจากน้อยไปมาก

Dependent Variable: CHML

Method: Least Squares

Date: 02/13/12 Time: 12:06

Sample (adjusted): 3 141

Included observations: 139 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.007020	0.001589	4.418405	0.0000
CHML(-1)	1.402332	0.078715	17.81524	0.0000
CHML(-2)	-0.408928	0.076785	-5.325601	0.0000
R-squared	0.997786	Mean dependent var		0.014218
Adjusted R-squared	0.997753	S.D. dependent var		0.317880
S.E. of regression	0.015068	Akaike info criterion		-5.531108
Sum squared resid	0.030879	Schwarz criterion		-5.467774
Log likelihood	387.4120	Hannan-Quinn criter.		-5.505371
F-statistic	30639.89	Durbin-Watson stat		2.233318
Prob(F-statistic)	0.000000			

Chow Breakpoint Test: 71

Null Hypothesis: No breaks at specified breakpoints

Varying regressors: All equation variables

Equation Sample: 3 141

F-statistic	15.71296	Prob. F(3,133)	0.0000
Log likelihood ratio	42.16968	Prob. Chi-Square(3)	0.0000
Wald Statistic	47.13888	Prob. Chi-Square(3)	0.0000

## 3.2 ค่า Threshold Regime

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**Output**

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Using maximum autoregressive order for low regime:  $mL = 1$

Using maximum autoregressive order for high regime:  $mH = 1$

Searching on 98 possible threshold values within regimes with sufficient ( 15% ) number of observations

Searching on 98 combinations of thresholds (98) and thDelay (1)

---

Results of the grid search for 1 threshold

Conditional on  $m= 1$

	thDelay	th	SSR
1	0	-0.17587104	5.316155
2	0	-0.17138878	5.340035
3	0	-0.06118882	5.346578
4	0	-0.06052161	5.357616
5	0	-0.14561733	5.398928
6	0	-0.05640471	5.399256
7	0	-0.13865235	5.400215
8	0	-0.16801768	5.403574
9	0	-0.06295291	5.405257
10	0	-0.07029497	5.411586

th

-0.175871

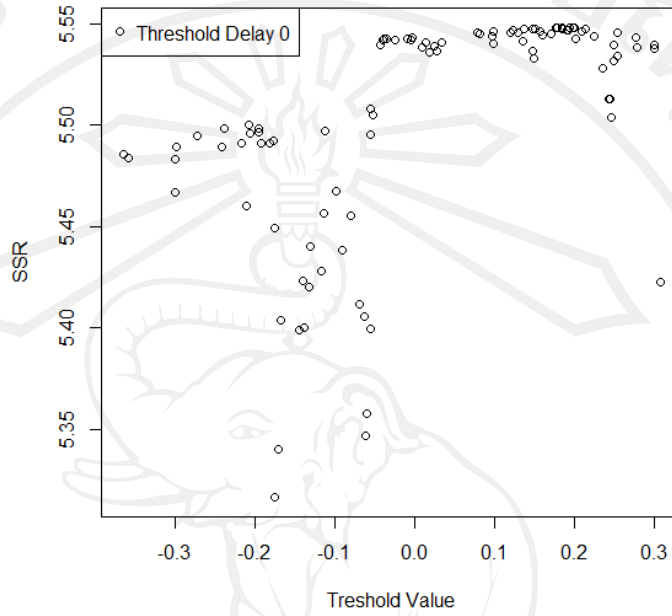
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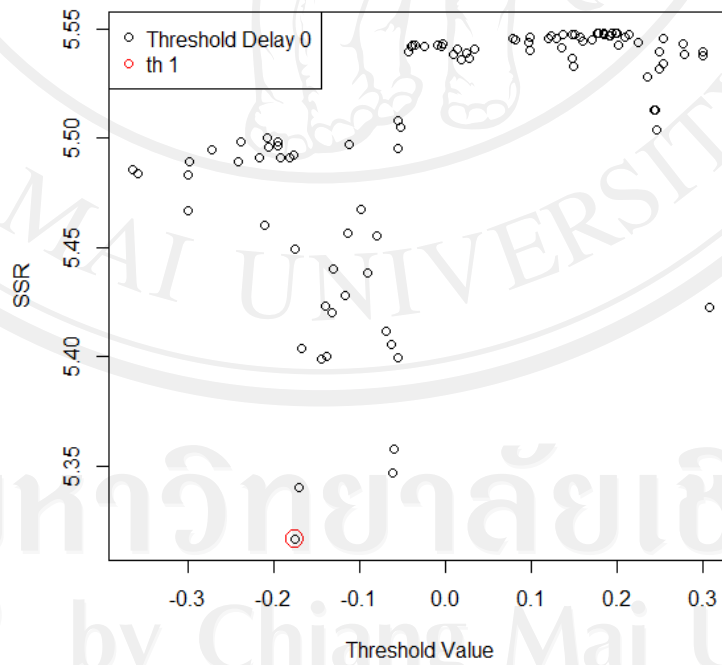
**Output of the grid search for one threshold**

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**Results of the grid search**



**Results of the grid search**



3.3 การวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะยาวโดยใช้แบบจำลอง Threshold Autoregression (TAR) ตามทฤษฎีและแนวคิดของ Balke และ Fomby (1997)

1) Upper Regime

Dependent Variable: LOG(CHU)

Method: Least Squares

Date: 02/15/12 Time: 11:21

Sample: 1 103

Included observations: 103

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(CHJU)	-1.374997	0.287583	-4.781213	0.0000
LOG(CHWU)	2.450604	0.283721	8.637381	0.0000
C	10.87408	0.179367	60.62462	0.0000
R-squared	0.889464	Mean dependent var		14.78340
Adjusted R-squared	0.887253	S.D. dependent var		0.608614
S.E. of regression	0.204359	Akaike info criterion		-0.309181
Sum squared resid	4.176272	Schwarz criterion		-0.232441
Log likelihood	18.92280	Hannan-Quinn criter.		-0.278098
F-statistic	402.3399	Durbin-Watson stat		0.746328
Prob(F-statistic)	0.000000			

Dependent Variable: ECU

Method: Least Squares

Date: 02/13/12 Time: 18:09

Sample (adjusted): 3 103

Included observations: 101 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.000552	0.015897	-0.034740	0.9724
ECU(-1)	0.647912	0.100625	6.438857	0.0000
ECU(-2)	-0.029342	0.100272	-0.292625	0.7704
R-squared	0.396624	Mean dependent var		-0.001299
Adjusted R-squared	0.384311	S.D. dependent var		0.203595
S.E. of regression	0.159753	Akaike info criterion		-0.801126
Sum squared resid	2.501052	Schwarz criterion		-0.723449
Log likelihood	43.45686	Hannan-Quinn criter.		-0.769680
F-statistic	32.20978	Durbin-Watson stat		2.009674
Prob(F-statistic)	0.000000			

## 2) Lower Regime

Dependent Variable: LOG(CHL)

Method: Least Squares

Date: 02/15/12 Time: 11:27

Sample: 1 38

Included observations: 38

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(CHJL)	-0.798098	0.607550	-1.313632	0.1975
LOG(CHWL)	2.045104	0.643024	3.180448	0.0031
C	9.501281	0.266927	35.59505	0.0000
R-squared	0.895951	Mean dependent var		14.05552
Adjusted R-squared	0.890005	S.D. dependent var		0.710480
S.E. of regression	0.235634	Akaike info criterion		0.022580
Sum squared resid	1.943312	Schwarz criterion		0.151863
Log likelihood	2.570988	Hannan-Quinn criter.		0.068578
F-statistic	150.6901	Durbin-Watson stat		0.681208
Prob(F-statistic)	0.000000			

Dependent Variable: ECL

Method: Least Squares

Date: 02/13/12 Time: 18:21

Sample (adjusted): 3 38

Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.013348	0.027431	0.486595	0.6298
ECL(-1)	0.855633	0.159671	5.358729	0.0000
ECL(-2)	-0.301818	0.159619	-1.890872	0.0674
R-squared	0.505494	Mean dependent var		0.011294
Adjusted R-squared	0.475523	S.D. dependent var		0.227219
S.E. of regression	0.164553	Akaike info criterion		-0.691508
Sum squared resid	0.893568	Schwarz criterion		-0.559548
Log likelihood	15.44714	Hannan-Quinn criter.		-0.645450
F-statistic	16.86660	Durbin-Watson stat		2.080321
Prob(F-statistic)	0.000009			

## 3.4 ผลการทดสอบความนิ่งของค่าความคลาดเคลื่อน (Residual) โดยวิธี ADF

## 1) Upper Regime

Null Hypothesis: ECU has a unit root  
 Exogenous: None  
 Lag Length: 0 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.865355	0.0000
Test critical values:		
1% level	-2.587831	
5% level	-1.944006	
10% level	-1.614656	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(ECU)  
 Method: Least Squares  
 Date: 02/13/12 Time: 18:09  
 Sample (adjusted): 2 103  
 Included observations: 102 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECU(-1)	-0.376586	0.077402	-4.865355	0.0000
R-squared	0.189739	Mean dependent var		-0.002239
Adjusted R-squared	0.189739	S.D. dependent var		0.175656
S.E. of regression	0.158116	Akaike info criterion		-0.841222
Sum squared resid	2.525063	Schwarz criterion		-0.815487
Log likelihood	43.90232	Hannan-Quinn criter.		-0.830801
Durbin-Watson stat	1.940732			



## 2) Lower Regime

Null Hypothesis: ECL has a unit root  
 Exogenous: None  
 Lag Length: 0 (Automatic - based on SIC, maxlag=9)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.664400	0.0091
Test critical values:		
1% level	-2.628961	
5% level	-1.950117	
10% level	-1.611339	

\*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation  
 Dependent Variable: D(ECL)  
 Method: Least Squares  
 Date: 02/13/12 Time: 18:21  
 Sample (adjusted): 2 38  
 Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
ECL(-1)	-0.338142	0.126911	-2.664400	0.0115
R-squared	0.163754	Mean dependent var		0.006409
Adjusted R-squared	0.163754	S.D. dependent var		0.191651
S.E. of regression	0.175258	Akaike info criterion		-0.618461
Sum squared resid	1.105752	Schwarz criterion		-0.574923
Log likelihood	12.44153	Hannan-Quinn criter.		-0.603112
Durbin-Watson stat	1.493060			

## 3.5 ผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้นด้วยวิธี Threshold Error

## Correction Model

## 1) Upper Regime

Dependent Variable: DLOG(CHU)

Method: Least Squares

Date: 02/15/12 Time: 17:19

Sample (adjusted): 3 103

Included observations: 101 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(CHU(-1))	-0.051691	0.099403	-0.520019	0.6042
DLOG(CHJU)	-0.511650	0.245142	-2.087161	0.0395
DLOG(CHWU)	0.953996	0.273546	3.487522	0.0007
E(-1)	-0.202538	0.076555	-2.645636	0.0095
C	0.008560	0.013772	0.621502	0.5357
R-squared	0.177623	Mean dependent var		0.013876
Adjusted R-squared	0.143357	S.D. dependent var		0.147496
S.E. of regression	0.136515	Akaike info criterion		-1.096526
Sum squared resid	1.789090	Schwarz criterion		-0.967065
Log likelihood	60.37459	Hannan-Quinn criter.		-1.044117
F-statistic	5.183682	Durbin-Watson stat		1.987224
Prob(F-statistic)	0.000799			

## 2) Lower Regime

Dependent Variable: DLOG(CHL)

Method: Least Squares

Date: 02/15/12 Time: 12:05

Sample (adjusted): 3 38

Included observations: 36 after adjustments

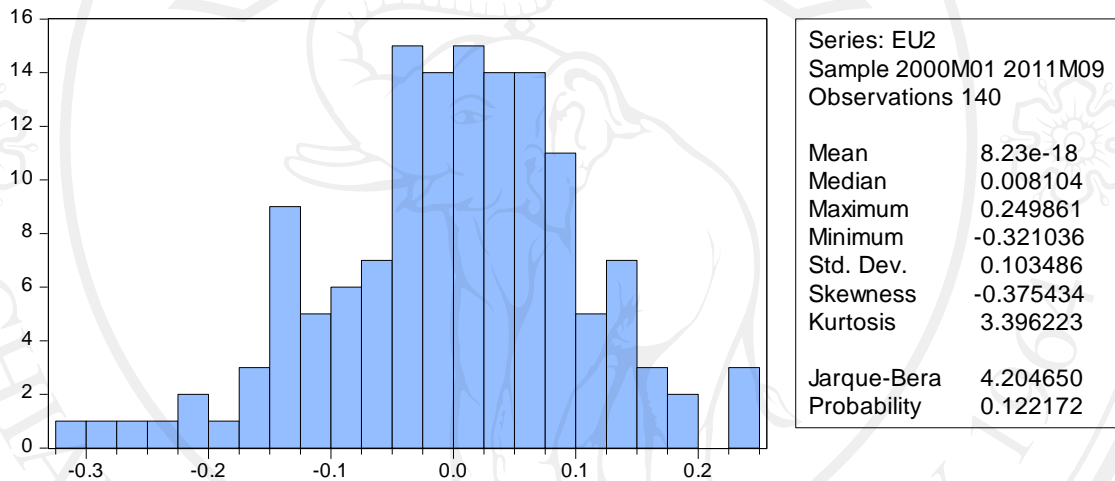
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(CHL(-1))	0.222783	0.180780	1.232344	0.2271
DLOG(CHJL)	-0.178429	0.436145	-0.409105	0.6853
DLOG(CHWL)	0.936006	0.547694	1.708994	0.0974
EL(-1)	-0.297713	0.153707	-1.936892	0.0619
C	0.018069	0.029901	0.604288	0.5500
R-squared	0.238248	Mean dependent var		0.055239
Adjusted R-squared	0.139957	S.D. dependent var		0.174118
S.E. of regression	0.161474	Akaike info criterion		-0.680697
Sum squared resid	0.808291	Schwarz criterion		-0.460764
Log likelihood	17.25255	Hannan-Quinn criter.		-0.603935
F-statistic	2.423911	Durbin-Watson stat		1.813724
Prob(F-statistic)	0.069111			

## ภาคผนวก ง

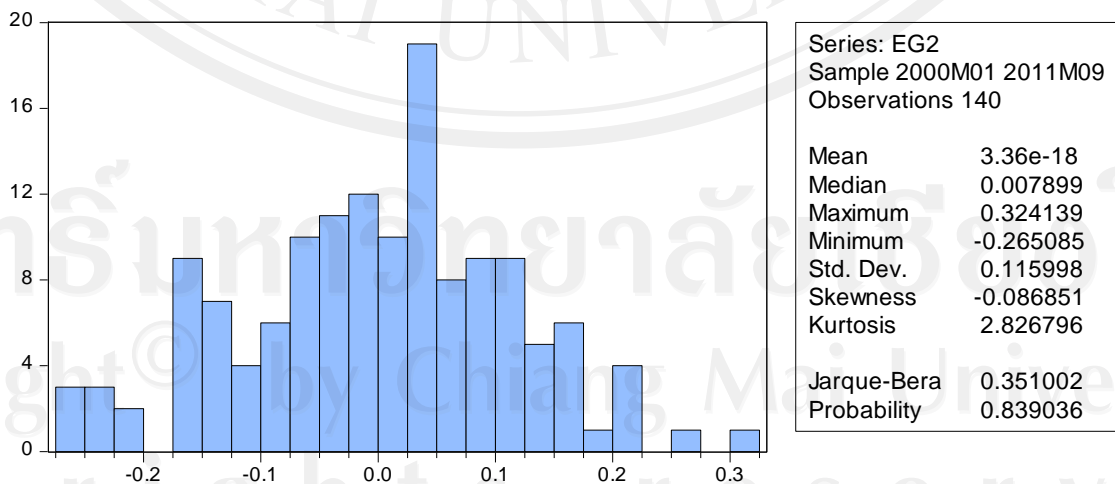
ผลการวิเคราะห์การแจกแจงปกติของค่าความคลาดเคลื่อนด้วยวิธี Jarque-Bera

### 1. ผลการวิเคราะห์การแจกแจงปกติของค่าความคลาดเคลื่อนด้วยวิธี Jarque-Bera ในกรณีของผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้นของแบบจำลอง Error Correction Model

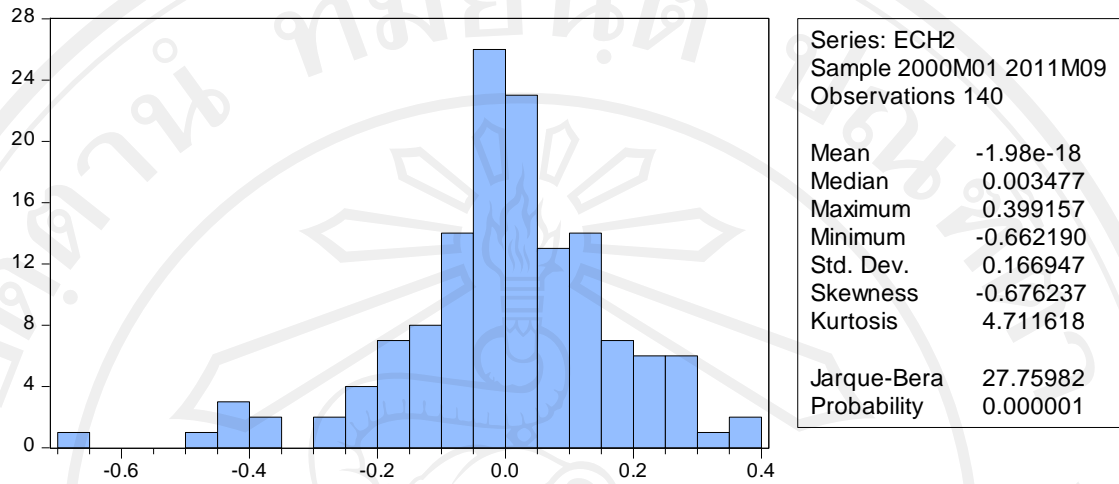
#### 1.1 ประเทศสหรัฐอเมริกา



#### 1.2 ประเทศเยอรมัน



## 1.3 ประเทศจีน

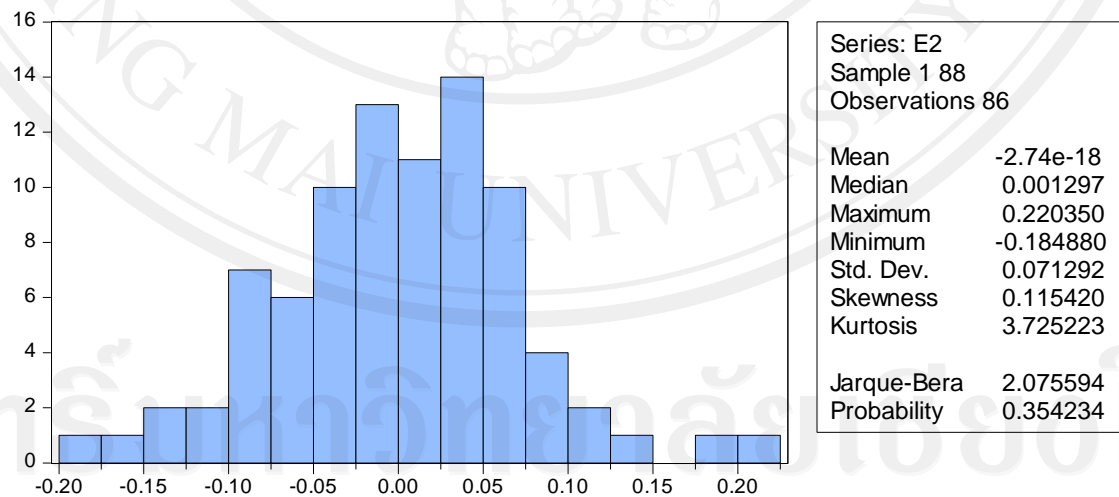


## 2. ผลการวิเคราะห์การแจกแจงปกติของค่าความคลาดเคลื่อนด้วยวิธี Jarque-Bera ในกรณีของผลการวิเคราะห์ความสัมพันธ์เชิงดุลยภาพระยะสั้นของแบบจำลอง Threshold Error Correction

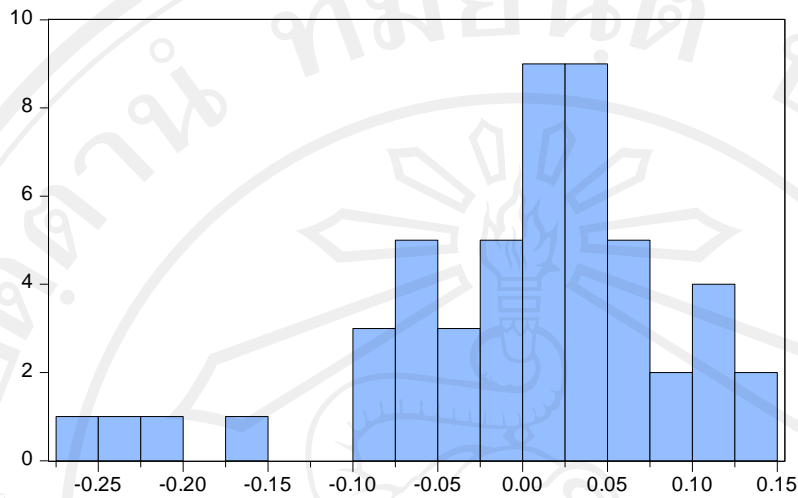
### Model

#### 2.1 ประเทศสหรัฐอเมริกา

##### 1) ในกรณีของ Upper Regime

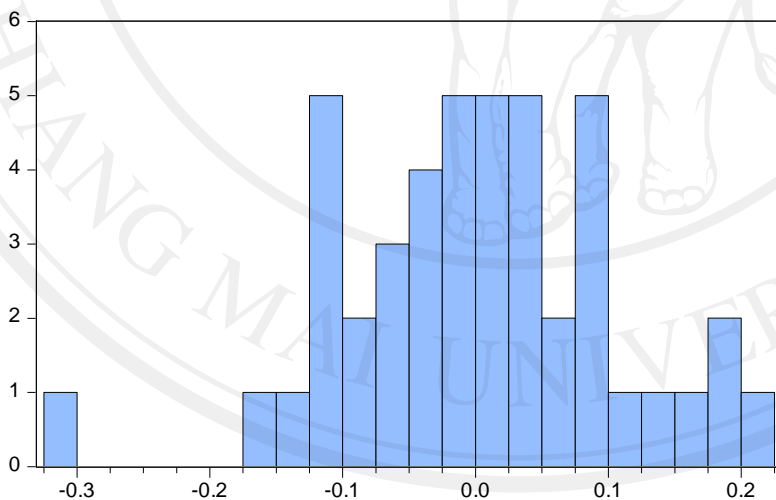


## 2) ในกรณีของ Lower Regime

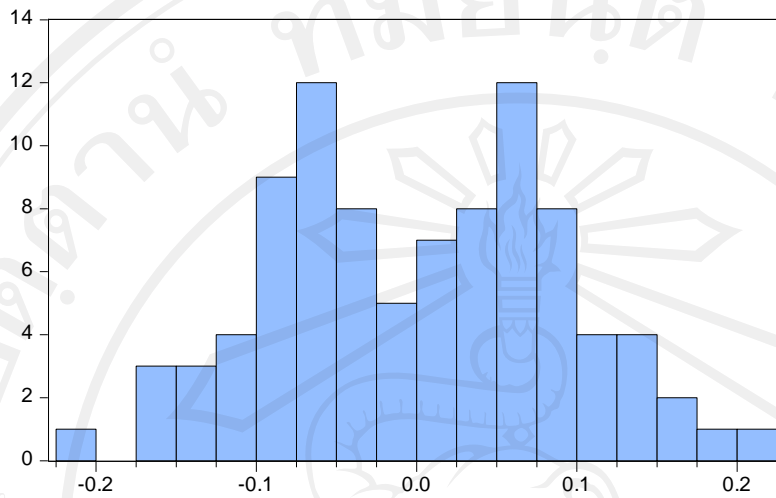


## 2.2 ประเทศเยอรมัน

## 1) ในกรณีของ Upper Regime



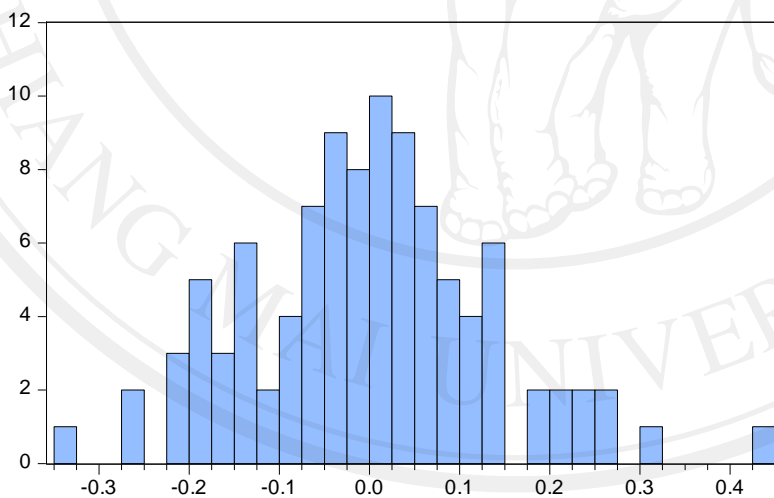
## 2) ในกรณีของ Lower Regime



Series: E2	Sample 1 94	Observations 92
Mean	-1.21e-18	
Median	0.009346	
Maximum	0.210791	
Minimum	-0.202137	
Std. Dev.	0.089997	
Skewness	-0.003757	
Kurtosis	2.311356	
Jarque-Bera	1.818100	
Probability	0.402907	

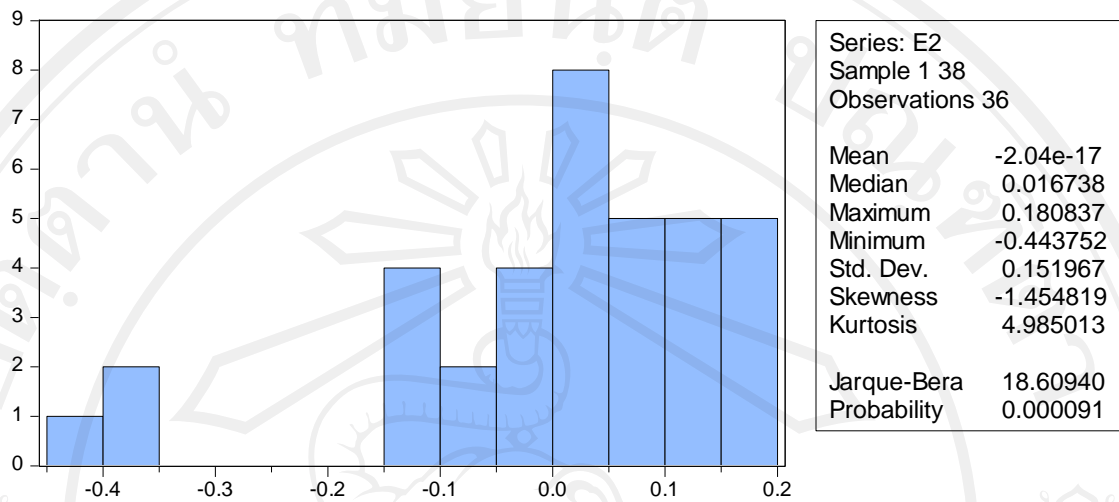
## 2.3 ประเทศจีน

## 1) ในกรณีของ Upper Regime



Series: E2	Sample 1 103	Observations 101
Mean	-1.30e-17	
Median	0.001912	
Maximum	0.437506	
Minimum	-0.330831	
Std. Dev.	0.133757	
Skewness	0.287685	
Kurtosis	3.466714	
Jarque-Bera	2.309840	
Probability	0.315083	

## 2) ในกรณีของ Lower Regime



## ประวัติผู้เขียน

ชื่อ-สกุล

นางสาวนนทวรรณ พาณิชย์จิระสกุล

วัน เดือน ปี เกิด

25 กรกฎาคม 2531

ประวัติการศึกษา

สำเร็จการศึกษามัธยมศึกษาตอนปลาย

โรงเรียนสตรีวัดมหาพฤฒารามในพระบรมราชินูปถัมภ์

เขตบางรัก กรุงเทพมหานคร

สำเร็จการศึกษาระดับปริญญาตรี เศรษฐศาสตรบัณฑิต

คณะเศรษฐศาสตร์ มหาวิทยาลัยเชียงใหม่

ปีการศึกษา 2553

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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