



ภาคผนวก

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ภาคผนวก ก

1. ตารางผลการทดสอบ Unit root test ด้วยวิธี ADF test ของราคาชายแก่

1.1 คงที่ (Intercept)

Null Hypothesis: D(PRUB) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.430227	0.0000
Test critical values:		
1% level	-3.486551	
5% level	-2.886074	
10% level	-2.579931	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(PRUB,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:30
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PRUB(-1))	-0.752620	0.089276	-8.430227	0.0000
C	-0.004168	0.007612	-0.547564	0.5850
R-squared	0.379907	Mean dependent var		-0.000936
Adjusted R-squared	0.374561	S.D. dependent var		0.104427
S.E. of regression	0.082586	Akaike info criterion		-2.133149
Sum squared resid	0.791172	Schwarz criterion		-2.086188
Log likelihood	127.8558	Hannan-Quinn criter.		-2.114082
F-statistic	71.06873	Durbin-Watson stat		2.054546
Prob(F-statistic)	0.000000			

ที่มา: จากการคำนวณ

1.2 ค่าคงที่และแนวโน้ม (Trend and Intercept)

Null Hypothesis: D(PRUB) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.466151	0.0000
Test critical values:		
1% level	-4.037668	
5% level	-3.448348	
10% level	-3.149326	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(PRUB,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:30
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PRUB(-1))	-0.762961	0.090119	-8.466151	0.0000
C	0.007860	0.015572	0.504746	0.6147
@TREND("2006M01")	-0.000200	0.000225	-0.885681	0.3776
R-squared	0.384108	Mean dependent var		-0.000936
Adjusted R-squared	0.373397	S.D. dependent var		0.104427
S.E. of regression	0.082663	Akaike info criterion		-2.122998
Sum squared resid	0.785812	Schwarz criterion		-2.052557
Log likelihood	128.2569	Hannan-Quinn criter.		-2.094397
F-statistic	35.86055	Durbin-Watson stat		2.045230
Prob(F-statistic)	0.000000			

ที่มา: จากการคำนวณ

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1.3 ไม่มี (None)

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

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-8.438614	0.0000
Test critical values:		
1% level	-2.584707	
5% level	-1.943563	
10% level	-1.614927	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(PRUB,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:31
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PRUB(-1))	-0.750157	0.088896	-8.438614	0.0000
R-squared	0.378304	Mean dependent var		-0.000936
Adjusted R-squared	0.378304	S.D. dependent var		0.104427
S.E. of regression	0.082339	Akaike info criterion		-2.147517
Sum squared resid	0.793217	Schwarz criterion		-2.124037
Log likelihood	127.7035	Hannan-Quinn criter.		-2.137983
Durbin-Watson stat	2.054810			

ที่มา: จากการคำนวณ

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2. ตารางผลการทดสอบ Unit root test ด้วยวิธี ADF test ของราคาน้ำมันดิบของโลก

2.1 คงที่ (Intercept)

Null Hypothesis: D(PO) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.035218	0.0000
Test critical values:		
1% level	-3.486551	
5% level	-2.886074	
10% level	-2.579931	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(PO,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:28
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PO(-1))	-0.598268	0.085039	-7.035218	0.0000
C	0.000705	0.005088	0.138538	0.8901
R-squared	0.299070	Mean dependent var		2.21E-05
Adjusted R-squared	0.293027	S.D. dependent var		0.065722
S.E. of regression	0.055261	Akaike info criterion		-2.936711
Sum squared resid	0.354232	Schwarz criterion		-2.889751
Log likelihood	175.2660	Hannan-Quinn criter.		-2.917644
F-statistic	49.49430	Durbin-Watson stat		1.977841
Prob(F-statistic)	0.000000			

ที่มา: จากการคำนวณ

2.2 ค่าคงที่และแนวโน้ม (Trend and Intercept)

Null Hypothesis: D(PO) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.155506	0.0000
Test critical values:		
1% level	-4.037668	
5% level	-3.448348	
10% level	-3.149326	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(PO,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:28
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PO(-1))	-0.618208	0.086396	-7.155506	0.0000
C	0.011992	0.010506	1.141412	0.2561
@TREND("2006M01")	-0.000186	0.000152	-1.227103	0.2223
R-squared	0.308129	Mean dependent var		2.21E-05
Adjusted R-squared	0.296096	S.D. dependent var		0.065722
S.E. of regression	0.055140	Akaike info criterion		-2.932771
Sum squared resid	0.349654	Schwarz criterion		-2.862330
Log likelihood	176.0335	Hannan-Quinn criter.		-2.904170
F-statistic	25.60794	Durbin-Watson stat		1.965080
Prob(F-statistic)	0.000000			

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2.3 ไม่มี (None)

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

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.063524	0.0000
Test critical values:		
1% level	-2.584707	
5% level	-1.943563	
10% level	-1.614927	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(PO,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:28
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PO(-1))	-0.598043	0.084666	-7.063524	0.0000
R-squared	0.298954	Mean dependent var		2.21E-05
Adjusted R-squared	0.298954	S.D. dependent var		0.065722
S.E. of regression	0.055028	Akaike info criterion		-2.953495
Sum squared resid	0.354291	Schwarz criterion		-2.930015
Log likelihood	175.2562	Hannan-Quinn criter.		-2.943961
Durbin-Watson stat	1.977951			

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3. ตารางผลการทดสอบ Unit root test ด้วยวิธี ADF test ของปริมาณการผลิตยางแท่ง

3.1 คงที่ (Intercept)

Null Hypothesis: D(QR) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-13.70133	0.0000
Test critical values:		
1% level	-3.486551	
5% level	-2.886074	
10% level	-2.579931	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(QR,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:33
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(QR(-1))	-1.236129	0.090220	-13.70133	0.0000
C	-0.004961	0.011870	-0.417950	0.6768
R-squared	0.618078	Mean dependent var		5.47E-06
Adjusted R-squared	0.614785	S.D. dependent var		0.207655
S.E. of regression	0.128882	Akaike info criterion		-1.243031
Sum squared resid	1.926835	Schwarz criterion		-1.196070
Log likelihood	75.33880	Hannan-Quinn criter.		-1.223963
F-statistic	187.7266	Durbin-Watson stat		2.022530
Prob(F-statistic)	0.000000			

ที่มา: จากการคำนวณ

3.2 ค่าคงที่และแนวโน้ม (Trend and Intercept)

Null Hypothesis: D(QR) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-13.68785	0.0000
Test critical values:		
1% level	-4.037668	
5% level	-3.448348	
10% level	-3.149326	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(QR,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:33
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(QR(-1))	-1.240332	0.090616	-13.68785	0.0000
C	-0.019836	0.024301	-0.816255	0.4160
@TREND("2006M01")	0.000246	0.000350	0.701965	0.4841
R-squared	0.619707	Mean dependent var		5.47E-06
Adjusted R-squared	0.613093	S.D. dependent var		0.207655
S.E. of regression	0.129165	Akaike info criterion		-1.230357
Sum squared resid	1.918614	Schwarz criterion		-1.159916
Log likelihood	75.59107	Hannan-Quinn criter.		-1.201756
F-statistic	93.69921	Durbin-Watson stat		2.023181
Prob(F-statistic)	0.000000			

ที่มา: จากการคำนวณ

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3.3 ไม่มี (None)

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

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-13.74352	0.0000
Test critical values:		
1% level	-2.584707	
5% level	-1.943563	
10% level	-1.614927	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(QR,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:34
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(QR(-1))	-1.234978	0.089859	-13.74352	0.0000
R-squared	0.617502	Mean dependent var		5.47E-06
Adjusted R-squared	0.617502	S.D. dependent var		0.207655
S.E. of regression	0.128427	Akaike info criterion		-1.258475
Sum squared resid	1.929737	Schwarz criterion		-1.234995
Log likelihood	75.25002	Hannan-Quinn criter.		-1.248941
Durbin-Watson stat	2.021687			

ที่มา: จากการคำนวณ

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4. ตารางผลการทดสอบ Unit root test ด้วยวิธี ADF test ของมูลค่าการส่งออกขงล้อยานยนต์

4.1 คงที่ (Intercept)

Null Hypothesis: D(EPT) has a unit root
 Exogenous: Constant
 Lag Length: 11 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.730815	0.0722
Test critical values:		
1% level	-3.492523	
5% level	-2.888669	
10% level	-2.581313	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(EPT,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:23
 Sample (adjusted): 2007M02 2015M12
 Included observations: 107 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EPT(-1))	-1.477554	0.541067	-2.730815	0.0075
D(EPT(-1),2)	0.245397	0.503116	0.487755	0.6269
D(EPT(-2),2)	0.166376	0.467396	0.355964	0.7227
D(EPT(-3),2)	0.201673	0.431944	0.466895	0.6417
D(EPT(-4),2)	0.095538	0.396602	0.240892	0.8102
D(EPT(-5),2)	0.006067	0.355329	0.017076	0.9864
D(EPT(-6),2)	-0.115765	0.315494	-0.366933	0.7145
D(EPT(-7),2)	-0.228583	0.276521	-0.826639	0.4105
D(EPT(-8),2)	-0.187730	0.237633	-0.790001	0.4315
D(EPT(-9),2)	-0.271341	0.198679	-1.365725	0.1753
D(EPT(-10),2)	-0.346989	0.147286	-2.355886	0.0206
D(EPT(-11),2)	-0.486839	0.084679	-5.749234	0.0000
C	0.013316	0.009120	1.460051	0.1476
R-squared	0.811029	Mean dependent var		0.000690
Adjusted R-squared	0.786905	S.D. dependent var		0.171078
S.E. of regression	0.078973	Akaike info criterion		-2.125955
Sum squared resid	0.586259	Schwarz criterion		-1.801219
Log likelihood	126.7386	Hannan-Quinn criter.		-1.994311
F-statistic	33.61914	Durbin-Watson stat		2.027211
Prob(F-statistic)	0.000000			

ที่มา: จากการคำนวณ

4.2 ค่าคงที่และแนวโน้ม (Trend and Intercept)

Null Hypothesis: D(EPT) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 11 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.917352	0.1613
Test critical values:		
1% level	-4.046072	
5% level	-3.452358	
10% level	-3.151673	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(EPT,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:24
 Sample (adjusted): 2007M02 2015M12
 Included observations: 107 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EPT(-1))	-1.659662	0.568893	-2.917352	0.0044
D(EPT(-1),2)	0.410953	0.527868	0.778515	0.4382
D(EPT(-2),2)	0.315925	0.489156	0.645858	0.5200
D(EPT(-3),2)	0.335318	0.450766	0.743886	0.4588
D(EPT(-4),2)	0.215748	0.413195	0.522146	0.6028
D(EPT(-5),2)	0.114031	0.370267	0.307969	0.7588
D(EPT(-6),2)	-0.019597	0.328842	-0.059592	0.9526
D(EPT(-7),2)	-0.146419	0.287645	-0.509026	0.6119
D(EPT(-8),2)	-0.122244	0.245866	-0.497196	0.6202
D(EPT(-9),2)	-0.222921	0.204067	-1.092388	0.2775
D(EPT(-10),2)	-0.315336	0.150390	-2.096790	0.0387
D(EPT(-11),2)	-0.471314	0.085973	-5.482100	0.0000
C	0.032752	0.020912	1.566205	0.1207
@TREND("2006M01")	-0.000269	0.000260	-1.032754	0.3044
R-squared	0.813171	Mean dependent var		0.000690
Adjusted R-squared	0.787055	S.D. dependent var		0.171078
S.E. of regression	0.078945	Akaike info criterion		-2.118667
Sum squared resid	0.579611	Schwarz criterion		-1.768951
Log likelihood	127.3487	Hannan-Quinn criter.		-1.976897
F-statistic	31.13707	Durbin-Watson stat		2.015859
Prob(F-statistic)	0.000000			

ที่มา: จากการคำนวณ

4.3 ไม่มี (None)

Null Hypothesis: D(EPT) has a unit root
 Exogenous: None
 Lag Length: 11 (Automatic - based on SIC, maxlag=12)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.294427	0.0217
Test critical values:		
1% level	-2.586753	
5% level	-1.943853	
10% level	-1.614749	

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

Augmented Dickey-Fuller Test Equation
 Dependent Variable: D(EPT,2)
 Method: Least Squares
 Date: 12/19/16 Time: 23:24
 Sample (adjusted): 2007M02 2015M12
 Included observations: 107 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EPT(-1))	-1.045772	0.455788	-2.294427	0.0240
D(EPT(-1),2)	-0.151892	0.425697	-0.356807	0.7220
D(EPT(-2),2)	-0.194454	0.399072	-0.487265	0.6272
D(EPT(-3),2)	-0.122532	0.372699	-0.328769	0.7431
D(EPT(-4),2)	-0.194396	0.345346	-0.562901	0.5748
D(EPT(-5),2)	-0.246392	0.312263	-0.789052	0.4320
D(EPT(-6),2)	-0.331695	0.280339	-1.183193	0.2397
D(EPT(-7),2)	-0.407853	0.249238	-1.636396	0.1051
D(EPT(-8),2)	-0.329862	0.218066	-1.512669	0.1337
D(EPT(-9),2)	-0.377735	0.185930	-2.031595	0.0450
D(EPT(-10),2)	-0.416978	0.140094	-2.976418	0.0037
D(EPT(-11),2)	-0.520687	0.081927	-6.355476	0.0000
R-squared	0.806743	Mean dependent var		0.000690
Adjusted R-squared	0.784366	S.D. dependent var		0.171078
S.E. of regression	0.079442	Akaike info criterion		-2.122222
Sum squared resid	0.599554	Schwarz criterion		-1.822465
Log likelihood	125.5389	Hannan-Quinn criter.		-2.000704
Durbin-Watson stat	2.054154			

ที่มา: จากการคำนวณ

ภาคผนวก ข

พิจารณาจาก Correlogram ของสหสัมพันธ์ในตัวเอง [Autocorrelation (ACF)] และสหสัมพันธ์ในตัวเองบางส่วน [Partial Correlation (PACF)] เพื่อกำหนด AR(p) และ MA(q)

Date: 12/13/16 Time: 16:06
 Sample: 2006M01 2015M12
 Included observations: 117
 Q-statistic probabilities adjusted for 4 ARMA terms

	Autocorrelation	Partial Correlation	AC	PAC	Q-Stat	Prob	
			1	0.044	0.044	0.2348	
			2	-0.070	-0.072	0.8280	
			3	-0.018	-0.012	0.8684	
			4	0.123	0.121	2.7405	
			5	-0.081	-0.097	3.5535	0.059
			6	-0.152	-0.131	6.4686	0.039
			7	0.073	0.085	7.1364	0.068
			8	0.049	0.007	7.4428	0.114
			9	-0.098	-0.085	8.6858	0.122
			10	-0.015	0.032	8.7138	0.190
			11	0.002	-0.050	8.7141	0.274
			12	0.030	0.012	8.8306	0.357
			13	-0.090	-0.048	9.9096	0.358
			14	-0.061	-0.072	10.406	0.406
			15	0.048	0.029	10.715	0.467
			16	-0.047	-0.058	11.016	0.528
			17	0.180	0.215	15.550	0.274
			18	0.025	0.002	15.636	0.336
			19	-0.039	-0.076	15.855	0.392
			20	-0.007	0.029	15.863	0.463
			21	-0.014	-0.054	15.892	0.531
			22	-0.103	-0.120	17.437	0.493
			23	-0.016	0.078	17.474	0.558
			24	0.051	0.009	17.866	0.596

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ภาคผนวก ค

1. ค่า Schwarz criterion (BIC) ในการตัดสินใจเลือกแบบจำลอง ARIMAX(p,d,q) ของราคายางแท่งของประเทศไทย

1.1 ARIMAX (1,1,0)

Dependent Variable: DLOG(PRUB)
 Method: Least Squares
 Date: 12/02/16 Time: 15:35
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments
 Estimation settings: tol= 1.0e-05
 Initial Values: C(1)=-0.00523, C(2)=0.00250
 Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.005538	0.010103	-0.548202	0.5846
AR(1)	0.247380	0.089276	2.770952	0.0065
R-squared	0.062082	Mean dependent var		-0.005231
Adjusted R-squared	0.053996	S.D. dependent var		0.084910
S.E. of regression	0.082586	Akaike info criterion		-2.133149
Sum squared resid	0.791172	Schwarz criterion		-2.086188
Log likelihood	127.8558	Hannan-Quinn criter.		-2.114082
F-statistic	7.678175	Durbin-Watson stat		2.054546
Prob(F-statistic)	0.006512			
Inverted AR Roots	.25			

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1.2 ARIMAX (2,1,0)

Dependent Variable: DLOG(PRUB)
 Method: Least Squares
 Date: 12/02/16 Time: 15:36
 Sample (adjusted): 2006M04 2015M12
 Included observations: 117 after adjustments
 Estimation settings: tol= 1.0e-05
 Initial Values: C(1)=-0.00513, C(2)=0.00250, C(3)=0.00250
 Convergence achieved after 3 iterations

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.005370	0.011782	-0.455761	0.6494
AR(1)	0.218882	0.092727	2.360513	0.0199
AR(2)	0.133907	0.092240	1.451719	0.1493
R-squared	0.080756	Mean dependent var		-0.005131
Adjusted R-squared	0.064629	S.D. dependent var		0.085269
S.E. of regression	0.082467	Akaike info criterion		-2.127529
Sum squared resid	0.775293	Schwarz criterion		-2.056704
Log likelihood	127.4604	Hannan-Quinn criter.		-2.098775
F-statistic	5.007483	Durbin-Watson stat		1.984676
Prob(F-statistic)	0.008233			
Inverted AR Roots	.49	-.27		

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1.3 ARIMAX (2,1,1)

Dependent Variable: DLOG(PRUB)
 Method: Least Squares
 Date: 12/02/16 Time: 15:37
 Sample (adjusted): 2006M04 2015M12
 Included observations: 117 after adjustments
 Estimation settings: tol= 1.0e-05, derivs=analytic (linear)
 MA derivatives use accurate numeric methods
 Initial Values: C(1)=-0.00513, C(2)=0.00250, C(3)=0.00250, C(4)=0.00250
 Convergence achieved after 9 iterations
 MA Backcast: 2006M03

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.005495	0.011416	-0.481338	0.6312
AR(1)	-0.107197	0.562670	-0.190516	0.8492
AR(2)	0.216395	0.144498	1.497557	0.1370
MA(1)	0.331238	0.574008	0.577062	0.5650
R-squared	0.082580	Mean dependent var		-0.005131
Adjusted R-squared	0.058224	S.D. dependent var		0.085269
S.E. of regression	0.082749	Akaike info criterion		-2.112421
Sum squared resid	0.773755	Schwarz criterion		-2.017987
Log likelihood	127.5766	Hannan-Quinn criter.		-2.074082
F-statistic	3.390496	Durbin-Watson stat		1.997038
Prob(F-statistic)	0.020512			
Inverted AR Roots	.41	-.52		
Inverted MA Roots	-.33			

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1.4 ARIMAX (2,1,2)

Dependent Variable: DLOG(PRUB)
 Method: Least Squares
 Date: 12/02/16 Time: 15:38
 Sample (adjusted): 2006M04 2015M12
 Included observations: 117 after adjustments
 Estimation settings: tol= 1.0e-05, derivs=analytic (linear)
 MA derivatives use accurate numeric methods
 Initial Values: C(1)=-0.00513, C(2)=0.00250, C(3)=0.00250, C(4)=0.00250,
 C(5)=0.00250
 Convergence achieved after 154 iterations
 MA Backcast: 2006M02 2006M03

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.006381	0.010191	-0.626125	0.5325
AR(1)	0.765253	0.071433	10.71284	0.0000
AR(2)	-0.656695	0.072194	-9.096262	0.0000
MA(1)	-0.671208	0.023390	-28.69629	0.0000
MA(2)	0.974822	0.016857	57.82755	0.0000
R-squared	0.243428	Mean dependent var		-0.005131
Adjusted R-squared	0.216407	S.D. dependent var		0.085269
S.E. of regression	0.075480	Akaike info criterion		-2.288094
Sum squared resid	0.638096	Schwarz criterion		-2.170052
Log likelihood	138.8535	Hannan-Quinn criter.		-2.240170
F-statistic	9.009011	Durbin-Watson stat		1.902280
Prob(F-statistic)	0.000002			
Inverted AR Roots	.38-.71i	.38+.71i		
Inverted MA Roots	.34+.93i	.34-.93i		

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1.5 ARIMAX (1,1,1)

Dependent Variable: DLOG(PRUB)
 Method: Least Squares
 Date: 12/02/16 Time: 15:39
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments
 Estimation settings: tol= 1.0e-05, derivs=analytic (linear)
 MA derivatives use accurate numeric methods
 Initial Values: C(1)=-0.00523, C(2)=0.00250, C(3)=0.00250
 Convergence achieved after 51 iterations
 MA Backcast: 2006M02

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.005890	0.011167	-0.527441	0.5989
AR(1)	0.480038	0.280609	1.710702	0.0898
MA(1)	-0.240816	0.312515	-0.770575	0.4425
R-squared	0.069126	Mean dependent var		-0.005231
Adjusted R-squared	0.052937	S.D. dependent var		0.084910
S.E. of regression	0.082632	Akaike info criterion		-2.123739
Sum squared resid	0.785230	Schwarz criterion		-2.053298
Log likelihood	128.3006	Hannan-Quinn criter.		-2.095138
F-statistic	4.269905	Durbin-Watson stat		2.028360
Prob(F-statistic)	0.016264			
Inverted AR Roots	.48			
Inverted MA Roots	.24			

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1.6 ARIMAX (1,1,2)

Dependent Variable: DLOG(PRUB)
 Method: Least Squares
 Date: 12/02/16 Time: 15:40
 Sample (adjusted): 2006M03 2015M12
 Included observations: 118 after adjustments
 Estimation settings: tol= 1.0e-05, derivs=analytic (linear)
 MA derivatives use accurate numeric methods
 Initial Values: C(1)=-0.00523, C(2)=0.00250, C(3)=0.00250, C(4)=0.00250
 Convergence achieved after 22 iterations
 MA Backcast: 2006M01 2006M02

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.005617	0.011068	-0.507546	0.6128
AR(1)	0.197807	0.392727	0.503676	0.6155
MA(1)	0.018770	0.391991	0.047884	0.9619
MA(2)	0.151491	0.122976	1.231873	0.2205
R-squared	0.082549	Mean dependent var		-0.005231
Adjusted R-squared	0.058405	S.D. dependent var		0.084910
S.E. of regression	0.082393	Akaike info criterion		-2.121314
Sum squared resid	0.773907	Schwarz criterion		-2.027393
Log likelihood	129.1575	Hannan-Quinn criter.		-2.083179
F-statistic	3.419097	Durbin-Watson stat		1.987480
Prob(F-statistic)	0.019755			
Inverted AR Roots	.20			
Inverted MA Roots	-.01-.39i	-.01+.39i		

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ภาคผนวก ง

ผลการทดสอบปัญหาอัตสหสัมพันธ์ในตัวเอง

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.485831	Prob. F(1,111)	0.4873
Obs*R-squared	0.505124	Prob. Chi-Square(1)	0.4773

Test Equation:

Dependent Variable: RESID

Method: Least Squares

Date: 12/06/16 Time: 17:06

Sample: 2006M04 2015M12

Included observations: 117

Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000123	0.010216	0.012046	0.9904
AR(1)	-0.052875	0.104317	-0.506866	0.6133
AR(2)	0.020486	0.078109	0.262279	0.7936
MA(1)	-5.78E-05	0.023450	-0.002463	0.9980
MA(2)	0.002048	0.017154	0.119409	0.9052
RESID(-1)	0.098430	0.141216	0.697016	0.4873
R-squared	0.004317	Mean dependent var		0.000471
Adjusted R-squared	-0.040533	S.D. dependent var		0.074166
S.E. of regression	0.075654	Akaike info criterion		-2.275367
Sum squared resid	0.635315	Schwarz criterion		-2.133717
Log likelihood	139.1090	Hannan-Quinn criter.		-2.217859
F-statistic	0.096260	Durbin-Watson stat		1.982326
Prob(F-statistic)	0.992602			

ที่มา: จากการคำนวณ

ภาคผนวก จ

ผลการทดสอบ ARIMAX

Dependent Variable: D(PRUB)
 Method: Least Squares
 Date: 12/21/16 Time: 15:59
 Sample (adjusted): 2006M04 2015M12
 Included observations: 117 after adjustments
 Estimation settings: tol= 1.0e-05, derivs=analytic (linear)
 MA derivatives use accurate numeric methods
 Initial Values: C(1)=-0.00636, C(2)=0.63708, C(3)=-0.01760, C(4)=0.05119,
 C(5)=0.00250, C(6)=0.00250, C(7)=0.00250, C(8)=0.00250
 Convergence achieved after 26 iterations
 MA Backcast: 2006M02 2006M03

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.006954	0.008460	-0.821889	0.4129
D(PO)	0.443970	0.107648	4.124292	0.0001
D(QR)	-0.030252	0.056409	-0.536290	0.5929
D(EPT)	0.052655	0.076198	0.691023	0.4910
AR(1)	0.843197	0.055015	15.32655	0.0000
AR(2)	-0.805228	0.058303	-13.81111	0.0000
MA(1)	-0.776105	0.018121	-42.82897	0.0000
MA(2)	0.977407	0.011594	84.30442	0.0000
R-squared	0.310379	Mean dependent var		-0.005131
Adjusted R-squared	0.266092	S.D. dependent var		0.085269
S.E. of regression	0.073048	Akaike info criterion		-2.329469
Sum squared resid	0.581628	Schwarz criterion		-2.140602
Log likelihood	144.2739	Hannan-Quinn criter.		-2.252791
F-statistic	7.008275	Durbin-Watson stat		1.870216
Prob(F-statistic)	0.000001			
Inverted AR Roots	.42+.79i	.42-.79i		
Inverted MA Roots	.39-.91i	.39+.91i		

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