ภาคผนวก

ภาคผนวก ก

ข้อมูลที่ใช้ในการศึกษา

ตาราง ก-1 ข้อมูลที่ใช้ในการศึกษา

ปี	ไตรมาส	GDP	PP	ELEC	SFF	NG
2543	Q1	764,339	6,831	1,821	905	368
	Q2	727,229	6,791	1,958	728	415
	Q3	731,689	6,528	1,990	932	468
	Q4	785,144	6,573	1,934	493	566
2544	Q1	777,523	6,722	1,944	627	411
	Q2	743,138	6,896	2,113	737	487
	Q3	746,884	6,706	2,128	1,140	523
	Q4	806,056	6,965	1,997	912	539
2545	Q1	812,458	7,126	2,027	1,157	460
	Q2	780,037	7,260	2,247	1,090	547
	Q3	789,845	7,157	2,263	1,059	573
	Q4	854,702	7,355	2,205	834	553
2546	Q1	868,512	7,567	2,187	1,328	567
	Q2	831,715	7,462	2,387	987	550
	Q3	842,416	7,499	2,408	961	590
	Q4	925,523	8,009	2,363	1,086	594
2547	Q1	926,696	8,297	2,367	1,326	633
	Q2	886,437	8,157	2,589	1,395	684
	Q3	895,134	8,044	2,603	1,283	692
	Q4	979,922	8,598	2,536	1,251	703

ตาราง ก-1 (ต่อ)

ปี	ไตรมาส	GDP	PP	ELEC	SFF	NG
2548	Q1	959,975	8,475	2,541	1,652	686
	Q2	928,361	8,444	2,799	1,621	662
	Q3	944,173	7,788	2,704	1,478	721
	Q4	1,025,510	7,909	2,620	1,440	695
2549	Q1	1,018,621	8,184	2,655	1,619	705
	Q2	975,690	7,991	2,827	1,405	717
	Q3	989,089	7,642	2,869	1,400	748
	Q4	1,071,104	7,999	2,793	1,557	789
2550	Q1	1,065,589	8,357	2,750	1,688	876
	Q2	1,020,773	8,129	2,993	1,496	910
	Q3	1,043,868	7,885	3,010	1,630	893
	Q4	1,128,796	8,164	2,896	1,624	1,006
2551	Q1	1,132,889	8,368	2,912	1,859	1,049
	Q2	1,073,963	8,013	3,076	1,917	1,064
	Q3	1,075,757	7,312	3,092	1,864	1,163
	Q4	1,082,224	7,778	2,754	1,642	1,086
2552	Q1	1,053,066	8,121	2,707	1,597	1,188
	Q2	1,018,647	7,926	3,001	2,044	1,283
	Q3	1,045,615	7,696	3,113	1,962	1,343
	Q4	1,145,811	8,213	3,015	1,902	1,454
2553	Q1	1,179,635	8,404	3,127	1,890	1,478
	Q2	1,112,764	7,979	3,425	2,065	1,508
	Q3	1,114,342	7,845	3,342	1,995	1,548
	Q4	1,189,371	8,187	3,166	1,883	1,618

ภาคผนวก ข

ผลการทดสอบ Unit Root

ตาราง ข-1 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ GDP

รูปสมการ Intercept

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.131998	0.0025
Test critical values:	1% level	-3.615588	
	5% level	-2.941145	
	10% level	-2.609066	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 02/22/12   Time: 02:04
Sample (adjusted): 2001Q3 2010Q4
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-1.539601	0.372604	-4.131998	0.0002
D(GDP(-1),2)	0.870895	0.344266	2.529718	0.0165
D(GDP(-2),2)	0.348372	0.277456	1.255593	0.2184
D(GDP(-3),2)	0.107151	0.196891	0.544215	0.5901
D(GDP(-4),2)	0.572284	0.154890	3.694778	0.0008
C	15267.46	4880.650	3.128160	0.0037

R-squared	0.913191	Mean dependent var	2879.316
Adjusted R-squared	0.899628	S.D. dependent var	62410.82
S.E. of regression	19772.75	Akaike info criterion	22.76594
Sum squared resid	1.25E+10	Schwarz criterion	23.02450
Log likelihood	-426.5528	Hannan-Quinn criter.	22.85793
F-statistic	67.32548	Durbin-Watson stat	2.198695
Prob(F-statistic)	0.000000		

ตาราง ข-2 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ GDP

รูปสมการ Intercept and Trend

Null Hypothesis: D(GDP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.112318	0.0130
Test critical values:	1% level	-4.219126	
	5% level	-3.533083	
	10% level	-3.198312	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 02/22/12   Time: 02:05
Sample (adjusted): 2001Q3 2010Q4
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-1.552785	0.377594	-4.112318	0.0003
D(GDP(-1),2)	0.882051	0.348758	2.529124	0.0167
D(GDP(-2),2)	0.357542	0.281096	1.271956	0.2128
D(GDP(-3),2)	0.112466	0.199352	0.564155	0.5767
D(GDP(-4),2)	0.576062	0.156791	3.674070	0.0009
C	19313.80	8978.738	2.151060	0.0394
@TREND(2000Q1)	-160.0373	296.6522	-0.539478	0.5934

R-squared	0.913999	Mean dependent var	2879.316
Adjusted R-squared	0.897354	S.D. dependent var	62410.82
S.E. of regression	19995.49	Akaike info criterion	22.80922
Sum squared resid	1.24E+10	Schwarz criterion	23.11088
Log likelihood	-426.3752	Hannan-Quinn criter.	22.91655
F-statistic	54.91007	Durbin-Watson stat	2.217094
Prob(F-statistic)	0.000000		

ตาราง ข-3 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ GDP

รูปสมการ None

Null Hypothesis: D(GDP) has a unit root
Exogenous: None
Lag Length: 4 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.399309	0.0177
Test critical values:	1% level	-2.627238	
	5% level	-1.949856	
	10% level	-1.611469	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP,2)
Method: Least Squares
Date: 02/22/12   Time: 02:08
Sample (adjusted): 2001Q3 2010Q4
Included observations: 38 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP(-1))	-0.663718	0.276629	-2.399309	0.0222
D(GDP(-1),2)	0.146010	0.286492	0.509650	0.6137
D(GDP(-2),2)	-0.208983	0.239331	-0.873197	0.3889
D(GDP(-3),2)	-0.196228	0.192813	-1.017712	0.3162
D(GDP(-4),2)	0.449071	0.168563	2.664121	0.0118

R-squared	0.886646	Mean dependent var	2879.316
Adjusted R-squared	0.872906	S.D. dependent var	62410.82
S.E. of regression	22249.60	Akaike info criterion	22.98011
Sum squared resid	1.63E+10	Schwarz criterion	23.19559
Log likelihood	-431.6222	Hannan-Quinn criter.	23.05678
Durbin-Watson stat	1.938987		

ตาราง ข-4 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ PP

รูปสมการ Intercept

Null Hypothesis: D(PP) has a unit root
Exogenous: Constant
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.561757	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PP,2)
Method: Least Squares
Date: 02/22/12   Time: 02:09
Sample (adjusted): 2001Q1 2010Q4
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PP(-1))	-1.893230	0.340401	-5.561757	0.0000
D(PP(-1),2)	0.751059	0.222992	3.368096	0.0018
D(PP(-2),2)	0.107275	0.169129	0.634283	0.5299
C	68.36996	41.10279	1.663390	0.1049

R-squared	0.715455	Mean dependent var	7.425000
Adjusted R-squared	0.691743	S.D. dependent var	447.9998
S.E. of regression	248.7336	Akaike info criterion	13.96528
Sum squared resid	2227263.	Schwarz criterion	14.13417
Log likelihood	-275.3056	Hannan-Quinn criter.	14.02635
F-statistic	30.17256	Durbin-Watson stat	1.887403
Prob(F-statistic)	0.000000		

ตาราง ข-5 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ PP

รูปสมการ Intercept and Trend

Null Hypothesis: D(PP) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.946233	0.0001
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PP,2)
Method: Least Squares
Date: 02/22/12   Time: 02:10
Sample (adjusted): 2001Q1 2010Q4
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PP(-1))	-2.034843	0.342207	-5.946233	0.0000
D(PP(-1),2)	0.826027	0.221848	3.723397	0.0007
D(PP(-2),2)	0.155734	0.167344	0.930621	0.3584
C	210.1997	92.73370	2.266703	0.0297
@TREND(2000Q1)	-5.827341	3.436048	-1.695943	0.0988

R-squared	0.737062	Mean dependent var	7.425000
Adjusted R-squared	0.707012	S.D. dependent var	447.9998
S.E. of regression	242.4948	Akaike info criterion	13.93631
Sum squared resid	2058130.	Schwarz criterion	14.14742
Log likelihood	-273.7261	Hannan-Quinn criter.	14.01264
F-statistic	24.52786	Durbin-Watson stat	1.852697
Prob(F-statistic)	0.000000		

ตาราง ข-6 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ PP

รูปสมการ None

Null Hypothesis: D(PP) has a unit root
Exogenous: None
Lag Length: 3 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.997396	0.0450
Test critical values:	1% level	-2.625606	
	5% level	-1.949609	
	10% level	-1.611593	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(PP,2)
Method: Least Squares
Date: 02/22/12   Time: 02:11
Sample (adjusted): 2001Q2 2010Q4
Included observations: 39 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(PP(-1))	-0.735534	0.368246	-1.997396	0.0536
D(PP(-1),2)	-0.317913	0.298098	-1.066468	0.2935
D(PP(-2),2)	-0.592718	0.206198	-2.874507	0.0068
D(PP(-3),2)	-0.588579	0.141062	-4.172490	0.0002

R-squared	0.795133	Mean dependent var	4.948718
Adjusted R-squared	0.777573	S.D. dependent var	453.5788
S.E. of regression	213.9178	Akaike info criterion	13.66598
Sum squared resid	1601629.	Schwarz criterion	13.83660
Log likelihood	-262.4865	Hannan-Quinn criter.	13.72719
Durbin-Watson stat	1.829513		

ตาราง ข-7 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ ELEC

รูปสมการ Intercept

Null Hypothesis: D(ELEC) has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.067839	0.0031
Test critical values:	1% level	-3.621023	
	5% level	-2.943427	
	10% level	-2.610263	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ELEC,2)
Method: Least Squares
Date: 02/22/12   Time: 02:13
Sample (adjusted): 2001Q4 2010Q4
Included observations: 37 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ELEC(-1))	-2.298098	0.564943	-4.067839	0.0003
D(ELEC(-1),2)	1.243907	0.497002	2.502823	0.0180
D(ELEC(-2),2)	0.923756	0.484604	1.906209	0.0662
D(ELEC(-3),2)	0.557516	0.369421	1.509160	0.1417
D(ELEC(-4),2)	0.808583	0.257265	3.142999	0.0037
D(ELEC(-5),2)	0.407340	0.199797	2.038775	0.0504
C	73.03844	21.54124	3.390632	0.0020

R-squared	0.886626	Mean dependent var	-5.162162
Adjusted R-squared	0.863951	S.D. dependent var	198.6223
S.E. of regression	73.26146	Akaike info criterion	11.59460
Sum squared resid	161017.2	Schwarz criterion	11.89937
Log likelihood	-207.5002	Hannan-Quinn criter.	11.70205
F-statistic	39.10177	Durbin-Watson stat	2.120417
Prob(F-statistic)	0.000000		

ตาราง ข-8 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ ELEC

รูปสมการ Intercept and Trend

Null Hypothesis: D(ELEC) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 6 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.406646	0.0065
Test critical values:	1% level	-4.234972	
	5% level	-3.540328	
	10% level	-3.202445	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ELEC,2)
Method: Least Squares
Date: 02/22/12   Time: 02:13
Sample (adjusted): 2002Q1 2010Q4
Included observations: 36 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ELEC(-1))	-3.652961	0.828966	-4.406646	0.0001
D(ELEC(-1),2)	2.412992	0.723209	3.336509	0.0025
D(ELEC(-2),2)	2.030639	0.683220	2.972158	0.0062
D(ELEC(-3),2)	1.691110	0.633968	2.667501	0.0128
D(ELEC(-4),2)	1.678860	0.474371	3.539126	0.0015
D(ELEC(-5),2)	1.085788	0.369341	2.939798	0.0067
D(ELEC(-6),2)	0.480915	0.237311	2.026520	0.0527
C	170.5538	49.90197	3.417777	0.0020
@TREND(2000Q1)	-2.222298	1.282954	-1.732173	0.0947

R-squared	0.905607	Mean dependent var	-1.250000
Adjusted R-squared	0.877639	S.D. dependent var	199.9888
S.E. of regression	69.95628	Akaike info criterion	11.54594
Sum squared resid	132134.8	Schwarz criterion	11.94182
Log likelihood	-198.8268	Hannan-Quinn criter.	11.68411
F-statistic	32.37992	Durbin-Watson stat	1.907606
Prob(F-statistic)	0.000000		

ตาราง ข-9 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ ELEC

รูปสมการ None

Null Hypothesis: D(ELEC) has a unit root
Exogenous: None
Lag Length: 2 (Fixed)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.039833	0.0002
Test critical values:	1% level	-2.624057	
	5% level	-1.949319	
	10% level	-1.611711	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(ELEC,2)
Method: Least Squares
Date: 02/22/12   Time: 02:14
Sample (adjusted): 2001Q1 2010Q4
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ELEC(-1))	-1.260929	0.312124	-4.039833	0.0003
D(ELEC(-1),2)	0.470826	0.197133	2.388373	0.0221
D(ELEC(-2),2)	-0.244004	0.168942	-1.444310	0.1571

R-squared	0.732079	Mean dependent var	-3.000000
Adjusted R-squared	0.717597	S.D. dependent var	194.4227
S.E. of regression	103.3195	Akaike info criterion	12.18557
Sum squared resid	394971.7	Schwarz criterion	12.31223
Log likelihood	-240.7113	Hannan-Quinn criter.	12.23137
Durbin-Watson stat	2.285481		

ตาราง ข-10 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ SFF

รูปสมการ Intercept

Null Hypothesis: D(SFF) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.096031	0.0000
Test critical values:	1% level	-3.605593	
	5% level	-2.936942	
	10% level	-2.606857	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SFF,2)
Method: Least Squares
Date: 02/22/12   Time: 02:15
Sample (adjusted): 2001Q1 2010Q4
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SFF(-1))	-2.547606	0.314673	-8.096031	0.0000
D(SFF(-1),2)	0.994607	0.235022	4.231967	0.0002
D(SFF(-2),2)	0.467063	0.132874	3.515083	0.0012
C	78.58052	26.34027	2.983285	0.0051

R-squared	0.793474	Mean dependent var	8.175000
Adjusted R-squared	0.776263	S.D. dependent var	330.9343
S.E. of regression	156.5346	Akaike info criterion	13.03907
Sum squared resid	882110.9	Schwarz criterion	13.20796
Log likelihood	-256.7814	Hannan-Quinn criter.	13.10014
F-statistic	46.10404	Durbin-Watson stat	1.917822
Prob(F-statistic)	0.000000		

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ตาราง ข-11 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ SFF

รูปสมการ Intercept and Trend

Null Hypothesis: D(SFF) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.003775	0.0000
Test critical values:	1% level	-4.205004	
	5% level	-3.526609	
	10% level	-3.194611	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SFF,2)
Method: Least Squares
Date: 02/22/12   Time: 02:16
Sample (adjusted): 2001Q1 2010Q4
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SFF(-1))	-2.539125	0.317241	-8.003775	0.0000
D(SFF(-1),2)	0.989151	0.236894	4.175507	0.0002
D(SFF(-2),2)	0.464297	0.133917	3.467042	0.0014
C	113.2880	57.00582	1.987306	0.0548
@TREND(2000Q1)	-1.487061	2.161703	-0.687912	0.4960

R-squared	0.796229	Mean dependent var	8.175000
Adjusted R-squared	0.772941	S.D. dependent var	330.9343
S.E. of regression	157.6926	Akaike info criterion	13.07564
Sum squared resid	870343.3	Schwarz criterion	13.28675
Log likelihood	-256.5128	Hannan-Quinn criter.	13.15197
F-statistic	34.19037	Durbin-Watson stat	1.951801
Prob(F-statistic)	0.000000		

ตาราง ข-12 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ SFF

รูปสมการ None

Null Hypothesis: D(SFF) has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.835520	0.0000
Test critical values:	1% level	-2.624057	
	5% level	-1.949319	
	10% level	-1.611711	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(SFF,2)
Method: Least Squares
Date: 02/22/12   Time: 02:16
Sample (adjusted): 2001Q1 2010Q4
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(SFF(-1))	-2.227214	0.325830	-6.835520	0.0000
D(SFF(-1),2)	0.772668	0.245587	3.146213	0.0033
D(SFF(-2),2)	0.372254	0.142125	2.619200	0.0127

R-squared	0.742416	Mean dependent var	8.175000
Adjusted R-squared	0.728493	S.D. dependent var	330.9343
S.E. of regression	172.4378	Akaike info criterion	13.20999
Sum squared resid	1100188.	Schwarz criterion	13.33666
Log likelihood	-261.1998	Hannan-Quinn criter.	13.25579
Durbin-Watson stat	1.768271		

ตาราง ข-13 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ NG

รูปสมการ Intercept

Null Hypothesis: D(NG) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-8.173558	0.0000
Test critical values:	1% level	-3.596616	
	5% level	-2.933158	
	10% level	-2.604867	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(NG,2)
Method: Least Squares
Date: 02/22/12   Time: 02:17
Sample (adjusted): 2000Q3 2010Q4
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NG(-1))	-1.256733	0.153756	-8.173558	0.0000
C	35.85582	9.285864	3.861334	0.0004
R-squared	0.625493	Mean dependent var		0.547619
Adjusted R-squared	0.616130	S.D. dependent var		85.98020
S.E. of regression	53.27095	Akaike info criterion		10.83511
Sum squared resid	113511.8	Schwarz criterion		10.91785
Log likelihood	-225.5373	Hannan-Quinn criter.		10.86544
F-statistic	66.80704	Durbin-Watson stat		2.001957
Prob(F-statistic)	0.000000			

ตาราง ข-14 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ NG

รูปสมการ Intercept and Trend

Null Hypothesis: D(NG) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-9.074330	0.0000
Test critical values:	1% level	-4.192337	
	5% level	-3.520787	
	10% level	-3.191277	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(NG,2)
Method: Least Squares
Date: 02/22/12   Time: 02:18
Sample (adjusted): 2000Q3 2010Q4
Included observations: 42 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NG(-1))	-1.349969	0.148768	-9.074330	0.0000
C	0.884979	16.26270	0.054418	0.9569
@TREND(2000Q1)	1.670682	0.656157	2.546162	0.0150

R-squared	0.678873	Mean dependent var	0.547619
Adjusted R-squared	0.662405	S.D. dependent var	85.98020
S.E. of regression	49.95698	Akaike info criterion	10.72895
Sum squared resid	97332.29	Schwarz criterion	10.85307
Log likelihood	-222.3080	Hannan-Quinn criter.	10.77445
F-statistic	41.22373	Durbin-Watson stat	2.153804
Prob(F-statistic)	0.000000		

ตาราง ข-15 ผลการทดสอบ Unit Root ที่ระดับ First Difference; $I(1)$ ของ NG

รูปสมการ None

Null Hypothesis: D(NG) has a unit root
Exogenous: None
Lag Length: 2 (Automatic - based on SIC, maxlag=9)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.309782	0.0219
Test critical values:	1% level	-2.624057	
	5% level	-1.949319	
	10% level	-1.611711	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(NG,2)
Method: Least Squares
Date: 02/22/12   Time: 02:18
Sample (adjusted): 2001Q1 2010Q4
Included observations: 40 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(NG(-1))	-0.556569	0.240962	-2.309782	0.0266
D(NG(-1),2)	-0.549474	0.211464	-2.598425	0.0134
D(NG(-2),2)	-0.337573	0.150926	-2.236677	0.0314
R-squared	0.600028	Mean dependent var		-0.700000
Adjusted R-squared	0.578408	S.D. dependent var		87.85600
S.E. of regression	57.04500	Akaike info criterion		10.99760
Sum squared resid	120402.9	Schwarz criterion		11.12426
Log likelihood	-216.9519	Hannan-Quinn criter.		11.04339
Durbin-Watson stat	1.681764			

ภาคผนวก ค

ผลการเลือกค่าความล่าช้าที่เหมาะสม (Lag Length)

ตาราง ค-1 ผลการเลือกค่า Lag Length ในแบบจำลองทดสอบความสัมพันธ์ระหว่างการใช้พลังงาน
เชิงพาณิชย์ขั้นสุดท้ายกับการเจริญเติบโตทางเศรษฐกิจของประเทศไทย

Test Statistics and Choice Criteria for Selecting the Order of the VAR Model

****

Based on 39 observations from 2001Q2 to 2010Q4. Order of VAR = 5

List of variables included in the unrestricted VAR:

GDP	PP	ELEC	SFF	NG

****

Order	LL	AIC	SBC	LR test	Adjusted LR test
5	-1225.8	-1350.8	-1454.8	------	------
4	-1253.7	-1353.7	-1436.9	CHSQ(25)= 55.7440[.000]	20.0107[.746]
3	-1279.6	-1354.6	-1416.9	CHSQ(50)= 107.4476[.000]	38.5709[.880]
2	-1329.3	-1379.3	-1420.9	CHSQ(75)= 206.9365[.000]	74.2849[.502]
1	-1389.7	-1414.7	-1435.5	CHSQ(100)= 327.7028[.000]	117.6369[.110]
0	-1662.1	-1662.1	-1662.1	CHSQ(125)= 872.5703[.000]	313.2303[.000]

****

AIC=Akaike Information Criterion   SBC=Schwarz Bayesian Criterion

ภาคผนวก ง

ผลการทดสอบ Cointegration ในรูปแบบสมการต่างๆ

ตาราง ง-1 การทดสอบสมการ Cointegration with no intercepts or trends in the VAR

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP	PP	ELEC	SFF	NG

List of eigenvalues in descending order:

.67870   .52482   .31722   .17821   .0083346

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	44.2797	29.9500	27.5700
r<= 1	r = 2	29.0182	23.9200	21.5800
r<= 2	r = 3	14.8818	17.6800	15.5700
r<= 3	r = 4	7.6547	11.0300	9.2800
r<= 4	r = 5	.32641	4.1600	3.0400

****

Use the above table to determine r (the number of cointegrating vectors).

Cointegration LR Test Based on Trace of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

List of eigenvalues in descending order:

.67870   .52482   .31722   .17821   .0083346

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r >= 1	96.1608	59.3300	55.4200
r <= 1	r >= 2	51.8811	39.8100	36.6900
r <= 2	r >= 3	22.8629	24.0500	21.4600
r <= 3	r >= 4	7.9811	12.3600	10.2500
r <= 4	r = 5	.32641	4.1600	3.0400

****

Use the above table to determine r (the number of cointegrating vectors).

Choice of the Number of Cointegrating Relations Using Model Selection Criteria

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

List of eigenvalues in descending order:

.67870   .52482   .31722   .17821   .0083346

****

Rank	Maximized LL	AIC	SBC	HQC
r = 0	-1273.9	-1373.9	-1457.1	-1403.8
r = 1	-1251.8	-1360.8	-1451.4	-1393.3
r = 2	-1237.3	-1353.3	-1449.7	-1387.9
r = 3	-1229.8	-1350.8	-1451.5	-1386.9
r = 4	-1226.0	-1350.0	-1453.1	-1387.0
r = 5	-1225.8	-1350.8	-1454.8	-1388.1

****

AIC = Akaike Information Criterion   SBC = Schwarz Bayesian Criterion

HQC = Hannan-Quinn Criterion

ตาราง ง-2 การทดสอบสมการ Cointegration with restricted intercepts and no trends

in the VAR

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

Intercept

List of eigenvalues in descending order:

.76791   .52672   .45360   .24530   .17729   0.00

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	56.9644	34.4000	31.7300
r<= 1	r = 2	29.1747	28.2700	25.8000
r<= 2	r = 3	23.5715	22.0400	19.8600
r<= 3	r = 4	10.9762	15.8700	13.8100
r<= 4	r = 5	7.6109	9.1600	7.5300

****

Use the above table to determine r (the number of cointegrating vectors).

Cointegration LR Test Based on Trace of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

| GDP | PP | ELEC | SFF | NG |

Intercept

List of eigenvalues in descending order:

.76791   .52672   .45360   .24530   .17729   0.00

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r >= 1	128.2977	75.9800	71.8100
r <= 1	r >= 2	71.3333	53.4800	49.9500
r <= 2	r >= 3	42.1586	34.8700	31.9300
r <= 3	r >= 4	18.5871	20.1800	17.8800
r <= 4	r = 5	7.6109	9.1600	7.5300

****

Use the above table to determine r (the number of cointegrating vectors).

Choice of the Number of Cointegrating Relations Using Model Selection Criteria

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

Intercept

List of eigenvalues in descending order:

.76791   .52672   .45360   .24530   .17729   0.00

****

Rank	Maximized LL	AIC	SBC	HQC
r = 0	-1273.9	-1373.9	-1457.1	-1403.8
r = 1	-1245.4	-1355.4	-1446.9	-1388.3
r = 2	-1230.8	-1348.8	-1447.0	-1384.1
r = 3	-1219.1	-1343.1	-1446.2	-1380.1
r = 4	-1213.6	-1341.6	-1448.0	-1379.8
r = 5	-1209.8	-1339.8	-1447.9	-1378.6

****

AIC = Akaike Information Criterion   SBC = Schwarz Bayesian Criterion

HQC = Hannan-Quinn Criterion

ตาราง ง-3 การทดสอบสมการ Cointegration with unrestricted intercepts and no trends
in the VAR

 Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

 List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

 List of eigenvalues in descending order:

.72769   .52394   .31733   .24035   .11234

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	50.7314	33.6400	31.0200
r <= 1	r = 2	28.9459	27.4200	24.9900
r <= 2	r = 3	14.8880	21.1200	19.0200
r <= 3	r = 4	10.7212	14.8800	12.9800
r <= 4	r = 5	4.6475	8.0700	6.5000

****

Use the above table to determine r (the number of cointegrating vectors).

Cointegration LR Test Based on Trace of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

List of eigenvalues in descending order:

.72769   .52394   .31733   .24035   .11234

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r >= 1	109.9339	70.4900	66.2300
r <= 1	r >= 2	59.2026	48.8800	45.7000
r <= 2	r >= 3	30.2567	31.5400	28.7800
r <= 3	r >= 4	15.3687	17.8600	15.7500
r <= 4	r = 5	4.6475	8.0700	6.5000

*** ***

Use the above table to determine r (the number of cointegrating vectors).

Choice of the Number of Cointegrating Relations Using Model Selection Criteria

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

List of eigenvalues in descending order:

.72769   .52394   .31733   .24035   .11234

****

Rank	Maximized LL	AIC	SBC	HQC
r = 0	-1264.7	-1369.7	-1457.1	-1401.1
r = 1	-1239.4	-1353.4	-1448.2	-1387.4
r = 2	-1224.9	-1345.9	-1446.5	-1382.0
r = 3	-1217.4	-1343.4	-1448.2	-1381.0
r = 4	-1212.1	-1341.1	-1448.4	-1379.6
r = 5	-1209.8	-1339.8	-1447.9	-1378.6

****

AIC = Akaike Information Criterion   SBC = Schwarz Bayesian Criterion

HQC = Hannan-Quinn Criterion

ตาราง ง-4 การทดสอบสมการ Cointegration with unrestricted intercepts and restricted trends in the VAR

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP	PP	ELEC	SFF	NG

Trend

List of eigenvalues in descending order:

.81688   .55771   .51973   .24418   .17623   .0000

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	66.2062	37.8600	35.0400
r<= 1	r = 2	31.8156	31.7900	29.1300
r<= 2	r = 3	28.6032	25.4200	23.1000
r<= 3	r = 4	10.9184	19.2200	17.1800
r<= 4	r = 5	7.5606	12.3900	10.5500

****

Use the above table to determine r (the number of cointegrating vectors).

Cointegration LR Test Based on Trace of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

Trend

List of eigenvalues in descending order:

.81688   .55771   .51973   .24418   .17623   .0000

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r >= 1	145.1039	87.1700	82.8800
r <= 1	r >= 2	78.8977	63.0000	59.1600
r <= 2	r >= 3	47.0821	42.3400	39.3400
r <= 3	r >= 4	18.4789	25.7700	23.0800
r <= 4	r = 5	7.5606	12.3900	10.5500

****

Use the above table to determine r (the number of cointegrating vectors).

Choice of the Number of Cointegrating Relations Using Model Selection Criteria

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

Trend

List of eigenvalues in descending order:

.81688   .55771   .51973   .24418   .17623   .0000

****

Rank	Maximized LL	AIC	SBC	HQC
r = 0	-1264.7	-1369.7	-1457.1	-1401.1
r = 1	-1231.6	-1346.6	-1442.3	-1380.9
r = 2	-1215.7	-1338.7	-1441.0	-1375.4
r = 3	-1201.4	-1330.4	-1437.7	-1368.9
r = 4	-1196.0	-1329.0	-1439.6	-1368.6
r = 5	-1192.2	-1327.2	-1439.5	-1367.5

****

AIC = Akaike Information Criterion   SBC = Schwarz Bayesian Criterion

HQC = Hannan-Quinn Criterion

ตาราง ง-5 การทดสอบสมการ Cointegration with unrestricted intercepts and unrestricted trends in the VAR

Cointegration LR Test Based on Maximal Eigenvalue of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP	PP	ELEC	SFF	NG

List of eigenvalues in descending order:

.81256	.54958	.45527	.17827	.0070829

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r = 1	65.2972	37.0700	34.1600
r<= 1	r = 2	31.1052	31.0000	28.3200
r<= 2	r = 3	23.6914	24.3500	22.2600
r<= 3	r = 4	7.6573	18.3300	16.2800
r<= 4	r = 5	.27722	11.5400	9.7500

****

Use the above table to determine r (the number of cointegrating vectors).

Cointegration LR Test Based on Trace of the Stochastic Matrix

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

List of eigenvalues in descending order:

.81256   .54958   .45527   .17827   .0070829

****

Null	Alternative	Statistic	95% Critical Value	90% Critical Value
r = 0	r>= 1	128.0283	82.2300	77.5500
r<= 1	r>= 2	62.7311	58.9300	55.0100
r<= 2	r>= 3	31.6259	39.3300	36.2800
r<= 3	r>= 4	7.9346	23.8300	21.2300
r<= 4	r = 5	.27722	11.5400	9.7500

****

Use the above table to determine r (the number of cointegrating vectors).

Choice of the Number of Cointegrating Relations Using Model Selection Criteria

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

List of eigenvalues in descending order:

.81256   .54958   .45527   .17827   .0070829

****

Rank	Maximized LL	AIC	SBC	HQC
r = 0	-1256.2	-1366.2	-1457.7	-1399.0
r = 1	-1223.5	-1342.5	-1441.5	-1378.1
r = 2	-1208.0	-1334.0	-1438.8	-1371.6
r = 3	-1196.1	-1327.1	-1436.1	-1366.2
r = 4	-1192.3	-1326.3	-1437.8	-1366.3
r = 5	-1192.2	-1327.2	-1439.5	-1367.5

****

AIC = Akaike Information Criterion   SBC = Schwarz Bayesian Criterion

HQC = Hannan-Quinn Criterion

ภาคผนวก จ

ผลการประมาณค่า Cointegration Vectors

ตาราง จ-1 ผลการประมาณค่าของ Cointegrating Vectors with unrestricted intercepts and

unrestricted trends in the VAR

Estimated Cointegrated Vectors in Johansen Estimation (Normalized in Brackets)

****

39 observations from 2001Q2 to 2010Q4. Order of VAR = 5, chosen r =2.

List of variables included in the cointegrating vector:

GDP   PP   ELEC   SFF   NG

****

	Vector 1	Vector 2
GDP	-.1271E-4	-.2089E-4
	(-1.0000)	(-1.0000)
PP	-.1815E-3	-.1704E-4
	(-14.2843)	(-.81557)
ELEC	-.0014221	.0044703
	(-111.9044)	(213.9937)
SFF	.0021803	-.0037184
	(171.5622)	(-178.0012)
NG	-.0033796	-.0015602
	(-265.9346)	(-74.6865)

ผลการทดสอบ Error Correction Mechanism

ตาราง ฉ-1 ผลการทดสอบ Error Correction Mechanism

ECM for variable GDP estimated by OLS based on cointegrating VAR(5)

****

Dependent variable is dGDP

 39 observations used for estimation from 2001Q2 to 2010Q4

****

Regressor	Coefficient	Standard Error	T-Ratio[Prob]
Intercept	565698.1	250949.4	2.2542[.040]
Trend	11956.4	4462.3	2.6794[.017]
dGDP1	.76812	.36841	2.0850[.055]
dPP1	-15.2288	19.7704	-.77028[.453]
dELEC1	-137.2569	113.9431	-1.2046[.247]
dSFF1	105.5428	57.2812	1.8425[.085]
dNG1	41.8492	103.4522	.40453[.692]
dGDP2	.13958	.38957	.35829[.725]
dPP2	10.2116	20.4141	.50022[.624]
dELEC2	43.0038	105.2554	.40857[.689]
dSFF2	53.1282	44.5491	1.1926[.252]
dNG2	-25.3953	116.2766	-.21840[.830]

dGDP3	.38309	.31114	1.2312[.237]
dPP3	-4.5927	24.3727	-.18844[.853]
dELEC3	-72.0042	93.3226	-.77156[.452]
dSFF3	64.2830	36.7824	1.7477[.101]
dNG3	-71.6425	115.9835	-.61770[.546]
dGDP4	-.023914	.37195	-.064293[.950]
dPP4	15.7234	23.1655	.67874[.508]
dELEC4	-65.8253	83.0064	-.79302[.440]
dSFF4	28.4883	25.6517	1.1106[.284]
dNG4	-109.1059	76.2755	-1.4304[.173]
ecm1(-1)	-.13657	.19383	-.70460[.492]
ecm2(-1)	-.85240	.31862	-2.6753[.017]

****

List of additional temporary variables created:

dGDP = GDP-GDP(-1)

dGDP1 = GDP(-1)-GDP(-2)

dPP1 = PP(-1)-PP(-2)

dELEC1 = ELEC(-1)-ELEC(-2)

dSFF1 = SFF(-1)-SFF(-2)

dNG1 = NG(-1)-NG(-2)

dGDP2 = GDP(-2)-GDP(-3)

dPP2 = PP(-2)-PP(-3)

dELEC2 = ELEC(-2)-ELEC(-3)

dSFF2 = SFF(-2)-SFF(-3)

dNG2 = NG(-2)-NG(-3)

dGDP3 = GDP(-3)-GDP(-4)

dPP3 = PP(-3)-PP(-4)

dELEC3 = ELEC(-3)-ELEC(-4)

dSFF3 = SFF(-3)-SFF(-4)

dNG3 = NG(-3)-NG(-4)

dGDP4 = GDP(-4)-GDP(-5)

dPP4 = PP(-4)-PP(-5)

dELEC4 = ELEC(-4)-ELEC(-5)

dSFF4 = SFF(-4)-SFF(-5)

dNG4 = NG(-4)-NG(-5)

ecm1 =   1.0000*GDP + 14.2843*PP + 111.9044*ELEC -171.5622*SFF + 265.9346*N

G;ecm2 = 1.0000*GDP + .81557*PP -213.9937*ELEC + 178.0012*SFF + 74.6865*NG

****

R-Squared .95505 R-Bar-Squared .88612

S.E. of Regression 15252.3 F-stat. F(23, 15) 13.8554[.000]

Mean of Dependent Variable 10560.2 S.D. of Dependent Variable 45196.6

Residual Sum of Squares 3.49E+09 Equation Log-likelihood -412.3732

Akaike Info. Criterion -436.3732 Schwarz Bayesian Criterion -456.3359

DW-statistic 2.1471 System Log-likelihood -1208.0

****

Diagnostic Tests

****

* Test Statistics * LM Version * F Version *

****

* A:Serial Correlation *CHSQ(4)= 22.3189[.000] *F(4, 11)= 3.6794[.039]*

* B:Functional Form *CHSQ(1)= .51927[.471] *F(1, 14)= .18892[.670]*

* C:Normality *CHSQ(2)= .12030[.942] * Not applicable *

* D:Heteroscedasticity *CHSQ(1)= .55073[.458] *F(1, 37)= .52997[.471]*

****

A:Lagrange multiplier test of residual serial correlation

B:Ramsey's RESET test using the square of the fitted values

C:Based on a test of skewness and kurtosis of residuals

D:Based on the regression of squared residuals on squared fitted values

ภาคผนวก ช

ผลการทดสอบ Granger Causality

ตาราง ช-1 ผลการทดสอบ Granger Causality แบบรวม

Pairwise Granger Causality Tests
Date: 02/13/12   Time: 19:31
Sample: 2000Q1 2010Q4
Lags: 5

Null Hypothesis:	Obs	F-Statistic	Prob.
PP does not Granger Cause GDP	39	1.93598	0.1199
GDP does not Granger Cause PP		2.20072	0.0825
ELEC does not Granger Cause GDP	39	7.02152	0.0002
GDP does not Granger Cause ELEC		4.03812	0.0069
SFF does not Granger Cause GDP	39	2.04799	0.1024
GDP does not Granger Cause SFF		3.09292	0.0240
NG does not Granger Cause GDP	39	1.44320	0.2398
GDP does not Granger Cause NG		0.99003	0.4415
ELEC does not Granger Cause PP	39	0.64230	0.6694
PP does not Granger Cause ELEC		4.94188	0.0023
SFF does not Granger Cause PP	39	0.94072	0.4702
PP does not Granger Cause SFF		0.82184	0.5446
NG does not Granger Cause PP	39	0.69578	0.6310
PP does not Granger Cause NG		0.48644	0.7834
SFF does not Granger Cause ELEC	39	0.90107	0.4942
ELEC does not Granger Cause SFF		2.83847	0.0339
NG does not Granger Cause ELEC	39	1.08953	0.3879
ELEC does not Granger Cause NG		1.01664	0.4266
NG does not Granger Cause SFF	39	2.57446	0.0489
SFF does not Granger Cause NG		0.78526	0.5690

ประวัติผู้เขียน

ชื่อ – สกุล   นางสาวณัฐกานต์ พงศ์พิษณุ

วัน เดือน ปี เกิด   6 เมษายน 2529

ประวัติการศึกษา   สำเร็จการศึกษามัธยมศึกษาตอนปลาย โรงเรียนสามัคคีวิทยาคม
จังหวัดเชียงราย ปีการศึกษา 2547
สำเร็จการศึกษาปริญญาตรีเศรษฐศาสตรบัณฑิต มหาวิทยาลัยเชียงใหม่
ปีการศึกษา 2552