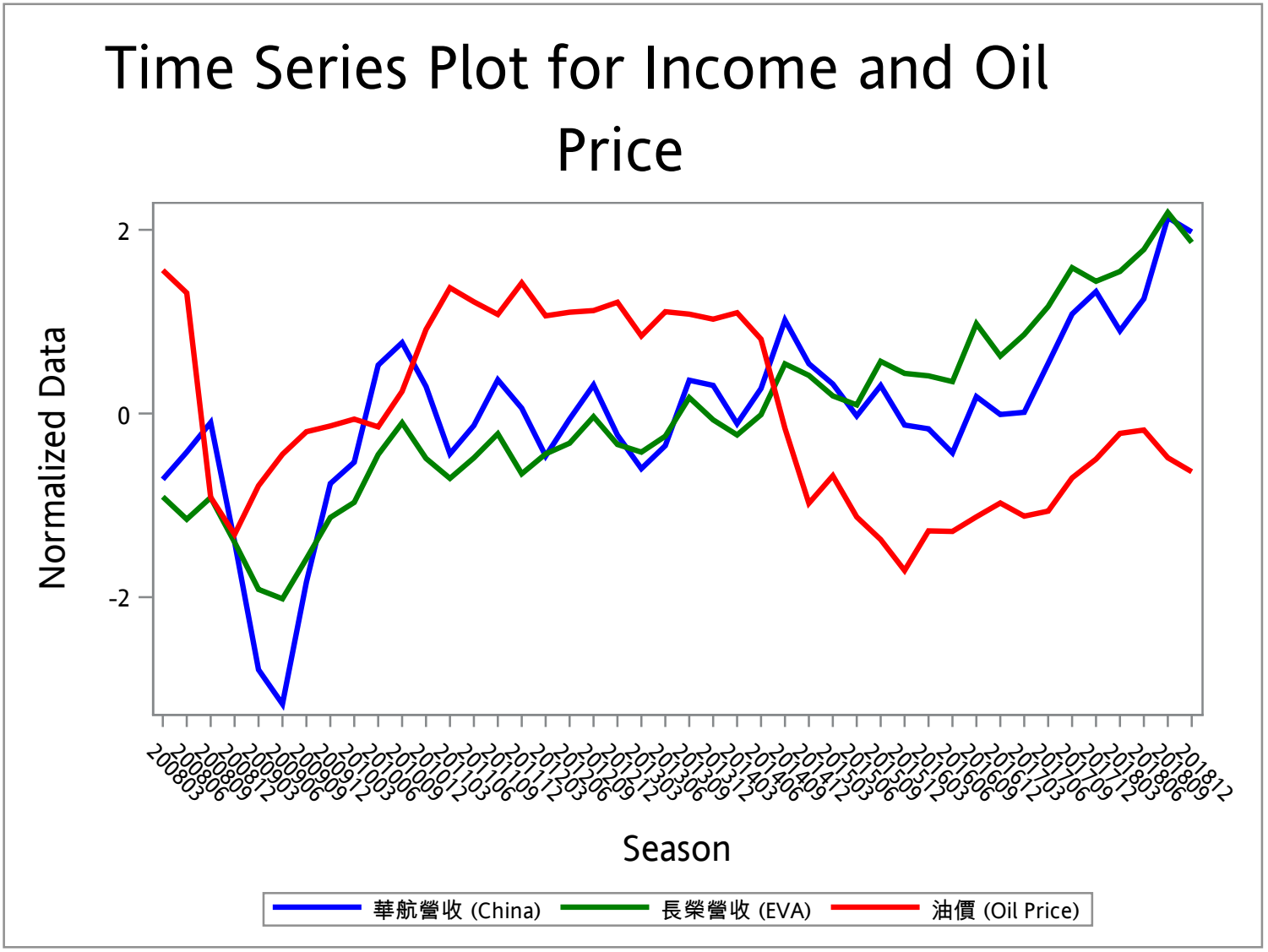
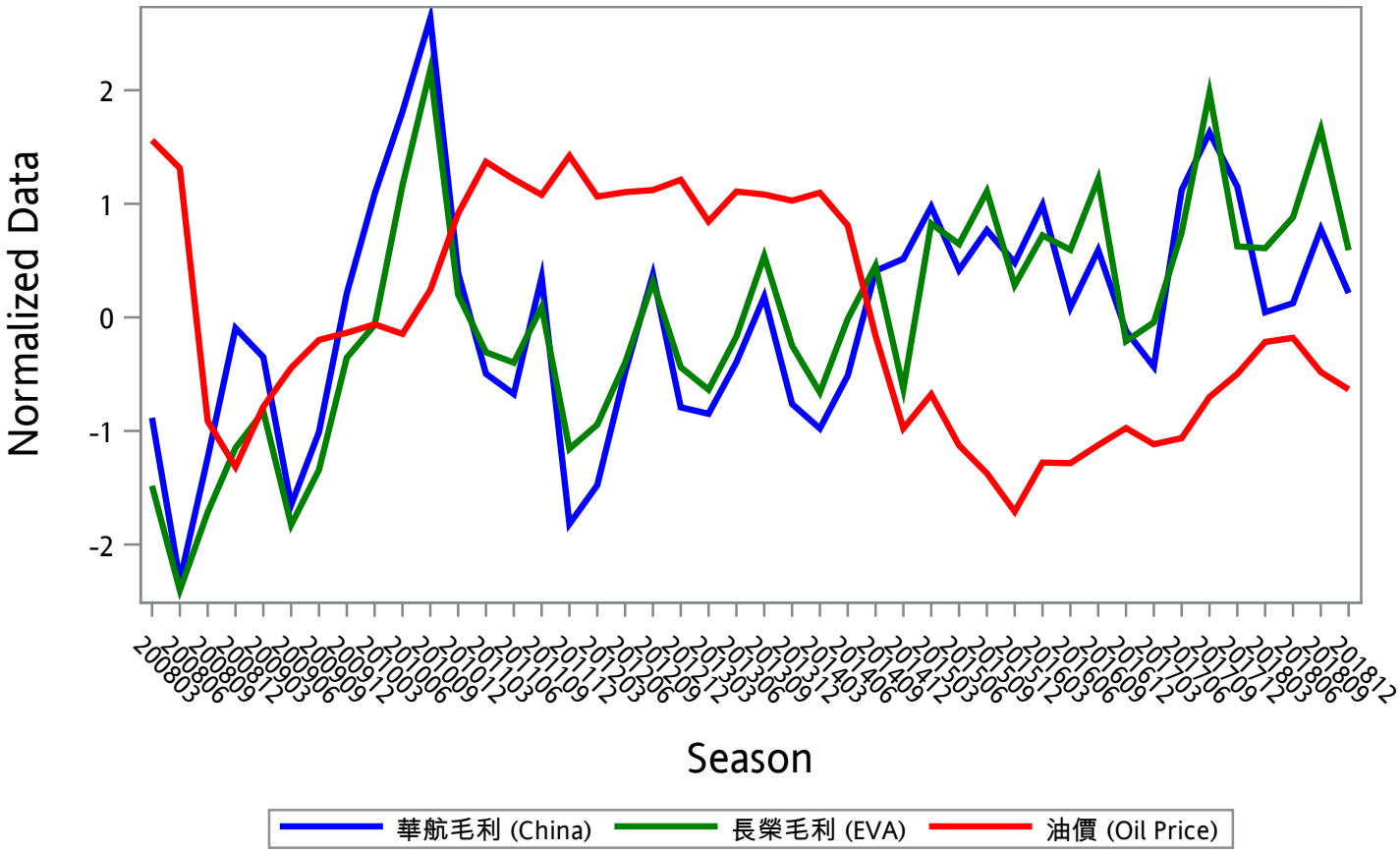
Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price
1	200803	32558850	25666911	1869432	325532	122.2439177
2	200806	33877134	23950573	-1098628	-1652777	115.6047174
3	200809	35303015	25610852	1141696	-176836	55.77905072
4	200812	29541863	22195282	3505199	1043809	44.93356061
5	200903	23369555	18594170	2976190	1733069	59.18047619
6	200906	21708890	17879176	282551	-414058	68.36734488
7	200909	27597226	20937317	1611646	628078	74.97691919
8	200912	32354351	24085666	4141096	2754236	76.66638785
9	201003	33387059	25240676	5948628	3373843	78.67259019
10	201006	38074869	28892524	7449310	6024057	76.40515152
11	201009	39160671	31322921	9151309	8209996	86.79487233
12	201012	37043408	28598332	4513085	3949832	104.8970221
13	201103	33791797	27072445	2672331	2857583	117.1221284
14	201106	35159619	28642277	2302862	2659192	112.9963583
15	201109	37365477	30480808	4434156	3712718	109.3143795
16	201112	35993787	27423843	-64177	1025811	118.5415512
17	201203	33686686	28944597	642056	1484381	108.9005797
18	201206	35471724	29762217	2696584	2658879	109.9544697
19	201209	37117310	31787371	4478924	4187686	110.4417655
20	201212	34696419	29664282	2061207	2572014	112.8745652
21	201303	33075918	29080135	1943039	2146588	103.004137
22	201306	34187617	30295700	2883507	3154923	110.1008385
23	201309	37343853	33244731	4078100	4684201	109.3964778
24	201312	37095157	31543885	2122739	2982020	107.929383
25	201403	35246873	30392098	1675213	2095252	109.806645
26	201406	36947737	31938491	2640132	3487603	102.080596
27	201409	40244398	35820040	4548704	4501016	75.95686957
28	201412	38142734	34939379	4767321	2165129	54.04622727
29	201503	37163905	33374491	5716576	5296114	62.09896104
30	201506	35621247	32686440	4564806	4907729	50.03149445
31	201509	37089144	36014470	5290604	5906898	43.42099097
32	201512	35181921	35093143	4696388	4128701	34.35772257
33	201603	34999023	34906089	5748765	5072620	45.95284271
34	201606	33834966	34468468	3879073	4798619	45.80131219
35	201609	36552871	38887294	4924994	6138980	50.07821789
36	201612	35692247	36417814	3453074	3066432	54.11816271

Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price
37	201703	35796465	38064697	2799380	3424482	50.27630501
38	201706	38156614	40200582	6022797	5128473	51.74080745
39	201709	40542703	43166421	7068240	7775831	61.46836219
40	201712	41626003	42130031	6081994	4865142	66.95132543
41	201803	39735027	42878322	3794007	4829346	74.48866805
42	201806	41275835	44554750	3959170	5415316	75.47547431
43	201809	45196764	47379049	5310156	7080708	67.36929356
44	201812	44503981	45095211	4144198	4792320	63.27252036

Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price
1	201903	40405348	44312727	4213439	7002903	68.33977997
2	201906	42892312	43864832	4296535	4479449	61.85909091
3	201909	43004648	45528073	5126524	5734779	62.65627706


Time Series Plot for Income and Oil Price
Normalized Data
2
0
-2
200803
200806
200809
200812
200903
200906
200909
200912
201003
201006
201009
201012
201103
201106
201109
201112
201203
201206
201209
201212
201303
201306
201309
201312
201403
201406
201409
201412
201503
201506
201509
201512
201603
201606
201609
201612
201703
201706
201709
201712
201803
201806
201809
201812
Season
華航營收 (China)
長榮營收 (EVA)
油價 (Oil Price)

Time Series Plot for Net Income and Oil Price



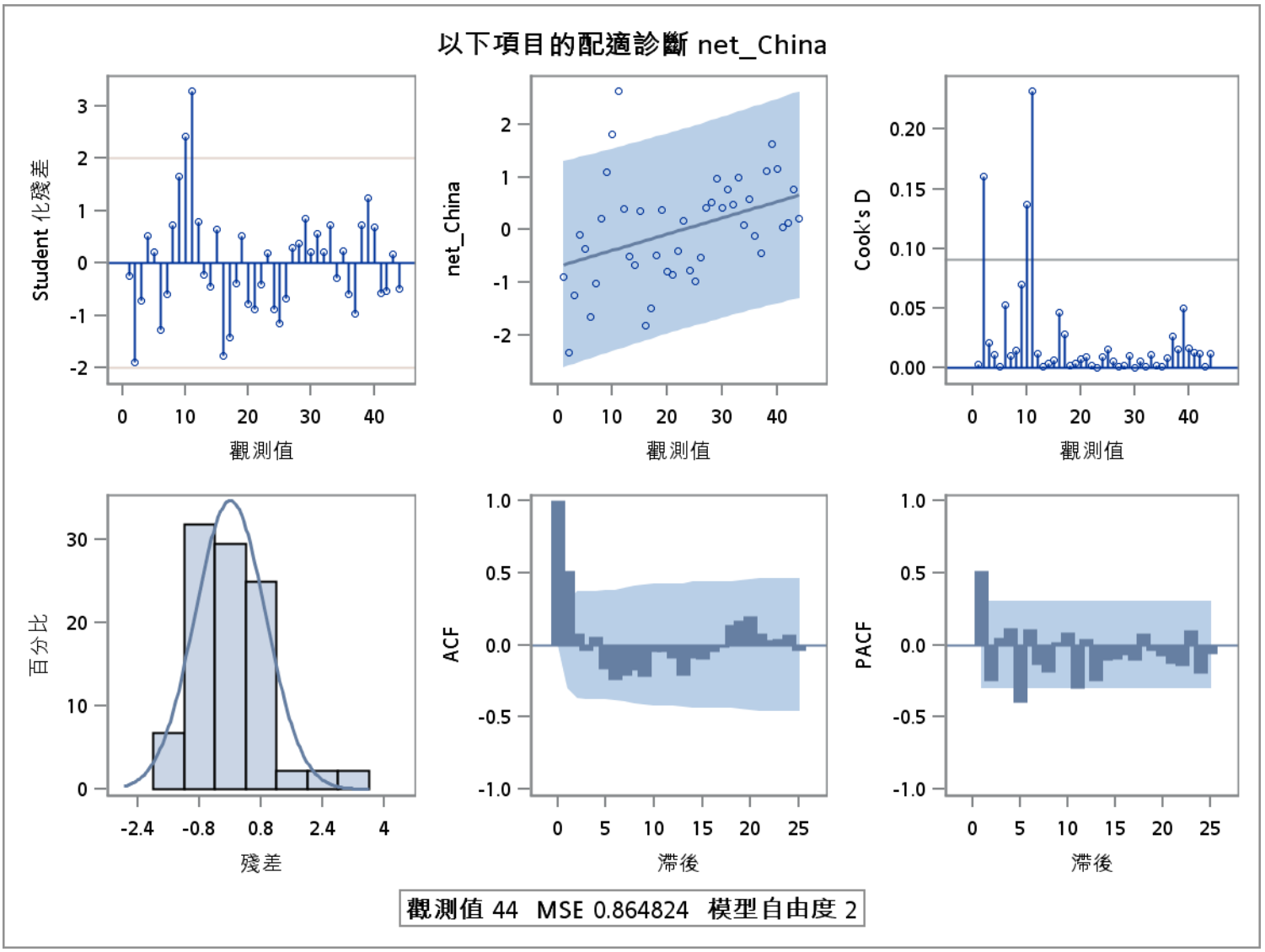
Check Breakpoint of Log Income of China

AUTOREG 程序

結構變更檢定					
檢定	轉折點	分子自由度	分母自由度	F 值	Pr > F
Chow	5	2	40	1.23	0.3032
Chow	6	2	40	1.23	0.3033
Chow	7	2	40	1.71	0.1945
Chow	8	2	40	2.27	0.1165

Check Breakpoint of Log Income of China

AUTOREG 程序



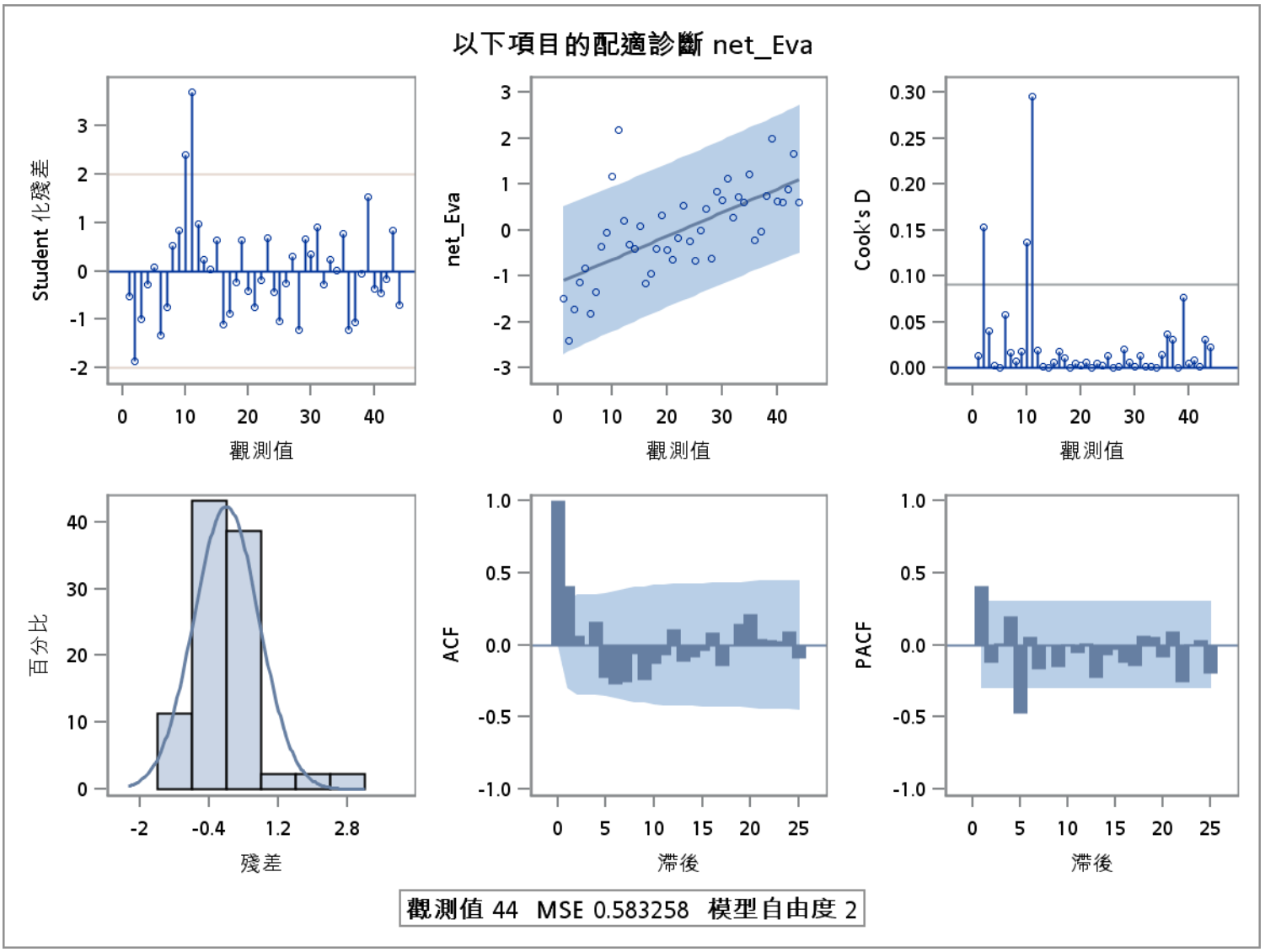
Check Breakpoint of Log Income of China

AUTOREG 程序

結構變更檢定					
檢定	轉折點	分子自由度	分母自由度	F 值	Pr > F
Chow	10	2	40	4.31	0.0202
Chow	11	2	40	5.20	0.0098
Chow	12	2	40	14.12	<.0001
Chow	13	2	40	13.36	<.0001

Check Breakpoint of Log Income of China

AUTOREG 程序



Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price	LogChina	LogEva
1	200912	32354351	24085666	5239725	4407014	76.66638785	17.2923	16.9971
2	201003	33387059	25240676	7047257	5026621	78.67259019	17.3237	17.0440
3	201006	38074869	28892524	8547939	7676835	76.40515152	17.4551	17.1791
4	201009	39160671	31322921	10249938	9862774	86.79487233	17.4832	17.2599
5	201012	37043408	28598332	5611714	5602610	104.8970221	17.4276	17.1689
6	201103	33791797	27072445	3770960	4510361	117.1221284	17.3357	17.1140
7	201106	35159619	28642277	3401491	4311970	112.9963583	17.3754	17.1704
8	201109	37365477	30480808	5532785	5365496	109.3143795	17.4363	17.2326
9	201112	35993787	27423843	1034452	2678589	118.5415512	17.3989	17.1269
10	201203	33686686	28944597	1740685	3137159	108.9005797	17.3326	17.1809
11	201206	35471724	29762217	3795213	4311657	109.9544697	17.3842	17.2088
12	201209	37117310	31787371	5577553	5840464	110.4417655	17.4296	17.2746
13	201212	34696419	29664282	3159836	4224792	112.8745652	17.3621	17.2055
14	201303	33075918	29080135	3041668	3799366	103.004137	17.3143	17.1856
15	201306	34187617	30295700	3982136	4807701	110.1008385	17.3474	17.2265
16	201309	37343853	33244731	5176729	6336979	109.3964778	17.4357	17.3194
17	201312	37095157	31543885	3221368	4634798	107.929383	17.4290	17.2669

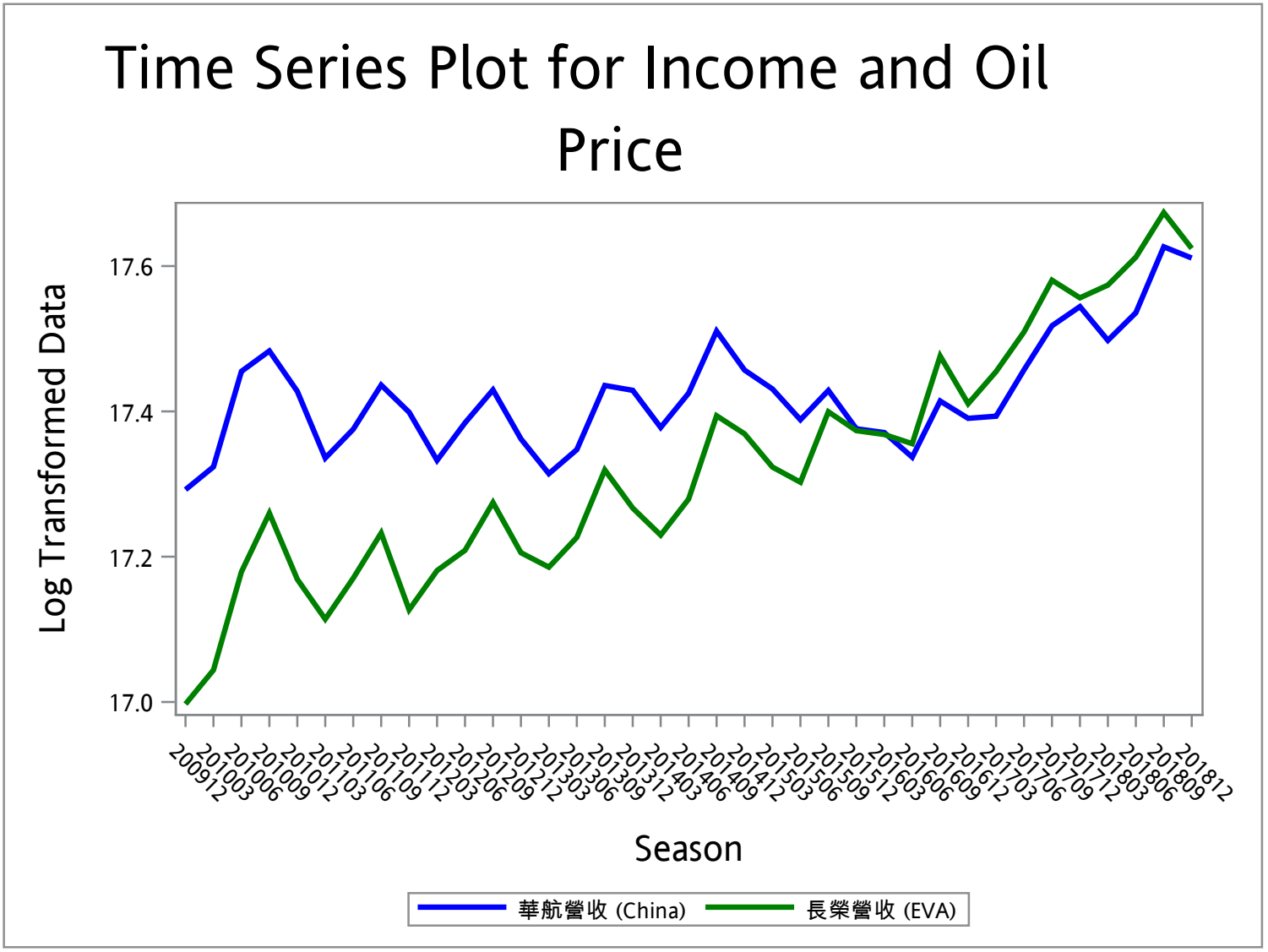
Obs	net_LogChina	net_LogEva	LogOil	Term
1	15.4718	15.2987	4.33946	1
2	15.7681	15.4303	4.36529	2
3	15.9612	15.8537	4.33605	3
4	16.1428	16.1043	4.46355	4
5	15.5404	15.5387	4.65298	5
6	15.1428	15.3219	4.76322	6
7	15.0397	15.2769	4.72736	7
8	15.5262	15.4955	4.69423	8
9	13.8494	14.8008	4.77526	9
10	14.3698	14.9588	4.69044	10
11	15.1493	15.2768	4.70007	11
12	15.5343	15.5803	4.70449	12
13	14.9660	15.2565	4.72628	13
14	14.9279	15.1503	4.63477	14
15	15.1973	15.3857	4.70140	15
16	15.4597	15.6619	4.69498	16
17	14.9853	15.3491	4.68148	17

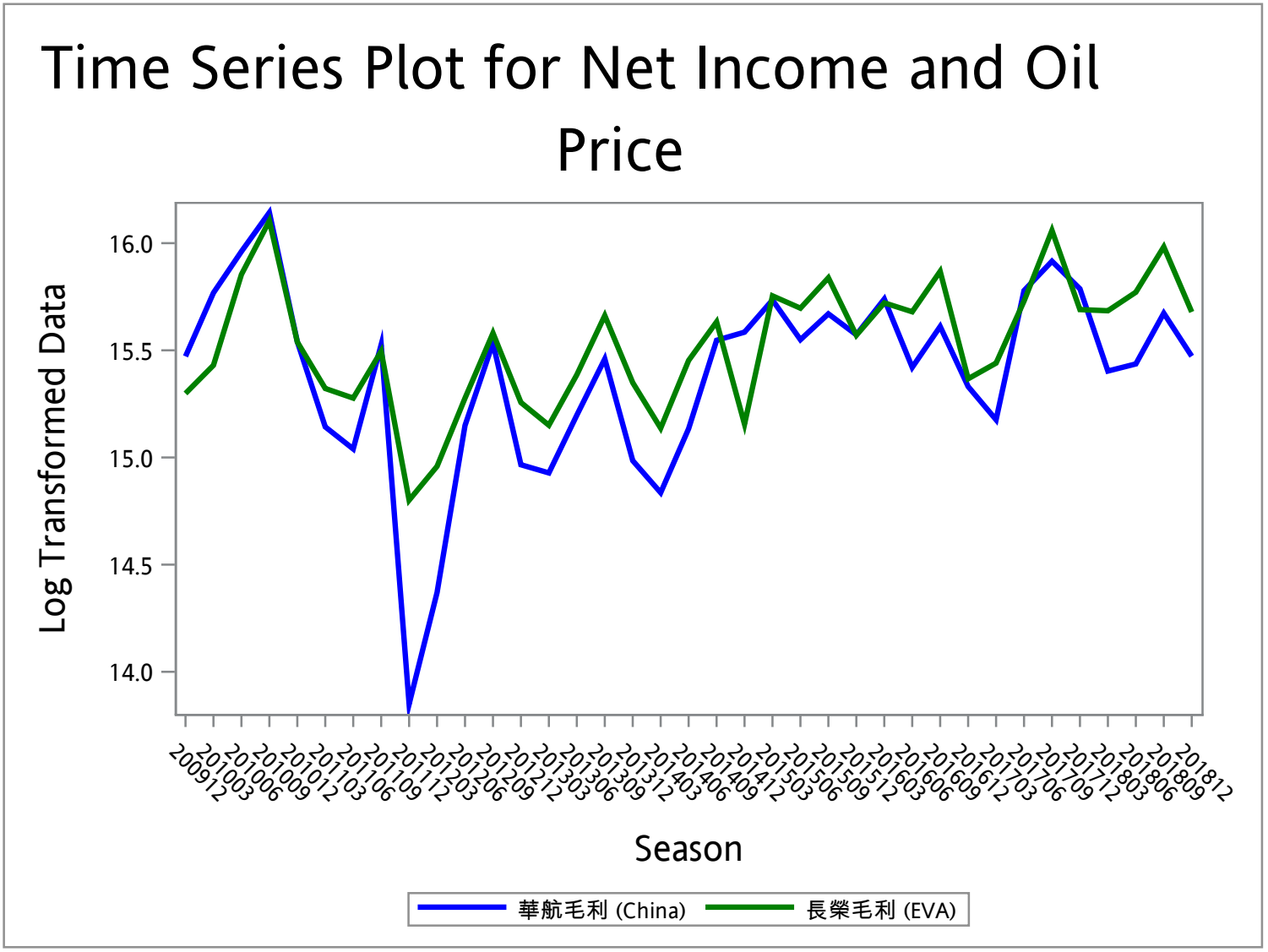
Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price	LogChina	LogEva
18	201403	35246873	30392098	2773842	3748030	109.806645	17.3779	17.2297
19	201406	36947737	31938491	3738761	5140381	102.080596	17.4250	17.2793
20	201409	40244398	35820040	5647333	6153794	75.95686957	17.5105	17.3940
21	201412	38142734	34939379	5865950	3817907	54.04622727	17.4568	17.3691
22	201503	37163905	33374491	6815205	6948892	62.09896104	17.4308	17.3233
23	201506	35621247	32686440	5663435	6560507	50.03149445	17.3885	17.3025
24	201509	37089144	36014470	6389233	7559676	43.42099097	17.4288	17.3994
25	201512	35181921	35093143	5795017	5781479	34.35772257	17.3760	17.3735
26	201603	34999023	34906089	6847394	6725398	45.95284271	17.3708	17.3682
27	201606	33834966	34468468	4977702	6451397	45.80131219	17.3370	17.3556
28	201609	36552871	38887294	6023623	7791758	50.07821789	17.4143	17.4762
29	201612	35692247	36417814	4551703	4719210	54.11816271	17.3904	17.4106
30	201703	35796465	38064697	3898009	5077260	50.27630501	17.3934	17.4548
31	201706	38156614	40200582	7121426	6781251	51.74080745	17.4572	17.5094
32	201709	40542703	43166421	8166869	9428609	61.46836219	17.5179	17.5806
33	201712	41626003	42130031	7180623	6517920	66.95132543	17.5442	17.5563
34	201803	39735027	42878322	4892636	6482124	74.48866805	17.4977	17.5739

Obs	net_LogChina	net_LogEva	LogOil	Term
18	14.8357	15.1367	4.69872	18
19	15.1343	15.4526	4.62576	19
20	15.5467	15.6326	4.33017	20
21	15.5847	15.1552	3.98984	21
22	15.7347	15.7541	4.12873	22
23	15.5495	15.6966	3.91265	23
24	15.6701	15.8383	3.77094	24
25	15.5725	15.5702	3.53683	25
26	15.7394	15.7214	3.82762	26
27	15.4205	15.6798	3.82431	27
28	15.6112	15.8686	3.91359	28
29	15.3310	15.3672	3.99117	29
30	15.1760	15.4403	3.91753	30
31	15.7786	15.7297	3.94625	31
32	15.9156	16.0593	4.11852	32
33	15.7869	15.6901	4.20397	33
34	15.4032	15.6846	4.31065	34

Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price	LogChina	LogEva
35	201806	41275835	44554750	5057799	7068094	75.47547431	17.5358	17.6122
36	201809	45196764	47379049	6408785	8733486	67.36929356	17.6265	17.6737
37	201812	44503981	45095211	5242827	6445098	63.27252036	17.6111	17.6243

Obs	net_LogChina	net_LogEva	LogOil	Term
35	15.4364	15.7711	4.32381	35
36	15.6732	15.9827	4.21019	36
37	15.4724	15.6788	4.14745	37


Time Series Plot for Income and Oil Price
Log Transformed Data
17.6
17.4
17.2
17.0
200912
201003
201006
201009
201012
201103
201106
201109
201112
201203
201206
201209
201212
201303
201306
201309
201312
201403
201406
201409
201412
201503
201506
201509
201512
201603
201606
201609
201612
201703
201706
201709
201712
201803
201806
201809
Season
華航營收 (China)
長榮營收 (EVA)


Time Series Plot for Net Income and Oil Price
Log Transformed Data
16.0
15.5
15.0
14.5
14.0
200912
201003
201006
201009
201012
201103
201106
201109
201112
201203
201206
201209
201212
201303
201306
201309
201312
201403
201406
201409
201412
201503
201506
201509
201512
201603
201606
201609
201612
201703
201706
201709
201712
201803
201806
201809
Season
華航毛利 (China)
長榮毛利 (EVA)

Dickey-Fuller Unit Root Test for Log Income

VARMAX 程序

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	0.02	0.6802	0.79	0.8788
	Single Mean	-17.35	0.0112	-2.38	0.1541
	Trend	-30.15	0.0009	-3.24	0.0938
LogEva	Zero Mean	0.03	0.6842	1.66	0.9743
	Single Mean	-2.46	0.7108	-1.04	0.7269
	Trend	-40.83	<.0001	-4.18	0.0119
LogOil	Zero Mean	-0.07	0.6601	-0.35	0.5529
	Single Mean	-3.32	0.6011	-1.20	0.6634
	Trend	-7.13	0.6151	-1.91	0.6296

Dickey-Fuller Unit Root Test for Diff Log Income

VARMAX 程序

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	-105.06	0.0001	-7.78	<.0001
	Single Mean	-111.91	0.0001	-7.84	0.0002
	Trend	-113.23	0.0001	-8.04	0.0001
LogEva	Zero Mean	-76.00	<.0001	-6.54	<.0001
	Single Mean	-105.60	0.0001	-7.44	0.0002
	Trend	-106.06	0.0001	-7.40	0.0001
LogOil	Zero Mean	-24.20	0.0001	-3.33	0.0015
	Single Mean	-24.23	0.0009	-3.28	0.0233
	Trend	-24.33	0.0078	-3.25	0.0925

Obs	p	LogLike	AIC
1	1	245.645917	-455.291834
2	2	256.949463	-459.898926
3	3	265.191183	-458.382366
4	4	265.867905	-441.735810
5	5	267.493744	-426.987487

Model for Log Income with p = 2

VARMAX 程序

觀測值數目	36
成對遺漏數目	0
經由差分消除的觀測值	1

簡單摘要統計值

變數	類型	N	平均值	標準差	最小值	最大值	差異	標籤
LogChina	相依	36	0.00886	0.05592	-0.09187	0.13139	1	華航營收 (China)
LogEva	相依	36	0.01742	0.06317	-0.10568	0.13513	1	長榮營收 (EVA)
LogOil	相依	36	-0.00533	0.13250	-0.34033	0.29079	1	

Dickey-Fuller 單根檢定

變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	-105.06	0.0001	-7.78	<.0001
	Single Mean	-111.91	0.0001	-7.84	0.0002
	Trend	-113.23	0.0001	-8.04	0.0001
LogEva	Zero Mean	-76.00	<.0001	-6.54	<.0001
	Single Mean	-105.60	0.0001	-7.44	0.0002
	Trend	-106.06	0.0001	-7.40	0.0001
LogOil	Zero Mean	-24.20	0.0001	-3.33	0.0015
	Single Mean	-24.23	0.0009	-3.28	0.0233
	Trend	-24.33	0.0078	-3.25	0.0925

使用追蹤的共整合秩檢定

H0: Rank=r	H1: Rank>r	特徵值	追蹤	Pr > 追蹤	ECM 中的漂移	程序中的漂移
0	0	0.7443	69.4499	<.0001	NOINT	Constant
1	1	0.3927	23.0848	0.0003		
2	2	0.1650	6.1297	0.0156		

長期參數 Beta 估計值

變數	1	2	3
LogChina	21.75705	49.49476	-19.39006
LogEva	1.51848	-45.41267	27.87895
LogOil	-2.80889	1.90910	10.02420

Model for Log Income with p = 2

VARMAX 程序

調整係數 Alpha 估計值			
變數	1	2	3
LogChina	-0.05738	-0.01275	-0.00292
LogEva	-0.06929	0.01037	-0.00991
LogOil	0.05448	-0.06584	-0.03454

Model for Log Income with p = 2

VARMAX 程序

模型類型	VAR(2)
估計法	Least Squares Estimation

AR 係數估計值				
滯後	變數	LogChina	LogEva	LogOil
1	LogChina	-0.19957	0.27544	-0.04755
	LogEva	-0.01255	-0.11497	-0.07874
	LogOil	-1.37549	1.03745	0.22206
2	LogChina	-0.62315	0.13490	0.15510
	LogEva	-0.78980	0.26280	0.19383
	LogOil	-0.02825	1.07247	0.15298

參數估計值的圖示		
變數/滯後	AR1	AR2
LogChina	...	-.+
LogEva	...	-.+
LogOil	...	...
+ is > 2*std error, - is < -2*std error, . is between, * is N/A		

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
LogChina	AR1_1_1	-0.19957	0.26291	-0.76	0.4542	LogChina(t-1)
	AR1_1_2	0.27544	0.22283	1.24	0.2267	LogEva(t-1)
	AR1_1_3	-0.04755	0.05679	-0.84	0.4095	LogOil(t-1)
	AR2_1_1	-0.62315	0.24419	-2.55	0.0165	LogChina(t-2)
	AR2_1_2	0.13490	0.22981	0.59	0.5619	LogEva(t-2)
	AR2_1_3	0.15510	0.05740	2.70	0.0116	LogOil(t-2)
LogEva	AR1_2_1	-0.01255	0.33484	-0.04	0.9704	LogChina(t-1)
	AR1_2_2	-0.11497	0.28379	-0.41	0.6885	LogEva(t-1)
	AR1_2_3	-0.07874	0.07232	-1.09	0.2855	LogOil(t-1)
	AR2_2_1	-0.78980	0.31099	-2.54	0.0169	LogChina(t-2)
	AR2_2_2	0.26280	0.29268	0.90	0.3769	LogEva(t-2)
	AR2_2_3	0.19383	0.07311	2.65	0.0130	LogOil(t-2)
LogOil	AR1_3_1	-1.37549	0.81687	-1.68	0.1033	LogChina(t-1)
	AR1_3_2	1.03745	0.69232	1.50	0.1452	LogEva(t-1)

Model for Log Income with p = 2

VARMAX 程序

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
	AR1_3_3	0.22206	0.17644	1.26	0.2186	LogOil(t-1)
	AR2_3_1	-0.02825	0.75868	-0.04	0.9706	LogChina(t-2)
	AR2_3_2	1.07247	0.71401	1.50	0.1443	LogEva(t-2)
	AR2_3_3	0.15298	0.17835	0.86	0.3983	LogOil(t-2)

創新的共變異數			
變數	LogChina	LogEva	LogOil
LogChina	0.00173	0.00159	0.00089
LogEva	0.00159	0.00281	-0.00075
LogOil	0.00089	-0.00075	0.01671

對數概度	251.3854

訊息準則	
AICC	-321.438
HQC	-442.278
AIC	-454.771
SBC	-418.138
FPEC	5.492E-8

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	0.00143	0.00131	0.00073
	LogEva	0.00131	0.00231	-0.00062
	LogOil	0.00073	-0.00062	0.01376
1	LogChina	-0.00001	-0.00005	-0.00069
	LogEva	0.00003	-0.00001	-0.00079
	LogOil	0.00049	0.00038	0.00038
2	LogChina	0.00007	0.00018	-0.00057
	LogEva	-0.00014	-0.00000	-0.00068
	LogOil	-0.00071	-0.00092	0.00039
3	LogChina	0.00001	0.00004	-0.00082

Model for Log Income with p = 2

VARMAX 程序

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
	LogEva	-0.00003	0.00022	-0.00106
	LogOil	-0.00057	-0.00103	0.00139

殘差的交叉相關				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	1.00000	0.72040	0.16591
	LogEva	0.72040	1.00000	-0.10996
	LogOil	0.16591	-0.10996	1.00000
1	LogChina	-0.00721	-0.02819	-0.15544
	LogEva	0.01653	-0.00616	-0.13950
	LogOil	0.11003	0.06801	0.02770
2	LogChina	0.04577	0.09773	-0.12806
	LogEva	-0.07657	-0.00077	-0.12125
	LogOil	-0.16033	-0.16236	0.02804
3	LogChina	0.00774	0.02053	-0.18550
	LogEva	-0.01470	0.09705	-0.18848
	LogOil	-0.12756	-0.18197	0.10107

殘差的交叉相關示意圖				
變數/滯後	0	1	2	3
LogChina	++.	. . .	. . .	. . .
LogEva	++.	. . .	. . .	. . .
LogOil	. .+	. . .	. . .	. . .
+ is > 2*std error, - is < -2*std error, . is between				

殘差交叉相關的 Portmanteau 檢定			
滯後上限	自由度	卡方	Pr > ChiSq
3	9	10.59	0.3050

Model for Log Income with p = 2

VARMAX 程序

單變量模型 ANOVA 診斷				
變數	R 平方	標準差	F 值	Pr > F
LogChina	0.4805	0.04161	5.18	0.0017
LogEva	0.3675	0.05299	3.25	0.0193
LogOil	0.2365	0.12928	1.73	0.1594

單變量模型白噪音診斷					
		常態性		ARCH	
變數	Durbin Watson	卡方	Pr > ChiSq	F 值	Pr > F
LogChina	2.00133	0.38	0.8284	1.03	0.3171
LogEva	1.86338	4.42	0.1095	0.39	0.5395
LogOil	1.91247	6.21	0.0449	1.72	0.1987

單變量模型 AR 診斷								
	AR1		AR2		AR3		AR4	
變數	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F
LogChina	0.01	0.9428	0.03	0.9709	0.08	0.9691	0.86	0.5016
LogEva	0.50	0.4850	0.50	0.6119	0.21	0.8885	0.39	0.8155
LogOil	0.09	0.7636	0.09	0.9164	0.08	0.9727	0.08	0.9884

VARMAX 程序

Granger-Causality Wald 檢定			
檢定	自由度	卡方	Pr > ChiSq
1	4	8.71	0.0689
2	2	1.47	0.4804

檢定 1: 群組 1 變數:	LogChina LogEva
群組 2 變數:	LogOil

檢定 2: 群組 1 變數:	LogChina
群組 2 變數:	LogEva

Dickey-Fuller Unit Root Test for Log Net Income

VARMAX 程序

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
net_LogChina	Zero Mean	-0.03	0.6710	-0.17	0.6177
	Single Mean	-21.43	0.0027	-3.17	0.0302
	Trend	-24.27	0.0083	-3.42	0.0648
net_LogEva	Zero Mean	0.02	0.6803	0.17	0.7299
	Single Mean	-22.66	0.0017	-3.17	0.0301
	Trend	-32.11	0.0004	-3.76	0.0311
LogOil	Zero Mean	-0.07	0.6601	-0.35	0.5529
	Single Mean	-3.32	0.6011	-1.20	0.6634
	Trend	-7.13	0.6151	-1.91	0.6296

Dickey-Fuller Unit Root Test for Diff Log Net Income

VARMAX 程序

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
net_LogChina	Zero Mean	-83.58	<.0001	-6.33	<.0001
	Single Mean	-83.62	0.0002	-6.24	0.0002
	Trend	-84.71	<.0001	-6.21	0.0001
net_LogEva	Zero Mean	-91.53	<.0001	-6.79	<.0001
	Single Mean	-91.78	0.0002	-6.67	0.0002
	Trend	-92.51	<.0001	-6.63	0.0001
LogOil	Zero Mean	-24.20	0.0001	-3.33	0.0015
	Single Mean	-24.23	0.0009	-3.28	0.0233
	Trend	-24.33	0.0078	-3.25	0.0925

Model Criterion for Log Net Income

Obs	p	LogLike	AIC
1	1	114.544096	-193.088192
2	2	118.183281	-182.366563
3	3	128.364136	-184.728272
4	4	129.767569	-169.535138
5	5	128.096812	-148.193623

Model for Log Net Income with p = 2

VARMAX 程序

觀測值數目	36
成對遺漏數目	0
經由差分消除的觀測值	1

簡單摘要統計值

變數	類型	N	平均值	標準差	最小值	最大值	差異	標籤
net_LogChina	相依	36	0.00002	0.43853	-1.67682	0.77946	1	華航毛利 (China)
net_LogEva	相依	36	0.01056	0.31020	-0.69470	0.59888	1	長榮毛利 (EVA)
LogOil	相依	36	-0.00533	0.13250	-0.34033	0.29079	1	

Dickey-Fuller 單根檢定

變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
net_LogChina	Zero Mean	-83.58	<.0001	-6.33	<.0001
	Single Mean	-83.62	0.0002	-6.24	0.0002
	Trend	-84.71	<.0001	-6.21	0.0001
net_LogEva	Zero Mean	-91.53	<.0001	-6.79	<.0001
	Single Mean	-91.78	0.0002	-6.67	0.0002
	Trend	-92.51	<.0001	-6.63	0.0001
LogOil	Zero Mean	-24.20	0.0001	-3.33	0.0015
	Single Mean	-24.23	0.0009	-3.28	0.0233
	Trend	-24.33	0.0078	-3.25	0.0925

使用追蹤的共整合秩檢定

H0: Rank=r	H1: Rank>r	特徵值	追蹤	Pr > 追蹤	ECM 中的漂移	程序中的漂移
0	0	0.6325	70.6934	<.0001	NOINT	Constant
1	1	0.5522	36.6549	<.0001		
2	2	0.2402	9.3403	0.0027		

長期參數 Beta 估計值

變數	1	2	3
net_LogChina	-1.60310	6.66329	1.51165
net_LogEva	6.91157	-6.66659	-1.47772
LogOil	0.37097	1.90261	10.76419

Model for Log Net Income with p = 2

VARMAX 程序

調整係數 Alpha 估計值			
變數	1	2	3
net_LogChina	-0.32834	-0.29470	-0.03481
net_LogEva	-0.33176	-0.03521	-0.02678
LogOil	-0.00351	0.04245	-0.06504

Model for Log Net Income with p = 2

VARMAX 程序

模型類型	VAR(2)
估計法	Least Squares Estimation

AR 係數估計值

滯後	變數	net_LogChina	net_LogEva	LogOil
1	net_LogChina	-0.40265	0.22341	-1.32980
	net_LogEva	0.09868	-0.41525	-0.64022
	LogOil	0.17441	-0.25176	0.29843
2	net_LogChina	-0.08726	-0.47671	0.27261
	net_LogEva	0.15805	-0.60340	0.16192
	LogOil	0.01575	0.04063	0.08093

參數估計值的圖示

變數/滯後	AR1	AR2
net_LogChina	..-	...
net_LogEva	...	...
LogOil	...	...

+ is > 2*std error, - is < -2*std error, . is between, * is N/A

模型參數估計值

方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
net_LogChina	AR1_1_1	-0.40265	0.29133	-1.38	0.1779	net_LogChina(t-1)
	AR1_1_2	0.22341	0.40330	0.55	0.5840	net_LogEva(t-1)
	AR1_1_3	-1.32980	0.58548	-2.27	0.0310	LogOil(t-1)
	AR2_1_1	-0.08726	0.30545	-0.29	0.7772	net_LogChina(t-2)
	AR2_1_2	-0.47671	0.43356	-1.10	0.2809	net_LogEva(t-2)
	AR2_1_3	0.27261	0.62294	0.44	0.6650	LogOil(t-2)
net_LogEva	AR1_2_1	0.09868	0.20414	0.48	0.6326	net_LogChina(t-1)
	AR1_2_2	-0.41525	0.28259	-1.47	0.1529	net_LogEva(t-1)
	AR1_2_3	-0.64022	0.41024	-1.56	0.1299	LogOil(t-1)
	AR2_2_1	0.15805	0.21403	0.74	0.4664	net_LogChina(t-2)
	AR2_2_2	-0.60340	0.30379	-1.99	0.0569	net_LogEva(t-2)
	AR2_2_3	0.16192	0.43650	0.37	0.7135	LogOil(t-2)
LogOil	AR1_3_1	0.17441	0.09595	1.82	0.0798	net_LogChina(t-1)
	AR1_3_2	-0.25176	0.13283	-1.90	0.0684	net_LogEva(t-1)

Model for Log Net Income with p = 2

VARMAX 程序

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
	AR1_3_3	0.29843	0.19283	1.55	0.1329	LogOil(t-1)
	AR2_3_1	0.01575	0.10060	0.16	0.8767	net_LogChina(t-2)
	AR2_3_2	0.04063	0.14279	0.28	0.7781	net_LogEva(t-2)
	AR2_3_3	0.08093	0.20517	0.39	0.6962	LogOil(t-2)

創新的共變異數			
變數	net_LogChina	net_LogEva	LogOil
net_LogChina	0.16623	0.09064	-0.00281
net_LogEva	0.09064	0.08161	0.00604
LogOil	-0.00281	0.00604	0.01803

對數概度	117.9033

訊息準則	
AICC	-54.4732
HQC	-175.314
AIC	-187.807
SBC	-151.174
FPEC	0.000141

殘差的交叉共變異數				
滯後	變數	net_LogChina	net_LogEva	LogOil
0	net_LogChina	0.13689	0.07464	-0.00232
	net_LogEva	0.07464	0.06721	0.00497
	LogOil	-0.00232	0.00497	0.01485
1	net_LogChina	-0.02202	-0.01845	0.00052
	net_LogEva	-0.01645	-0.01902	-0.00144
	LogOil	0.00300	0.00324	0.00014
2	net_LogChina	0.00834	0.00359	-0.00219
	net_LogEva	0.00643	0.00076	-0.00116
	LogOil	-0.00219	-0.00325	-0.00010
3	net_LogChina	-0.04487	-0.02010	0.00273

Model for Log Net Income with p = 2

VARMAX 程序

殘差的交叉共變異數				
滯後	變數	net_LogChina	net_LogEva	LogOil
	net_LogEva	-0.02853	-0.02113	0.00212
	LogOil	-0.00194	-0.00765	-0.00005

殘差的交叉相關				
滯後	變數	net_LogChina	net_LogEva	LogOil
0	net_LogChina	1.00000	0.77818	-0.05137
	net_LogEva	0.77818	1.00000	0.15739
	LogOil	-0.05137	0.15739	1.00000
1	net_LogChina	-0.16085	-0.19233	0.01153
	net_LogEva	-0.17154	-0.28304	-0.04550
	LogOil	0.06653	0.10264	0.00945
2	net_LogChina	0.06091	0.03746	-0.04856
	net_LogEva	0.06707	0.01124	-0.03667
	LogOil	-0.04860	-0.10283	-0.00662
3	net_LogChina	-0.32775	-0.20960	0.06064
	net_LogEva	-0.29742	-0.31431	0.06722
	LogOil	-0.04308	-0.24202	-0.00369

殘差的交叉相關示意圖				
變數/滯後	0	1	2	3
net_LogChina	++.	. . .	. . .	. . .
net_LogEva	++.	. . .	. . .	. . .
LogOil	. .+	. . .	. . .	. . .
+ is > 2*std error, - is < -2*std error, . is between				

殘差交叉相關的 Portmanteau 檢定			
滯後上限	自由度	卡方	Pr > ChiSq
3	9	16.64	0.0546

Model for Log Net Income with p = 2

VARMAX 程序

單變量模型 ANOVA 診斷				
變數	R 平方	標準差	F 值	Pr > F
net_LogChina	0.2947	0.40771	2.34	0.0679
net_LogEva	0.2801	0.28568	2.18	0.0851
LogOil	0.1763	0.13428	1.20	0.3355

單變量模型白噪音診斷					
		常態性		ARCH	
變數	Durbin Watson	卡方	Pr > ChiSq	F 值	Pr > F
net_LogChina	2.29757	113.90	<.0001	0.02	0.9022
net_LogEva	2.45875	0.47	0.7906	1.59	0.2166
LogOil	1.90322	0.25	0.8837	2.23	0.1455

單變量模型 AR 診斷								
	AR1		AR2		AR3		AR4	
變數	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F
net_LogChina	0.87	0.3579	0.39	0.6784	1.42	0.2584	1.24	0.3203
net_LogEva	3.04	0.0914	1.31	0.2857	2.58	0.0742	3.48	0.0217
LogOil	0.00	0.9556	0.06	0.9380	0.05	0.9866	0.12	0.9760

Model for Log Income with p = 2

VARMAX 程序

觀測值數目	36
成對遺漏數目	0
經由差分消除的觀測值	1

簡單摘要統計值

變數	類型	N	平均值	標準差	最小值	最大值	差異	標籤
LogChina	相依	36	0.00886	0.05592	-0.09187	0.13139	1	華航營收 (China)
LogEva	相依	36	0.01742	0.06317	-0.10568	0.13513	1	長榮營收 (EVA)
LogOil	相依	36	-0.00533	0.13250	-0.34033	0.29079	1	

Dickey-Fuller 單根檢定

變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	-105.06	0.0001	-7.78	<.0001
	Single Mean	-111.91	0.0001	-7.84	0.0002
	Trend	-113.23	0.0001	-8.04	0.0001
LogEva	Zero Mean	-76.00	<.0001	-6.54	<.0001
	Single Mean	-105.60	0.0001	-7.44	0.0002
	Trend	-106.06	0.0001	-7.40	0.0001
LogOil	Zero Mean	-24.20	0.0001	-3.33	0.0015
	Single Mean	-24.23	0.0009	-3.28	0.0233
	Trend	-24.33	0.0078	-3.25	0.0925

使用追蹤的共整合秩檢定

H0: Rank=r	H1: Rank>r	特徵值	追蹤	Pr > 追蹤	ECM 中的漂移	程序中的漂移
0	0	0.7443	69.4499	<.0001	NOINT	Constant
1	1	0.3927	23.0848	0.0003		
2	2	0.1650	6.1297	0.0156		

長期參數 Beta 估計值

變數	1	2	3
LogChina	21.75705	49.49476	-19.39006
LogEva	1.51848	-45.41267	27.87895
LogOil	-2.80889	1.90910	10.02420

Model for Log Income with p = 2

VARMAX 程序

調整係數 Alpha 估計值			
變數	1	2	3
LogChina	-0.05738	-0.01275	-0.00292
LogEva	-0.06929	0.01037	-0.00991
LogOil	0.05448	-0.06584	-0.03454

Model for Log Income with p = 2

VARMAX 程序

模型類型	VAR(2)
估計法	Least Squares Estimation

AR 係數估計值				
滯後	變數	LogChina	LogEva	LogOil
1	LogChina	-0.19957	0.27544	-0.04755
	LogEva	-0.01255	-0.11497	-0.07874
	LogOil	-1.37549	1.03745	0.22206
2	LogChina	-0.62315	0.13490	0.15510
	LogEva	-0.78980	0.26280	0.19383
	LogOil	-0.02825	1.07247	0.15298

參數估計值的圖示		
變數/滯後	AR1	AR2
LogChina	...	-.+
LogEva	...	-.+
LogOil	...	...
+ is > 2*std error, - is < -2*std error, . is between, * is N/A		

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
LogChina	AR1_1_1	-0.19957	0.26291	-0.76	0.4542	LogChina(t-1)
	AR1_1_2	0.27544	0.22283	1.24	0.2267	LogEva(t-1)
	AR1_1_3	-0.04755	0.05679	-0.84	0.4095	LogOil(t-1)
	AR2_1_1	-0.62315	0.24419	-2.55	0.0165	LogChina(t-2)
	AR2_1_2	0.13490	0.22981	0.59	0.5619	LogEva(t-2)
	AR2_1_3	0.15510	0.05740	2.70	0.0116	LogOil(t-2)
LogEva	AR1_2_1	-0.01255	0.33484	-0.04	0.9704	LogChina(t-1)
	AR1_2_2	-0.11497	0.28379	-0.41	0.6885	LogEva(t-1)
	AR1_2_3	-0.07874	0.07232	-1.09	0.2855	LogOil(t-1)
	AR2_2_1	-0.78980	0.31099	-2.54	0.0169	LogChina(t-2)
	AR2_2_2	0.26280	0.29268	0.90	0.3769	LogEva(t-2)
	AR2_2_3	0.19383	0.07311	2.65	0.0130	LogOil(t-2)
LogOil	AR1_3_1	-1.37549	0.81687	-1.68	0.1033	LogChina(t-1)
	AR1_3_2	1.03745	0.69232	1.50	0.1452	LogEva(t-1)

Model for Log Income with p = 2

VARMAX 程序

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
	AR1_3_3	0.22206	0.17644	1.26	0.2186	LogOil(t-1)
	AR2_3_1	-0.02825	0.75868	-0.04	0.9706	LogChina(t-2)
	AR2_3_2	1.07247	0.71401	1.50	0.1443	LogEva(t-2)
	AR2_3_3	0.15298	0.17835	0.86	0.3983	LogOil(t-2)

創新的共變異數			
變數	LogChina	LogEva	LogOil
LogChina	0.00173	0.00159	0.00089
LogEva	0.00159	0.00281	-0.00075
LogOil	0.00089	-0.00075	0.01671

對數概度	251.3854

訊息準則	
AICC	-321.438
HQC	-442.278
AIC	-454.771
SBC	-418.138
FPEC	5.492E-8

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	0.00143	0.00131	0.00073
	LogEva	0.00131	0.00231	-0.00062
	LogOil	0.00073	-0.00062	0.01376
1	LogChina	-0.00001	-0.00005	-0.00069
	LogEva	0.00003	-0.00001	-0.00079
	LogOil	0.00049	0.00038	0.00038
2	LogChina	0.00007	0.00018	-0.00057
	LogEva	-0.00014	-0.00000	-0.00068
	LogOil	-0.00071	-0.00092	0.00039
3	LogChina	0.00001	0.00004	-0.00082

Model for Log Income with p = 2

VARMAX 程序

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
	LogEva	-0.00003	0.00022	-0.00106
	LogOil	-0.00057	-0.00103	0.00139

殘差的交叉相關				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	1.00000	0.72040	0.16591
	LogEva	0.72040	1.00000	-0.10996
	LogOil	0.16591	-0.10996	1.00000
1	LogChina	-0.00721	-0.02819	-0.15544
	LogEva	0.01653	-0.00616	-0.13950
	LogOil	0.11003	0.06801	0.02770
2	LogChina	0.04577	0.09773	-0.12806
	LogEva	-0.07657	-0.00077	-0.12125
	LogOil	-0.16033	-0.16236	0.02804
3	LogChina	0.00774	0.02053	-0.18550
	LogEva	-0.01470	0.09705	-0.18848
	LogOil	-0.12756	-0.18197	0.10107

殘差的交叉相關示意圖				
變數/滯後	0	1	2	3
LogChina	++.	. . .	. . .	. . .
LogEva	++.	. . .	. . .	. . .
LogOil	. .+	. . .	. . .	. . .
+ is > 2*std error, - is < -2*std error, . is between				

殘差交叉相關的 Portmanteau 檢定			
滯後上限	自由度	卡方	Pr > ChiSq
3	9	10.59	0.3050

Model for Log Income with p = 2

VARMAX 程序

單變量模型 ANOVA 診斷				
變數	R 平方	標準差	F 值	Pr > F
LogChina	0.4805	0.04161	5.18	0.0017
LogEva	0.3675	0.05299	3.25	0.0193
LogOil	0.2365	0.12928	1.73	0.1594

單變量模型白噪音診斷					
		常態性		ARCH	
變數	Durbin Watson	卡方	Pr > ChiSq	F 值	Pr > F
LogChina	2.00133	0.38	0.8284	1.03	0.3171
LogEva	1.86338	4.42	0.1095	0.39	0.5395
LogOil	1.91247	6.21	0.0449	1.72	0.1987

單變量模型 AR 診斷								
	AR1		AR2		AR3		AR4	
變數	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F
LogChina	0.01	0.9428	0.03	0.9709	0.08	0.9691	0.86	0.5016
LogEva	0.50	0.4850	0.50	0.6119	0.21	0.8885	0.39	0.8155
LogOil	0.09	0.7636	0.09	0.9164	0.08	0.9727	0.08	0.9884

Model for Log Income with p = 2

VARMAX 程序

觀測值數目	36
成對遺漏數目	0
經由差分消除的觀測值	1

簡單摘要統計值

變數	類型	N	平均值	標準差	最小值	最大值	差異	標籤
LogChina	相依	36	0.00886	0.05592	-0.09187	0.13139	1	華航營收 (China)
LogEva	相依	36	0.01742	0.06317	-0.10568	0.13513	1	長榮營收 (EVA)
LogOil	相依	36	-0.00533	0.13250	-0.34033	0.29079	1	

Dickey-Fuller 單根檢定

變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	-105.06	0.0001	-7.78	<.0001
	Single Mean	-111.91	0.0001	-7.84	0.0002
	Trend	-113.23	0.0001	-8.04	0.0001
LogEva	Zero Mean	-76.00	<.0001	-6.54	<.0001
	Single Mean	-105.60	0.0001	-7.44	0.0002
	Trend	-106.06	0.0001	-7.40	0.0001
LogOil	Zero Mean	-24.20	0.0001	-3.33	0.0015
	Single Mean	-24.23	0.0009	-3.28	0.0233
	Trend	-24.33	0.0078	-3.25	0.0925

使用追蹤的共整合秩檢定

H0: Rank=r	H1: Rank>r	特徵值	追蹤	Pr > 追蹤	ECM 中的漂移	程序中的漂移
0	0	0.7443	69.4499	<.0001	NOINT	Constant
1	1	0.3927	23.0848	0.0003		
2	2	0.1650	6.1297	0.0156		

長期參數 Beta 估計值

變數	1	2	3
LogChina	21.75705	49.49476	-19.39006
LogEva	1.51848	-45.41267	27.87895
LogOil	-2.80889	1.90910	10.02420

Model for Log Income with p = 2

VARMAX 程序

調整係數 Alpha 估計值			
變數	1	2	3
LogChina	-0.05738	-0.01275	-0.00292
LogEva	-0.06929	0.01037	-0.00991
LogOil	0.05448	-0.06584	-0.03454

Model for Log Income with p = 2

VARMAX 程序

模型類型	VAR(2)
估計法	Least Squares Estimation

AR 係數估計值				
滯後	變數	LogChina	LogEva	LogOil
1	LogChina	-0.19957	0.27544	-0.04755
	LogEva	-0.01255	-0.11497	-0.07874
	LogOil	-1.37549	1.03745	0.22206
2	LogChina	-0.62315	0.13490	0.15510
	LogEva	-0.78980	0.26280	0.19383
	LogOil	-0.02825	1.07247	0.15298

參數估計值的圖示		
變數/滯後	AR1	AR2
LogChina	...	-.+
LogEva	...	-.+
LogOil	...	...
+ is > 2*std error, - is < -2*std error, . is between, * is N/A		

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
LogChina	AR1_1_1	-0.19957	0.26291	-0.76	0.4542	LogChina(t-1)
	AR1_1_2	0.27544	0.22283	1.24	0.2267	LogEva(t-1)
	AR1_1_3	-0.04755	0.05679	-0.84	0.4095	LogOil(t-1)
	AR2_1_1	-0.62315	0.24419	-2.55	0.0165	LogChina(t-2)
	AR2_1_2	0.13490	0.22981	0.59	0.5619	LogEva(t-2)
	AR2_1_3	0.15510	0.05740	2.70	0.0116	LogOil(t-2)
LogEva	AR1_2_1	-0.01255	0.33484	-0.04	0.9704	LogChina(t-1)
	AR1_2_2	-0.11497	0.28379	-0.41	0.6885	LogEva(t-1)
	AR1_2_3	-0.07874	0.07232	-1.09	0.2855	LogOil(t-1)
	AR2_2_1	-0.78980	0.31099	-2.54	0.0169	LogChina(t-2)
	AR2_2_2	0.26280	0.29268	0.90	0.3769	LogEva(t-2)
	AR2_2_3	0.19383	0.07311	2.65	0.0130	LogOil(t-2)
LogOil	AR1_3_1	-1.37549	0.81687	-1.68	0.1033	LogChina(t-1)
	AR1_3_2	1.03745	0.69232	1.50	0.1452	LogEva(t-1)

Model for Log Income with p = 2

VARMAX 程序

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
	AR1_3_3	0.22206	0.17644	1.26	0.2186	LogOil(t-1)
	AR2_3_1	-0.02825	0.75868	-0.04	0.9706	LogChina(t-2)
	AR2_3_2	1.07247	0.71401	1.50	0.1443	LogEva(t-2)
	AR2_3_3	0.15298	0.17835	0.86	0.3983	LogOil(t-2)

創新的共變異數			
變數	LogChina	LogEva	LogOil
LogChina	0.00173	0.00159	0.00089
LogEva	0.00159	0.00281	-0.00075
LogOil	0.00089	-0.00075	0.01671

對數概度	251.3854

訊息準則	
AICC	-321.438
HQC	-442.278
AIC	-454.771
SBC	-418.138
FPEC	5.492E-8

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	0.00143	0.00131	0.00073
	LogEva	0.00131	0.00231	-0.00062
	LogOil	0.00073	-0.00062	0.01376
1	LogChina	-0.00001	-0.00005	-0.00069
	LogEva	0.00003	-0.00001	-0.00079
	LogOil	0.00049	0.00038	0.00038
2	LogChina	0.00007	0.00018	-0.00057
	LogEva	-0.00014	-0.00000	-0.00068
	LogOil	-0.00071	-0.00092	0.00039
3	LogChina	0.00001	0.00004	-0.00082

Model for Log Income with p = 2

VARMAX 程序

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
	LogEva	-0.00003	0.00022	-0.00106
	LogOil	-0.00057	-0.00103	0.00139

殘差的交叉相關				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	1.00000	0.72040	0.16591
	LogEva	0.72040	1.00000	-0.10996
	LogOil	0.16591	-0.10996	1.00000
1	LogChina	-0.00721	-0.02819	-0.15544
	LogEva	0.01653	-0.00616	-0.13950
	LogOil	0.11003	0.06801	0.02770
2	LogChina	0.04577	0.09773	-0.12806
	LogEva	-0.07657	-0.00077	-0.12125
	LogOil	-0.16033	-0.16236	0.02804
3	LogChina	0.00774	0.02053	-0.18550
	LogEva	-0.01470	0.09705	-0.18848
	LogOil	-0.12756	-0.18197	0.10107

殘差的交叉相關示意圖				
變數/滯後	0	1	2	3
LogChina	++.	. . .	. . .	. . .
LogEva	++.	. . .	. . .	. . .
LogOil	. .+	. . .	. . .	. . .
+ is > 2*std error, - is < -2*std error, . is between				

殘差交叉相關的 Portmanteau 檢定			
滯後上限	自由度	卡方	Pr > ChiSq
3	9	10.59	0.3050

Model for Log Income with p = 2

VARMAX 程序

單變量模型 ANOVA 診斷				
變數	R 平方	標準差	F 值	Pr > F
LogChina	0.4805	0.04161	5.18	0.0017
LogEva	0.3675	0.05299	3.25	0.0193
LogOil	0.2365	0.12928	1.73	0.1594

單變量模型白噪音診斷					
		常態性		ARCH	
變數	Durbin Watson	卡方	Pr > ChiSq	F 值	Pr > F
LogChina	2.00133	0.38	0.8284	1.03	0.3171
LogEva	1.86338	4.42	0.1095	0.39	0.5395
LogOil	1.91247	6.21	0.0449	1.72	0.1987

單變量模型 AR 診斷								
	AR1		AR2		AR3		AR4	
變數	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F
LogChina	0.01	0.9428	0.03	0.9709	0.08	0.9691	0.86	0.5016
LogEva	0.50	0.4850	0.50	0.6119	0.21	0.8885	0.39	0.8155
LogOil	0.09	0.7636	0.09	0.9164	0.08	0.9727	0.08	0.9884

VARMAX 程序

Granger-Causality Wald 檢定			
檢定	自由度	卡方	Pr > ChiSq
1	4	8.71	0.0689
2	2	1.47	0.4804

檢定 1: 群組 1 變數:	LogChina LogEva
群組 2 變數:	LogOil

檢定 2: 群組 1 變數:	LogChina
群組 2 變數:	LogEva

VARMAX 程序

觀測值數目	36
成對遺漏數目	0
經由差分消除的觀測值	1

簡單摘要統計值								
變數	類型	N	平均值	標準差	最小值	最大值	差異	標籤
LogChina	相依	36	0.00886	0.05592	-0.09187	0.13139	1	華航營收 (China)
LogEva	相依	36	0.01742	0.06317	-0.10568	0.13513	1	長榮營收 (EVA)
LogOil	相依	36	-0.00533	0.13250	-0.34033	0.29079	1	

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	-105.06	0.0001	-7.78	<.0001
	Single Mean	-111.91	0.0001	-7.84	0.0002
	Trend	-113.23	0.0001	-8.04	0.0001
LogEva	Zero Mean	-76.00	<.0001	-6.54	<.0001
	Single Mean	-105.60	0.0001	-7.44	0.0002
	Trend	-106.06	0.0001	-7.40	0.0001
LogOil	Zero Mean	-24.20	0.0001	-3.33	0.0015
	Single Mean	-24.23	0.0009	-3.28	0.0233
	Trend	-24.33	0.0078	-3.25	0.0925

使用追蹤的共整合秩檢定						
H0: Rank=r	H1: Rank>r	特徵值	追蹤	Pr > 追蹤	ECM 中的漂移	程序中的漂移
0	0	0.7443	69.4499	<.0001	NOINT	Constant
1	1	0.3927	23.0848	0.0003		
2	2	0.1650	6.1297	0.0156		

長期參數 Beta 估計值			
變數	1	2	3
LogChina	21.75705	49.49476	-19.39006
LogEva	1.51848	-45.41267	27.87895
LogOil	-2.80889	1.90910	10.02420

VARMAX 程序

調整係數 Alpha 估計值			
變數	1	2	3
LogChina	-0.05738	-0.01275	-0.00292
LogEva	-0.06929	0.01037	-0.00991
LogOil	0.05448	-0.06584	-0.03454

VARMAX 程序

模型類型	VAR(2)
估計法	Least Squares Estimation

AR 係數估計值				
滯後	變數	LogChina	LogEva	LogOil
1	LogChina	-0.19957	0.27544	-0.04755
	LogEva	-0.01255	-0.11497	-0.07874
	LogOil	-1.37549	1.03745	0.22206
2	LogChina	-0.62315	0.13490	0.15510
	LogEva	-0.78980	0.26280	0.19383
	LogOil	-0.02825	1.07247	0.15298

參數估計值的圖示		
變數/滯後	AR1	AR2
LogChina	...	-.+
LogEva	...	-.+
LogOil	...	...
+ is > 2*std error, - is < -2*std error, . is between, * is N/A		

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
LogChina	AR1_1_1	-0.19957	0.26291	-0.76	0.4542	LogChina(t-1)
	AR1_1_2	0.27544	0.22283	1.24	0.2267	LogEva(t-1)
	AR1_1_3	-0.04755	0.05679	-0.84	0.4095	LogOil(t-1)
	AR2_1_1	-0.62315	0.24419	-2.55	0.0165	LogChina(t-2)
	AR2_1_2	0.13490	0.22981	0.59	0.5619	LogEva(t-2)
	AR2_1_3	0.15510	0.05740	2.70	0.0116	LogOil(t-2)
LogEva	AR1_2_1	-0.01255	0.33484	-0.04	0.9704	LogChina(t-1)
	AR1_2_2	-0.11497	0.28379	-0.41	0.6885	LogEva(t-1)
	AR1_2_3	-0.07874	0.07232	-1.09	0.2855	LogOil(t-1)
	AR2_2_1	-0.78980	0.31099	-2.54	0.0169	LogChina(t-2)
	AR2_2_2	0.26280	0.29268	0.90	0.3769	LogEva(t-2)
	AR2_2_3	0.19383	0.07311	2.65	0.0130	LogOil(t-2)
LogOil	AR1_3_1	-1.37549	0.81687	-1.68	0.1033	LogChina(t-1)
	AR1_3_2	1.03745	0.69232	1.50	0.1452	LogEva(t-1)

VARMAX 程序

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
	AR1_3_3	0.22206	0.17644	1.26	0.2186	LogOil(t-1)
	AR2_3_1	-0.02825	0.75868	-0.04	0.9706	LogChina(t-2)
	AR2_3_2	1.07247	0.71401	1.50	0.1443	LogEva(t-2)
	AR2_3_3	0.15298	0.17835	0.86	0.3983	LogOil(t-2)

創新的共變異數			
變數	LogChina	LogEva	LogOil
LogChina	0.00173	0.00159	0.00089
LogEva	0.00159	0.00281	-0.00075
LogOil	0.00089	-0.00075	0.01671

對數概度	251.3854

訊息準則	
AICC	-321.438
HQC	-442.278
AIC	-454.771
SBC	-418.138
FPEC	5.492E-8

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	0.00143	0.00131	0.00073
	LogEva	0.00131	0.00231	-0.00062
	LogOil	0.00073	-0.00062	0.01376
1	LogChina	-0.00001	-0.00005	-0.00069
	LogEva	0.00003	-0.00001	-0.00079
	LogOil	0.00049	0.00038	0.00038
2	LogChina	0.00007	0.00018	-0.00057
	LogEva	-0.00014	-0.00000	-0.00068
	LogOil	-0.00071	-0.00092	0.00039
3	LogChina	0.00001	0.00004	-0.00082

VARMAX 程序

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
	LogEva	-0.00003	0.00022	-0.00106
	LogOil	-0.00057	-0.00103	0.00139

殘差的交叉相關				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	1.00000	0.72040	0.16591
	LogEva	0.72040	1.00000	-0.10996
	LogOil	0.16591	-0.10996	1.00000
1	LogChina	-0.00721	-0.02819	-0.15544
	LogEva	0.01653	-0.00616	-0.13950
	LogOil	0.11003	0.06801	0.02770
2	LogChina	0.04577	0.09773	-0.12806
	LogEva	-0.07657	-0.00077	-0.12125
	LogOil	-0.16033	-0.16236	0.02804
3	LogChina	0.00774	0.02053	-0.18550
	LogEva	-0.01470	0.09705	-0.18848
	LogOil	-0.12756	-0.18197	0.10107

殘差的交叉相關示意圖				
變數/滯後	0	1	2	3
LogChina	++.	. . .	. . .	. . .
LogEva	++.	. . .	. . .	. . .
LogOil	. .+	. . .	. . .	. . .
+ is > 2*std error, - is < -2*std error, . is between				

殘差交叉相關的 Portmanteau 檢定			
滯後上限	自由度	卡方	Pr > ChiSq
3	9	10.59	0.3050

VARMAX 程序

單變量模型 ANOVA 診斷				
變數	R 平方	標準差	F 值	Pr > F
LogChina	0.4805	0.04161	5.18	0.0017
LogEva	0.3675	0.05299	3.25	0.0193
LogOil	0.2365	0.12928	1.73	0.1594

單變量模型白噪音診斷					
		常態性		ARCH	
變數	Durbin Watson	卡方	Pr > ChiSq	F 值	Pr > F
LogChina	2.00133	0.38	0.8284	1.03	0.3171
LogEva	1.86338	4.42	0.1095	0.39	0.5395
LogOil	1.91247	6.21	0.0449	1.72	0.1987

單變量模型 AR 診斷								
	AR1		AR2		AR3		AR4	
變數	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F
LogChina	0.01	0.9428	0.03	0.9709	0.08	0.9691	0.86	0.5016
LogEva	0.50	0.4850	0.50	0.6119	0.21	0.8885	0.39	0.8155
LogOil	0.09	0.7636	0.09	0.9164	0.08	0.9727	0.08	0.9884

VARMAX 程序

Granger-Causality Wald 檢定			
檢定	自由度	卡方	Pr > ChiSq
1	4	8.71	0.0689
2	2	1.47	0.4804

檢定 1: 群組 1 變數:	LogChina LogEva
群組 2 變數:	LogOil

檢定 2: 群組 1 變數:	LogChina
群組 2 變數:	LogEva

VARMAX 程序

Granger-Causality Wald 檢定			
檢定	自由度	卡方	Pr > ChiSq
1	4	5.18	0.2692
2	2	0.39	0.8214

檢定 1: 群組 1 變數:	net_LogChina net_LogEva
群組 2 變數:	LogOil

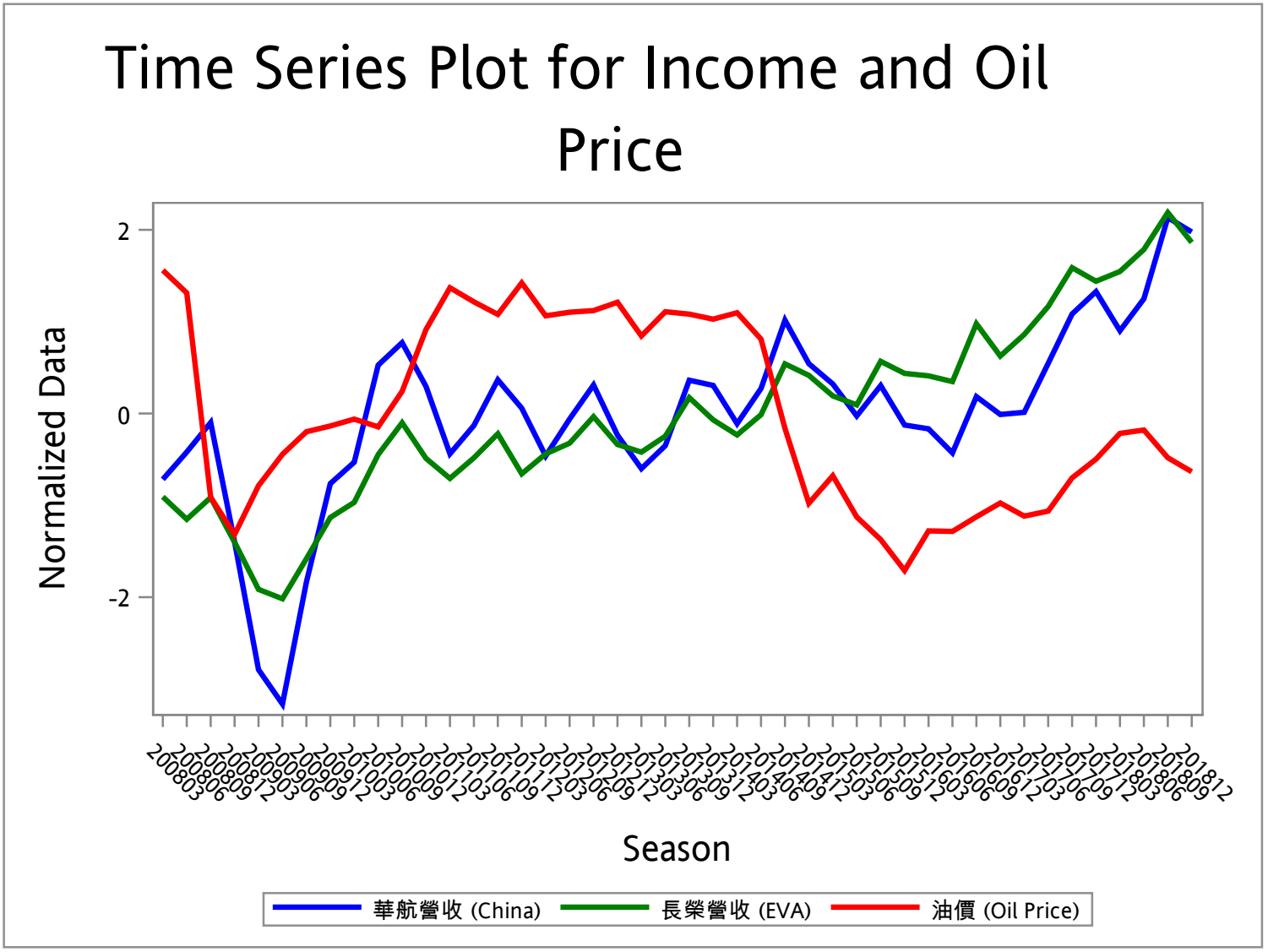
檢定 2: 群組 1 變數:	net_LogChina
群組 2 變數:	net_LogEva

VARMAX 程序

Granger-Causality Wald 檢定			
檢定	自由度	卡方	Pr > ChiSq
1	4	8.71	0.0689
2	2	1.47	0.4804

檢定 1: 群組 1 變數:	LogChina LogEva
群組 2 變數:	LogOil

檢定 2: 群組 1 變數:	LogChina
群組 2 變數:	LogEva


Time Series Plot for Income and Oil Price
Normalized Data
2
0
-2
200803
200806
200809
200812
200903
200906
200909
200912
201003
201006
201009
201012
201103
201106
201109
201112
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201603
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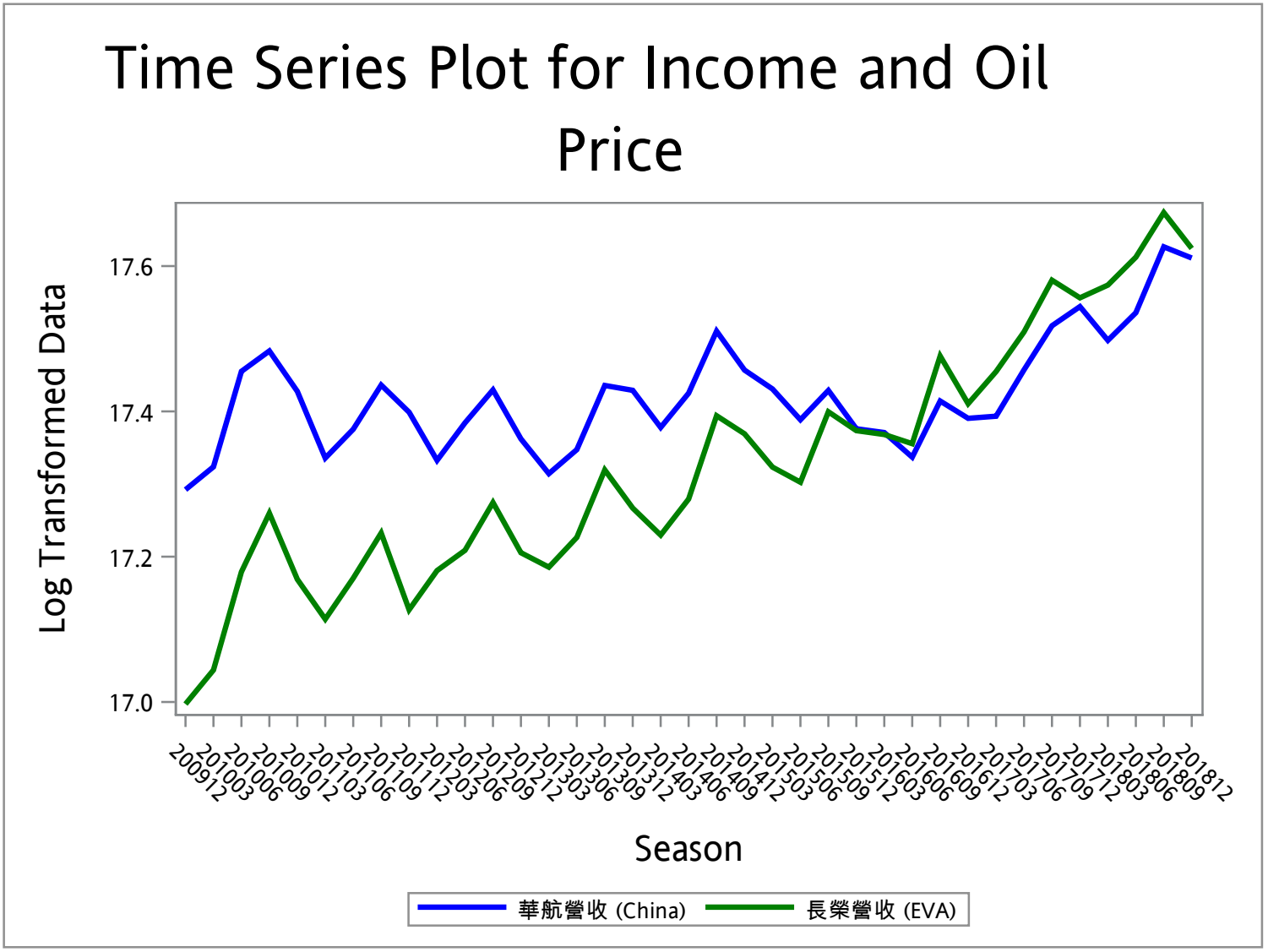
201612
201703
201706
201709
201712
201803
201806
201809
201812
Season
華航營收 (China)
長榮營收 (EVA)
油價 (Oil Price)


Time Series Plot for Income and Oil Price
Log Transformed Data
17.6
17.4
17.2
17.0
200912
201003
201006
201009
201012
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201106
201109
201112
201203
201206
201209
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201412
201503
201506
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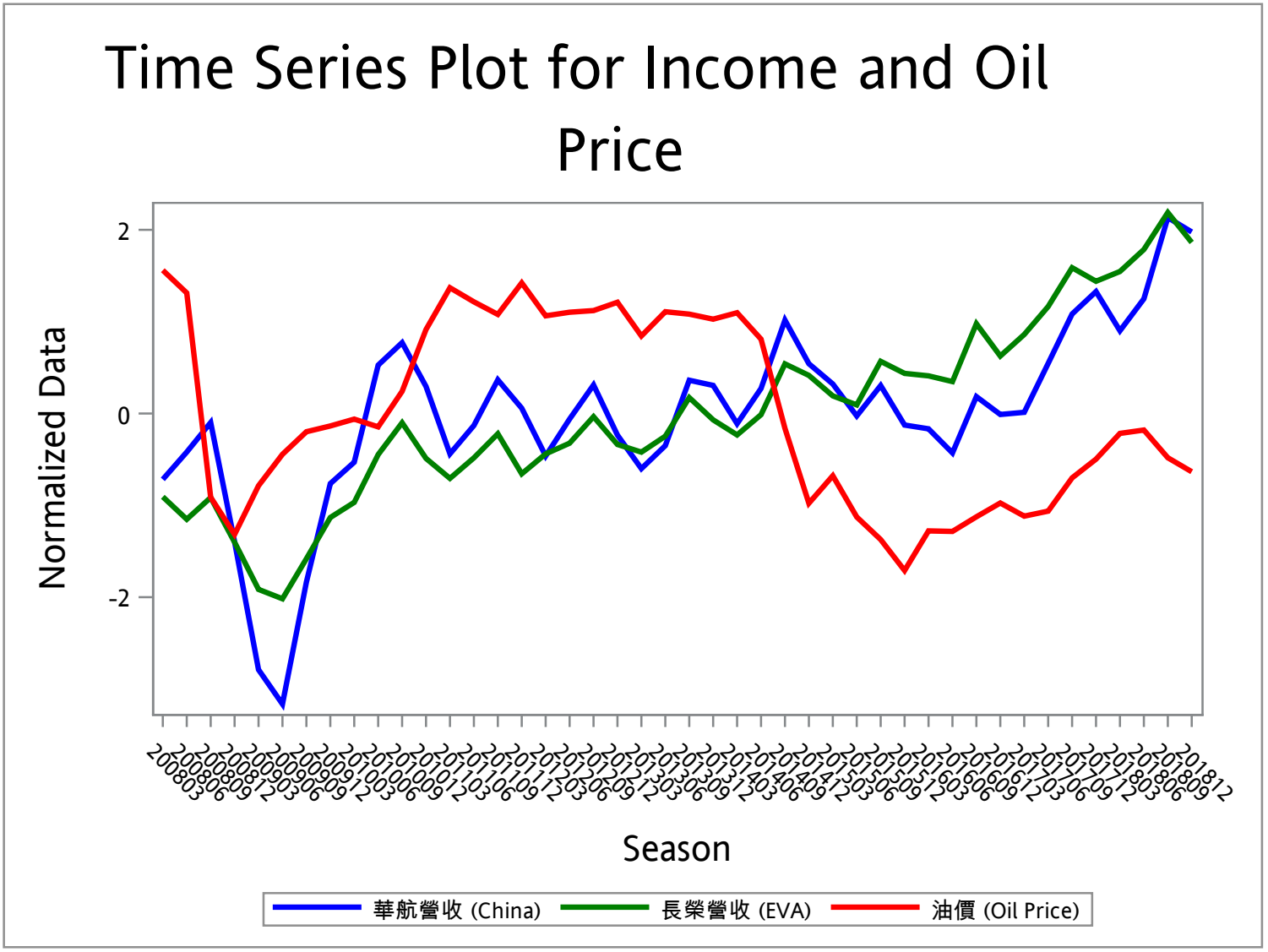
201512
201603
201606
201609
201612
201703
201706
201709
201712
201803
201806
201809
Season
華航營收 (China)
長榮營收 (EVA)

Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price
1	200803	32558850	25666911	1869432	325532	122.2439177
2	200806	33877134	23950573	-1098628	-1652777	115.6047174
3	200809	35303015	25610852	1141696	-176836	55.77905072
4	200812	29541863	22195282	3505199	1043809	44.93356061
5	200903	23369555	18594170	2976190	1733069	59.18047619
6	200906	21708890	17879176	282551	-414058	68.36734488
7	200909	27597226	20937317	1611646	628078	74.97691919
8	200912	32354351	24085666	4141096	2754236	76.66638785
9	201003	33387059	25240676	5948628	3373843	78.67259019
10	201006	38074869	28892524	7449310	6024057	76.40515152
11	201009	39160671	31322921	9151309	8209996	86.79487233
12	201012	37043408	28598332	4513085	3949832	104.8970221
13	201103	33791797	27072445	2672331	2857583	117.1221284
14	201106	35159619	28642277	2302862	2659192	112.9963583
15	201109	37365477	30480808	4434156	3712718	109.3143795
16	201112	35993787	27423843	-64177	1025811	118.5415512
17	201203	33686686	28944597	642056	1484381	108.9005797
18	201206	35471724	29762217	2696584	2658879	109.9544697
19	201209	37117310	31787371	4478924	4187686	110.4417655
20	201212	34696419	29664282	2061207	2572014	112.8745652
21	201303	33075918	29080135	1943039	2146588	103.004137
22	201306	34187617	30295700	2883507	3154923	110.1008385
23	201309	37343853	33244731	4078100	4684201	109.3964778
24	201312	37095157	31543885	2122739	2982020	107.929383
25	201403	35246873	30392098	1675213	2095252	109.806645
26	201406	36947737	31938491	2640132	3487603	102.080596
27	201409	40244398	35820040	4548704	4501016	75.95686957
28	201412	38142734	34939379	4767321	2165129	54.04622727
29	201503	37163905	33374491	5716576	5296114	62.09896104
30	201506	35621247	32686440	4564806	4907729	50.03149445
31	201509	37089144	36014470	5290604	5906898	43.42099097
32	201512	35181921	35093143	4696388	4128701	34.35772257
33	201603	34999023	34906089	5748765	5072620	45.95284271
34	201606	33834966	34468468	3879073	4798619	45.80131219
35	201609	36552871	38887294	4924994	6138980	50.07821789
36	201612	35692247	36417814	3453074	3066432	54.11816271

Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price
37	201703	35796465	38064697	2799380	3424482	50.27630501
38	201706	38156614	40200582	6022797	5128473	51.74080745
39	201709	40542703	43166421	7068240	7775831	61.46836219
40	201712	41626003	42130031	6081994	4865142	66.95132543
41	201803	39735027	42878322	3794007	4829346	74.48866805
42	201806	41275835	44554750	3959170	5415316	75.47547431
43	201809	45196764	47379049	5310156	7080708	67.36929356
44	201812	44503981	45095211	4144198	4792320	63.27252036

Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price
1	201903	40405348	44312727	4213439	7002903	68.33977997
2	201906	42892312	43864832	4296535	4479449	61.85909091
3	201909	43004648	45528073	5126524	5734779	62.65627706


Time Series Plot for Income and Oil Price
Normalized Data
2
0
-2
200803
200806
200809
200812
200903
200906
200909
200912
201003
201006
201009
201012
201103
201106
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201112
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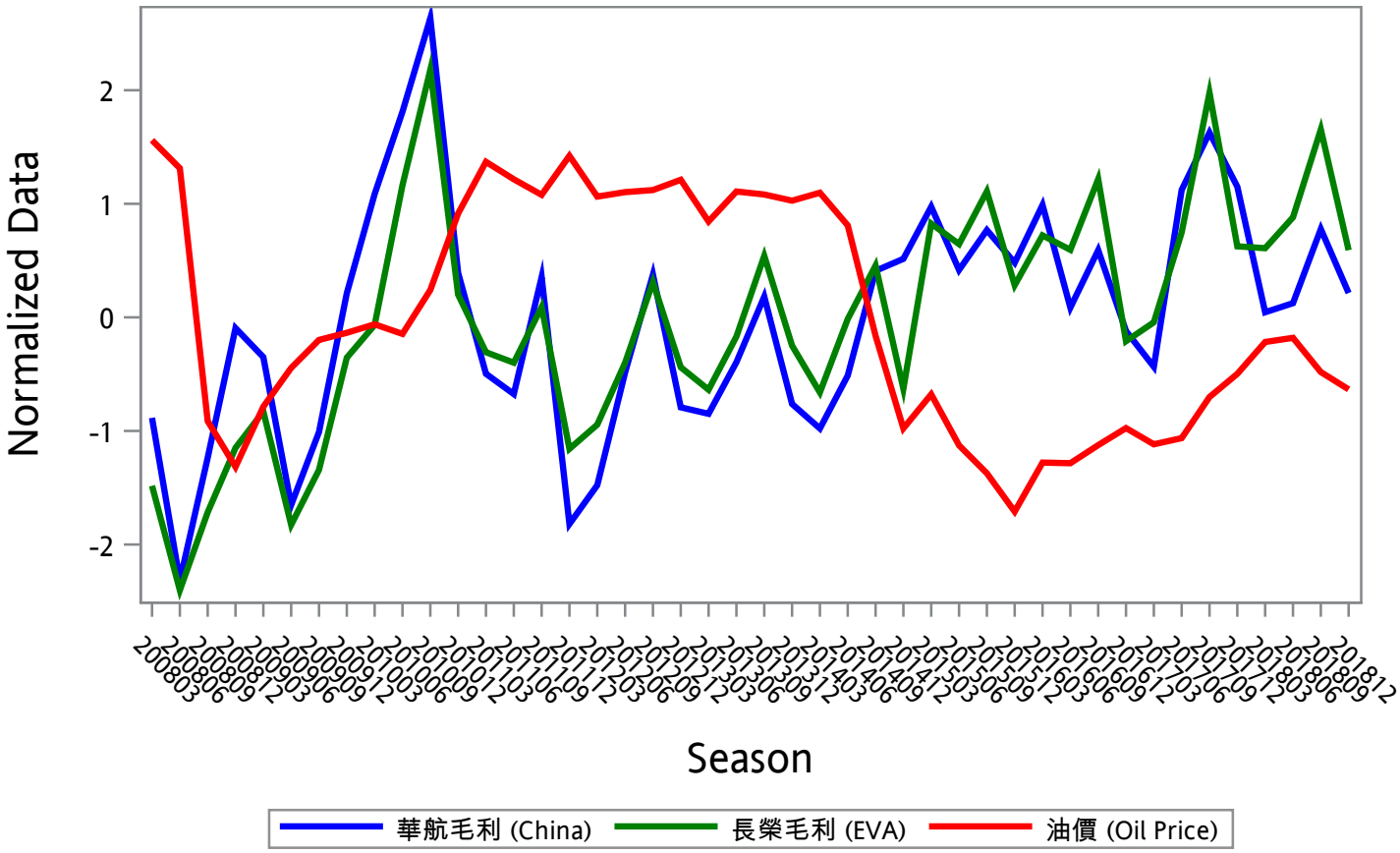
201709
201712
201803
201806
201812
Season
華航營收 (China)
長榮營收 (EVA)
油價 (Oil Price)

Time Series Plot for Net Income and Oil Price



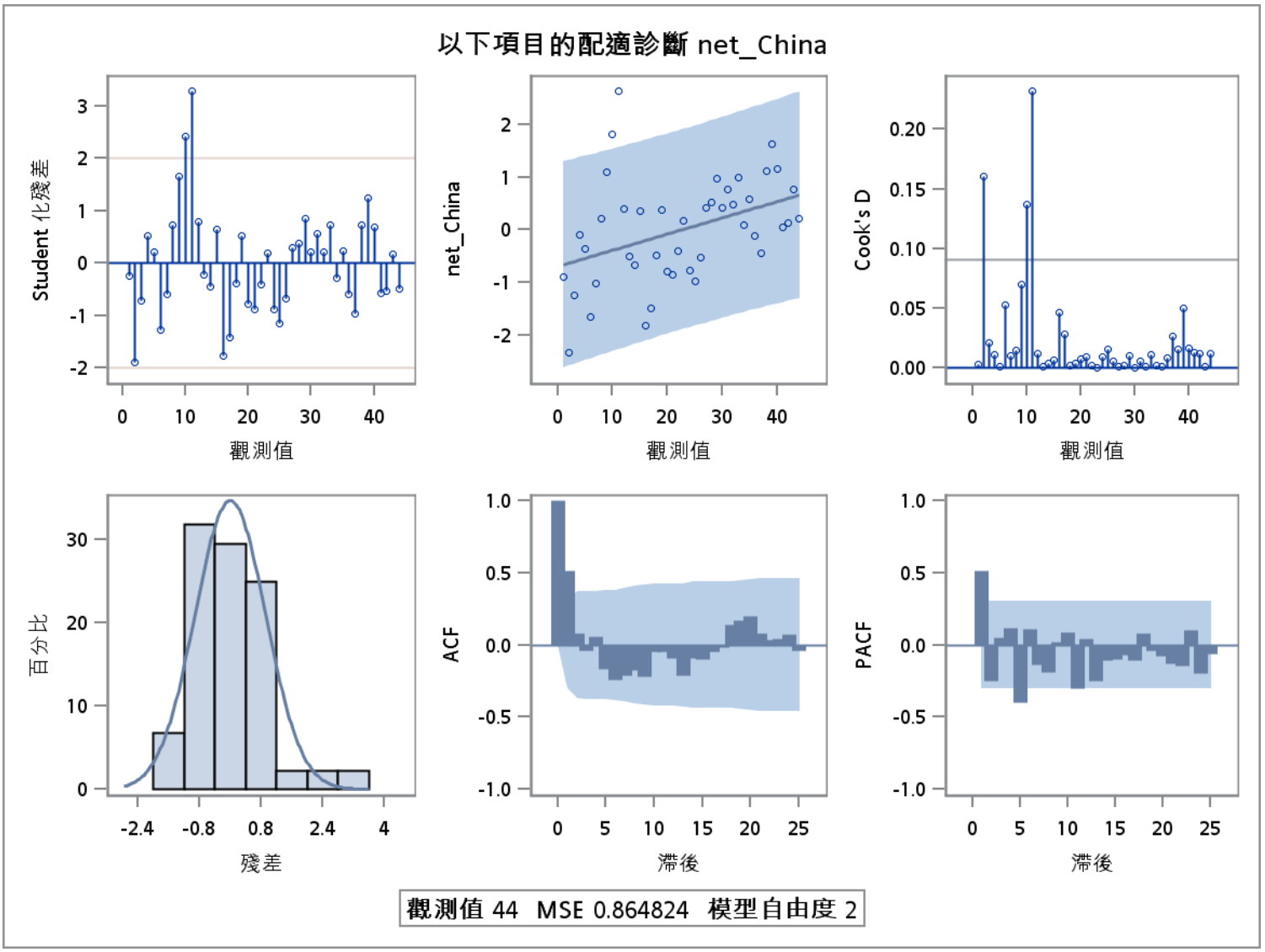
Check Breakpoint of Log Income of China

AUTOREG 程序

結構變更檢定					
檢定	轉折點	分子自由度	分母自由度	F 值	Pr > F
Chow	5	2	40	1.23	0.3032
Chow	6	2	40	1.23	0.3033
Chow	7	2	40	1.71	0.1945
Chow	8	2	40	2.27	0.1165

Check Breakpoint of Log Income of China

AUTOREG 程序



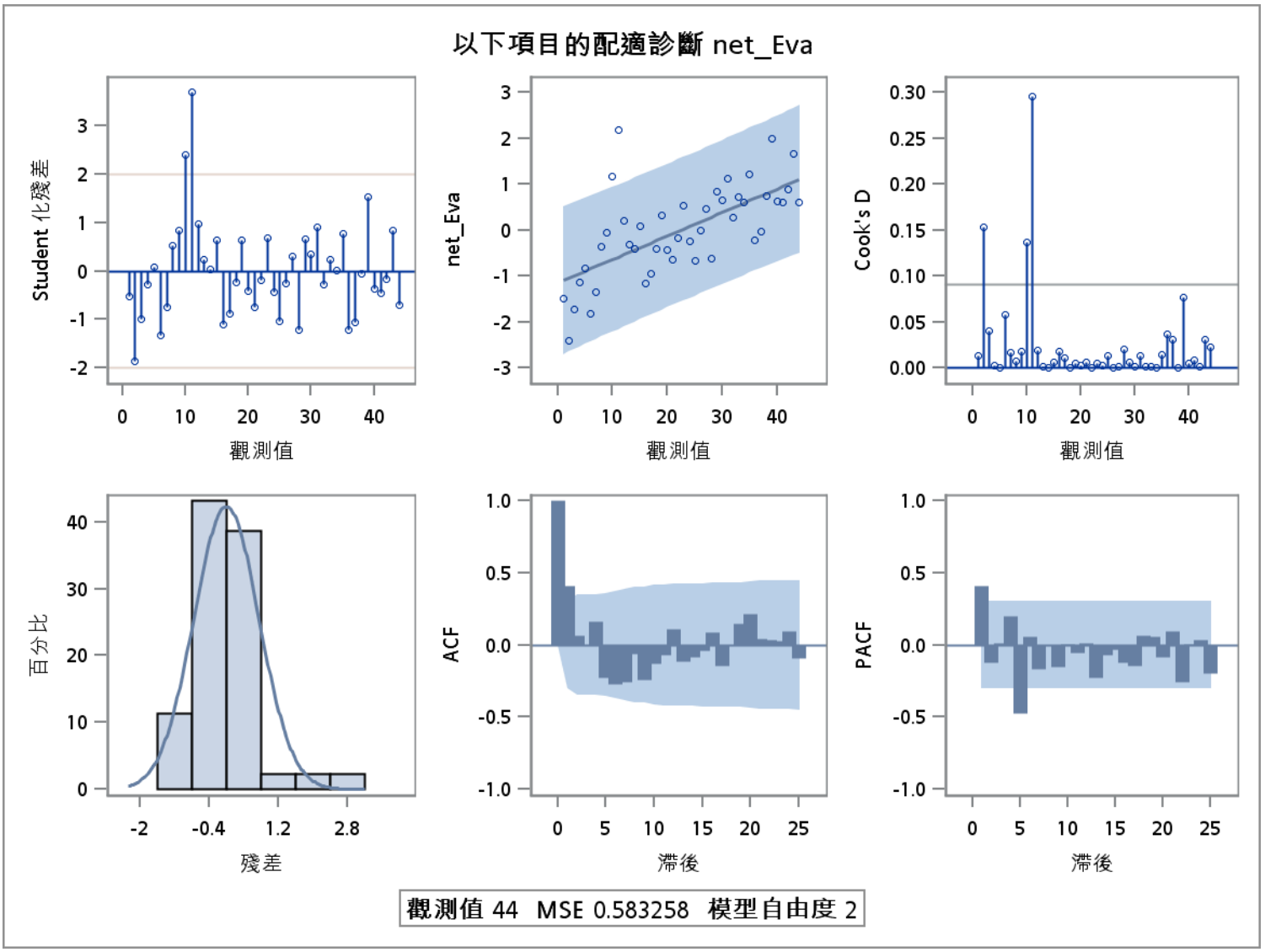
Check Breakpoint of Log Income of China

AUTOREG 程序

結構變更檢定					
檢定	轉折點	分子自由度	分母自由度	F 值	Pr > F
Chow	10	2	40	4.31	0.0202
Chow	11	2	40	5.20	0.0098
Chow	12	2	40	14.12	<.0001
Chow	13	2	40	13.36	<.0001

Check Breakpoint of Log Income of China

AUTOREG 程序



Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price	LogChina	LogEva
1	200803	32558850	25666911	2968061	1978310	122.2439177	17.2986	17.0607
2	200806	33877134	23950573	1	1	115.6047174	17.3383	16.9915
3	200809	35303015	25610852	2240325	1475942	55.77905072	17.3795	17.0585
4	200812	29541863	22195282	4603828	2696587	44.93356061	17.2013	16.9154
5	200903	23369555	18594170	4074819	3385847	59.18047619	16.9669	16.7384
6	200906	21708890	17879176	1381180	1238720	68.36734488	16.8932	16.6991
7	200909	27597226	20937317	2710275	2280856	74.97691919	17.1332	16.8570
8	200912	32354351	24085666	5239725	4407014	76.66638785	17.2923	16.9971
9	201003	33387059	25240676	7047257	5026621	78.67259019	17.3237	17.0440
10	201006	38074869	28892524	8547939	7676835	76.40515152	17.4551	17.1791
11	201009	39160671	31322921	10249938	9862774	86.79487233	17.4832	17.2599
12	201012	37043408	28598332	5611714	5602610	104.8970221	17.4276	17.1689
13	201103	33791797	27072445	3770960	4510361	117.1221284	17.3357	17.1140
14	201106	35159619	28642277	3401491	4311970	112.9963583	17.3754	17.1704
15	201109	37365477	30480808	5532785	5365496	109.3143795	17.4363	17.2326
16	201112	35993787	27423843	1034452	2678589	118.5415512	17.3989	17.1269
17	201203	33686686	28944597	1740685	3137159	108.9005797	17.3326	17.1809

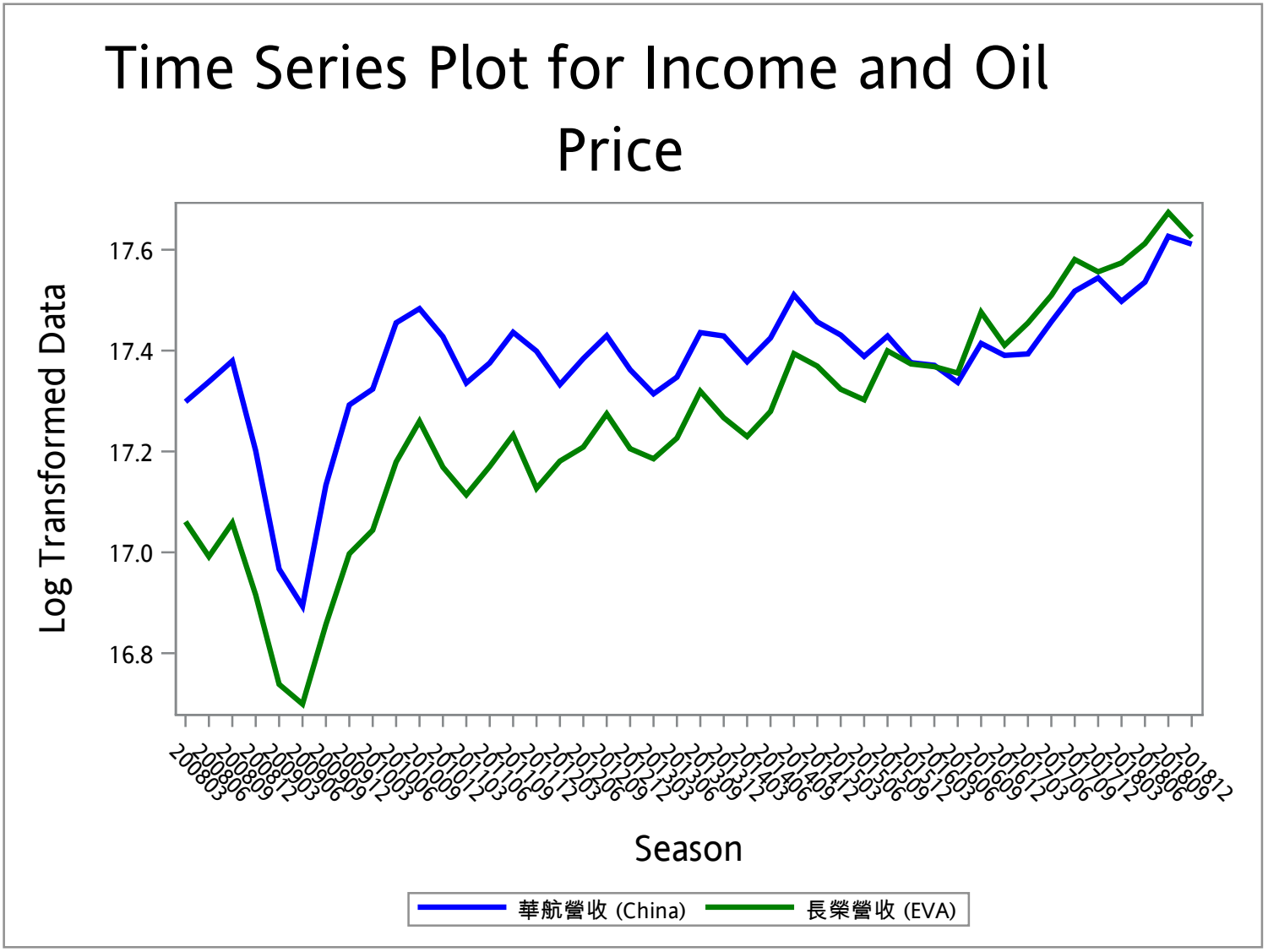
Obs	net_LogChina	net_LogEva	LogOil	Term
1	14.9034	14.4978	4.80602	-6
2	0.0000	0.0000	4.75018	-5
3	14.6221	14.2048	4.02140	-4
4	15.3424	14.8075	3.80518	-3
5	15.2203	15.0351	4.08059	-2
6	14.1384	14.0296	4.22490	-1
7	14.8126	14.6401	4.31718	0
8	15.4718	15.2987	4.33946	1
9	15.7681	15.4303	4.36529	2
10	15.9612	15.8537	4.33605	3
11	16.1428	16.1043	4.46355	4
12	15.5404	15.5387	4.65298	5
13	15.1428	15.3219	4.76322	6
14	15.0397	15.2769	4.72736	7
15	15.5262	15.4955	4.69423	8
16	13.8494	14.8008	4.77526	9
17	14.3698	14.9588	4.69044	10

Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price	LogChina	LogEva
18	201206	35471724	29762217	3795213	4311657	109.9544697	17.3842	17.2088
19	201209	37117310	31787371	5577553	5840464	110.4417655	17.4296	17.2746
20	201212	34696419	29664282	3159836	4224792	112.8745652	17.3621	17.2055
21	201303	33075918	29080135	3041668	3799366	103.004137	17.3143	17.1856
22	201306	34187617	30295700	3982136	4807701	110.1008385	17.3474	17.2265
23	201309	37343853	33244731	5176729	6336979	109.3964778	17.4357	17.3194
24	201312	37095157	31543885	3221368	4634798	107.929383	17.4290	17.2669
25	201403	35246873	30392098	2773842	3748030	109.806645	17.3779	17.2297
26	201406	36947737	31938491	3738761	5140381	102.080596	17.4250	17.2793
27	201409	40244398	35820040	5647333	6153794	75.95686957	17.5105	17.3940
28	201412	38142734	34939379	5865950	3817907	54.04622727	17.4568	17.3691
29	201503	37163905	33374491	6815205	6948892	62.09896104	17.4308	17.3233
30	201506	35621247	32686440	5663435	6560507	50.03149445	17.3885	17.3025
31	201509	37089144	36014470	6389233	7559676	43.42099097	17.4288	17.3994
32	201512	35181921	35093143	5795017	5781479	34.35772257	17.3760	17.3735
33	201603	34999023	34906089	6847394	6725398	45.95284271	17.3708	17.3682
34	201606	33834966	34468468	4977702	6451397	45.80131219	17.3370	17.3556

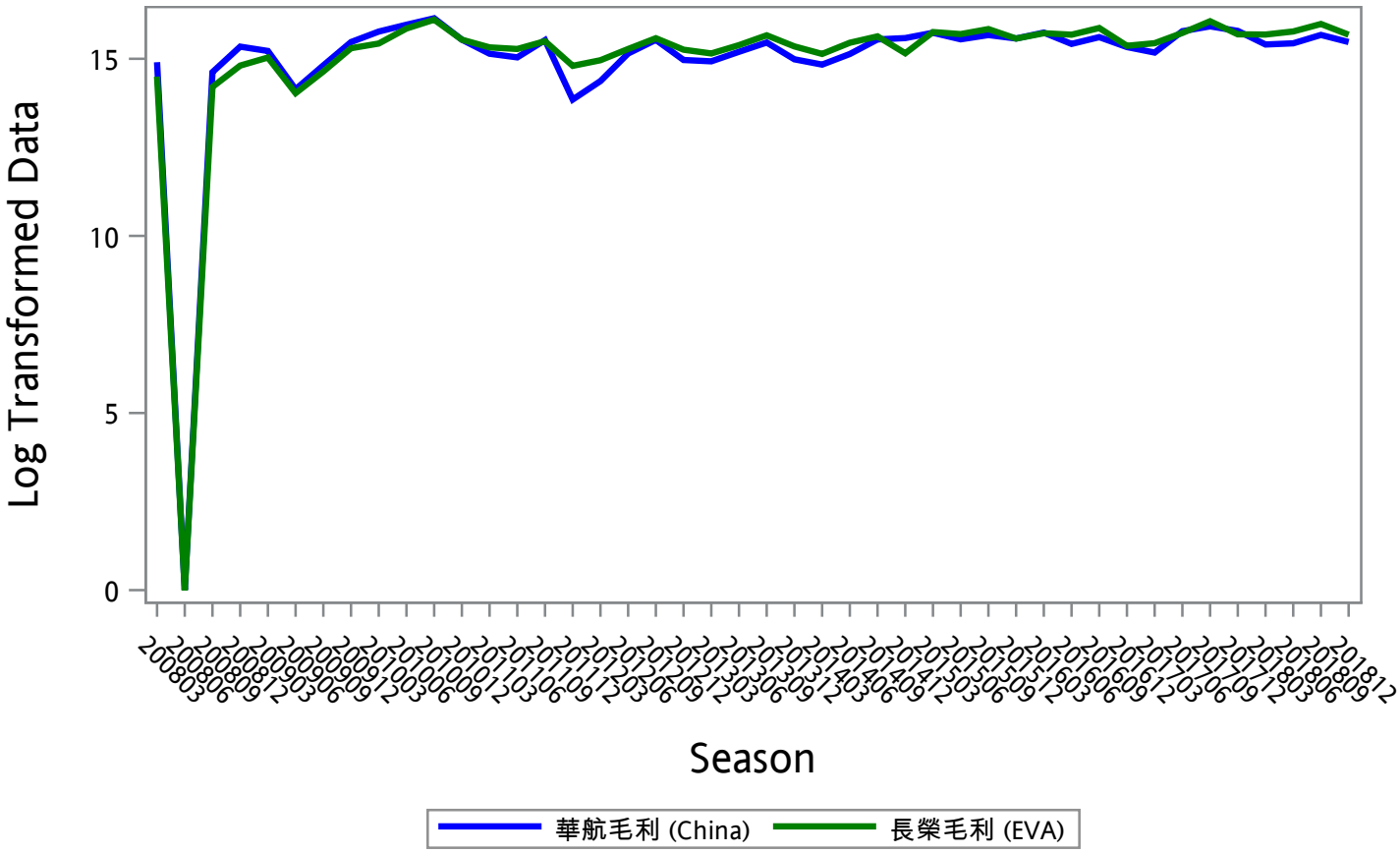
Obs	net_LogChina	net_LogEva	LogOil	Term
18	15.1493	15.2768	4.70007	11
19	15.5343	15.5803	4.70449	12
20	14.9660	15.2565	4.72628	13
21	14.9279	15.1503	4.63477	14
22	15.1973	15.3857	4.70140	15
23	15.4597	15.6619	4.69498	16
24	14.9853	15.3491	4.68148	17
25	14.8357	15.1367	4.69872	18
26	15.1343	15.4526	4.62576	19
27	15.5467	15.6326	4.33017	20
28	15.5847	15.1552	3.98984	21
29	15.7347	15.7541	4.12873	22
30	15.5495	15.6966	3.91265	23
31	15.6701	15.8383	3.77094	24
32	15.5725	15.5702	3.53683	25
33	15.7394	15.7214	3.82762	26
34	15.4205	15.6798	3.82431	27

Obs	time	income_China	income_Eva	net_China	net_Eva	Oil_Price	LogChina	LogEva
35	201609	36552871	38887294	6023623	7791758	50.07821789	17.4143	17.4762
36	201612	35692247	36417814	4551703	4719210	54.11816271	17.3904	17.4106
37	201703	35796465	38064697	3898009	5077260	50.27630501	17.3934	17.4548
38	201706	38156614	40200582	7121426	6781251	51.74080745	17.4572	17.5094
39	201709	40542703	43166421	8166869	9428609	61.46836219	17.5179	17.5806
40	201712	41626003	42130031	7180623	6517920	66.95132543	17.5442	17.5563
41	201803	39735027	42878322	4892636	6482124	74.48866805	17.4977	17.5739
42	201806	41275835	44554750	5057799	7068094	75.47547431	17.5358	17.6122
43	201809	45196764	47379049	6408785	8733486	67.36929356	17.6265	17.6737
44	201812	44503981	45095211	5242827	6445098	63.27252036	17.6111	17.6243

Obs	net_LogChina	net_LogEva	LogOil	Term
35	15.6112	15.8686	3.91359	28
36	15.3310	15.3672	3.99117	29
37	15.1760	15.4403	3.91753	30
38	15.7786	15.7297	3.94625	31
39	15.9156	16.0593	4.11852	32
40	15.7869	15.6901	4.20397	33
41	15.4032	15.6846	4.31065	34
42	15.4364	15.7711	4.32381	35
43	15.6732	15.9827	4.21019	36
44	15.4724	15.6788	4.14745	37


Time Series Plot for Income and Oil Price
Log Transformed Data
17.6
17.4
17.2
17.0
16.8
Season
華航營收 (China)
長榮營收 (EVA)

Time Series Plot for Net Income and Oil Price



Dickey-Fuller Unit Root Test for Log Income

VARMAX 程序

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	0.01	0.6808	0.32	0.7728
	Single Mean	-20.29	0.0048	-2.83	0.0622
	Trend	-44.69	<.0001	-4.52	0.0042
LogEva	Zero Mean	0.04	0.6859	1.10	0.9270
	Single Mean	-2.98	0.6468	-1.06	0.7220
	Trend	-33.23	0.0005	-3.98	0.0169
LogOil	Zero Mean	-0.20	0.6337	-0.59	0.4560
	Single Mean	-10.07	0.1099	-2.27	0.1844
	Trend	-11.81	0.2709	-2.34	0.4020

Dickey-Fuller Unit Root Test for Diff Log Income

VARMAX 程序

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	-82.17	<.0001	-6.23	<.0001
	Single Mean	-83.28	0.0003	-6.18	0.0001
	Trend	-84.38	<.0001	-6.17	<.0001
LogEva	Zero Mean	-57.02	<.0001	-5.23	<.0001
	Single Mean	-62.71	0.0003	-5.39	0.0002
	Trend	-64.58	<.0001	-5.39	0.0004
LogOil	Zero Mean	-44.38	<.0001	-6.13	<.0001
	Single Mean	-44.18	0.0003	-6.02	0.0001
	Trend	-42.78	<.0001	-5.84	0.0001

Obs	p	LogLike	AIC
1	1	272.224463	-508.448925
2	2	290.845892	-527.691784
3	3	296.111333	-520.222665
4	4	295.691533	-501.383065
5	5	306.999764	-505.999527

Model for Log Income with p = 2

VARMAX 程序

觀測值數目	43
成對遺漏數目	0
經由差分消除的觀測值	1

簡單摘要統計值

變數	類型	N	平均值	標準差	最小值	最大值	差異	標籤
LogChina	相依	43	0.00727	0.08285	-0.23437	0.23999	1	華航營收 (China)
LogEva	相依	43	0.01311	0.07722	-0.17703	0.15790	1	長榮營收 (EVA)
LogOil	相依	43	-0.01532	0.17539	-0.72878	0.29079	1	

Dickey-Fuller 單根檢定

變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
LogChina	Zero Mean	-82.17	<.0001	-6.23	<.0001
	Single Mean	-83.28	0.0003	-6.18	0.0001
	Trend	-84.38	<.0001	-6.17	<.0001
LogEva	Zero Mean	-57.02	<.0001	-5.23	<.0001
	Single Mean	-62.71	0.0003	-5.39	0.0002
	Trend	-64.58	<.0001	-5.39	0.0004
LogOil	Zero Mean	-44.38	<.0001	-6.13	<.0001
	Single Mean	-44.18	0.0003	-6.02	0.0001
	Trend	-42.78	<.0001	-5.84	0.0001

使用追蹤的共整合秩檢定

H0: Rank=r	H1: Rank>r	特徵值	追蹤	Pr > 追蹤	ECM 中的漂移	程序中的漂移
0	0	0.7277	95.0896	<.0001	NOINT	Constant
1	1	0.4726	41.7541	<.0001		
2	2	0.3151	15.5188	0.0002		

長期參數 Beta 估計值

變數	1	2	3
LogChina	19.38800	36.94543	-14.85368
LogEva	-9.82626	-38.46288	29.54646
LogOil	-5.21917	2.97252	4.93216

Model for Log Income with p = 2

VARMAX 程序

調整係數 Alpha 估計值			
變數	1	2	3
LogChina	-0.08100	-0.01084	-0.01275
LogEva	-0.06876	0.01344	-0.02678
LogOil	0.06541	-0.09380	-0.03566

Model for Log Income with p = 2

VARMAX 程序

模型類型	VAR(2)
估計法	Least Squares Estimation

AR 係數估計值				
滯後	變數	LogChina	LogEva	LogOil
1	LogChina	-0.17185	0.48050	0.07597
	LogEva	0.05728	0.05562	0.03587
	LogOil	-1.18147	0.80048	0.18957
2	LogChina	-0.60980	0.35570	0.25168
	LogEva	-0.49611	0.31193	0.23085
	LogOil	-0.48642	1.11127	0.01438

參數估計值的圖示		
變數/滯後	AR1	AR2
LogChina	...	-.+
LogEva	...	..+
LogOil	...	...
+ is > 2*std error, - is < -2*std error, . is between, * is N/A		

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
LogChina	AR1_1_1	-0.17185	0.27541	-0.62	0.5367	LogChina(t-1)
	AR1_1_2	0.48050	0.28192	1.70	0.0972	LogEva(t-1)
	AR1_1_3	0.07597	0.05897	1.29	0.2061	LogOil(t-1)
	AR2_1_1	-0.60980	0.24613	-2.48	0.0182	LogChina(t-2)
	AR2_1_2	0.35570	0.27469	1.29	0.2038	LogEva(t-2)
	AR2_1_3	0.25168	0.06144	4.10	0.0002	LogOil(t-2)
LogEva	AR1_2_1	0.05728	0.30174	0.19	0.8505	LogChina(t-1)
	AR1_2_2	0.05562	0.30888	0.18	0.8581	LogEva(t-1)
	AR1_2_3	0.03587	0.06461	0.56	0.5823	LogOil(t-1)
	AR2_2_1	-0.49611	0.26966	-1.84	0.0743	LogChina(t-2)
	AR2_2_2	0.31193	0.30096	1.04	0.3071	LogEva(t-2)
	AR2_2_3	0.23085	0.06732	3.43	0.0016	LogOil(t-2)
LogOil	AR1_3_1	-1.18147	0.60487	-1.95	0.0588	LogChina(t-1)
	AR1_3_2	0.80048	0.61919	1.29	0.2046	LogEva(t-1)

Model for Log Income with p = 2

VARMAX 程序

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
	AR1_3_3	0.18957	0.12952	1.46	0.1522	LogOil(t-1)
	AR2_3_1	-0.48642	0.54057	-0.90	0.3744	LogChina(t-2)
	AR2_3_2	1.11127	0.60330	1.84	0.0740	LogEva(t-2)
	AR2_3_3	0.01438	0.13494	0.11	0.9157	LogOil(t-2)

創新的共變異數			
變數	LogChina	LogEva	LogOil
LogChina	0.00344	0.00312	0.00016
LogEva	0.00312	0.00413	-0.00119
LogOil	0.00016	-0.00119	0.01661

對數概度	286.3863

訊息準則	
AICC	-449.773
HQC	-509.797
AIC	-524.773
SBC	-483.647
FPEC	1.033E-7

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	0.00294	0.00266	0.00014
	LogEva	0.00266	0.00353	-0.00101
	LogOil	0.00014	-0.00101	0.01418
1	LogChina	0.00035	0.00071	-0.00067
	LogEva	0.00029	0.00059	-0.00053
	LogOil	-0.00079	-0.00081	0.00070
2	LogChina	-0.00006	-0.00006	-0.00001
	LogEva	-0.00041	-0.00036	-0.00003
	LogOil	0.00001	0.00009	0.00257
3	LogChina	-0.00049	-0.00021	-0.00077

Model for Log Income with p = 2

VARMAX 程序

殘差的交叉共變異數				
滯後	變數	LogChina	LogEva	LogOil
	LogEva	-0.00065	-0.00026	-0.00020
	LogOil	-0.00008	-0.00012	0.00175

殘差的交叉相關				
滯後	變數	LogChina	LogEva	LogOil
0	LogChina	1.00000	0.82698	0.02176
	LogEva	0.82698	1.00000	-0.14332
	LogOil	0.02176	-0.14332	1.00000
1	LogChina	0.11844	0.21976	-0.10393
	LogEva	0.09091	0.16718	-0.07490
	LogOil	-0.12303	-0.11417	0.04930
2	LogChina	-0.01906	-0.01956	-0.00191
	LogEva	-0.12682	-0.10220	-0.00370
	LogOil	0.00096	0.01271	0.18102
3	LogChina	-0.16526	-0.06656	-0.11865
	LogEva	-0.20249	-0.07328	-0.02768
	LogOil	-0.01265	-0.01639	0.12375

殘差的交叉相關示意圖				
變數/滯後	0	1	2	3
LogChina	++.	. . .	. . .	. . .
LogEva	++.	. . .	. . .	. . .
LogOil	. .+	. . .	. . .	. . .
+ is > 2*std error, - is < -2*std error, . is between				

殘差交叉相關的 Portmanteau 檢定			
滯後上限	自由度	卡方	Pr > ChiSq
3	9	13.60	0.1373

Model for Log Income with p = 2

VARMAX 程序

單變量模型 ANOVA 診斷				
變數	R 平方	標準差	F 值	Pr > F
LogChina	0.5785	0.05868	9.61	<.0001
LogEva	0.3989	0.06430	4.65	0.0023
LogOil	0.2424	0.12889	2.24	0.0720

單變量模型白噪音診斷					
		常態性		ARCH	
變數	Durbin Watson	卡方	Pr > ChiSq	F 值	Pr > F
LogChina	1.70138	0.80	0.6698	0.56	0.4606
LogEva	1.61549	2.17	0.3376	0.33	0.5714
LogOil	1.90098	4.45	0.1079	1.42	0.2415

單變量模型 AR 診斷								
	AR1		AR2		AR3		AR4	
變數	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F
LogChina	0.56	0.4603	0.31	0.7336	0.60	0.6175	0.52	0.7239
LogEva	0.42	0.5187	1.02	0.3700	1.00	0.4034	1.16	0.3447
LogOil	0.06	0.8057	0.63	0.5379	0.55	0.6515	0.52	0.7241

VARMAX 程序

Granger-Causality Wald 檢定			
檢定	自由度	卡方	Pr > ChiSq
1	4	23.81	<.0001
2	2	0.17	0.9169

檢定 1: 群組 1 變數:	LogChina LogEva
群組 2 變數:	LogOil

檢定 2: 群組 1 變數:	LogChina
群組 2 變數:	LogEva

Dickey-Fuller Unit Root Test for Log Net Income

VARMAX 程序

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
net_LogChina	Zero Mean	0.35	0.7619	0.69	0.8600
	Single Mean	-39.32	0.0003	-22.83	0.0001
	Trend	-41.84	<.0001	-22.19	<.0001
net_LogEva	Zero Mean	0.38	0.7689	0.79	0.8795
	Single Mean	-34.87	0.0003	-26.84	0.0001
	Trend	-38.22	<.0001	-28.58	<.0001
LogOil	Zero Mean	-0.20	0.6337	-0.59	0.4560
	Single Mean	-10.07	0.1099	-2.27	0.1844
	Trend	-11.81	0.2709	-2.34	0.4020

Dickey-Fuller Unit Root Test for Diff Log Net Income

VARMAX 程序

Dickey-Fuller 單根檢定					
變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
net_LogChina	Zero Mean	-42.74	<.0001	-15.36	<.0001
	Single Mean	-42.91	0.0003	-14.87	0.0001
	Trend	-43.20	<.0001	-13.90	<.0001
net_LogEva	Zero Mean	-39.48	<.0001	-17.73	<.0001
	Single Mean	-39.76	0.0003	-17.14	0.0001
	Trend	-40.19	<.0001	-15.96	<.0001
LogOil	Zero Mean	-44.38	<.0001	-6.13	<.0001
	Single Mean	-44.18	0.0003	-6.02	0.0001
	Trend	-42.78	<.0001	-5.84	0.0001

Model Criterion for Log Net Income

Obs	p	LogLike	AIC
1	1	74.866442	-113.732883
2	2	134.728841	-215.457683
3	3	139.931418	-207.862837
4	4	141.750011	-193.500022
5	5	141.019283	-174.038566

Model for Log Net Income with p = 2

VARMAX 程序

觀測值數目	43
成對遺漏數目	0
經由差分消除的觀測值	1

簡單摘要統計值

變數	類型	N	平均值	標準差	最小值	最大值	差異	標籤
net_LogChina	相依	43	0.01323	3.25589	-14.90342	14.62213	1	華航毛利 (China)
net_LogEva	相依	43	0.02747	3.15298	-14.49775	14.20481	1	長榮毛利 (EVA)
LogOil	相依	43	-0.01532	0.17539	-0.72878	0.29079	1	

Dickey-Fuller 單根檢定

變數	類型	Rho	Pr < Rho	Tau	Pr < Tau
net_LogChina	Zero Mean	-42.74	<.0001	-15.36	<.0001
	Single Mean	-42.91	0.0003	-14.87	0.0001
	Trend	-43.20	<.0001	-13.90	<.0001
net_LogEva	Zero Mean	-39.48	<.0001	-17.73	<.0001
	Single Mean	-39.76	0.0003	-17.14	0.0001
	Trend	-40.19	<.0001	-15.96	<.0001
LogOil	Zero Mean	-44.38	<.0001	-6.13	<.0001
	Single Mean	-44.18	0.0003	-6.02	0.0001
	Trend	-42.78	<.0001	-5.84	0.0001

使用追蹤的共整合秩檢定

H0: Rank=r	H1: Rank>r	特徵值	追蹤	Pr > 追蹤	ECM 中的漂移	程序中的漂移
0	0	0.9079	141.4201	<.0001	NOINT	Constant
1	1	0.5504	43.6413	<.0001		
2	2	0.2329	10.8700	0.0008		

長期參數 Beta 估計值

變數	1	2	3
net_LogChina	-0.34819	7.02834	1.25317
net_LogEva	1.25529	-7.07265	-0.29757
LogOil	-0.76320	2.13471	10.75278

Model for Log Net Income with p = 2

VARMAX 程序

調整係數 Alpha 估計值			
變數	1	2	3
net_LogChina	-1.03432	-0.25175	-0.07054
net_LogEva	-0.97644	-0.00417	-0.07080
LogOil	0.11206	0.03445	-0.05920

Model for Log Net Income with p = 2

VARMAX 程序

模型類型	VAR(2)
估計法	Least Squares Estimation

AR 係數估計值				
滯後	變數	net_LogChina	net_LogEva	LogOil
1	net_LogChina	-0.31676	0.31683	-1.22421
	net_LogEva	0.15726	-0.13190	-0.67956
	LogOil	0.13565	-0.11692	0.27846
2	net_LogChina	-0.18086	0.18631	0.71774
	net_LogEva	0.06470	-0.04326	0.65457
	LogOil	-0.00670	0.03153	0.07298

參數估計值的圖示		
變數/滯後	AR1	AR2
net_LogChina	..-	...
net_LogEva	...	...
LogOil	...	...
+ is > 2*std error, - is < -2*std error, . is between, * is N/A		

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
net_LogChina	AR1_1_1	-0.31676	0.30967	-1.02	0.3134	net_LogChina(t-1)
	AR1_1_2	0.31683	0.31133	1.02	0.3158	net_LogEva(t-1)
	AR1_1_3	-1.22421	0.57829	-2.12	0.0414	LogOil(t-1)
	AR2_1_1	-0.18086	0.31896	-0.57	0.5743	net_LogChina(t-2)
	AR2_1_2	0.18631	0.32103	0.58	0.5654	net_LogEva(t-2)
	AR2_1_3	0.71774	0.59906	1.20	0.2389	LogOil(t-2)
net_LogEva	AR1_2_1	0.15726	0.24791	0.63	0.5300	net_LogChina(t-1)
	AR1_2_2	-0.13190	0.24924	-0.53	0.6000	net_LogEva(t-1)
	AR1_2_3	-0.67956	0.46297	-1.47	0.1511	LogOil(t-1)
	AR2_2_1	0.06470	0.25535	0.25	0.8014	net_LogChina(t-2)
	AR2_2_2	-0.04326	0.25701	-0.17	0.8673	net_LogEva(t-2)
	AR2_2_3	0.65457	0.47959	1.36	0.1810	LogOil(t-2)
LogOil	AR1_3_1	0.13565	0.08650	1.57	0.1258	net_LogChina(t-1)
	AR1_3_2	-0.11692	0.08697	-1.34	0.1875	net_LogEva(t-1)

Model for Log Net Income with p = 2

VARMAX 程序

模型參數估計值						
方程式	參數	估計值	標準誤差	t 值	Pr > |t|	變數
	AR1_3_3	0.27846	0.16154	1.72	0.0936	LogOil(t-1)
	AR2_3_1	-0.00670	0.08910	-0.08	0.9405	net_LogChina(t-2)
	AR2_3_2	0.03153	0.08968	0.35	0.7273	net_LogEva(t-2)
	AR2_3_3	0.07298	0.16735	0.44	0.6654	LogOil(t-2)

創新的共變異數			
變數	net_LogChina	net_LogEva	LogOil
net_LogChina	0.20699	0.14029	-0.00596
net_LogEva	0.14029	0.13266	0.00303
LogOil	-0.00596	0.00303	0.01615

對數概度	134.3712

訊息準則	
AICC	-145.742
HQC	-205.767
AIC	-220.742
SBC	-179.617
FPEC	0.000172

殘差的交叉共變異數				
滯後	變數	net_LogChina	net_LogEva	LogOil
0	net_LogChina	0.17670	0.11976	-0.00509
	net_LogEva	0.11976	0.11325	0.00259
	LogOil	-0.00509	0.00259	0.01379
1	net_LogChina	-0.01505	-0.02536	-0.00630
	net_LogEva	-0.00219	-0.01731	-0.00802
	LogOil	0.00632	0.00686	-0.00053
2	net_LogChina	-0.04158	-0.03603	0.00023
	net_LogEva	-0.04206	-0.04039	0.00053
	LogOil	-0.00352	-0.00392	0.00002
3	net_LogChina	-0.02694	0.00520	0.01126

Model for Log Net Income with p = 2

VARMAX 程序

殘差的交叉共變異數				
滯後	變數	net_LogChina	net_LogEva	LogOil
	net_LogEva	-0.01279	0.00464	0.00897
	LogOil	-0.00109	-0.00673	-0.00092

殘差的交叉相關				
滯後	變數	net_LogChina	net_LogEva	LogOil
0	net_LogChina	1.00000	0.84663	-0.10313
	net_LogEva	0.84663	1.00000	0.06551
	LogOil	-0.10313	0.06551	1.00000
1	net_LogChina	-0.08517	-0.17924	-0.12761
	net_LogEva	-0.01545	-0.15281	-0.20290
	LogOil	0.12805	0.17365	-0.03876
2	net_LogChina	-0.23533	-0.25467	0.00475
	net_LogEva	-0.29731	-0.35665	0.01349
	LogOil	-0.07122	-0.09929	0.00135
3	net_LogChina	-0.15247	0.03675	0.22816
	net_LogEva	-0.09044	0.04099	0.22688
	LogOil	-0.02201	-0.17033	-0.06705

殘差的交叉相關示意圖				
變數/滯後	0	1	2	3
net_LogChina	++.	...	...	...
net_LogEva	++.	...	.-.	...
LogOil	..+	...	...	...
+ is > 2*std error, - is < -2*std error, . is between				

殘差交叉相關的 Portmanteau 檢定			
滯後上限	自由度	卡方	Pr > ChiSq
3	9	22.32	0.0079

Model for Log Net Income with p = 2

VARMAX 程序

單變量模型 ANOVA 診斷				
變數	R 平方	標準差	F 值	Pr > F
net_LogChina	0.2216	0.45496	1.99	0.1041
net_LogEva	0.1636	0.36423	1.37	0.2594
LogOil	0.2634	0.12709	2.50	0.0487

單變量模型白噪音診斷					
		常態性		ARCH	
變數	Durbin Watson	卡方	Pr > ChiSq	F 值	Pr > F
net_LogChina	2.15329	28.87	<.0001	0.01	0.9177
net_LogEva	2.27096	1.08	0.5816	0.64	0.4273
LogOil	2.07327	2.53	0.2821	6.10	0.0181

單變量模型 AR 診斷								
	AR1		AR2		AR3		AR4	
變數	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F	F 值	Pr > F
net_LogChina	0.29	0.5950	1.32	0.2803	1.48	0.2365	1.55	0.2113
net_LogEva	1.07	0.3077	4.28	0.0215	3.11	0.0390	2.84	0.0405
LogOil	0.06	0.8120	0.03	0.9725	0.07	0.9738	0.42	0.7894

VARMAX 程序

Granger-Causality Wald 檢定			
檢定	自由度	卡方	Pr > ChiSq
1	4	23.81	<.0001
2	2	0.17	0.9169

檢定 1: 群組 1 變數:	LogChina LogEva
群組 2 變數:	LogOil

檢定 2: 群組 1 變數:	LogChina
群組 2 變數:	LogEva