



ภาคผนวก

ลิขสิทธิ์มหาวิทยาลัยเชียงใหม่

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ภาคผนวก ก ผลการทดสอบความนิ่งของข้อมูล

ตาราง ก-1 ผลการทดสอบ Panel Unit Root ที่ระดับ First Differential โดยกำหนดให้มีค่าคงที่ (Individual Intercept)

Panel unit root test: Summary

Series: D(LNGDP)

Date: 01/13/13 Time: 23:15

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.81009	0.0000	6	52
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.24418	0.0124	6	52
ADF - Fisher Chi-square	25.9935	0.0108	6	52
PP - Fisher Chi-square	40.1923	0.0001	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNGDP)

Date: 01/13/13 Time: 23:16

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	2.66496	0.0038
Heteroscedastic Consistent Z-stat	4.09269	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNGDP)

Cross section	LM	Variance HAC	Bandwidth	Obs
1	0.5296	5.09E-05	0.0	10
2	0.4500	0.000114	8.0	10
3	0.5000	3.02E-05	9.0	10
4	0.2347	0.000589	2.0	10
5	0.2801	0.000124	1.0	10
6	0.5000	0.000189	9.0	10

Panel unit root test: Summary

Series: D(LNSAV)

Date: 01/13/13 Time: 23:19

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.98167	0.0000	6	52
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-4.54127	0.0000	6	52
ADF - Fisher Chi-square	44.3067	0.0000	6	52
PP - Fisher Chi-square	53.2053	0.0000	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNSAV)

Date: 01/13/13 Time: 23:20

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	2.02406	0.0215
Heteroscedastic Consistent Z-stat	3.53114	0.0002

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNSAV)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.5000	0.001545	9.0	10
2	0.2467	0.003138	1.0	10
3	0.1474	0.004901	1.0	10
4	0.3953	0.000489	7.0	10
5	0.5000	0.001392	9.0	10
6	0.5000	0.000785	9.0	10

Panel unit root test: Summary

Series: D(LNUNEM)

Date: 01/13/13 Time: 23:23

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.99638	0.0000	6	52
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.05822	0.0198	6	52
ADF - Fisher Chi-square	24.0389	0.0201	6	52
PP - Fisher Chi-square	28.8022	0.0042	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNUNEM)

Date: 01/13/13 Time: 23:24

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	2.30710	0.0105
Heteroscedastic Consistent Z-stat	2.86649	0.0021

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNUNEM)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.4642	0.011425	1.0	10
2	0.5000	0.000618	9.0	10
3	0.1165	0.011959	2.0	10
4	0.2354	0.016931	4.0	10
5	0.3212	0.001143	2.0	10
6	0.4093	0.015271	7.0	10

Panel unit root test: Summary

Series: D(LNHEAL)

Date: 01/13/13 Time: 23:26

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.17979	0.0000	6	44
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.52136	0.0002	6	44
ADF - Fisher Chi-square	38.8767	0.0001	6	44
PP - Fisher Chi-square	43.4322	0.0000	6	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNHEAL)

Date: 01/13/13 Time: 23:27

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 54

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	1.79781	0.0361
Heteroscedastic Consistent Z-stat	3.49971	0.0002

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNHEAL)

Cross section	LM	Variance HAC	Bandwidth	Obs
1	0.3807	0.003229	6.0	9
2	0.5000	0.001807	8.0	9
3	0.2289	0.002242	3.0	9
4	0.5000	0.000570	8.0	9
5	0.1684	0.008024	1.0	9
6	0.5000	0.000446	8.0	9

Panel unit root test: Summary

Series: D(LNSAN)

Date: 01/13/13 Time: 23:30

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.12262	0.0000	5	44
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.34792	0.0004	5	44
ADF - Fisher Chi-square	30.7673	0.0006	5	44
PP - Fisher Chi-square	46.7117	0.0000	5	45

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNSAN)

Date: 01/13/13 Time: 23:31

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	2.49030	0.0064
Heteroscedastic Consistent Z-stat	2.54666	0.0054

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNSAN)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.5000	3.62E-05	9.0	10
2	0.4202	2.69E-05	1.0	10
3	0.3155	2.98E-05	3.0	10
4	0.3167	3.99E-05	0.0	10
5	0.2276	5.15E-05	0.0	10
6	0.1500	2.68E-05	2.0	10

Panel unit root test: Summary

Series: D(LNINT)

Date: 01/13/13 Time: 23:34

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.04168	0.0000	6	53
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.36072	0.0004	6	53
ADF - Fisher Chi-square	32.4393	0.0012	6	53
PP - Fisher Chi-square	19.3974	0.0794	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNINT)

Date: 01/13/13 Time: 23:35

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	2.19438	0.0141
Heteroscedastic Consistent Z-stat	2.83038	0.0023

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNINT)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.3747	0.022668	3.0	10
2	0.3585	0.008069	2.0	10
3	0.1956	0.092533	0.0	10
4	0.4310	0.015743	1.0	10
5	0.3483	0.111674	2.0	10
6	0.3254	0.003833	3.0	10

Panel unit root test: Summary

Series: D(LNMOB)

Date: 01/13/13 Time: 23:37

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.61120	0.0045	6	53
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.35638	0.3608	6	53
ADF - Fisher Chi-square	13.9975	0.3009	6	53
PP - Fisher Chi-square	13.7706	0.3156	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNMOB)

Date: 01/13/13 Time: 23:38

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	3.12760	0.0009
Heteroscedastic Consistent Z-stat	3.48805	0.0002

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNMOB)

Cross section	LM	Variance HAC	Bandwidth	Obs
1	0.4587	0.035052	2.0	10
2	0.3594	0.007314	0.0	10
3	0.4847	0.013710	0.0	10
4	0.4722	0.037024	0.0	10
5	0.2484	0.086937	1.0	10
6	0.2502	0.001467	1.0	10

Panel unit root test: Summary

Series: D(LNCOR)

Date: 01/13/13 Time: 23:40

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.40676	0.0000	6	52
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-3.93718	0.0000	6	52
ADF - Fisher Chi-square	38.8848	0.0001	6	52
PP - Fisher Chi-square	49.2340	0.0000	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNCOR)

Date: 01/13/13 Time: 23:41

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	2.63064	0.0043
Heteroscedastic Consistent Z-stat	3.48876	0.0002

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNCOR)

Cross section	LM	Variance HAC	Bandwidth	Obs
1	0.5000	0.000542	9.0	10
2	0.2238	0.002108	0.0	10
3	0.3714	0.002718	1.0	10
4	0.2518	0.001723	3.0	10
5	0.5000	0.000731	9.0	10
6	0.4269	4.35E-05	7.0	10

Panel unit root test: Summary

Series: D(LNPRO)

Date: 01/13/13 Time: 23:44

Sample: 2001 2011

Exogenous variables: Individual effects

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.79726	0.0026	1	9
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.26209	0.1035	1	9
ADF - Fisher Chi-square	5.25451	0.0723	1	9
PP - Fisher Chi-square	5.25712	0.0722	1	9

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNPRO)

Date: 01/13/13 Time: 23:45

Sample: 2001 2011

Exogenous variables: Individual effects

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 40

Cross-sections included: 4 (2 dropped)

Method	Statistic	Prob.**
Hadri Z-stat	1.11228	0.1330
Heteroscedastic Consistent Z-stat	0.92809	0.1767

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNPRO)

Cross section	LM	Variance HAC	Bandwidth	Obs
1		Dropped from Test		
2	0.0500	0.001817		10
3	0.2417	0.015657	3.0	10
4	0.3922	0.002506	7.0	10
5	0.2595	0.012988	1.0	10
6		Dropped from Test		

ตาราง ก-2 ผลการทดสอบ Panel Unit Root ที่ระดับ First Differential โดยกำหนดให้มีค่าคงที่
และแนวโน้มเวลา (Individual Intercept and Trend)

Panel unit root test: Summary

Series: D(LNGDP)

Date: 01/13/13 Time: 23:15

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross- sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.55877	0.0000	6	50
Breitung t-stat	-2.08466	0.0185	6	44
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.89927	0.1843	6	50
ADF - Fisher Chi-square	21.5600	0.0428	6	50
PP - Fisher Chi-square	39.8641	0.0001	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNGDP)

Date: 01/13/13 Time: 23:16

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	22.2675	0.0000
Heteroscedastic Consistent Z-stat	20.7337	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNGDP)

Cross section	LM	Variance HAC	Bandwidth	Obs
1	0.3714	5.92E-06	6.0	10
2	0.5000	5.40E-05	9.0	10
3	0.5000	3.12E-05	9.0	10
4	0.5000	8.30E-05	9.0	10
5	0.1508	6.29E-05	0.0	10
6	0.5000	0.000188	9.0	10

Panel unit root test: Summary

Series: D(LNSAV)

Date: 01/13/13 Time: 23:19

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.69001	0.0000	6	50
Breitung t-stat	-1.85803	0.0316	6	44
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.27394	0.0115	6	50
ADF - Fisher Chi-square	36.9069	0.0002	6	50
PP - Fisher Chi-square	53.6204	0.0000	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNSAV)

Date: 01/13/13 Time: 23:20

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	11.7325	0.0000
Heteroscedastic Consistent Z-stat	17.4522	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNSAV)

Cross section	LM	Variance HAC	Bandwidth	Obs
1	0.3585	0.001026	6.0	10
2	0.2979	0.000587	5.0	10
3	0.1356	0.005045	1.0	10
4	0.3943	0.000493	7.0	10
5	0.5000	0.001341	9.0	10
6	0.5000	0.000747	9.0	10

Panel unit root test: Summary

Series: D(LNUNEM)

Date: 01/13/13 Time: 23:23

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.39254	0.0000	6	52
Breitung t-stat	-0.35234	0.3623	6	46
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.22934	0.4093	6	52
ADF - Fisher Chi-square	12.9850	0.3701	6	52
PP - Fisher Chi-square	17.3890	0.1355	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNUNEM)

Date: 01/13/13 Time: 23:24

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	8.54622	0.0000
Heteroscedastic Consistent Z-stat	15.6354	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNUNEM)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.3854	0.000765	7.0	10
2	0.5000	0.000513	9.0	10
3	0.1144	0.011961	2.0	10
4	0.2061	0.016233	4.0	10
5	0.5000	0.000193	9.0	10
6	0.2944	0.011480	5.0	10

Panel unit root test: Summary

Series: D(LNHEAL)

Date: 01/13/13 Time: 23:26

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.69926	0.0000	6	44
Breitung t-stat	0.88725	0.8125	6	38
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.12470	0.1304	6	44
ADF - Fisher Chi-square	26.7972	0.0083	6	44
PP - Fisher Chi-square	39.0168	0.0001	6	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNHEAL)

Date: 01/13/13 Time: 23:27

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 54

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	13.1944	0.0000
Heteroscedastic Consistent Z-stat	17.5846	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNHEAL)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.3748	0.003145	6.0	9
2	0.5000	0.001396	8.0	9
3	0.1702	0.002196	3.0	9
4	0.4444	0.000609	7.0	9
5	0.2104	0.005772	0.0	9
6	0.5000	0.000441	8.0	9

Panel unit root test: Summary

Series: D(LNSAN)

Date: 01/13/13 Time: 23:31

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.80310	0.0000	5	43
Breitung t-stat	-3.66605	0.0001	5	38
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.82888	0.0337	5	43
ADF - Fisher Chi-square	28.2805	0.0016	5	43
PP - Fisher Chi-square	62.7256	0.0000	5	45

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNSAN)

Date: 01/13/13 Time: 23:32

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	10.6619	0.0000
Heteroscedastic Consistent Z-stat	18.2991	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNSAN)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.5000	1.48E-05	9.0	10
2	0.5000	1.58E-06	9.0	10
3	0.5000	4.46E-06	9.0	10
4	0.1326	2.77E-05	1.0	10
5	0.5000	3.50E-06	9.0	10
6	0.1404	2.69E-05	2.0	10

Panel unit root test: Summary

Series: D(LNINT)

Date: 01/13/13 Time: 23:34

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.32080	0.0004	6	52
Breitung t-stat	-1.95231	0.0255	6	46
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.94479	0.1724	6	52
ADF - Fisher Chi-square	20.9300	0.0514	6	52
PP - Fisher Chi-square	28.0019	0.0055	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNINT)

Date: 01/13/13 Time: 23:35

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	4.37619	0.0000
Heteroscedastic Consistent Z-stat	11.4104	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNINT)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.4081	0.004150	7.0	10
2	0.1463	0.001278	3.0	10
3	0.1316	0.079110	2.0	10
4	0.2824	0.001698	5.0	10
5	0.0995	0.018482	2.0	10
6	0.5000	0.000531	9.0	10

Panel unit root test: Summary

Series: D(LNMOB)

Date: 01/13/13 Time: 23:37

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-11.9043	0.0000	6	50
Breitung t-stat	-1.75519	0.0396	6	44
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-2.37905	0.0087	6	50
ADF - Fisher Chi-square	35.9575	0.0003	6	50
PP - Fisher Chi-square	51.4145	0.0000	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNMOB)

Date: 01/13/13 Time: 23:38

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	5.66111	0.0000
Heteroscedastic Consistent Z-stat	18.1177	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNMOB)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.5000	0.000356	9.0	10
2	0.3976	0.000568	7.0	10
3	0.3256	0.001105	6.0	10
4	0.4349	0.002321	7.0	10
5	0.1463	0.066641	1.0	10
6	0.4500	0.000233	8.0	10

Panel unit root test: Summary

Series: D(LNCOR)

Date: 01/13/13 Time: 23:41

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.39179	0.0000	6	52
Breitung t-stat	-4.15812	0.0000	6	46
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-1.58144	0.0569	6	52
ADF - Fisher Chi-square	28.5030	0.0047	6	52
PP - Fisher Chi-square	50.9312	0.0000	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNCOR)

Date: 01/13/13 Time: 23:41

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 60

Cross-sections included: 6

Method	Statistic	Prob.**
Hadri Z-stat	13.8702	0.0000
Heteroscedastic Consistent Z-stat	21.2868	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNCOR)

Cross section	Variance			Obs
	LM	HAC	Bandwidth	
1	0.4500	0.000333	8.0	10
2	0.5000	0.000165	9.0	10
3	0.1288	0.001117	3.0	10
4	0.5000	0.000336	9.0	10
5	0.5000	0.000230	9.0	10
6	0.5000	1.12E-05	9.0	10

Panel unit root test: Summary

Series: D(LNPRO)

Date: 01/13/13 Time: 23:44

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 1

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-5.17893	0.0000	2	16
Breitung t-stat	-2.04485	0.0204	2	14
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.77982	0.2177	2	16
ADF - Fisher Chi-square	9.50677	0.0496	2	16
PP - Fisher Chi-square	18.7469	0.0009	2	18

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Null Hypothesis: Stationarity

Series: D(LNPRO)

Date: 01/13/13 Time: 23:46

Sample: 2001 2011

Exogenous variables: Individual effects, individual linear trends

Newey-West automatic bandwidth selection and Bartlett kernel

Total (balanced) observations: 40

Cross-sections included: 4 (2 dropped)

Method	Statistic	Prob.**
Hadri Z-stat	20.0436	0.0000
Heteroscedastic Consistent Z-stat	20.1425	0.0000

* Note: High autocorrelation leads to severe size distortion in Hadri test, leading to over-rejection of the null.

** Probabilities are computed assuming asymptotic normality

Intermediate results on D(LNPRO)

Cross section	LM	Variance HAC	Bandwidth	Obs
1		Dropped from Test		
2	0.5000	0.000184	9.0	10
3	0.5000	0.002467	9.0	10
4	0.5000	0.001183	9.0	10
5	0.4500	0.001576	8.0	10
6		Dropped from Test		

ตาราง ก-3 ผลการทดสอบ Panel Unit Root ที่ระดับ First Differential โดยกำหนดให้ไม่มีค่าคงที่
และแนวโน้มเวลา (None)

Panel unit root test: Summary

Series: D(LNGDP)

Date: 01/13/13 Time: 23:15

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross- sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-0.79006	0.2147	6	54
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	19.1126	0.0858	6	54
PP - Fisher Chi-square	17.6062	0.1282	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: D(LNSAV)

Date: 01/13/13 Time: 23:19

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross- sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-9.33260	0.0000	6	52
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	76.9205	0.0000	6	52
PP - Fisher Chi-square	73.6557	0.0000	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: D(LNUNEM)

Date: 01/13/13 Time: 23:23

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-4.56631	0.0000	6	53
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	38.1424	0.0001	6	53
PP - Fisher Chi-square	38.8411	0.0001	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: D(LNHEAL)

Date: 01/13/13 Time: 23:27

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.53581	0.0056	6	47
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	20.7461	0.0542	6	47
PP - Fisher Chi-square	18.2701	0.1077	6	48

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: D(LNSAN)

Date: 01/13/13 Time: 23:31

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.92873	0.0017	5	43
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	30.6508	0.0007	5	43
PP - Fisher Chi-square	34.4526	0.0002	5	45

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: D(LNINT)

Date: 01/13/13 Time: 23:34

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.29963	0.0000	6	52
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	42.5323	0.0000	6	52
PP - Fisher Chi-square	28.6569	0.0044	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: D(LNMOB)

Date: 01/13/13 Time: 23:37

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0 to 1

Newey-West automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.11431	0.0009	6	53
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	22.3794	0.0335	6	53
PP - Fisher Chi-square	25.1477	0.0141	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

Panel unit root test: Summary

Series: D(LNCOR)

Date: 01/13/13 Time: 23:41

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-7.15813	0.0000	6	54
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	56.4274	0.0000	6	54
PP - Fisher Chi-square	58.1011	0.0000	6	54

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

panel unit root test: Summary

Series: D(LNPRO)

Date: 01/13/13 Time: 23:45

Sample: 2001 2011

Exogenous variables: None

Automatic selection of maximum lags

Automatic lag length selection based on SIC: 0

Newey-West automatic bandwidth selection and Bartlett kernel

Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.86526	0.0021	1	9
Null: Unit root (assumes individual unit root process)				
ADF - Fisher Chi-square	9.13990	0.0104	1	9
PP - Fisher Chi-square	9.13990	0.0104	1	9

** Probabilities for Fisher tests are computed using an asymptotic Chi-square distribution. All other tests assume asymptotic normality.

ภาคผนวก ข ผลการทดสอบความสัมพันธ์ของข้อมูลด้วยวิธีการทดสอบพหุแนล

ตาราง ข-1 ผลการทดสอบสมการพหุแนลด้วยวิธี Kao โดยกำหนดให้มีค่าคงที่ (Individual Intercept)

Kao Residual Cointegration Test

Series: LNGDP LNSAV LNUNEM LNHEAL LNSAN LNINT LNMOB LNCOR
LNPRO

Date: 01/13/13 Time: 23:49

Sample: 2001 2011

Included observations: 66

Null Hypothesis: No cointegration

Trend assumption: No deterministic trend

User-specified lag length: 1

Newey-West automatic bandwidth selection and Bartlett kernel

	t-Statistic	Prob.
ADF	-4.191044	0.0000
Residual variance	0.000339	
HAC variance	0.000365	

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RESID)

Method: Least Squares

Date: 01/13/13 Time: 23:49

Sample (adjusted): 2003 2010

Included observations: 48 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID(-1)	-0.713723	0.155207	-4.598511	0.0000
D(RESID(-1))	0.302588	0.140933	2.147034	0.0371

R-squared	0.314004	Mean dependent var	0.000893
Adjusted R-squared	0.299091	S.D. dependent var	0.024046
S.E. of regression	0.020131	Akaike info criterion	-4.932338
Sum squared resid	0.018642	Schwarz criterion	-4.854372
Log likelihood	120.3761	Hannan-Quinn criter.	-4.902875
Durbin-Watson stat	1.701876		

ภาคผนวก ค ผลการประมาณค่าแบบจำลอง

ตาราง ค-1 ผลการประมาณแบบจำลองด้วยวิธี Pooled OLS

Dependent Variable: LNGDP
 Method: Panel Least Squares
 Date: 01/13/13 Time: 23:55
 Sample (adjusted): 2001 2010
 Periods included: 10
 Cross-sections included: 6
 Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNSAV	-0.239847	0.175762	-1.364609	0.1796
LNUNEM	-0.135083	0.039974	-3.379319	0.0016
LNHEAL	0.925685	0.083397	11.09976	0.0000
LNSAN	-1.275957	0.146992	-8.680428	0.0000
LNINT	0.087106	0.042234	2.062427	0.0454
LNMOB	-0.075881	0.036996	-2.051046	0.0465
LNCOR	0.058790	0.193357	0.304048	0.7626
LNPRO	0.549282	0.037094	14.80770	0.0000
C	8.106550	1.105318	7.334131	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.996928	Mean dependent var	7.900730
Adjusted R-squared	0.995685	S.D. dependent var	1.255143
S.E. of regression	0.082450	Akaike info criterion	-1.909915
Sum squared resid	0.285519	Schwarz criterion	-1.281612
Log likelihood	75.29746	Hannan-Quinn criter.	-1.664151
F-statistic	801.8037	Durbin-Watson stat	1.412017
Prob(F-statistic)	0.000000		

ตาราง ก-2 ผลการประมาณแบบจำลองด้วยวิธี Fixed Effects Model

Redundant Fixed Effects Tests

Equation: Untitled

Test period fixed effects

Effects Test	Statistic	d.f.	Prob.
Period F	4.564828	(9,42)	0.0003
Period Chi-square	40.930553	9	0.0000

Period fixed effects test equation:

Dependent Variable: LNGDP

Method: Panel Least Squares

Date: 01/13/13 Time: 23:55

Sample (adjusted): 2001 2010

Periods included: 10

Cross-sections included: 6

Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNSAV	-0.434729	0.205342	-2.117103	0.0391
LNUNEM	-0.133255	0.049896	-2.670659	0.0101
LNHEAL	0.594804	0.068238	8.716639	0.0000
LNSAN	-1.258600	0.183972	-6.841242	0.0000
LNINT	0.141431	0.050377	2.807439	0.0071
LNMOB	-0.153030	0.034857	-4.390272	0.0001
LNCOR	0.827586	0.151154	5.475121	0.0000
LNPRO	0.616856	0.039812	15.49430	0.0000
C	9.158412	1.334052	6.865110	0.0000
R-squared	0.993923	Mean dependent var		7.900730
Adjusted R-squared	0.992970	S.D. dependent var		1.255143
S.E. of regression	0.105236	Akaike info criterion		-1.527740
Sum squared resid	0.564806	Schwarz criterion		-1.213588
Log likelihood	54.83219	Hannan-Quinn criter.		-1.404858
F-statistic	1042.730	Durbin-Watson stat		0.987849
Prob(F-statistic)	0.000000			

ตาราง ก-3 ผลการประมาณแบบจำลองด้วยวิธี Random Effects Model

Period random effects test equation:

Dependent Variable: LNGDP

Method: Panel Least Squares

Date: 01/13/13 Time: 23:54

Sample (adjusted): 2001 2010

Periods included: 10

Cross-sections included: 6

Total panel (balanced) observations: 60

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	8.106550	1.105318	7.334131	0.0000
LNSAV	-0.239847	0.175762	-1.364609	0.1796
LNUNEM	-0.135083	0.039974	-3.379319	0.0016
LNHEAL	0.925685	0.083397	11.09976	0.0000
LNSAN	-1.275957	0.146992	-8.680428	0.0000
LNINT	0.087106	0.042234	2.062427	0.0454
LNMOB	-0.075881	0.036996	-2.051046	0.0465
LNCOR	0.058790	0.193357	0.304048	0.7626
LNPRO	0.549282	0.037094	14.80770	0.0000

Effects Specification

Period fixed (dummy variables)

R-squared	0.996928	Mean dependent var	7.900730
Adjusted R-squared	0.995685	S.D. dependent var	1.255143
S.E. of regression	0.082450	Akaike info criterion	-1.909915
Sum squared resid	0.285519	Schwarz criterion	-1.281612
Log likelihood	75.29746	Hannan-Quinn criter.	-1.664151
F-statistic	801.8037	Durbin-Watson stat	1.412017
Prob(F-statistic)	0.000000		

ตาราง ก-4 ผลการทดสอบด้วยวิธี Hausman Test

Correlated Random Effects - Hausman Test

Equation: Untitled

Test period random effects

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	41.057540	8	0.0000

** WARNING: estimated period random effects variance is zero.

Period random effects test comparisons:

Variable	Fixed	Random	Var(Diff.)	Prob.
LNSAV	-0.239847	-0.434729	0.005010	0.0059
LNUNEM	-0.135083	-0.133255	0.000070	0.8266
LNHEAL	0.925685	0.594804	0.004097	0.0000
LNSAN	-1.275957	-1.258600	0.000831	0.5471
LNINT	0.087106	0.141431	0.000226	0.0003
LNMOB	-0.075881	-0.153030	0.000623	0.0020
LNCOR	0.058790	0.827586	0.023362	0.0000
LNPRO	0.549282	0.616856	0.000403	0.0008

ประวัติผู้เขียน**ชื่อ-สกุล**

นางสาวคุลิกา ง่วนของ

วัน เดือน ปี เกิด

2 พฤศจิกายน 2532

ประวัติการศึกษาสำเร็จการศึกษามัธยมศึกษาตอนปลาย โรงเรียนเตรียมอุดมศึกษา
พัฒนาการ ปีการศึกษา 2550สำเร็จการศึกษาระดับปริญญาตรี เศรษฐศาสตรบัณฑิต
มหาวิทยาลัยเชียงใหม่ ปีการศึกษา 2554