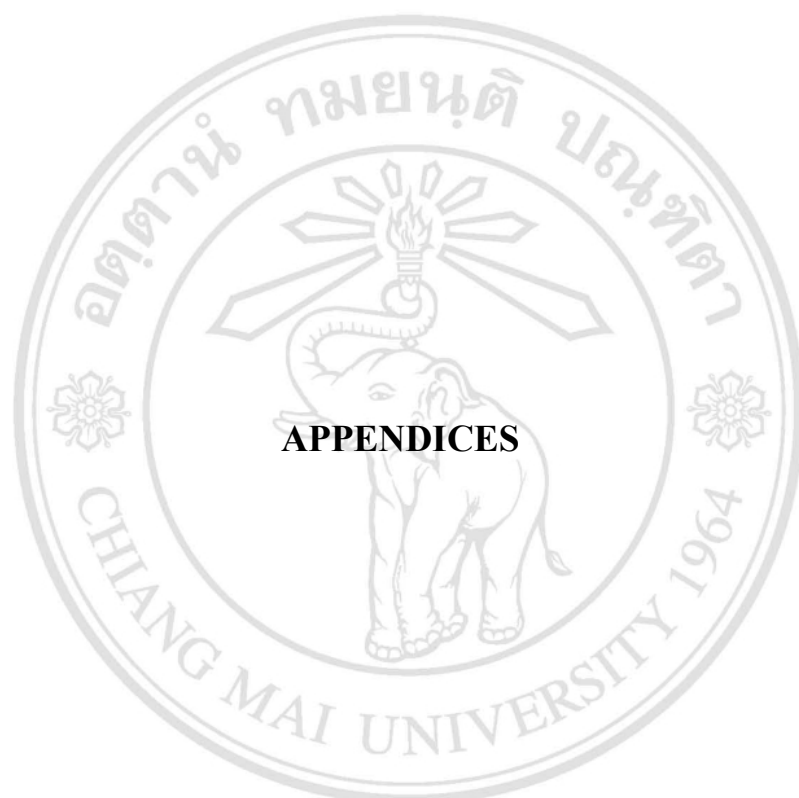
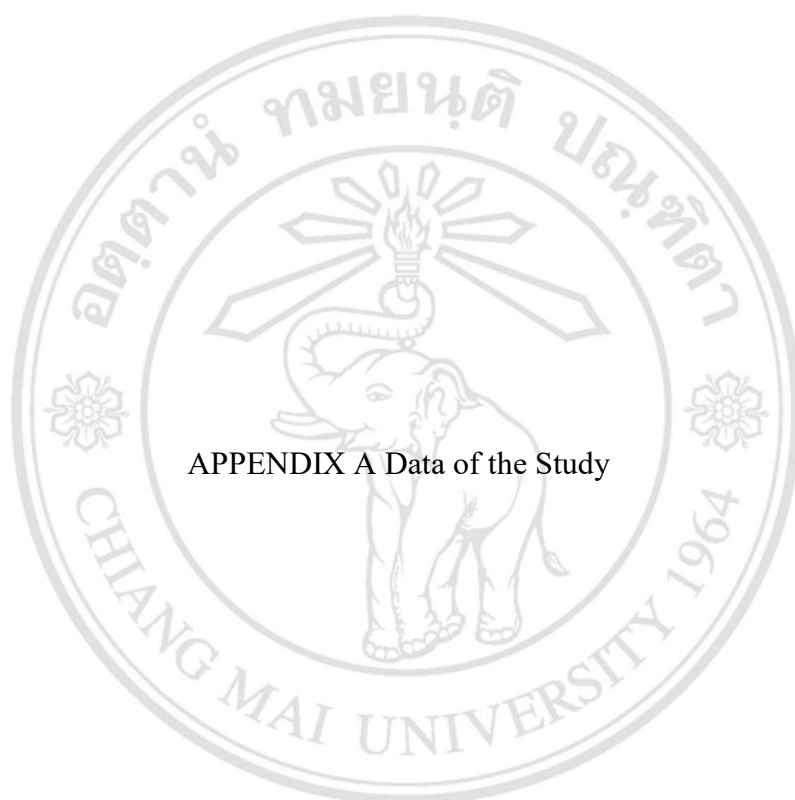




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APPENDIX A Data of the Study

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Appendix. A Data of the Study

Year	Public HPI	Private HPI	ln GDP per capita	CPI
1990	98.4	165	10.00636	63.058
1991	100.7	182.1	10.0753799	65.227
1992	109.8	210.8	10.1363834	66.691
1993	166.5	269.4	10.2437739	68.219
1994	211.5	387.1	10.3371811	70.33
1995	262.6	451.5	10.3953659	71.543
1996	366.8	502.9	10.4454313	72.53
1997	377.7	458.8	10.5084801	73.997
1998	307.2	338.2	10.4627984	73.797
1999	301.3	346.7	10.5291609	73.814
2000	313	391.8	10.6195779	74.809
2001	285.5	352.8	10.6055691	75.568
2002	278.1	329.9	10.6529314	75.272
2003	292.9	324	10.7308189	75.639
2004	304.9	322.7	10.836629	76.903
2005	297.4	332	10.9170133	77.263
2006	297	355.8	11.0008738	78.008
2007	325.1	439.7	11.0726795	79.65
2008	386.9	493.9	11.0566059	84.929
2009	415.4	424	11.0279629	85.436
2010	474.4	531.5	11.164234	87.848
2011	529.9	581.8	11.2240451	92.458
2012	568.6	595.4	11.253808	96.689
2013	591.9	614.2	11.2993307	98.969
2014	561.1	596.6	11.3361713	99.984
2015	540	573.6	11.3548941	99.461



Appendix B Engle-Granger two-steps approach

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Appendix B Engle-Granger two-steps approach

Public-CPI

Dependent Variable: PUBLIC_HPI

Method: Least Squares

Date: 08/02/17 Time: 22:58

Sample: 1990 2015

Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	12.53095	0.814727	15.38055	0.0000
C	-654.8168	65.06950	-10.06334	0.0000
R-squared	0.907891	Mean dependent var		337.1000
Adjusted R-squared	0.904053	S.D. dependent var		142.4361
S.E. of regression	44.11995	Akaike info criterion		10.48550
Sum squared resid	46717.68	Schwarz criterion		10.58228
Log likelihood	-134.3116	Hannan-Quinn criter.		10.51337
F-statistic	236.5613	Durbin-Watson stat		0.478972
Prob(F-statistic)	0.000000			

Residual testing

Null Hypothesis: RESID01 has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 3 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.489727	0.0090
Test critical values: 1% level	-4.440739	
5% level	-3.632896	
10% level	-3.254671	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RESID01)

Method: Least Squares

Date: 08/02/17 Time: 22:59

Sample (adjusted): 1994 2015

Included observations: 22 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
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RESID01(-1)	-0.680745	0.151623	-4.489727	0.0004
D(RESID01(-1))	0.640132	0.165968	3.856955	0.0014
D(RESID01(-2))	-0.130968	0.170957	-0.766090	0.4548
D(RESID01(-3))	0.593830	0.170684	3.479122	0.0031
C	25.69214	11.88815	2.161155	0.0462
@TREND("1990")	-1.486950	0.736171	-2.019842	0.0605

R-squared	0.681748	Mean dependent var	-0.817808
Adjusted R-squared	0.582295	S.D. dependent var	31.05071
S.E. of regression	20.06811	Akaike info criterion	9.063142
Sum squared resid	6443.664	Schwarz criterion	9.360699
Log likelihood	-93.69456	Hannan-Quinn criter.	9.133237
F-statistic	6.854936	Durbin-Watson stat	1.770166
Prob(F-statistic)	0.001352		

PUB-GDP

Dependent Variable: PUBLIC_HPI

Method: Least Squares

Date: 08/02/17 Time: 23:01

Sample: 1990 2015

Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	308.9112	30.62665	10.08635	0.0000
C	-2981.241	329.2289	-9.055222	0.0000

R-squared	0.809122	Mean dependent var	337.1000
Adjusted R-squared	0.801168	S.D. dependent var	142.4361
S.E. of regression	63.51302	Akaike info criterion	11.21417
Sum squared resid	96813.67	Schwarz criterion	11.31095
Log likelihood	-143.7842	Hannan-Quinn criter.	11.24204
F-statistic	101.7345	Durbin-Watson stat	0.296764
Prob(F-statistic)	0.000000		

Residual testing

Null Hypothesis: RESID02 has a unit root

Exogenous: None

Lag Length: 1 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
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Augmented Dickey-Fuller test statistic	-2.797288	0.0072
Test critical values: 1% level	-2.664853	
5% level	-1.955681	
10% level	-1.608793	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RESID02)
Method: Least Squares
Date: 08/02/17 Time: 23:02
Sample (adjusted): 1992 2015
Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID02(-1)	-0.249290	0.089118	-2.797288	0.0105
D(RESID02(-1))	0.643739	0.165419	3.891566	0.0008
R-squared	0.451994	Mean dependent var	1.835156	
Adjusted R-squared	0.427085	S.D. dependent var	35.07022	
S.E. of regression	26.54505	Akaike info criterion	9.475219	
Sum squared resid	15502.08	Schwarz criterion	9.573390	
Log likelihood	-111.7026	Hannan-Quinn criter.	9.501264	
Durbin-Watson stat	1.920068			

PRI-CPI

Dependent Variable: PRIVATE_HPI
Method: Least Squares
Date: 08/02/17 Time: 23:03
Sample: 1990 2015
Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPI	10.44098	1.179736	8.850264	0.0000
C	-419.8575	94.22160	-4.456064	0.0002
R-squared	0.765458	Mean dependent var	406.6231	
Adjusted R-squared	0.755686	S.D. dependent var	129.2509	
S.E. of regression	63.88634	Akaike info criterion	11.22589	
Sum squared resid	97955.14	Schwarz criterion	11.32267	
Log likelihood	-143.9366	Hannan-Quinn criter.	11.25376	
F-statistic	78.32717	Durbin-Watson stat	0.577164	

Prob(F-statistic) 0.000000

Residual testing

Null Hypothesis: RESID03 has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.181564	0.0306
Test critical values: 1% level	-2.660720	
5% level	-1.955020	
10% level	-1.609070	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RESID03)

Method: Least Squares

Date: 08/02/17 Time: 23:04

Sample (adjusted): 1991 2015

Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID03(-1)	-0.312297	0.143153	-2.181564	0.0392

		Mean	dependent
R-squared	0.165005	var	1.140682
Adjusted R-squared	0.165005	S.D. dependent var	48.52131
		Akaike	info
S.E. of regression	44.33784	criterion	10.46073
Sum squared resid	47180.27	Schwarz criterion	10.50949
		Hannan-Quinn	
Log likelihood	-129.7592	criter.	10.47425
Durbin-Watson stat	1.441015		

PRI-GDP

Dependent Variable: PRIVATE_HPI

Method: Least Squares

Date: 08/02/17 Time: 23:05

Sample: 1990 2015

Included observations: 26

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNGDP	253.1444	37.09877	6.823525	0.0000
C	-2312.668	398.8026	-5.799030	0.0000
R-squared	0.659866	Mean dependent var	406.6231	
Adjusted R-squared	0.645694	S.D. dependent var	129.2509	
S.E. of regression	76.93477	Akaike info criterion	11.59760	
Sum squared resid	142055.0	Schwarz criterion	11.69437	
Log likelihood	-148.7688	Hannan-Quinn criter.	11.62546	
F-statistic	46.56049	Durbin-Watson stat	0.379232	
Prob(F-statistic)	0.000000			

Residual testing

Null Hypothesis: RESID04 has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on SIC, maxlag=5)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.682410	0.0869
Test critical values: 1% level	-2.660720	
5% level	-1.955020	
10% level	-1.609070	

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

Augmented Dickey-Fuller Test Equation

Dependent Variable: D(RESID04)

Method: Least Squares

Date: 08/02/17 Time: 23:07

Sample (adjusted): 1991 2015

Included observations: 25 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RESID04(-1)	-0.200117	0.118947	-1.682410	0.1055
R-squared	0.102484	Mean dependent var	2.689047	
Adjusted R-squared	0.102484	S.D. dependent var	47.29827	
S.E. of regression	44.80911	Akaike info criterion	10.48188	

Sum squared resid	48188.56	Schwarz criterion	10.53063
Log likelihood	-130.0235	Hannan-Quinn criter.	10.49540
Durbin-Watson stat	1.278568		

ECM

Pub-CPI

Dependent Variable: D(PUBLIC_HPI)

Method: Least Squares

Date: 08/03/17 Time: 00:23

Sample (adjusted): 1992 2015

Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	4.740892	7.719527	0.614143	0.5457
D(CPI)	10.65390	3.823687	2.786289	0.0111
RESID01(-2)	-0.443012	0.132798	-3.335994	0.0031
R-squared	0.569815	Mean dependent var	18.30417	
Adjusted R-squared	0.528845	S.D. dependent var	37.68204	
S.E. of regression	25.86522	Akaike info criterion	9.460144	
Sum squared resid	14049.20	Schwarz criterion	9.607401	
Log likelihood	-110.5217	Hannan-Quinn criter.	9.499211	
F-statistic	13.90812	Durbin-Watson stat	1.766352	
Prob(F-statistic)	0.000142			

PUB-GDP

Dependent Variable: D(PUBLIC_HPI)

Method: Least Squares

Date: 08/03/17 Time: 00:27

Sample (adjusted): 1992 2015

Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	5.251354	9.765895	0.537724	0.5964
D(LNGDP)	231.6206	142.4299	1.626207	0.1188
RESID02(-2)	-0.312729	0.099760	-3.134809	0.0050
R-squared	0.409946	Mean dependent var	18.30417	
Adjusted R-squared	0.353751	S.D. dependent var	37.68204	
S.E. of regression	30.29245	Akaike info criterion	9.776143	
Sum squared resid	19270.29	Schwarz criterion	9.923400	
Log likelihood	-114.3137	Hannan-Quinn criter.	9.815210	

F-statistic 7.294991 Durbin-Watson stat 1.153142
 Prob(F-statistic) 0.003930

Pri-CPI

Dependent Variable: D(PRIVATE_HPI)
 Method: Least Squares
 Date: 08/03/17 Time: 00:28
 Sample (adjusted): 1992 2015
 Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.945842	12.49670	-0.075687	0.9404
D(CPI)	12.98835	6.204099	2.093511	0.0486
RESID03(-2)	-0.419985	0.143931	-2.917967	0.0082
R-squared	0.457704	Mean dependent var	16.31250	
Adjusted R-squared	0.406056	S.D. dependent var	55.23489	
S.E. of regression	42.56828	Akaike info criterion	10.45656	
Sum squared resid	38053.24	Schwarz criterion	10.60382	
Log likelihood	-122.4788	Hannan-Quinn criter.	10.49563	
F-statistic	8.862105	Durbin-Watson stat	2.121899	
Prob(F-statistic)	0.001620			

PRI-GDP

Dependent Variable: D(PRIVATE_HPI)
 Method: Least Squares
 Date: 08/03/17 Time: 00:32
 Sample (adjusted): 1992 2015
 Included observations: 24 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-22.07519	12.44195	-1.774255	0.0905
D(LNGDP)	710.1058	183.3446	3.873067	0.0009
RESID04(-2)	-0.247261	0.105622	-2.340998	0.0292
R-squared	0.566141	Mean dependent var	16.31250	
Adjusted R-squared	0.524821	S.D. dependent var	55.23489	
S.E. of regression	38.07521	Akaike info criterion	10.23347	
Sum squared resid	30444.16	Schwarz criterion	10.38073	
Log likelihood	-119.8017	Hannan-Quinn criter.	10.27254	
F-statistic	13.70138	Durbin-Watson stat	1.307807	
Prob(F-statistic)	0.000156			



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