CHAPTER 4

EMPIRICAL RESULTS

This chapter explains the results from testing stationary by employing vary of unit root models such as Levin, Lin, and Chu (LLC) Test, Breitung Test, Im, Pesaran and Shin (IPS) Test and Fisher Type Test by using Fisher-ADF and Fisher-PP in order to make a comparison for the best model which suits to data structure. Recall for variables that exits in this study are Corruption Perception Index, total government expenditure, tax revenue, gross capital formation, Human Development Index, mean years schooling, ratio of girls boys in education, life expectancy, health expenditure, improved sanitation facilities, urban population, unemployment rate.

4.1 Panel Unit Root Tests Results

Level : Intercept					
Variable		A 1	Fisher - Type Test		
	LLC	LLC		Fisher-PP	
СРІ	-8.0730	-3.2697	171.2280	174.4740	
×	0.0000	0.0005	0.0007	0.0004	
EXPG	-13.4543	-7.0352	255.9360	298.8170	
	0.0000	0.0000	0.0000	0.0000	
TAXREV	-8.4725	-2.4649	157.1710	146.5940	
2	0.0000	0.0069	0.0032	0.0157	
GCPF	-6.7348	-3.4716	179.2070	119.3510	
	0.0000	0.0003	0.0002	0.4479	
HDI	-9.0208	-1.1801	170.4020	265.6170	
oht	0.0000	0.1190	0.0008	0.0000	
MYS	3.7615	9.4421	190.8580	244.7110	
	0.9999	1.0000	0.0000	0.0000	
RGBG	-14.4273	-6.3313	226.7390	271.0790	
	0.0000	0.0000	0.0000	0.0000	

Table 4.1 Panel Unit Root Tests Result: Individual Intercept at level (I_0)

LIFE	-20.2795	-26.3622	506.8660	706.8640
0	0.0000	0.0000	0.0000	0.0000
HEXG	-18.3869	-10.5894	345.5530	449.5220
	0.0000	0.0000	0.0000	0.0000
IPSFG	-8.5896	-5.2317	126.9190	219.2700
	0.0000	0.0000	0.0000	0.0000
UBPG	-0.8486	-1.9045	176.6730	158.9440
	0.1981	0.0284	0.0002	0.0050
UMG	-15.7389	-7.0990	193.6360	189.3850
	0.0000	0.0000	0.0000	0.0000
GNIG	-20.4590	-8.4281	283.3050	290.5330
	0.0000	0.0000	0.0000	0.0000

Table 4.1Panel Unit Root Tests Result: Individual Intercept at level (I_0) (Cont.)

*** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent Source: From estimation

Accordance with table 4.1, the result from panel unit root tests, the variables were determined with Individual Intercept and the meaning of the result is below:

Levin, Lin, and Chu (LLC) Test at level found that the statistics of all variables including with Corruption Perception Index (CPI), growth rate of government expenditure (EXPG), tax revenue (TAXREV), gross capital formation (GCPF), Human Development Index (HDI), mean years schooling (MYS), growth rate in ratio of girls boys in education (RGBG), life expectancy (LIFE), growth rate of health expenditure (HEXG), growth rate of improved sanitation facilities (IPSFG), growth rate of urban population (UBPG), growth rate of unemployment (UMG) and growth rate of Gross National Income (GNIG) reject the null hypothesis at significance level of 0.01, there is no unit root. Therefore, all variables are stationary with Level or Order of Integration is equal to 0 or I (0).

Im, Pesaran and Shin (IPS) Test at level found that the statistics of all variables including with Corruption Perception Index (CPI), growth rate of government expenditure (EXPG), tax revenue (TAXREV), gross capital formation (GCPF), Human Development Index (HDI), mean years schooling (MYS), growth rate in ratio of girls boys in education (RGBG), life expectancy (LIFE), growth rate of health expenditure (HEXG), growth rate of improved sanitation facilities (IPSFG), growth rate of urban population (UBPG), growth rate of unemployment (UMG) and growth rate of Gross National Income (GNIG) reject the null hypothesis at significance level of 0.01, there is no unit root. Therefore, all variables are stationary with Level or Order of Integration is equal to 0 or I (0).

Fisher Type Test by employing Fisher-ADF and Fisher-PP at level found that the statistics of all variables including with Corruption Perception Index (CPI), growth rate of government expenditure (EXPG), gross capital formation (GCPF), Human Development Index (HDI), mean years schooling (MYS), growth rate in ratio of girls boys in education (RGBG), life expectancy (LIFE), growth rate of health expenditure (HEXG), growth rate of improved sanitation facilities (IPSFG), growth rate of urban population (UBPG), growth rate of unemployment (UMG) and growth rate of Gross National Income (GNIG) reject the null hypothesis at significance level of 0.01, there is no unit root. Therefore, variables are stationary with Level or Order of Integration is equal to 0 or I (0). And tax revenue (TAXREV) does not significant at 99% level of confidence in Fisher-PP test.

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0	Variable LLC Breitung IPS		•	Fisher - Type Test	
Variable		Fisher-ADF	Fisher-PP		
CPI	-11.4915	1.4658	-1.0651	151.9530	172.7600
	0.0000	0.9286	0.1434	0.0141	0.0005
EXPG	-18.9589	0.4699	-2.7776	204.9650	377.4620
	0.0000	0.6808	0.0027	0.0000	0.0000
TAXREV	55.4284	0.0000	-0.0733	129.4420	155.7900
	1.0000	0.5000	0.4708	0.1243	0.0039
GCPF	-7.9651	0.0897	-1.7285	165.0850	119.4890
	0.0000	0.5357	0.0419	0.0028	0.4444
HDI	-6.2108	6.6337	2.4895	95.7375	80.3800
	0.0000	1.0000	0.9936	0.9150	0.9952
MYS	-1.0035	1.2881	8.2511	20.5974	26.0017
	0.1578	0.9011	1.0000	1.0000	1.0000
RGBG	277.5640	0.0000	-2.6781	192.4590	307.0330
	1.0000	0.5000	0.0037	0.0000	0.0000
LIFE	-17.9431	3.3155	-4.8893	311.0970	254.5320
	0.0000	0.9995	0.0000	0.0000	0.0000
HEXG	-18.6992	-4.8566	-3.7208	241.7090	373.2640
	0.0000	0.0000	0.0001	0.0000	0.0000
IPSFG	-13.5365	-4.4249	-3.2582	137.0350	256.4420
	0.0000	0.0000	0.0006	0.0000	0.0000
UBPG	-29.9986	-0.5485	-3.0494	187.9710	167.5470
	0.0000	0.2917	0.0011	0.0000	0.0012
UMG	-18.6239	-0.6323	-1.8818	129.1900	151.0970
8.	0.0000	0.2636	0.0299	0.0018	0.0000
GNIG	-17.7914	-0.3315	-2.1986	195.5870	242.9540

Table 4.2 Panel Unit Root Tests Result: Individual Intercept and Trend at level (I_0)

*** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent
Source: From estimation

Accordance with table 4.2, the result from panel unit root tests, the variables were determined with Individual Intercept with Trend and interpreting the result is below:

According to Levin, Lin, and Chu (LLC) Test at level found that the statistics of all variables including with Corruption Perception Index (CPI), growth rate of government expenditure (EXPG), gross capital formation (GCPF), Human Development Index (HDI), life expectancy (LIFE), growth rate of health expenditure (HEXG), growth rate of improved sanitation facilities (IPSFG), growth rate of urban population (UBPG), growth rate of unemployment (UMG) and growth rate of Gross National Income (GNIG) reject the null hypothesis at significance level of 0.01, there is no unit root. Therefore, variables are stationary with Level or Order of Integration is equal to 0 or I (0). On the other side, tax revenue (TAXREV), means year schooling (MYS) and growth rate in ratio of girls boys in education (RGBG) accept the null hypothesis at the level of significance 0.01, there is unit root or can imply that they are not stationary at level I(0).

Breitung Test at level, the result shows that growth rate of health expenditure (HEXG), growth rate of improved sanitation facilities (IPSFG) reject the null hypothesis at significance level of 0.01, there is no unit root. Therefore, variables are stationary with Level or Order of Integration is equal to 0 or I (0). On the other hand, Corruption Perception Index (CPI), growth rate of government expenditure (EXPG), gross capital formation (GCPF), Human Development Index (HDI), life expectancy (LIFE), growth rate of urban population (UBPG), growth rate of Gross National Income (GNIG) are all accept the null hypothesis at the level of significance 0.01, there is unit root or can imply that they are not stationary at level I(0).

Im Pesaran and Shin (IPS) Test at level, the result shows that growth rate of government expenditure (EXPG), growth rate in ratio of girls boys in education (RGBG), life expectancy (LIFE), growth rate of improved sanitation facilities (IPSFG) and growth rate of urban population (UBPG), reject the null hypothesis at significance level of 0.01, there is no unit root. Therefore, variables are stationary with Level or Order of Integration is equal to 0 or I (0). On the other hand, Corruption Perception Index (CPI), tax revenue (TAXREV), gross capital formation (GCPF), Human Development Index (HDI), mean years schooling (MYS), growth rate of health expenditure (HEXG) and growth rate of Gross National Income (GNIG) are all accept the null hypothesis at the level of significance 0.01, there is unit root or they are not stationary at level I(0).

Fisher Type Test with Fisher-ADF and Fisher-PP at level, the result shows that growth rate of government expenditure (EXPG), growth rate in ratio of girls boys in education (RGBG), life expectancy (LIFE), growth rate of health expenditure (HEXG), growth rate of improved sanitation facilities (IPSFG), growth rate of urban population (UBPG) and growth rate of Gross National Income (GNIG) reject the null hypothesis at significance level of 0.01, there is no unit root. Therefore, these variables are stationary with Level or Order of Integration is equal to 0 or I (0).

	Level	: None			
Variable		Fisher - T	Fisher - Type Test		
		Fisher-ADF	Fisher-PP		
СРІ	-0.7253	86.7268	113.1750		
	0.2342	0.9807	0.5569		
EXPG	-20.0307	467.9920	470.7920		
	0.0000	0.0000	0.0000		
TAXREV	-2.5272	95.3795	124.0390		
	0.0057	0.8967	0.2450		
GCPF	-1.2851	104.1710	126.4730		
	0.0994	0.8144	0.2803		
HDI	23.7936	9.1192	2.9951		
	1.0000	1.0000	1.0000		
MYS	25.8754	15.3015	6.8811		
	1.0000	1.0000	1.0000		
RGBG	-3.6055	217.8250	354.6480		
	0.0002	0.0000	0.0000		
LIFE	13.6104	107.0830	2.0940		
<u>15 U h</u>	1.0000	0.7549	1.0000		
HEXG	-22.1502	581.0990	603.4770		
aht(C) I	0.0000	0.0000	0.0000		

Table 4.3 Panel Unit Root Tests Result: None at level (I_0)

IPSFG	-6.1953	114.3440	137.0360
0	0.0000	0.0000	0.0000
UBPG	-10.2241	263.5590	315.4950
	0.0000	0.0000	0.0000
UMG	-13.2043	252.5390	318.4260
	0.0000	0.0000	0.0000
GNIG	-6.6420	218.8190	224.4480
	0.0000	0.0000	0.0000

Table 4.3 Panel Unit Root Tests Result: None at level (I_0) (Cont.)
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*** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent Source: From estimation

Accordance with table 4.3, the result from panel unit root tests, the variables were determined there is no intercept and trend (None) at level and interpreting the result is below:

Result from Levin, Lin, and Chu (LLC) Test at level found that the statistics of all variables including with growth rate of government expenditure (EXPG), tax revenue (TAXREV), growth rate in ratio of girls boys in education (RGBG), growth rate of health expenditure (HEXG), growth rate of improved sanitation facilities (IPSFG), growth rate of urban population (UBPG), growth rate of unemployment (UMG) and growth rate of Gross National Income (GNIG) reject the null hypothesis at significance level of 0.01, there is no unit root. While at level of confident 0.01 Corruption Perception Index (CPI), gross capital formation (GCPF), Human Development Index (HDI), mean years schooling (MYS) accept null hypothesis or these variables have unit root.

Fisher Type Test with Fisher-ADF and Fisher-PP at level, the result shows that the variables which reject null hypothesis are growth rate of government expenditure (EXPG), growth rate in ratio of girls boys in education (RGBG), growth rate of health expenditure (HEXG), growth rate of improved sanitation facilities (IPSFG), growth rate of urban population (UBPG), growth rate of unemployment (UMG) and growth rate of Gross National Income (GNIG), so these variables have no unit root or they are stationary with Level or Order of Integration is equal to 0 or I (0).

4.2 Model Specification and The Results from GMM Estimator

The models are estimated by Simultaneous equations as shown in equation 4.1 and 4.2 with Generalized Method of Moments estimator. And the results show in table 4.4 and table 4.5.

$$CPI_{i,t} = \beta_0 + \beta_1 HDI_{i,t} + \beta_2 EXPG_{i,t} + \beta_3 GCPF_{i,t} + \beta_4 TAXREV_{i,t} + \beta_5 UMG_{i,t} + \varepsilon_{i,t}$$

$$(4.1)$$

$$HDI_{i,t} = \beta_6 + \beta_7 CPI_{i,t} + \beta_8 HEXG_{i,t} + \beta_9 IPSFG_{i,t} + \beta_{10} LIFE + \beta_{11} MYS_{i,t}$$
$$+ \beta_{12} RGBG_{i,t} + \beta_{13} UBPG_{i,t} + \beta_{14} GNI_{i,t} + \varepsilon_{i,t}$$
(4.2)

Table 4.4 The result from estimation equation 4.1, the correlation between EconomicVariables, Human Development Index and Corruption Perception Index byGMM estimator

GMM Estimator			
Dependent Variable	Corruption Perception Index		
Independent Variables	Coefficient	Probability	
Constant	-5.5560	0.0000	
HDI	14.2315***	0.0000	
EXPG	-0.0227***	0.0096	
GCPF	-0.0719***	0.0000	
TAXREV	0.1088***	0.0000	
UMG	0.0035	0.1280	
R-squared	0.7162		
Adjusted R-squared	0.7116		

*** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent Source: From estimation

The results show that HDI has a positive effect on CPI significant at 1% means that increasing in 1% HDI scores leads to an increasing in CPI scores 1.4232 can implies that when human improved from several channels of development, it will has a positive effect on corruption perception index or result in less corruption (high CPI scores means more corruption eliminated).

Statistically significant at 1% show that 1 percent increase in growth rate of government expenditure induce more corrupt as shown in a negative significance with

CPI meaning government increase government budget for financing projects, increase expenditure it is the causes of raising in level of corruption or reducing in CPI scores. Supporting the negative correlation by Wilhelm and Fiestas (2005), Haque (2007) that public spending has a corruption behind makes public investment is ineffective moreover, corruption also distorts the real number of invests and profits. This is slow down the economic growth.

Statistically significant at 1% show that gross capital formation the result is a positive significant between gross capital formation and level of corruption a huge amount of capital formation in investment related to high corrupt as following the assumption.

The result is following the assumption, there is a positive correlation between tax revenue and CPI means increase in amount of tax revenue decreasing in corruption statistically significant at 1%. According to Tanzi and Davoodi (1997, found the negative correlation between corruption and tax revenue, tax revenue can be lowering by corruption.

Table 4.5 The result from estimation equation 4.2, the effects of Corruption

Perception Index and Human Development indicators to Human

GMM Estimator			
Dependent Variable	Human Development Index		
		000	
Independent Variables	Coefficient	Probability	
Constant	-0.3079	0.0000	
СРІ	0.0072***	0.0002	
HEXG	0.0001	0.5314	
IPSF	0.0004***	0.0000	
LIFE	0.0106***	0.0000	
MYS	0.0194***	0.0000	
RGBG	-0.0001	0.8748	
UBPG	-8.56×10^{6} ***	0.0032	
GNI	9.29×10 ⁷ ***	0.0002	
R-squared	0.9648		
Adjusted R-squared	0.9639		

Development Index

*** significant at 1 percent, ** significant at 5 percent, * significant at 10 percent Source: From estimation

Accordance with results in Table4.5 can interpret the effect of each variable on HDI as below:

There is a positive effect of CPI on HDI at significance 0.01, decrease in level of corruption can improve human development. People will have a better standard of living when corruption control or anti-corruption campaigns are effective.

There is a positive effect of improved sanitation facilities on HDI at significance 0.01, as the assumption IPSF can represent a good in health care and improved in health services so, this also has a positive effect in human development.

Life expectancy absolutely has a positive effect on HDI statistically significant 1%. Increase in 1 year of life expectancy leads to an increase in HDI following three basic dimensions for raising human capabilities. Health outcome is important for increase quality of good life (UNDP).

Statistically significant 1%, mean years schooling has a positive effect on HDI following the assumption and HDI structure that there is a positive effect of means years schooling on human development, people who obtained higher level in education will expand their opportunities to get a better job. This is the cause that provides them a better life.

GNI per capita is also positive significant with HDI as HDI structure increasing in health, education, and income related to an increase in HDI and increase decent standard of living.

Urban population growth has a negative effect on HDI. For more interpreting is in Panudulkitti (2008) that urbanization should be at the optimal level, it will have a positive effect to human development through many channels of development and also reduce poverty. But the result in this study found a negative effect of urban population growth to human development is possibly that levels of urban population growth are not the optimal level.

<mark>ລິບສີກຣົ້ນหາວົກຍາລັຍເຮີຍວໃหນ່</mark> Copyright[©] by Chiang Mai University All rights reserved