CHAPTER 4

Empirical Results and Discussions

This chapter pointed out to examines the relationship between export, import, the degree of openness, inflation rate, exchange rate and economic growth. The analysis is conducted for ASEAN plus China, Korea, and Japan from 1995 to 2014. The rise of export, import, openness, inflation and exchange rate are affected in some countries and another country, Brunei has not affected in short run. This chapter revealed that the comparison between descriptive analysis and econometrics analysis for this research by separating part I and part II. In part I, the author applied the descriptive analysis to explain the relationship between economic growth and export, import, the degree of openness, inflation, exchange rate. In part 2, the author collected the secondary data from World Bank database and applied the relationship between economic growth and trading in ASEAN plus China, Korea, and Japan. The results will indicate how trading can force to jump the economic growth of ASEAN plus China, Korea, and Japan.

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PART I

4.1 Trading and Economic growth of ASEAN plus China, Korea, and Japan

In this section, the author showed the real situation of trading especially export and import in ASEAN plus China, Korea, and Japan with the available data from World Bank database. The ASEAN trading arrangement is established in 1977 and expand intra-ASEAN trade by reducing trade barriers among the member countries. Moreover, have success in their investment programs, by increasing the trade relations ASEAN gets success in trading and signed the agreement to start the ASEAN Free Trade Area in January 1992. However, in 1995, the ASEAN countries reduced the level of tariffs on the import of goods under the new arrangement. In the developing countries, regional trading is not a wide market, but they gained some benefits from exports, imports and other economic advantages.



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Cambodia is a low income developing country which has undergone different stages of economic reforms during the past two decades. Cambodia joined the AFTA (Asian Free Trade Agreement), which requires for reduction of tariff rates on imported goods from ASEAN members improving markets areas in the region. One of the literature contributed by exploring the causal relationship between export, imports and economic growth in Cambodia empirically. Also a bilateral causal relationship between exports and growth supports, it may provide an insight to policy marker on its feasibility. Moreover, the three variables GDP, imports and exports are co – moving after 1985 with a rapid growth of exports and imports (goods and services).

Lao is the least developed and the poorest country in Asia, but significant economic growth in the past decade has benefited the country. Laos is the 119th largest export economy in the world and the most complex economy, their import and export are negative trade balance. In 1990, there was considerable diversification of Laos's exports. Laos's largest export earner is timber and furniture followed by garments, raw lags, electricity, manufactured products, coffee, agricultural commodities, and so forth. Approximately 52 percent of Laos' import from Thailand while 22 percent of its exports go to Thailand, reflecting a strong negative trade balance with that country. The Gross Domestic Product in Laos expanded 7 percent in 2015 from the previous year. The annual growth rate in Laos average 7.10 percent from 1989 until 2015.

Myanmar is one of membership in ASEAN countries. This country is the delay developed country among them. They had been a colony country from the British until 1948. Myanmar was one of the wealthiest nations in the region, with many natural resources. In Myanmar, border trade was regularised to develop and strengthen bilateral trade relations with the five neighbour countries. Myanmar's major destination of import and imports countries are ASEAN, the PRC, and India, for more than 70% of total exports and 90% of total imports. The export structure of Myanmar has changed since 1999/2000 and become major foreign exchange earner of the garment sector. By 2008/2009, the major export items are natural resources, minerals, agricultural products, marine products, forestry products.

International trade has a significant role in **Vietnam's** present economy as the country accelerates its transition to the modern market economy as well as deeper and

wider integration into the global economy. Export has proven instrumental in economic recovery and resilient in facing the challenges as a part of the world's economy still by the international financial crisis and the economic recession since 2008. In Vietnam, the export and imports are created more jobs and income to an economy. International trade can also redirect investment towards the most profitable sectors of the economy, and the expansion may lead to an improvement in national productivity. In recent years, international trade activities in Vietnam have considerably contributed to Vietnam's economic and social development. Export has become one of the key factors in economic growth, increasing employment, raising income, helping eliminate and alleviate hunger and poverty. The country has lacked advance economic growth and technology, they have benefited from imports, it provides Vietnam with access to new and advanced technology.

According to **Thailand's** economic growth, even though the previous studies showed that trade and economic growth have a positive effect. Over the last four decades, Thailand has made remarkable progress in social and economic development moving from a low – income country to an upper – income country in less than a generation. Thailand's economy suffered greatly from the great depression, a cause of the Thailand revolution of 1932. Thus, the portion of rice exporting on GDP has gradually decreased. Since 2005 increase in exports of automobiles from Japanese has helped improve the trade balance, and Thailand becomes the world's top ten automobiles exporting nations.

The economy of **Malaysia** is the 4th largest in Southeast Asia and the 35th largest in the world. Malaysia is also the 3rd richest in the Southeast Asia by GDP per capita value, and their economy is one of the most competitive in the world. In the past half of 2000, US exports rose, and the imports from Malaysia also increased. In 2013, Malaysia's total external trade total was 424 billion (USD) and made Malaysia the world's 21st largest exporter and the world's 25th largest importer.

Indonesia has one of the biggest economies in Southeast Asia, and it is one of the emerging market economies of the world. The country is also a member of G-20 major economies and a newly industrialised country. Oil exports continued to be a primary source of revenue for the Indonesian economy through to the early 1980s, and

Indonesia's trade ratio rose despite the government's use of protectionist policies. By the late 1980s, exports and imports had begun to grow strongly again as the government pursued policies of trade liberalisation and as the industrialisation of the Indonesian economy accelerated.

Singapore has a highly developed trade – oriented market economy. Singapore's economy has been ranked as the most open in the world. The small size of the total trade in Singapore is currently the 15th trading partner of the United States. Singapore's trade with a major trading partner is Malaysia, China, Indonesia and the South Korea in 2012. In 2006, the value of imports exceeded exports for Singapore trade with the United States, and the values of exports exceed imports for Singapore's trade with China in 2009. Trade in Singapore has benefited from the extensive network of trade agreements.

Brunei Darussalam is situated on the northern part of the Borneo Island in Southeast Asia. It is one of the smallest countries in the Southeast Asian region. Over half of GDP supported by the export of crude oil and natural gas with revenue from the petroleum sector of Brunei Darussalam. Brunei imports almost everything, including most foodstuffs and beverages. The annual growth rates in Brunei are influenced by the world oil prices and hence the value of oil exports. There may be other factors beyond oil price and oil exports that affect the economic growth in Brunei.

At the independence in 1946, the **Philippines** was an agricultural nation tied closely to its erstwhile coloniser, the United States. Philippine is the 41st largest export economy in the world. In the 1950s, the value of Philippines' principal exports being agricultural or mineral products. Since 1980, the Philippines have opened their economy to foreign markets and established a network of free trade agreements with several countries. Their import and export were rapidly increased since the end of the 1960s, and the United States is one of the Philippines top trading partners.

China is the world's second largest economy by nominal GDP and the world's largest economy and the world's fastest growing major economy. China is the largest trading nation in the world and plays the most important role in international trade. China is the global hub for manufacturing, and it is the biggest manufacturing economy in the world as well as the largest exporter of goods in the world. China is also the

world's fastest growing consumer market and second largest importer of goods in the world and is a net importer of services products.

The economy of South Korea is the fourth largest economy in Asia and the 11th largest in the world. South Korea is famous for its spectacular rise from one of the poorest country in the world to a developed country, a high-income country in one generation. The South Korea extremely careful and lifted and the establishment of highly motivated, the educated populations was increased and the country's high technology boom, finally rapid their economic growth. By emphasising the industrial sector, Seoul's export-oriented developed, however the rural sector relatively underdeveloped.

The second half of the nineteenth century, **Japan**'s productivity growth has outstripped, and their rapid economic growth has coexisted with labour markets, capital markets, and product markets whose structure and organisation have changed radically over time. Throughout modern Japanese history, Japan's international trade has been based on the sharp differences in its circumstance from those of the rest of the industrialised world. Over the course of the late nineteenth century and the twentieth century, the decline in the importance of natural resource. However, their advanced technology has helped Japan to achieve the 20th century highest rate of productivity growth. After the Second World War, both the exports and imports ratios are about 4-5 percent level. However, in the second half of the 1900's the export ratio exceeded the import ratio for the first time.

4.2 Trend of exports and imports of ASEAN plus China, Korea, and Japan

In this section, the author showed the real situation of trading especially export and import in ASEAN plus China, Korea, and Japan with the available data from World Bank database. The ASEAN trading arrangement is established in 1977 and expand intra-ASEAN trade by reducing trade barriers among the member countries. Moreover, have success in their investment programs, by increasing the trade relations ASEAN gets success in trading and signed the agreement to start the ASEAN Free Trade Area in January 1992. However, in 1995, the ASEAN countries found to reduce the level of tariffs on the imports of goods under the new arrangement. In the developing countries, regional trading is not a wide market, but they gained some benefits from exports,

imports and other economic advantages. The following figure 4.1 and 4.2 showed that the import and export chart of ASEAN.



Figure 4.1: Export of ASEAN countries



Source: Author's drawing based on data provided by World Bank

Figure 4.2: Import of ASEAN countries

The results of calculating from the World Bank data, the export and import have a positive relationship with economic growth and statistically significant in Developing Country. Summarized test results from PMG estimation by individual country, the GDP growth and the import are significant and positively related for Cambodia in the short

run, the export is negatively related to GDP growth, and they are insignificant. That means 1% increase import that enhances to increase the country's economic growth at the same time. The findings for Laos shows that the adjustment for the short run coefficient is significant at 1percent level while back to the equilibrium with an expectation of 22%. The export and import are positively related to GDP growth and statistically significant at 1percent and 5percent respectively. These two variables affect the Country's economic growth.

According to Myanmar, the import has positively related to economic growth, that means only the import have the force to increase the country's economic growth. However, export has negatively related with GDP growth means the export sector is not included in the country's developing sectors. From the results of Vietnam, the error correction term is significant at 5percent level with an expectation of 26percent. The import, openness and exchange rate are positively related to GDP growth in the short run while openness and exchange rate statistically significant at 5% level in the near future. When 1% increase in import that caused increase in the country's economic growth at the same time. According to the short term results of Malaysia, export and import are positively related to economic growth, and they are not significant in the near future. The degree of openness and economic growth have a positive relationship and statistically significant at 10% level. That means that the country's export sector and import sector is the best weapon to increase the country's economic growth and developing the sector.

The findings of Singapore show that the adjustment for the short run coefficient is significant at 1% level. Singapore's exports are positively related to GDP growth in the near term with 5% level. The coefficient of export 0.27669 that means that 1% increase in export that causes 0.28% increase of GDP growth short. The import and economic growth have a positive relationship but insignificant in short run. The coefficient of import means that 1% increase in import, 0.13% increase in the GDP growth of Singapore in the near future. As for Brunei, the results of short term estimations by using PMG estimator showed that the speed of adjustment of the short term coefficient is 0.191 and statistically insignificant. It means that there is no long term and short run relationship between economic growth and export, import, openness, inflations, and







Source: Author's drawing based on data provided by World Bank Figure 4.4: Import of EAST ASIA countries

According to the Developed Country, the long-run results showed that the country's export and the GDP growth have a negative long run relationship and statistically significant at 1% level. On the other hand, import and GDP growth also

have a negative long-run relationship, but exchange rate and GDP growth have a positive long-run relationship. The above two tables showed that the import and export for East Asia (China, Korea, and Japan) by using the data from the World Bank database from 1995 to 2014. The import sector and export sector of East Asia is the main machine to jump the country's economic growth by year after year.



PART II

4.3 Descriptive Statistics and Correlation Matrix

In this chapter, the author discussed the descriptive statistics analysis of the data that are collected for 13 countries, ASEAN countries plus China, Korea and Japan for the year 1995 to 2015 and the observation are 260. The following table (4.1) showed that the summary descriptive statistics of the variables in this study.

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Variables	Mean	Std. Deviation	Minimum	Maximum
GDPGR	5.467542	3.968387	-13.12672	15.24038
EXP	11865.21	366000	746.341	248000
IMP	197000	330000	1334.59	219000
OPN	98.58132	94.78122	.2281228	439.6567
INF	1236.629	4350.692	-2.314972	21148
EXC	1625.577	3110.446	-1.710337	11865.21

Tabl	e 4.1		Descriptive	Statistics	(1995 – 2014)	
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Sources: Stata calculation

From the above table, the dependent variable economic growth is GDPGR as an annual % of GDP varied from -13.12672 to 15.24038 with the average value is 5.467542. As for export (EXP), it's mean that the value is 11865.21 and the minimum and maximum value are746.341 and 248000. For the import (IMP), the average value is197000 and the maximum and minimum value are 1334.59 and 219000. The openness (OPN) is measured by total trade as % of GDP, and the average value is 98.58132. Its minimum and maximum values are 0.2281228 and 439.6567. Another independent variable, inflation rate (INF) is varied from the maximum value 21148 to the minimum value -2.314972 with the average value is 1236.629. The exchange rate (EXC) in this study is used by the value of official exchange rate of USD. Its average value is 1625.577 while the maximum value is 11865.21 and the minimum value is -1.710337.

Table (4.2) introduces the correlation matrixes of the coefficient. The measurement showed a strong the linear relationship among the variables. This measurement also

helps us to point out the problems of multicollinearity in the estimates process. The following table showed that the results that the correlation between GDPGR and EXP, IMP, OPN, INF and EXC are positive and significant. The inflation rate (INF) is varied from the maximum value 21148 to the minimum value -2.314972 with the average value is 1884.415. The exchange rate (EXC) in this study is used by the value of official exchange rate of USD. Its average value is 1625.577 while the maximum value is 11865.21 and the minimum value is -1.710337.

The correlation matrix of the coefficient are introduced in the following table (4.2). The measurement showed that how strong the linear relationship among the variables. This measurement also helps us to point out the problems of multicollinearity in the estimates process. The following table showed that the results that the correlation between GDPGR and EXP, IMP, OPN, INF and EXC are positive and significant.



Table 4.2. Conclation matrix of the variables
--

	GDPGR	EXP	IMP	OPN	INF	EXC
GDPGR	1.0000					
EXP	-0.0239	1.0000				
	0.7010					
IMP	-0.0421	0.9953*	1.0000			
	0.4988	0.0000				
OPN	-0.1189	0.0127	0.0036	1.0000		
	0.0555	0.8391	0.9543	23	en	
INF	0.0754	-0.1201	-0.1147*	0.0984	1.0000	
	0.2256	0.0531	0.0648	0.1134	c#85	
EXC	0.0497	-0.2021*	-0.2027*	-0.2392*	0.1993*	1.0000
	0.4246	0.0011	0.0010	0.0001	0.0012	

Sources: Author's calculation

4.4 Results of Panel Unit Root Tests

The results of the panel unit root tests of the variables used in this study are the countries' economic growth (GDPGR), export (EXP), import (IMP), trading as a % of GDP (OPN), inflation (INF) and exchange rate (EXC) with using Levin, Lin and Chu test (2002 test), Im, Pesaran and Shin test (IPS, 2003) test and Phillips – Perron test (PP test) with Eview 9 software. From the test results, the stationary and non-stationary will cause spurious regression to avoid the mean value and variance at different time intervals. The author took the results the statistical significance at 99%. 95% and 90% confidence level. After data collection, the first step is the Panel Unit Root Test to check the stationary or non-stationary of the collected data to determine the order of integration. In this test, the applied variables are stationary at level or I (0) and I (1), so the variables to make sure non-stationary at I(2). The details are as follow in table 4.3.

Varia	Level	Tests	LLC	IPS-W	ADF	PP
bles						
GDP	I (1)	Intercept	-	-12.5486***	173.734**	855.9
GR			13.1240*	0.0000	*	48**
			**		0.0000	*
			0.0000		0.0000	0.000
			0.0000			0.000
						0
		Intercept	- 91818	-11 6181***	148.093**	224.0
		and trand	12 2856*	0 - 0	*	56**
		and trend	12.2830	0.0000		
		5.1	**		0.0000	*
			0.0000			0.000
		685	40	a d	36	0
		马拉	Othe	SP S	20	Ŭ
		None	-	- 256.14	4*** 236.8	25***
		NE/	16.9450*	0,000	0.000	0
		NZ.	**	BL A	0.000	•
		0.1	Anna			
			0.0000	NIVER		
~ .						

 Table 4.3: Panel unit root tests for the variables

Varia	Level	Tests	LLC	IPS-W	ADF	PP
bles						
EXP	I(0)	Intercept	8.29874	9.60491	1.73324	1.04126
			1.0000	1.0000	1.0000	1.0000
		Intercept	-1.32537	1.22763	22.0296	22.3855
		and trend	0.0925	0.8902	0.6871	0.6674
		None	11.3927	120	0.80855	0.23295
		and	1.0000	Re	1.0000	1.0000
	I (1)	Intercept	-//		124.634***	160.493***
			10.0517*	8.90621**	0.0000	0.0000
		-393-	**	*	-583-	
		G	0.0000	0.0000	5	
		Intercept	- 0	-ANS	110.787***	194.907***
		and trend	9.11190*	8.61149**	0.0000	0.0000
			**AI 11	*IVER		
	0	0 5	0.0000	0.0000	a ?	
	ล	None	หาวท	ยาลยเ	134.901***	150.053***
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	A	ll ri	g∗h t s	res	erve	d
			0.0000			

 Table 4.3: Panel unit root tests for the variables (continued)

 Table 4.3: Panel unit root tests for the variables (continued)

Varia	Level	Tests	LLC	IPS-W	ADF	PP
bles						
D.(D)	T	T	7.20505	0.07004	0.06545	0.20400
IMP	1	Intercept	7.38505	9.97984	0.86545	0.38489
	(0)		1.0000	1.0000	1.0000	1.0000
		Intercept	-1.06026	2.83171	14.5878	14.4064
		and trend	0.1445	0.9977	0.9644	0.9672
		None	9.41288	2	0.48525	0.11171
		5	1.0000		1.0000	1.0000
	I (1)	Intercept	L Commen		107.942***	124.645***
		-36-	8.99940** *	6.93339** *	0.0000	0.0000
		E	0.0000	0.0000	1001	
		Intercept	- 6	30	122.449***	204.500***
		and trend	10.5446** *	9.51261** *	0.0000	0.0000
	ຄົ	ขสิทธิ์เ	0.0000	0.0000	ชียงให	Ú.
	C	None	ີ່ by Ch	iang Mai	128.173***	143.015***
	A	İİri	7.14129** *	res	0.0000/ e	0.0000
			0.0000			

 Table 4.3: Panel unit root tests for the variables (continued)

Varia	level	Test	LLC	IPS-W	ADF	PP
bles						
ODN	T	Testamont		0.66022	22 1202	06 02 42***
OPN	1	Intercept	-	-0.66933	32.1392	96.0242***
	(0)		2.49257**	0.2516	0.1886	0.0000
			*			
			0.0063			
		Intercept	-	-1.86967	41.4080	55.5349***
		and trend	2.38110**	0.0208	0.0282	0.0006
			*	0.0308	0.0282	0.0000
		18	0.000	NS-	331	
		5	0.0086		131	
		None	0.09921	2 ~	31.4036	58.6803***
		。論	0 5395	10-	0.2136	0.0003
		204	0.5575	N R	0.2150	0.0005
	I (1)	Intercept	-	- 1	144.371***	175.812***
		NE.	10.6956**	10.6463**	0.0000	0.0000
		12	*	***	\$1/	
			0,0000	0,0000	`//	
			0.0000	0.0000		
	8	Intercept			109.322***	136.192***
	a	and trend	9.07690**	8.55866**	0.0000	0.0000
	C	opyright	[⊆] ∗ by Ch	i*ng Mai	Universit	Y
	A	ll ri	ghts	0.0000 [°] S	erve	d
		None	-	_	197.532***	192.414***
			13.769***		0.0000	0.0000
			0.000		0.0000	0.0000

Sources: Author's own design, Note: *, ** and *** represents significant level 10%, 5% and 1%

Variables	level	Test	LLC	IPS-W	ADF	PP
INF	Ι	Intercept	-2.08076	-	69.1770***	99.6167*
	(0)		0.0187	3.88907***	0.0000	**
				0.0001		0.0000
		Intercept	-	-	90.3768***	88.7674**
		and trend	6.99102***	6.72548***	0.0000	*
			0.0000	0.0000		0.0000
		None	0	- 45	75.4356***	72.6861**
		15	2.21715***		0.0000	*
		a l	0.0133	21	3	0.0000
	I (1)	Intercept	- (-	A.	174.241***	701.869**
		335	11.5759***	12.7066***	0.0000	*
		131	0.0000	0.0000	1305	0.0000
		Intercept		Del F	120.926***	185.966**
		and trend	9.77222***	10.2306***	0.0000	*
			0.0000	0.0000		0.0000
	ຄີເ	None	หาวิทย	เาลัยเชี	223.327***	230.407**
	Co	pyright [©]	14.1381***	ng Mai U	0.0000	*
	A	ll ri	0.0000	rese	rved	0.0000
		None	11.3927	-	0.80855	0.23295
			1.0000		1.0000	1.0000

 Table 4.3: Panel unit root tests for the variables (continued)

Variables	level	Test	LLC	IPS-W	ADF	PP
EXC	Ι	Intercept	8.29874	9.60491	1.73324	1.04126
	(0)		1.0000	1.0000	1.0000	1.0000
		Intercept	-1.32537	1.22763	22.0296	22.3855
		and trend	0.0925	0.8902	0.6871	0.6674
		None	11.3927	-	0.80855	0.23295
			1.0000	10 2/2	1.0000	1.0000
	I (1)	Intercept	- 090	0 4	124.634***	160.493*
		5.	10.0517***	8.90621***	0.0000	**
			0.0000	0.0000		0.0000
		Intercept	- Sail	12	110.787***	194.907*
		and trend	9.11190***	8.61149***	0.0000	**
		E	0.0000	0.0000	5	0.0000
		None	660	- an	134.901***	150.053*
			7.42420***	IVER ^D	0.0000	**
	8.	225.	0.0000	a čau S	010222	0.0000
Sources: Auth	or's own	design	1.13119	19910	Joing	1

 Table 4.3: Panel unit root tests for the variables (continued)

Note: *, ** and *** represents significant level 10%, 5% and 1%

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The above table 4.3 represents the P-value, the test statistics and the results of Panel Unit Root Tests carried on the variables used in this research. All the variables are secondary data and obtained from World Bank database. The applied Panel Unit Root Test in this paper is Levin, Lin and Chu (2002), Im, Pesaran and Shin (2003), ADF and PP Fisher Type test to test the variable by an individual with intercept, individual intercept and trend, and none by using Eviews and state software.

The Panel ARDL approach assumes mixed levels I(0) and I(1). The variables for this method are not accepted when the integration for stationary is I (2) and above. The author Maddala and Kim (1998) 1 suggested that in the panel co integration test whether using no cointegration as null or cointegration as null. The Panel Data Unit Root tests the null hypothesis (H_0) and the alternative hypothesis (H_A) . Pedroni (1995, 1997), Kao (1999) and McCoskey and Kao (1998 a), allowed that the null hypothesis and alternative imply that either all the relationships are cointegrated or all the relationships are not cointegrated. In this paper, H_0 means the panel data has unit root test or the applied variables are not stationary and H_A means the panel data has no unit root test or the applied variables are stationary. If the value of test statistics must be higher or greater than the absolute values of the critical values, we have to reject the null hypothesis (H_0) and accept the alternative hypothesis (H_A) . The critical values are obtained from their confidence level of 1%, 5% and 10%. Another method is checking with p-values method. If p-values must be less than at least 10% significant level have to reject the null hypothesis also. According to the above two methods, comparing with test statistics and p-values that help to determine the acceptance or rejection of the null hypothesis. rights reserved

For the variables GDPGR and INF, the null hypothesis of panel unit root test is rejected in level or I (0) because these two variables have non-stationary at 1%, 5% and 10% significance levels or also can be said that these two variables are stationary at the level I(0). However, the rest of variables EXP, IMP, OPN, and EXC of the null hypothesis of panel unit root test in this research cannot reject the null hypothesis when the variables are stationary at the first different level I(1). In general, the two variables GDPGR and INF are significant and stationary in level I(0) but stationary and

significant at the first difference level I(1). According to the previous conversation, the confirm stationary data status are in mixed level I(0) and I(1) and the panel ARDL approach is the most suitable method for this type of data set. Finally, the table no. 4.3 already showed the summary of all these tests and results in details.

4.5 Results of PMG Estimations for Panel Level

In this study, the author reported the results of PMG Estimation for the model in the table below 4.4 and 4.5; the long run results and short run results into three groups, Overall Country, Developed Country and Developing Country. Overall Country included all the thirteen countries that studied in this studies. The Developed Country included China, Korea, and Japan. And the Developing Country included for all the ASEAN 10 countries. Moreover, lag length selection is also very important for the panel ARDL approach. In this studies, the author assigned lag length selection by AIC (Akaike Information Criterion) and Schwarz Beyesian Criterion and get the final result of lag length at ARDL (1,1,1,1) for the used model. Based on the unit root test results, all the data are stationary at level and first difference, that's made sure the panel ARDL approach is the most suitable method for the long run and short run estimations. The results of Pooled Mean Group (PMG) estimation for this model is showed in the following table 4.4 and 4.5 in detail.

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4.5.1 Long-Run and Short-Run PMG Estimation results for Panel Level

GDPGR	Overall ASEAN plus Korea, Japan	Country: China,	Developing (ASEAN	Country:	Developed China, Korea	Country: , Japan
	Coefficient	P- values	Coefficient	P- values	Coefficient	P- values
EXP	-0.00001	0.681	-0.00000***	0.000	0.0000001* **	0.000
IMP	0.000001	0.753	0.000000***	0.000	- 0.000001** *	0.000
OPN	.0005543	0.948	-0.0125362	0.152	.141332***	0.000
INF	-0.0003663***	0.011	-0.0003258*	0.042	-0.015901	0.732
EXC	-0.0000712**	0.047	-0.0000616	0.126	.0072556	0.652

 Table 4.4: Long Run Panel ARDL Results (PMG Estimation)

Sources: Author's own design Note: *, ** and *** represents significant level 10%, 5% and 1%

GDPGR	Overall ASEAN plus Korea, Japan	Country: China,	Developing (ASEAN	Country:	Developed (China, Korea	Country: , Japan
	Coefficient	P- values	Coefficient	P- values	Coefficient	P- values
EXP	-0.0000309	0.317	-0.0000402	0.317	-0.000001	0.739
IMP	-0.0000668	0.317	-0.000087	0.317	0.000001*	0.084
OPN	.5575331	0.527	.7132863	0.528	-0.068697	0.588
INF	-0.1087014	0.548	-0.0099607	0.966	-1.233177	0.406
EXC	-0.8112259	0.578	-2.752959**	0.038	.5784102	0.263
ECT	-1.5202***	0.000	-1.548326***	0.000	- 1.857096** *	0.011
Cons Sources: Aut	7.693172***	0.000	11.52121***	0.000	-2.722132	0.608

 Table 4.5: Short Run Panel ARDL Results (PMG Estimation)

4.5.2 Discussion of long run and short run results for panel level

The above table 4.4 and 4.5 are summarised the long run and short term regression results of the used model by using Pool Mean Group Estimation. The model estimated the countries' economic growth and the variables in the analysis of the major economic factors. The GDPGR as the dependent variable and other five different independent variables, are EXP, IMP, OPN, INF, and EXC. The long run and low coefficient showed that the relationship and the effect between the dependent variable and the independent variables. The Error Correction Term (ECT) showed the short-run equilibrium adjustment to long-run equilibrium. Moreover, ECT must be negative and significant to confirm that there is the speed of adjustment to equilibrium on the country's economic growth and the coefficient is close to zero means the model has the speed of adjustment rate from short term to equilibrium of change to long term.

Table 4.4 showed that the results of long-run panel ARDL and their coefficient results of all the countries that studied in this study by the Pool Mean Group estimation for the period of 1995-20014. Moreover, table 4.5 showed the results of short-run panel ARDL and their coefficient results of all the countries by the Pool Mean Group estimations from 1995 to 2014. In Overall Country, the long-run results showed that the country's GDP growth and IMP import, OPN degree of openness have no longrun relationship that is statistically insignificance. The export (EXP) and the economic growth have no long-run relationship that is statistically insignificance. The dependent variable GDP growth and the inflation rate is cointegrated -0.0003663*** that also statistically significant at 1% level. The inflation rate caused cointegrating relationship at the speed of adjustment to equilibrium on the country's economic growth by 0.0003663. The rest variable exchange rate and GDP growth have a negative long-run relationship called a long run cointegrated -0.0000712** with the country's economic growth. The exchange rate caused cointegrating relationship at the speed of adjustment to equilibrium on the country's economic growth. From the short run results, the adjustment for the near term coefficient ECT is significant at 1% level while a move back to the equilibrium with the expectation coefficient is -1.5202***. The speed of adjustment error correction term is negative to attain statistical significance at conventional levels (p<0.01, 1%).

In Developing Country, the rate of adjustment for the short-run coefficient is statistically significant at 1% level, and its coefficient ECT is -1.548326*** to achieve statistical significance at conventional levels (p<0.01, 1%). The independent variables export, import and inflation, have no long-run relationship that is statistically insignificance. The degree of openness and economic growth has no short run relationship with economic growth that is statistically insignificant at 5% level. The negative correlation with economic growth and significant at 5% level. The negative exchange rate means at the speed of adjustment to equilibrium on the country's economic growth by -2.752959**. In the long run result, the export EXP(-0.00000***), and inflation INF(-0.0003258*) have a long negative run cointegrated with economic growth. The long term cointegration of import (-0.00000***), is convergence to the equilibrium by 0.000001*** to fulfil the statistically significant at (p>0.01, 1%)

In Developed Country, the short-run results showed that variables EXP, OPN and EXC the country's export and the GDP growth have no statistically insignificance relationship. The import IMP is positive that means the speed of adjustment to equilibrium on the country's economic growth by 0.000001*unit. The short-run results only the import variable IMP has a statistically significant at 10% level and positively related to economic growth. Among all the variables, the exchange rate the degree of openness and the inflation rate related to economic growth is statistically insignificant. The speed of adjustment for the short-run coefficient ECT -1.857096*** is statistically significant at 1% level confirmed that there is a long-run and short-run relationship between GDP growth and trading variables. According to the long run results, the long term cointegration of the export is convergence to the equilibrium by 0.000001*** and openness.141332*** to fulfil the statistically significant at (p>0.01, 1%).

The next section discusses the MG and DFE estimations. Then the author conducts the Hausman test after analysing the results from all three estimators MG, PMG, DFE to determine significant differences between these estimators.

4.6 Results of MG Estimations for Panel Level

The results of MG Estimations are reported by the following table 4.6 and 4.7; the long run results and short term results into three groups, Overall Country, Developed Country and Developing Country. Overall Country included all the thirteen countries that studied in this studies. The Developed Country included China, Korea, and Japan. Moreover, the Developing Country included for all the ASEAN 10 countries. The author tested all the variables by using PMG, MG, and DFE estimations and choose the best estimators by using Hausman Test. MG estimation allows the coefficient to vary, be heterogeneous in the long-run and short-run and not make any restrictions. After estimated, the data used in this research are not sufficient, so the author needs to test the data set with another approach to see the best estimators among PMG, MG, and DFE. The MG estimation is valid if there is a sufficient large T and N of the data. After tested MG estimations, the author compared the results of MG estimations and PMG estimation, PMG estimator is better than MG estimators, but we will confirm this by testing with Hausman test.

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GDPGR	Overall Country		Developed Country		Developing Country	
	Coefficient	P- values	Coefficient	P- values	Coefficient	P- values
EXP	-0.0000111	0.317	-0.000000001	0.669	-0.0000144	0.317
IMP	-0.0000814	0.317	0.00001	0.367	-0.0001058	0.317
OPN	-0.4069302	0.465	2048649	0.302	-0.4675498	0.522
INF	-0.1718378	0.436	2581898	0.330	-0.1459322	0.604
EXC	.6573577	0.725	0480109	0.721	.8689683	0.724

Table 4.6: Long-run Panel ARDL Results (MG Estimation)

Note: *, ** and *** represents significant level 10%, 5% and 1%

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GDPGR	Overall Country		Developed Country		Developing Country	
	Coefficient	P- values	Coefficient	P- values	Coefficient	P- values
EXP	000033	0.317	0.000000001	0.613	-0.0000428	0.317
IMP	0.000000001	0.317	-0.00000001	0.592	0.00000001	0.317
OPN	1.262208	0.379	.3532827	0.465	1.534886	0.413
INF	.3728702	0.433	-0.0949924	0.878	.5132289	0.391
EXC	.3728702	0.568	.4939621	0.385	2.379843	0.595
ECT	-2.096422***	0.000	-2.551186***	0.000	- 1.959993** *	0.000
Cons	.2063302	0.980	-5.141329	0.827	1.810628	0.843

Table 4.7: Short-run Panel ARDL Results (MG Estimation)

Note: *, ** and *** represents significant level 10%, 5% and 1%

According to the results of long-run and short-run MG estimations for the Developing Country and Developed Country, most of the variables are not statically significant at 10%, 5% and 1% confident level. The independent variables have no long-run relationship that is statistically insignificance. The error correction term (ECT) give out the negative coefficient and significant at 1% level for Overall Country (-2.096422***), Developed Country (-2.551186***), and Developing Country (-1.959993***). The speed of adjustment for the short-run coefficient ECT -1.857096*** is statistically significant at 1% level. The Appendix of this paper provides the detailed test results.

4.7 Results of DFE Estimations for Panel Level

In this section, the author tested the same variables set with the same model by using DFE estimations. Moreover, DFE results are very similar to PMG estimation results. Table 4.7 and 4.8 reports the results of a long run and short term DFE estimations.

GDPGR	Overall Country		Developed Country		Developing Country	
	Coefficient	P- values	Coefficient	P- values	Coefficient	P- values
EXP	-0.0000001	0.880	-0.0000001	0.696	- 0.000001**	0.014
IMP	0.0000001	0.991	0.00000001	0.942	0.000001**	0.010
OPN	.0009955	0.922	-0.0014353	0.949	-0.0013647	0.901
INF	-0.0002087	0.316	.3763103*	0.084	- 0.0003629*	0.090
EXC	-0.0000784	0.653	-0.001582	0.687	-0.0001313	0.448

Table 4.8: Long-run Panel ARDL Results (DFE Estimation)

Sources: Author's own design ights reserved

GDPGR	Overall Country		Developed Country		Developing Country	
	Coefficient	P- values	Coefficient	P- values	Coefficient	P- value s
EXP	0.000000	0.283	0.00000001	0.193	0.0000001	0.428
IMP	-0.000000	0.610	-0.00000001	0.552	-0.0000001	0.733
OPN	-0.0395124	0.168	-0.1349118	0.263	-0.0507188	0.150
INF	.0000673	0.968	-0.4494657	0.219	-0.0002032	0.904
EXC	-0.0014103	0.001	-0.0061855	0.463	- 0.001283***	0.007
ECT	-1.754007***	0.000	-2.041873***	0.000	- 1.781634***	0.000
Cons	10.32206***	0.000	11.68665***	0.009	11.21006***	0.000

Table 4.9: Short-run Panel ARDL Results (DFE Estimation)

Note: *, ** and *** represents significant level 10%, 5% and 1%

Table 4.7 reports the long-run results of Overall Country, Developed Country, and Developing Country. All the variables are statistically significant, but some are positive long run cointegration, and some have negative long run cointegration with economic growth. The short-run results of DFE and PMG are very similar, and they are also mostly the same with PMG. The error correction term form Overall country (-1.754007***) Developed Country(-2.041873***) and Developing Country (-1.781634***are statistically significant at 1% level the negative coefficient confirm there are a short run and long run relationship between GDP growth and it macro economic variables. According to Hausman test results, author choice the best estimator by testing Hausman test and confirmed among MG, PMG, and DFE.

4.8 Hausman Test Results between MG, PMG and MG, DFE and PMG, DFE

Hausman test is applied to test the three estimators that already discussed in the above sections whether there are significant differences between them. According to the given results before testing with Hausman test, PMG can be considered a better estimator than the other two. The null hypothesis H0 of Hausman test is that difference between Pooled Mean Group, and Mean Group is insignificant, or between Pooled Mean Group and Dynamic, Fixed Effects is not significant. If the p-value is greater than 5% significance level and the null is not rejected, then the recommended efficient estimator is PMG. The alternative hypothesis Ha is that the difference between Pooled Mean Group and Mean Group is significant or Pooled Mean Group and Dynamic Fixed Effects is significant then the null hypothesis H0 is rejected, and Ha is accepted. If the P-value is not significant at 5%, it means PMG is the best estimator among three. Otherwise, MG or DFE estimator is appropriate and becomes the best estimator. The following table 4.9 showed that the results of Hausman test for choosing the best estimators between PMG, MG and PMG, DFE.

lausman Test	Results
	Iausman Test

Hausman Test			
ຄີບ	Overall	Developing	Developed
MG and PMG	0.9243>0.05	0.9468>0.05	0.0000<0.05
MG and DFE	0.9281>0.05	0.9624>0.05	0.0000<0.05
Decision	PMG	PMG	PMG

Sources: Author's design

The statistical hypotheses test alternative hypothesis "Accept alternative hypothesis" or to reject the null hypothesis. The result shows that PMG offers the best estimator available among three estimators as the p-value is significant as P < 0.05 level and the statistical hypotheses can reject the null hypothesis². The table shows the Hausman test results. MG and DFE are not significant as P < 0.05 level so the statistical hypotheses cannot reject the null hypothesis. The p-value of MG and PMG are greater than 5%, and the difference between DFE and MG showed that p-value is higher than 5% for Overall and Developing Country. For Developed Country, the p-value is less than 5% of the difference between MG and PMG, and MG and DFE. Among the three countries, the result confirmed PMG is the most appropriate for this research for both long-run and short-run.

4.9 Results of PMG Estimation for Individual Country Level for Developing

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Country

In this section, the author characterised the PMG estimations to test short run coefficients of the individual countries. After testing with the Hausman test to confirm which estimators are the best for this study, the author concluded that the PMG estimation is appropriate. After that, the author conducts full PMG estimator as it is the best estimator among the three estimators and test the short run individual country coefficient and their effects of export, import, openness, inflation, and exchange rate on the economic growth. The following table 4.10 will show the PMG estimation results for the individual countries in this study.

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² Explain in Chapter 3

Table 4.11: Short Run Panel ARDL results of PMG Estimation for Developing

 Country: ASEAN

GDP	Cambodia	Laos	Myanmar	Vietnam	Thailand
GR					
EXP	0.00000	0.000000003	0004016	0.0000000	0.00000
	(0.454)	***	(0.553)	(0.736)	(0.855)
		(0.000)		` ,	
IMP	-0.0000	0.000000002		0.00000	0.00000
	0.00000	***	0.0008696*	0.000000	0.000000
	(0.509)		*	(0.685)	(0.506)
		(0.009)	(0.021)	3.31	
			(0.031)	3	
OPN	10.63621	1734966***	-2.638576	.0663347**	-0.2035517
	(0.304)	(0.000)	(0.556)	(0.029)	(0.240)
INF	.0626895	.0370949***	.0459821	-0.0002067	1.284917*
	(0.296)	(0.000)	(0.158)	(0.509)	*
		CAL.	BOD GO	S//	(0.030)
EXC	-0.0002852	-0.0004024	0.0065482	-	-
	(0.956)	(0.123)	(0.108)	0.1337728**	1.163009*
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	Copyri A I I	ght [©] by C right	hiang Mai s res	(0.000)	(0.054)
ECT	1.238533***	-1.938669***	2768009	-	-
	(0.000)	(0.000)	(0.237)	0.8743361**	2.138859*
				*	**
				(0.000)	(0.000)
Const	11.11607***	15.19388***	3.188947	10.63677***	12.825***
ant	(0.001)	(0.000)	(0.296)	(0.000)	(0.000)

Sources: Author's own design, Note: *, ** and *** represents significant level 10%, 5% and 1%

Table 4.11: Short Run Panel ARDL results of PMG Estimation for Developing

 Country: ASEAN

GDPG	Indonesia	Malaysia	Singapore	Brunei	Philippines
R					
EXP	-	0.000000	-0.000000	0.000000000	0.0000000
	0.000000002	(0.212)	(0.434)	7***	005***
	(0.734)			(0.004)	(0.012)
IMP	0.0000000	-0.0000000	0.000000	-	-
	(0.361)	0.183	(0.130)	0.00000003	0.0000000
	/ .	NV. D	1/2 °	***	03
	Der 1			(0.007)	(0.136)
OPN	-0.3708621**	-0.0604046	-0.163549**	.045459	-0.0047032
	(0.021)	(0.597)	(0.021)	(0.513)	(0.976)
INF	.2301349**	.4572494	-1.5062	181	.1776154
	(0.023)	(0.424)	(0.198)	0.8888826** *	(0.612)
		MAIL	NIVERS	(0.001)	
EXC	-0.001298	-7.963188**	-10.97037	-7.035478	-0.2683335
	(0.382)	(0.030)	(0.675)	(0.307)	(0.413)
ECT	-1.420661***	right	s-res	erved	-
	(0.000)	1.961052***	2.379156**	1.245966***	2.009225*
		(0.000)	*	(0.000)	**
			(0.000)		(0.000)
Consta	8.013313***	17.31673***	23.76746**	3.790218***	9.363714*
nt	(0.001)	(0.000)	*	(0.003)	**
			(0.004)		(0.002)

4.9.1 Cambodia

According to the above ECT results for Cambodia, shows that the error correction term is significant at 1% level while the adjustment to long run coefficient back to the equilibrium with an expectation of 1.238533***. All the Cambodia variables are statistically insignificant. Therefore, there is no short run relationship between economic growth and determinants for the case of Cambodia due to statistical insignificance. Economic growth and export, import, openness, inflation and exchange rate for Cambodia in that short run relationship stated statistically insignificant.

4.9.2 Laos

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The findings for Laos shows that the adjustment for the ECT coefficient is significant at 1% level while the adjustment to long run coefficient back to the equilibrium with an expectation of -1.938669^{***} . Exchange rate for Laos in that short term relationship stated statistically insignificant. The export is positive, means that 1unit increase in the export tends to increase 0.000000003^{***} unit on economic growth of Laos to attain the statistically significant at conventional level (p<0.01, 1%). The degree of openness is negative, means that 1unit increase in the degree of openness tends to decrease $-.1734966^{***}$ unit on economic growth of Laos to attain the statistically significant at conventional level (p<0.01, 1%). The import is positive, means that 1unit increase in the import tends to increase0.000000002^{***} unit on economic growth of Laos to attain the statistically significant at conventional level (p<0.01, 1%). The inflation rate is positive, means that 1unit increase in the inflation rate tends to grow 0.0370949^{***} unit on economic growth of Laos to attain the statistically significant at conventional level (p<0.01, 1%).

4.9.3 Myanmar

According to the above ECT results table of Myanmar, the adjustment to long run coefficient is insignificant, and ECT determinant is -.2768009(0.237). Therefore, it can be said that there is no short term relationship between economic growth and determinants for the case of Myanmar due to the statistically insignificant. Economic growth and export, import, openness, inflation and exchange rate for Myanmar in that short run relationship stated statistically insignificant.

4.9.4 Vietnam

As for Vietnam, the error correction term ECT as the adjustment to long run coefficient is significant at 1% level of an expectation of -0.8743361^{***} . The exchange rate is negative, means that 1unit increase in the exchange rate tends to decrease -0.1337728^{***} unit on economic growth of Vietnam to attain the statistically significant at conventional level (p<0.01, 1%). The degree of openness is positive, means that 1unit increase in the degree of openness tends to grow 0.0663347^{**} unit on economic growth of Vietnam to attain the statistically significant at conventional level (p<0.05, 5%). Economic growth and export, import, and inflation for Vietnam in that short run relationship stated statistically insignificant.

4.9.5 Thailand

According to Thailand, the ECT results of the adjustment to long run coefficient by using PMG estimator shows the adjustment for the short term coefficient is significant at 1% level and while moving back to the equilibrium with the expectation coefficient -2.138859^{***} . Export, import and the degree of openness are statistically insignificant in the short run. The inflation is positive, means that 1 unit increase in the inflation tends to grow 1.284917^{**} unit on economic growth of Thailand to attain the statistically significant at conventional level (p<0.05, 5%). The exchange rate is negative, means that 1 unit increase in the exchange rate tends to decrease -1.163009^{**} unit on economic growth of Thailand to attain the statistically significant at conventional level (p<0.05, 5%). Therefore, inflation and exchange rate are important factors in the economic growth of Thailand in the short run.

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In the error correction term ECT results of Indonesia, the adjustment to long run coefficient is statistically significant at 1% level, and the equilibrium expectation is -1.420661***. The determinant of export, import and the degree of openness related to GDP growth are statistically insignificant. Therefore, the degree of openness is negative, means that 1unit increase in the degree of openness tends to decrease - 0.3708621** unit on economic growth of Indonesia to attain the statistically significant at conventional level (p<0.05, 5%). Moreover, the inflation rate is positive, means that

1 unit increase in the inflation rate tends to grow $.2301349^{**}$ unit on economic growth of Indonesia to attain the statistically significant at conventional level (p<0.05, 5%).

4.9.7 Malaysia

According to the ECT results of Malaysia, the adjustment to long run coefficient is significant at 1% level of the equilibrium expectation is -1.961052^{***} . Economic growth and export, import, inflation and degree of openness for Malaysia in that short run relationship quantified statistically insignificant. The exchange rate-7.963188** (0.030) is negative, means that 1unit increase in the exchange rate tends to decrease 7.963188** unit on economic growth of Malaysia to attain the statistically significant at conventional level (p<0.05, 5%).

4.9.8 Singapore

The findings of Singapore show that the adjustment to a long run for the ECT coefficient is significant at 1% level while looking back to the equilibrium with the expectation coefficient is -2.379156^{***} . Economic growth and export, import, inflation and exchange rate for Singapore in that short run relationship stated statistically insignificant. The import of Singapore related to GDP growth in the near future is statistically insignificant. The degree of openness is negative, means that 1unit increase in the degree of openness tends to decrease -0.163549^{**} unit on economic growth of Singapore to attain the statistically significant at conventional level (p<0.05, 5%).

4.9.9 Brunei สถาธิบหาวิทยาลัยเชียงไหม

As for Brunei, the results of ECT estimations by using PMG estimator showed that the speed of adjustment to long run coefficient is -1.245966^{***} and statistically significant at 1%. It means that there is a long term and short term relationship between economic growth and export, import, openness, inflations, and exchange rate in Brunei due to the speed of adjustment term is negative and significant. The export and the degree of openness are positively related to economic growth and statistically significant at 1% level of Brunei's export. The export is positive, means that 1unit increase in export tends to grow 0.000000007***unit on economic growth of Brunei to attain the statistically significant at conventional level (p<0.01, 1%). The import is negative, means that a 1 unit increase in import tends to decrease - 0.00000003^{***} unit on economic growth of Brunei to attain the statistically significant at conventional level (p<0.01, 1%). Moreover, the inflation rate is negative, means that a 1 unit increase in inflation tends to decrease -0.8888826^{***}unit on economic growth of Brunei to attain the statistically significant at conventional level (p<0.01, 1%).

4.9.10 Philippines

The PMG estimation ECT results of Philippines indicates the adjustment to long run coefficient -2.009225*** is statistically significant at 1% level, it can be said that there is a short term the adjustment to long term between economic growth and its determinants for the case of Philippines. Economic growth and export, import, openness, inflation and exchange rate for Philippines in that short run relationship stated statistically insignificant.

4.10 Results of PMG Estimation for Individual Country Level for Developed

Country

In this section, the author characterized the PMG estimations to test short run coefficients of the individual countries. After tested with Hausman test to confirm which estimators is the best for this study and found out PMG estimation is the appropriate for this study. After that the author conducts full PMG estimator as it is the best estimator among the three estimators and test the short run individual country coefficient and their effects of export, import, openness, inflation, and exchange rate on the economic growth. The following table 4.12 will showed the PMG estimation results for the individual countries in this study.

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Table 4.12: Short Run Panel ARDL results of PMG Estimation for Developed Country: China, Korea, Japan

GDPGR	China	Korea	Japan
EXP	-	0.000000	- 0.000000
	0.000000000 7	(0.898)	(0.518)
	(0.159)		
IMP	0.000000000	0.00000	0.00000
	1***	(0.444)	(0.655)
	(0.000)	Nº DOLO	2 232
OPN	- 8.	-0.2414416	.178245
	0.1428945**	(0.498)	(0.761)
	* 583	and the state	
	(0.062)	W	\mathcal{L}
INF	- 12	- M	.7804273
	0.3539945**	4.125963***	(0.255)
	*	(0.000)	IVER5.
	(0.000)		
EXC	1.610347	.0294788	.0954049
	(0.453)	(0.221)	(0.466) University
ECT	-	4090829	-
	2.373138***	(0.262)	2.789066***
	(0.000)		(0.000)
Constant	7.84909***	-8.761297	-7.25419
	(0.000)	(0.259)	(0.193)

Sources: Author's own design, Note: *, ** and *** represents significant level 10%, 5% and 1%

4.10.11 China

The findings of Japan point out that the speed of adjustment to long run ECT results is -2.373138^{***} (0.000)significant at 1% level. Exports are negatively related with economic growth and statistically insignificant. The import is positive, means that 1unit increase in the import tends to increase 0.0000000001^{***} unit on economic growth of China to attain the statistically significant at conventional level (p<0.10, 10%). The degree of openness is negative, means that 1unit increase in the degree of openness tends to decrease -0.1428945^{***} unit on economic growth of China to attain the statistically evel (p<0.1, 1%). The inflation is negative, means that 1unit increase in the inflation tends to decrease -0.3539945^{***} unit on economic growth of China to attain the statistically significant at conventional level (p<0.1, 1%). Economic growth and exchange rate for China in that short run relationship understood statistically insignificant.

4.10.2 Korea

The author tested the relationship of economic factors and GDP growth in Korea. According to the ECT results of PMG estimation said that the adjustment of relationship to long run is - statistically insignificant.4090829(0.262). The speed of adjustment for the long run coefficient ECT between economic growth and its determinants for the case of Korea due to the speed of adjustment is statistically insignificant. Economic growth and inflation -4.125963*** (0.000)to attain the statistically significant at conventional level (p<0.1, 1%). Economic growth and export, import, openness, and the exchange rate for Korea in that short run relationship understood statistically insignificant.

4.10.3 Japan

As for Japan, the results of short run estimation by using PMG estimator show the same as Korea. The speed of adjustment to a long run for ECT results coefficient is -2.789066*** (0.000) that means statistically significant. Therefore, the speed of adjustment for the long run coefficient ECT between economic growth and its determinants for the case of Japan due to the speed of adjustment is statistically significant. Economic growth and export, import, openness, inflation and exchange rate for Japan in that short run relationship understood statistically insignificant

