

《Chapter 2》 Convergence and Experiences

# Industrial Growth and Development in Thailand 1980-2010: A Lesson Learned for CLMV

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**Abstract** We examined sources of industrial growth and the causes of structural change in the manufacturing sector using Input-Output Tables of Thailand during 1980-2010. After the Asian Financial Crisis in 1997, the output growth of almost all industries was deteriorated. The domestic demand expansion had been shrunk but export expansion had replaced as main sources of industrial growth in Thailand. In summary, the Thai manufacture has progressed and dense in its inter-industrial relationships over the period of 1995-2010. For CLMV, the experiences of Thailand may indicate that the external fluctuation was uncontrollable as external demand's disruption is not foreseeable. The Mekong economy may reap the benefit from joining the WTO and looking intra-ASEAN market to reach the optimal scale of production. The next step, in order to join the Global Value Chain, the Mekong country would need to invite foreign direct investment from the counterparty, especially, ASEAN, Thailand, China, Japan and East Asia respectively. The domestic production would require an upgrade of their product quality to meet global standard. In order to be able to catch up with Thailand, other ASEAN, the CLMV would need to nurture her labor skills and improve the technology appropriately.

**Keywords** Industrialization and development policy, Sources of growth and structural change, Thailand, Mekong Economy, Cambodia, Laos, Myanmar, and Vietnam.

**JEL Classification** O47, O67, L16

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## 1 Introduction

The Mekong economy<sup>2</sup> has shown a remarkable growth potential during the last decade. The sources of growth are due to the net inflow of the FDI and the openness of trade liberalization. The Mekong economy is looking forward to further growth potential. The trade deepening and industrial development would be key determinants to sustainable growth. During 1980-2010, the Mekong economy has witnessed a diminishing of agriculture share but rapidly growing of industrial and service share respectively. Vietnam has significant growth and share of the industry and trade, especially after joining the WTO in 2007. Myanmar as a new comer has improved her export share and entering in the process of import substitution (See Table 1).

This paper would like to study the experiences of industrial development in Thailand that may be beneficial to the Mekong economic development in the next decade. Thailand had both success and failure which may be a good example for further development planning. The second section describes the stylized facts of the Mekong's relative competitiveness with RCA indicator such we will understand their current position of trade and industry. In the third section, we will estimate the *sources* of growth and the *causes* of structural change in industries in Thailand during 1980-2010. In the last section, the author will compare the national industrial policy of the Mekong economy for discussion and policy implication to the Mekong economy.

**Table 1** Comparative economic indicators in GMS countries, 1980, 2010 (constant price, 2005)

Indicators	Cambodia		Lao PDR		Myanmar		Vietnam		Thailand		ASEAN	
	1980	2010	1980	2010	1980	2010	1980	2010	1980	2010	1980	2010
Population (million)	6.7	14.4	3.3	6.3	34.5	51.7	54.4	88.4	47.4	66.7	358.1	595.6
GDP per capita	182.9	605.2	187.8	637.0	84.3	392.1	209.0	886.0	921.7	3410.4	n.a.	n.a.
Agriculture share (% of GDP)	47.1	30.7	50.7	29.8	59.4	37.9	36.3	20.7	16.8	8.3	17.2	9.5
Industrial share (% of GDP)	11.0	21.5	11.4	28.5	8.2	24.0	21.2	35.1	28.4	40.0	39.0	38.5
Services share (% of GDP)	44.0	42.5	37.1	42.3	33.5	37.5	42.4	46.0	55.6	51.6	42.5	52.6
Export share (% of GDP)	1.7	76.5	3.9	26.9	17.5	18.7	25.9	79.8	20.0	72.9	37.4	82.5
Import share (% of GDP)	14.8	88.0	10.6	31.8	92.9	24.1	28.4	94.7	31.3	67.1	35.4	74.2
Trade Openness Ratio	16.5	164.6	14.5	58.7	110.4	42.8	54.3	174.4	51.3	139.9	72.8	156.7

Note: Excluding Southern PRC (Guangxi, Yunnan)

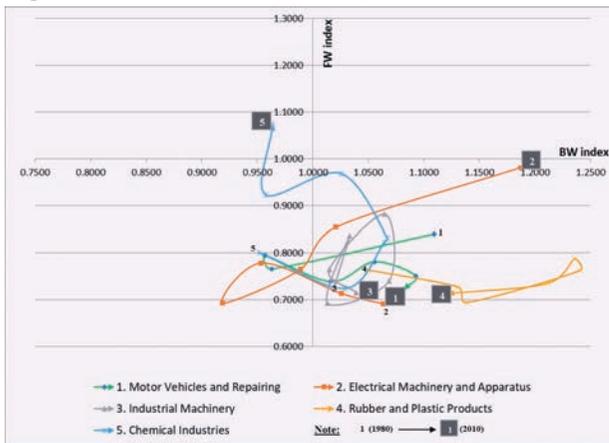
Source: UNCTAD-Stat, accessed April 2018. (available at <http://unctadstat.unctad.org>)

<sup>2</sup> Greater Mekong Subregion or GMS consists of Cambodia, Lao PDR, Myanmar, Vietnam, Thailand and Southern PRC (Guangxi, Yunnan).

## 2 The competitiveness of the Mekong economy

Thailand as a forerunner of the Mekong industrial development had a success record of the automobile, transport equipment, electronics and electrical machinery, chemical and machinery industrial growth during the last decades. The automobile and transport equipment have their value-added 9.3 percent of the total manufacturing GDP in 2010. It is the 3rd largest followed the electronic and food processing industry. One of the indicators to show the strengths of industrial development in Thailand is to compare the backward and forward linkages of production among industries. In Thailand, the development of the automobile and transport equipment industry was identified as "key" or "leading" sectors. It would have a direct and indirect linkage with up and down streams within the group of related sectors and spatial clusters. According to Miller and Blair (1985) we have estimated the backward and forward linkage of Thai industry during 1980-2010 (See Fig. 1). It is clearly shown that the selected sector of manufacturing in Thailand had backward & forward linkages<sup>3</sup> within domestic upstream - downstream. It had created supply chains among the inter-industrial relationship domestically. The chemical industry had been developed in forwarding linkages with downstream industries. Backward linkage was significantly advanced in the machinery, rubber and plastics and chemical industry. The automotive industry had high improvement in backward linkages with domestic suppliers such as a linkage with steel, petrochemical, plastic, tire & rubber, electrical and electronics as well as some other supporting industries such as mold, dies and compounds respectively<sup>4</sup>. However, it had a moderate in forwarding linkages as it has exploited the opportunity of vibrant export during the last decades.

**Fig.1** Backward and forward linkage effect of manufacturing in Thailand, 1980-2010.



Source: Author's calculation

3 Forward and backward formula sees Miller and Blair (1985) pp.322-325

4 Within Tier 1 (from total 3 tiers) category-manufacturers, leading automotive parts manufacturers are from Japan, EU, and the USA.

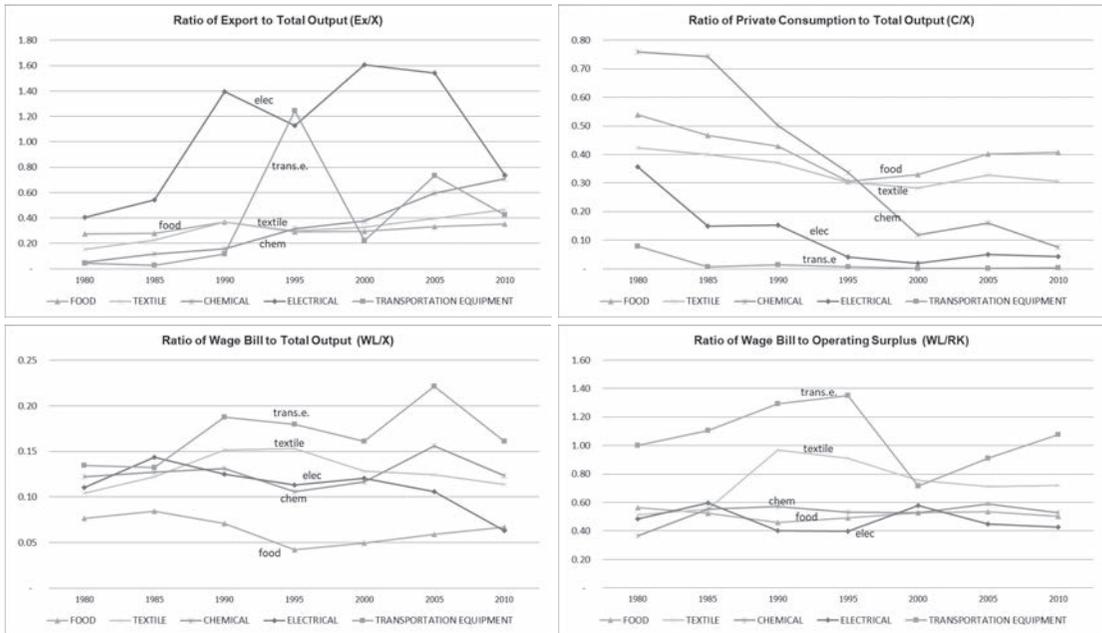
The policy of Thai government had promulgated the Investment Promotion Act 1977 (amended 1987). This policy had been favorable to automobile and transport equipment growth. The industry was permitted to have a 100% ownership of capital. During the period, Thailand still had an abundant labor force with reasonable wages cost. The realignment of Japanese Yen after the Plaza Accord in 1985' had also motivated the Japanese firms to relocate their production base into Thailand. As a result, the influx of foreign investment had built the whole supply chain of industry in Thailand. The investment climate had a favorable impact on the chemical industry as well. The value-added share of Chemical industry in total manufacturing was enlarged from 3 percent in 1990 to 7.3 percent in 2010 respectively.

It should be noted that the Food processing industry in Thailand had expanded significantly. It is the backbone of the Thai industry, especially for Thai capital investment. It has a high linkage with the production of the agriculture sector. The latter has supplied quality industrial inputs for the food processing industry. Several Thai origin companies had expanded to the world scale. More importantly, these companies had relocated to the neighboring countries of Mekong as a result of the high wage cost and seeking further supply chains as well as expanding the market base for their products.

The private consumption (C/X ratio) of food and textile has declined from 40-50 percent in 1980 to 30 percent in 1995. This might be a normal shifting of consumption bundle away from non-durable goods due to the income effect as income rising. The private consumption of automobile and transport equipment was quite stable and less than 10 percent of gross output. This may be owing to significant increased in gross output, and mostly destined for the export market. Similarly, the consumption-gross output ratio of electrical machinery and electronics decreased as they are destined for export to the rest of the world as well. After the Asian financial crisis in 1997, consumption of food industry has recovered. This is consistent with the gradual increase of export-output ratio (Ex/X) of food and textile during 1980-2010. The food industry was not sensitive to both Asian and Global financial crisis in 1997 and 2008 respectively. On the contrary, the export-output ratio (Ex/X) of transportation equipment, and electrical machinery and electronics were sensitive to the fluctuation of world demand. The chemical product export-output ratio has risen during 1980-2010. It did not subject to world demand fluctuation. Most of the chemical product is destined for the export market as seen from a declining share of domestic private consumption.

The industrialization in Thailand during 1980-2010 can be judged from the cost of the production side. The wage cost measured by wage bill-gross output ratio of food, chemical, electrical machinery and electronics during 1985-1995. This signifies the cost-effectiveness of the sector to produce output i.e., the rising competitiveness of food and chemical production in Thailand. The other sectors like textile and garments, automobile and transport equipment had their wage bill-gross output ratio increase during the same period. This implies a losing competitiveness. This is confirmed by the rising of wage bill- profit ratio in the right figure. During 1995-2010, there may have a structural change in these two sectors. It can be seen from the decreasing of the ratio. We witnessed the capital deepening of the automobile and transport equipment as well as the textile and garment production in Thailand to level up their competitiveness

**Fig.2** Production structure of manufacturing in Thailand, 1980-2010 (Measured in the constant price of 2010).



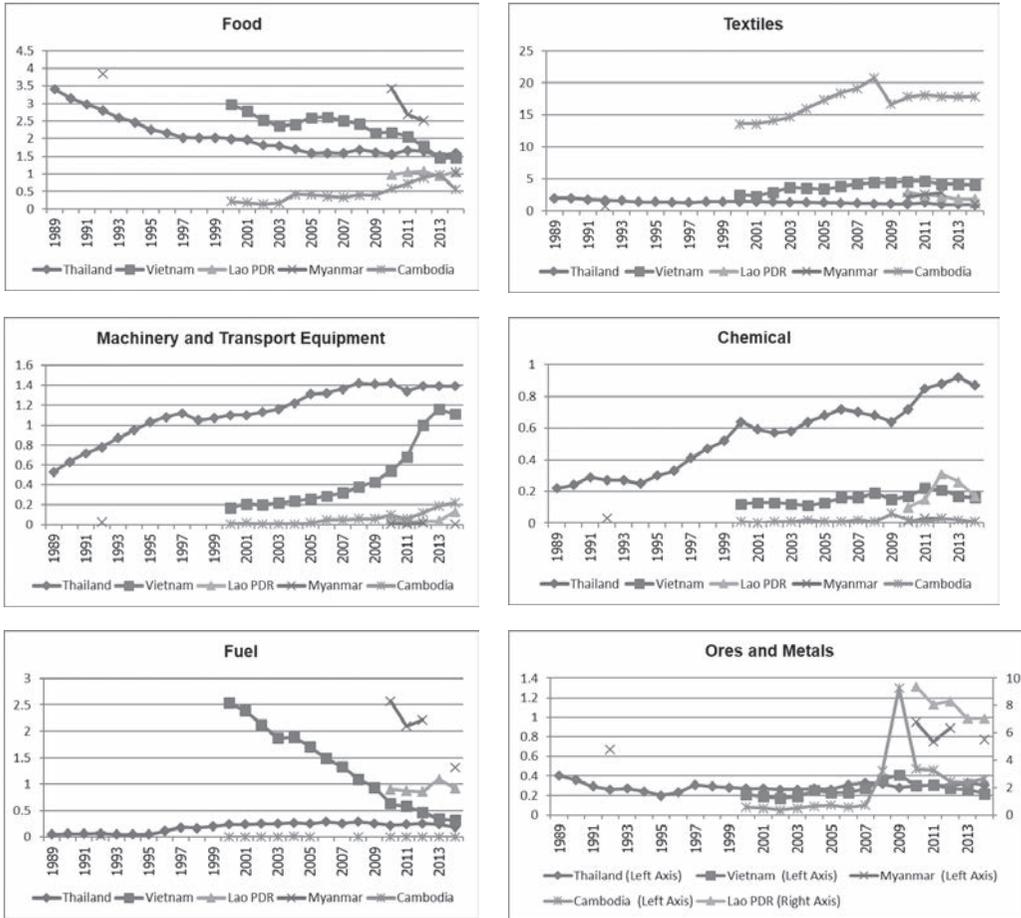
Remark: Selected leading industries.

Source: Input-Output Table of Thailand, NESDB (accessed August 2018)

with new technology. The rest of sectors have more stable wage-profit ration over the period i.e., capital deepening occurred correspondingly with the rising wage bill.

We have drawn the estimation of the revealed comparative advantage (RCA) which composed as the ratio of a country export of product j-th to the world market divided by the total export to the rest of the world 1990-2015 by WITS (2018) below in Fig. 3. The Mekong economy has her RCA of food export decline over time. For Thailand, it is noted that the machinery, transport equipment and chemical export has shown a rising competitiveness. Vietnam has her RCA increase rapidly in machinery and transport equipment 2005-2013. Cambodia has shown strong competitiveness in textiles garments and food wears export to the world market. Export from Cambodian has been subjected the world financial crisis in 2008. Laos has very high RCA in ores, metals and natural resources. Lastly, Myanmar is competitive in foods export, oils & gas and ores & metals as well as natural resources too.

**Fig.3** Comparative advantage of manufactured exports of GMS countries, 1990-2015 (RCA Index)



Notes: 1) Revealed Comparative Advantage (RCA Index)  $RCA_{ij} = (x_{ij}/X_{it}) / (x_{wj}/X_{wt})$   
 where  $x_{ij}$  and  $x_{wj}$  are the values of country  $i$ 's exports of product  $j$  and world exports of product  $j$  and  
 where  $X_{it}$  and  $X_{wt}$  refer to the country's total exports and world total exports.

2) Excluding PRC (Guangxi, Yunnan)

Source: Compiled data from the World Integrated Trade Solutions database (WITS), World Bank, (accessed October 2018)

### 3 Analysis of the pattern of industrial growth in Thailand 1980-2010

#### 3.1 Literatures

Chenery (1960) has estimated the *Pattern of Industrial Growth* of 38 countries during 1950-1956. Later, Akrasanee (1973), Chenery and Syrquin (1975), Dervis, De Melo, and Robinson (1982), Chen and Fujikawa (1992) had attempted to analyze the pattern of industrial growth. Haraguchi (2015) illustrated patterns of structural change in Thailand during 1963-2007 with panel data analysis, fixed effects, of 75-110 countries, 18 manufacturing industries, representing two sub-periods (1963-1980 and 1991-2007).

The study has applied real manufacturing value-added per capita with real GDP per capita and employment. He concluded that low-technology and labor-intensive industries (such as food and beverages, textiles and apparels) rapidly develop at a relatively early stage of development. As a country moves through the upper middle to the high-income range, the dominant industries change from early to middle industries (such as basic metals) and then to late industries (such as electrical machinery and apparatus) with an increased capital and technology intensity in manufacturing production as a whole.

Limskul (1999) investigated the situation and structure of leading supporting industries in Thailand in 1996 by conducting questionnaire surveys and in-depth interviews. He stated that the roles of transport equipment and electrical machinery and supplies were very important supporting industries of Thailand in terms of output, value added share and employment. This study also described major problems concerning industrial structural change after the Crisis 1997, one problem was low quality and irregularity of supplies and raw materials both supplied domestically and imported from abroad.

Nguyen and Chen (2016) applied composition methodology with 14 production sectors in Vietnam during 2 sub-periods of 1996-2000 and 2000-2007. The author concluded that machinery, mining and financial sectors were the newborn industry of Vietnam after 2000, which caused intermediate demand to shift toward a direction in favor of these industries. However, some other important sectors of the economy continued to lag behind or occasionally decrease such as textiles, agriculture service, travel services, trade, and rice processing.

National Economic and Social Development Board of Thailand (2017) applied Inter-Country Input-Output 2011 (ICAO) of OECD's 18 production sectors and compared the mean of labor productivity and forward-backward index to observe the status of Thai manufacturing in Global Value Chains (GVCs). This study revealed that most of the manufacturing in Thailand are in downstream of the global GVCs. However, comparing among 8 newly industrial developing countries in Asia (Asia-8): Thailand, South Korea, Taiwan, China, Malaysia, India, Indonesia, and Vietnam, some industries such as food manufacturing and textile and apparels industry are upstream of the Asia-8 GVCs. Machinery and textile and apparels industry have their labor productivity and ability to develop also upgrade for further industrial growth. (See Table 2).

**Table 2** Status of Thai manufacturing in GVCs

Manufacturing	Comparison with Mean of Labor Productivity, Asia-8)		Status in GVCs (FW-BW Index)	
	Level	Forerunner(s)	GVCs (Global)	GVCs (Asia-8)
1) Machinery	above	S.Korea	downstream	midstream
2) Textile and apparels	above	S.Korea, Taiwan	downstream	upstream
3) Automobile	mean	S.Korea, Taiwan, China	downstream	downstream
4) Electric appliance	mean	S.Korea, Taiwan	downstream	midstream
5) Rubber and plastics	under	S.Korea, Taiwan, Malaysia	downstream	downstream
6) Food manufacturing	under	S.Korea, Taiwan, Malaysia	downstream	upstream

Source: NESDB (2017) "Position of Thai's production sectors in Global Value Chain and impacts analysis from economic policy launched by major countries", in NESDB, Proceeding of a conference of Input-Output Table 2017, Chapter 2, pp.70-73.(in Thai)

### 3.2 Model

In this section, our sources of output growth and causes of structural change model follows Dervis, De Melo, and Robinson (1982), and Chenery, Robinson, and Syrquin (1986). The material balance equations for the supply of and demand for domestically produced goods is shown as:

$$X_i = d_i (F_i + V_i) + E_i \quad \text{-----} \quad (1)$$

where (dropping the  $d$  superscriptions)

- $X_i$  domestic production in sector  $i$
- $d_i$  ratio of domestic demand for domestically produced goods to total domestic demand
- $F_i, V_i, E_i$  final demand, intermediate demand, and exports

We can explain the source of output growth in the matrix notation of the material balance equation (without the superscripts);

$$X = (I - \hat{D}A)^{-1} (\hat{D}F + E) \quad \text{-----} \quad (2)$$

- where;  $\hat{D}$  diagonal matrix of the  $d_i$  ratios,
- $A$  matrix of input-output coefficients, and
- $X, F,$  and  $E$  vectors of gross output, final demand, and export
- $\hat{D}A$  the matrix of domestic goods input-output coefficient

Denoting the change in a variable by  $\Delta$  [ $\Delta X = X(t+1) - X(t)$ ], the change in total gross output can be contributed by change in (i) domestic demand expansion, (ii) export expansion, (iii) import substitution, and (iv) change in input-output coefficients or technological change. It can be written as

$$\Delta X = R_1 \hat{D}_1 (\Delta F) + R_1 (\Delta E) + R_1 (\Delta \hat{D}_1) (F_2 + V_2) + R_1 D_1 (\Delta A) X_2 \quad \text{----} \quad (3)^*$$

In addition, the causes of structural change are defined as the deviation from the proportional growth of output of sector  $i$  -th

$$\delta X_i^2 = X_i^2 - \lambda X_i^1 \quad \text{-----} \quad (4)$$

- where;  $\lambda$  ratio of total gross national product (GNP) in period 2 to GNP in period 1.
- the superscripts 1 and 2 refer to a time period

The material balance equation in deviation form of the *non-proportional* output growth in (3) as  $\delta X = R_1 \hat{D}_1 (\delta F) + R_1 (\delta E) + R_1 (\Delta \hat{D}_1) (F_2 + V_2) + R_1 D_1 (\Delta A) X_2 \quad \text{-----} \quad (5)^{5 **}$

We apply the input-output tables of Thailand 1980-2010 published by NESDB<sup>6</sup> (various issues) and estimate the sources of growth and causes of structural change defined above. I-O tables in constant

5 Formula sees Dervis, De Melo, and Robinson (1982), pp. 93-95

6 The National Economic and Social Development Board of Thailand (NESDB)

prices of 2010 were obtained using the GDP<sup>7</sup> deflators by construction. It is assumed that the price of value added i.e., wage and rental rate and the unit value of total input or producer price of gross output by sector is moving in the same direction at equilibrium. It is sufficient to analyze the direction of the sources of growth and causes of structural change over time.

### 3.3 Empirical results

In Thailand, the gross output growth was 8.2 percent during 1980-1995. It has declined to 4.7 percent during 1995-2010. Thus, the sources of industrial growth in Thailand were mainly determined by the domestic demand expansion as compared with export expansion and import substitution. The electronic and electrical machinery, transport equipment, rubber and plastic, and textile had contributed manufacturing growth in Thailand. The growth of gross output of these industries was 17.4, 13, 9.4 and 8.6 percent respectively. It can be observed that transport equipment's domestic demand (141.5% contribution) and export (128.2% contribution) had been a significant source of industrial growth. These industries had significant backward linkage as mentioned earlier. Thailand had benefited from the rising competitiveness as shown by RCA of these sectors.

After the Asian Financial Crisis in 1997, the output growth of almost all industries was deteriorated. The domestic demand expansion had been shrunk but export expansion had replaced as main sources of industrial growth in Thailand. This is because the substantial devaluation of the Thai baht owing to the AFC in 1997. This had increased Thai competitiveness in export. Most of the sector has responded positively to the GFC except the textile sector. The textile and garments have relied on the imports and showing declining industry as result of the relocation of industry to neighbors. The rising wage rate in Thailand has forced a relocation of textile industries to neighboring countries. The RCA of textile manufacture in Thailand has been dropped as compared to Cambodia (See Fig.3). Industrial performance and competitiveness of the petroleum refinery, chemical, and mining and quarrying (extraction of crude oil and natural gas) have shown significant growth. However, electronics and electrical machinery were subjected to unstable world demand.

In addition, import substitution in transport equipment and electronics and electrical machinery industry had shown improvement in utilizing local intermediate inputs and inter-industry linkages with upstream and downstream domestic suppliers. Change in input-output coefficients also reduce the demand for primary products especially in textile, transport equipment, paper and printing industry and increase the demand for advanced products such as metal, mining, petroleum refinery, electricity and water works and chemical industry (See Table 3). In summary, the Thai manufacture has progressed and dense in its inter-industrial relationships over the period of 1995-2010.

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<sup>7</sup> In our study, we have used the PPI (producer price index to help estimate the deflator). It is consistent over the study period 1980-2010.

Table 3 Sources of growth and deviations from proportional growth, 1980-2010 (%)

		1980-1995				1995-2010					
Sectors	Aggregate gross output growth	Sources of growth (%)			Change in input-output coefficients	Sectors	Sources of growth (%)			Change in input-output coefficients	
		Domestic demand expansion	Export expansion	Import substitution			Domestic demand expansion	Export expansion	Import substitution		
S1 Agriculture, Forestry, Fishery	2.3%	73.4	45.6	-19.4	0.4	S1 Agriculture, Forestry, Fishery	5.1%	65.9	48.7	-6.5	-8.1
S2 Mining and Quarrying	5.6%	77.8	29.6	-18.8	11.4	S2 Mining and Quarrying	8.9%	16.6	56.8	-10.9	37.5
S3 Food Manufacturing	5.0%	77.1	42.2	-21.4	2.2	S3 Food Manufacturing	4.6%	63.9	47.8	-3.2	-8.5
S4 Textile Industries	8.6%	46.8	46.8	-26.8	2.4	S4 Textile Industries	-1.6%	129.2	291.6	-172.5	-148.4
S5 Paper Industries and Printing	5.4%	80.4	35.7	-20.6	4.6	S5 Paper Industries and Printing	3.1%	69.0	65.7	-12.5	-22.2
S6 Chemical Industries	7.9%	75.7	44.7	-26.9	6.5	S6 Chemical Industries	9.3%	36.9	66.5	-12.4	9.0
S7 Petroleum Refineries	3.9%	77.2	29.9	-19.2	12.1	S7 Petroleum Refineries	10.7%	41.2	47.7	-8.7	19.7
S8 Rubber and Plastic Products	9.4%	66.7	50.6	-19.6	2.3	S8 Rubber and Plastic Products	6.6%	38.8	60.4	-6.1	7.0
S9 Non-Metallic Products	11.4%	91.1	24.3	-16.8	1.3	S9 Non-Metallic Products	2.7%	28.7	98.2	-25.8	-2.2
S10 Basic Metal	3.4%	78.0	34.9	-15.4	2.5	S10 Basic Metal	4.1%	-43.7	108.5	-27.7	63.0
S11 Fabricated Metal Products	11.5%	78.6	40.4	-25.4	6.3	S11 Fabricated Metal Products	6.2%	37.6	70.0	-14.3	6.7
S12 Industrial Machinery	11.8%	73.7	31.4	-14.7	9.6	S12 Industrial Machinery	6.9%	37.5	81.9	-21.9	2.5
S13 Electrical Machinery and Apparatus	17.4%	60.8	99.6	-46.8	-13.7	S13 Electrical Machinery and Apparatus	9.3%	33.8	65.3	6.6	-5.6
S14 Motor Vehicles and Repairing	11.0%	75.9	24.5	-7.9	7.5	S14 Motor Vehicles and Repairing	5.2%	56.9	72.4	-24.1	-5.3
S15 Other Transportation Equipment	13.0%	141.5	128.2	-137.2	-32.5	S15 Other Transportation Equipment	5.2%	66.8	50.4	7.5	-24.7
S16 Other Manufacturing	14.3%	78.6	46.4	-25.6	0.8	S16 Other Manufacturing	2.3%	50.4	72.7	-17.1	-6.0
S17 Electricity and Water Works	12.0%	82.7	31.4	-17.8	3.7	S17 Electricity and Water Works	8.9%	40.3	38.5	-7.9	29.1
S18 Construction	10.3%	95.1	8.2	-5.1	1.8	S18 Construction	-2.4%	122.8	-50.7	9.9	18.0
S19 Trade	7.3%	82.0	29.9	-15.3	3.4	S19 Trade	4.4%	46.7	48.5	-10.3	15.2
S20 Services (Restaurants and Hotels)	7.8%	80.9	30.7	-17.0	5.4	S20 Services (Restaurants and Hotels)	4.8%	42.8	49.6	-9.9	17.5
S21 Transportation and Communication	8.0%	82.5	28.8	-17.7	6.5	S21 Transportation and Communication	2.2%	56.7	53.0	-13.2	3.6
S22 Services (Bank, Insur, Real, others)	9.7%	90.3	26.8	-17.1	0.0	S22 Services (Bank, Insur, Real, others)	4.7%	68.4	53.5	-10.3	-11.5
S23 Unclassified	14.6%	75.3	38.9	-21.6	7.5	S23 Unclassified	6.4%	54.7	37.7	-4.1	11.7
<b>Thai industry</b>	<b>8.2%</b>	<b>78.9</b>	<b>34.4</b>	<b>-19.4</b>	<b>6.1</b>	<b>Thai industry</b>	<b>4.7%</b>	<b>44.2</b>	<b>59.6</b>	<b>-11.3</b>	<b>7.5</b>

		Sources (% change in aggregate gross output)			
Sectors	Output deviations (%)	Sources of growth (%)			Change in input-output coefficients
		Domestic demand expansion	Export expansion	Import substitution	
S4 Textile Industries	2.0%	1.6	2.3	-2.0	0.1
S6 Chemical Industries	0.1%	0.1	0.1	-0.1	0.0
S8 Rubber and Plastic Products	3.6%	2.4	4.9	-3.5	-0.1
S13 Electrical Machinery and Apparatus	15.8%	8.1	26.5	-14.2	-4.6
S15 Transportation Equipment	10.0%	26.6	59.9	-61.2	-15.3

Notes: 1) Sources of sectoral growth contributions are expressed as percentages of the % change in aggregate gross output

2) For each sub-component, a sum of columns 2-5 equals to 100.

Source: Author's calculation

## **4 Policy discussion of the Mekong economy**

### **4.1 Current industrial policy of Mekong**

We have collected the industrial development policy of each Mekong economy, the comparison is as follows: At the beginning of Thailand's industrial development, during the 1<sup>st</sup> - 3<sup>rd</sup> NESDP<sup>8</sup> (1961-1971), Thai government promoted the labor-intensive and light industries such as processed food, textile and furniture industry etc. Many investment projects in the industrial sectors mainly gear import substitution to boost domestic demand. As a result, the expansion of the domestic demand for industrial products had supported the growth of the overall Thai economy. During the 4<sup>th</sup> NESDP, the government shifted its economic development strategy toward an outward-looking towards the export-oriented policy. Thailand had invested sufficient basic infrastructure. She has her investment promotion policy with tax incentives and subsidies, attracting both foreign as well as fostering domestic investment. There was a relocation of foreign automotive parts, electronics and electrical appliances, machinery, chemical and petroleum refinery to Thailand from developed countries.

As the results from the export promotion strategy during the 5<sup>th</sup> - 7<sup>th</sup> NESDP (1982-1996), industrial goods' production had expanded more than 10 percent per year over the past four decades. The foreign exchange earning of industrial sector became the main national revenue instead of the agricultural-based sector. Especially during the 1990s and the 7<sup>th</sup> NESDP, technological change has induced development in the food processing and automotive assembling. There were many food processing products, such as canned food, sweetened and condensed milk, instant noodles that destined for the world market in complement with the local domestic demand. In the automotive and electronics industry, Thai manufacturer can step up to the Global Value Chain with foreign partners especially the Japanese and Chinese firms. They were able to produce various types of automobile parts, electrical parts, semiconductor and transportation equipment etc.

The CLMV had their political system and trade policy different from Thailand. There were closed trade policy with self-reliance, relied on planting and trading agricultural products. They had limited openness through border trade, necessary daily consumer products, fertilizer and agricultural machinery. From Table 4, it can be revealed that CLMV countries had started their industrialization process since the 1980s and clearly noticeable in the 1990s. The policy of Internal Economic Liberalization and Reform, or locally known as "Doi Moi" of Vietnam was started in 1986. She has enhanced the state economic sector where industrial policy had been concentrated to serve domestic markets and substitute import. Since 1987, Vietnam has introduced foreign investment policy. The industrial sector has grown and be able to export agriculture-based industries, textile and electronics respectively. Vietnamese economy and

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<sup>8</sup> Thailand's national development plans has been conducted by Office of the National Economic and Social Development Board, Office of the Prime Minister, then officially approved by the cabinet's meeting.

industry achieved rapid growth during the 1990s, especially after implementing the Equalization Program in 1992 and joining ASEAN in 1995. Vietnam has gained from the Trade Deal with the United States in 2000 and being members of the World Trade Organization (WTO) in 2007. During the first 5 Year-Plan for Socio-Economic Development (2001-2005), Vietnam has promoted targeted manufacturing such as agro-processing industry, paper, textile, garment, footwear, electronics, informatics and telecommunication, mechanical engineering, chemical fertilizers and steel respectively. One success factor of industrialization in Vietnam was the government policy. It has played an important role to support industrial cluster's development and prepare enough young labor and quality-human capital for foreign-invested enterprises (FIEs). The investment in the garment and footwear industry, consumer electronics, motor vehicles and parts and recycling industry has been successful.

The Cambodia and Lao PDR had started industrialization processes in the late 1980s - early 1990s. Cambodia has launched the first Five-Year Socioeconomic Rehabilitation and Development Program (SRDP1) in 1986. It has evolved significantly after signing the "Paris Peace Agreement" in 1991 in order to end the internal conflict in the country. There was an amendment of the Law on Investment in 1994 which allowed foreign capital to invest in agro-industry, garment industry (later primarily owned by Chinese capital) and tourism industry. In addition to receiving the Generalized System of Preferences (GSP) privileges from the United States and European Unions, in 1996, they had also obtained the Overseas Development Assistant (ODA) from Japan. After joining ASEAN later in 1999 Cambodia has entered the industrial revolution significantly.

During the same period, there was also the import substitution policy to support chemicals, paper, fertilizer and consumption goods industries. Later in the 2000s, promotion policy packages have been launched such as the Rectangular Strategy (2003), National Poverty Reduction Strategy (NPRS) (2003), Export Processing Zones (EPZs) and Special Economic Zones (SEZs) (2003). They have aimed to stimulate economic growth and address poverty problem by boosting employment in labor-intensive industries, agro-business, natural resource-based industry, electronics, and small and medium enterprises. Especially, since joining WTO in 2004, it has thrived Cambodian economy and industrial growth until recent. Cambodia has successful in her garment industries especially the cut-make-trim type.

Industrialization in Lao has occurred after the establishment of Laos PDR in 1975. The agriculture modernization policy and agricultural cooperatives were launched in 1977. Later on, Laos has launched the first Five-Year (1981-1985) Socioeconomic Development Plan (SDP) and the New Economic Mechanism (NEM), or "Chintanakan Mai" or New Concept, were introduced in 1986. Laos has also transformed into a market-oriented economy and invited the foreign direct investment (FDI) especially for nurture a competitive garment industry. During the 1990s, after the 3<sup>rd</sup>. Five-Year SDP (1991-1995), and joining ASEAN in 1997, Lao economy significantly shifted from the centrally planned economy to the market-oriented economy. Laos has focused on stimulating the domestic industry through the exploitation of natural resources, such as hydropower on top of agricultural manufacturing, tourism, mining, and

Table 4 Transition of industrial development policy in Mekong economy.

	1960s	1970s	1980s	1990s	2000s-2010s
<b>THA</b>	<ul style="list-style-type: none"> <li>- Import substitution (Light industries)</li> <li>- Investment Promotion Act 1960</li> <li>- The 1<sup>st</sup> NESDP (1961-1966)</li> <li>- Investment Promotion Act (Amended 1962)</li> <li>- Revision of tariff structure (1964)</li> <li>- Founded BOI (1966)</li> <li>- The 2<sup>nd</sup> NESDP (1967-1971)</li> <li>- Joined ASEAN (1967)</li> </ul>	<ul style="list-style-type: none"> <li>- Import substitution (Heavy industries)</li> <li>- Export promotion</li> <li>- The 1<sup>st</sup> Export Processing Zones (EPZs) (1970)</li> <li>- Regional development policy (1970)</li> <li>- The 3<sup>rd</sup> NESDP (1972-1976)</li> <li>- Investment Promotion Act (revised 1972)</li> <li>- Export Promotion Act (1972)</li> <li>- Established the Industrial Estate Authority (1972)</li> <li>- Tariff Refund on imports of raw materials used in exports (1972)</li> <li>- Export Boom (1973)</li> <li>- East Seaboard Development Program (1976)</li> <li>- Investment Promotion Act (1977)</li> <li>- Established Industrial Estate Zone (1977)</li> <li>- The 4<sup>th</sup> NESDP (1977-1981)</li> </ul>	<ul style="list-style-type: none"> <li>- Manufacturing export-led economy (1983)</li> <li>- The 5<sup>th</sup> NESDP (1982-1986)</li> <li>- Export promotion</li> <li>- Promote FDI</li> <li>- Joined GATT (1983)</li> <li>- Tariff reform</li> <li>- Permission of 100% ownership of capital by a foreign company (1983)</li> <li>- Investment Promotion Act, divided into 3 Industrial Estate Zone (revised 1987)</li> <li>- The 6<sup>th</sup> NESDP (1987-1991)</li> </ul>	<ul style="list-style-type: none"> <li>- Export promotion</li> <li>- Investment Promotion Act (1<sup>st</sup> revised 1991)</li> <li>- The 7<sup>th</sup> NESDP (1992-1996)</li> <li>- Regional Development Scheme</li> <li>- ASEAN FTA (1993)</li> <li>- Joined WTO (1995)</li> <li>- Linked to Japan and regional production networks</li> <li>- The 8<sup>th</sup> NESDP (1997-2001)</li> </ul>	<ul style="list-style-type: none"> <li>- Sustainable development</li> <li>- Neighboring countries economic cooperation</li> <li>- Investment Promotion Act (2<sup>nd</sup> revised 2001)</li> <li>- The 9<sup>th</sup> NESDP (2002-2006)</li> <li>- Special Border Economic Zone (2002)</li> <li>- Industrial Cluster Policy (2003)</li> <li>- New investment policy and CEO Governors (2003)</li> <li>- China FTA (2003)</li> <li>- The 10<sup>th</sup> NESDP (2007-2011)</li> <li>- Japan FTA (2007)</li> </ul>
<b>CAM</b>	<ul style="list-style-type: none"> <li>- Socialism</li> </ul>	<ul style="list-style-type: none"> <li>- Socialism</li> <li>- The 1<sup>st</sup> Five-Year Socioeconomic Rehabilitation and Development Program (SRDP1) (1986)</li> <li>- SRDP1 promoted agriculture, food, rubber, fishing, timber</li> <li>- Started to liberalize the economy (1989)</li> <li>- Rehabilitation Phase (1989-1996)</li> <li>- Privatize state-owned enterprise (1989)</li> </ul>	<ul style="list-style-type: none"> <li>- Signed the Paris Peace Agreement (1991)</li> <li>- SRDP2 (1991)</li> <li>- Market economy (1993)</li> <li>- Law on investment (1994) allowed foreign capital investment</li> <li>- The 1<sup>st</sup> Five-Year Socio-Economic Development Plan (SEDP1) (1996)</li> <li>- SEDP1 promoted agriculture, garment sector, tourism</li> <li>- Standardization of trade (1996)</li> <li>- GSP from the US, EU (1996)</li> <li>- Lead by garment industry owned by</li> </ul>	<ul style="list-style-type: none"> <li>- Economic Take-off (2004)</li> <li>- Export-oriented</li> <li>- Domestically oriented</li> <li>- Supporting industry</li> <li>- Import substitution; paper, chemicals, fertilizer, consumption goods</li> <li>- SEDP2 (2001)</li> <li>- Law on investment (amended 2003)</li> <li>- Introduced a tax incentive</li> <li>- Declared "The Rectangular Strategy" to promote growth (2003)</li> <li>- National Poverty Reduction Strategy</li> </ul>	

<p><b>LAO</b></p>	<p>-</p>	<p>- Establishment of Lao PDR (1975)                  - Annual Plan (1976-1977)                  - Three Year Plan (1978-1980)                  - Agriculture modernization                  - Established Agricultural Cooperatives (1977)</p>	<p>- The 1<sup>st</sup> Five-Year Socioeconomic Development Plan (1981-1985)                  - Introduced New Economic Mechanism (NEM) (1986) or "Chintanakan Mai" or New Concept                  - Market-oriented                  - Promoted foreign trade and FDI                  - Garment industry                  - The 2<sup>nd</sup> Five-Year Plan (1986-2000)</p>	<p>foreign capital, Chinese                  - Triangle Strategy (1998)                  - Reconstruction Phase (1998-2004)                  - Joined ASEAN (1999)</p>	<p>(NPRS) (2003)                  - NPRS promoted labor-intensive industries, agri-business, natural resources based-industry, electronics, SMEs                  - Established industrial and export processing zone (EPZ) and special economic zone (SEZ) (2003, sub-2005)                  - Joined WTO (2004)                  - Rapid growth (2004-2007) average 11.1%                  - Sihanouville port SEZ (2005)                  - National Strategic Development Plan (NSDP) (2006)                  - NSDP promoted agro-industry, transport, telecom, infrastructure, energy, electricity.                  - Rectangular Strategy 2<sup>nd</sup> Phase (2008) promoted agro-industry, labor-intensive and export-oriented industries, electronic, machinery, a tourism industry</p>
			<p>- The 3<sup>rd</sup> Five-Year Plan (1991-1995) shifted from centrally planned economy to market-oriented economy                  - Joined ASEAN (1997)                  - Promoted FDI                  - Boosting industries; hydropower, agriculture manufacturing, tourism, mining, construction materials                  - Infrastructure development                  - Tax exemption and incentives                  - Set up Special Economic Zones (SEZs)</p>		<p>- Industrialization and Modernization Strategy 2001                  - National Export Strategy 2005                  - Promoted FDI                  - Selected sectors; garment, organic agriculture, silk, handicraft, medicinal plants and herbs, tourism                  - Rapid growth 2006-2010                  - Exports natural-based products: wood products, mining, electricity, garments                  - Leading industries; garment and apparels, motorcycle                  - Joined WTO (2013)                  - 10 Year Development Strategy (2016-</p>

Industrial Growth and Development in Thailand 1980-2010: A Lesson Learned for CLMV

<p>2025)</p> <ul style="list-style-type: none"> <li>- Promotion of agricultural development and linkage to industry and services</li> </ul>				<p><b>MYA</b></p> <ul style="list-style-type: none"> <li>- Military Rule (1962-1974)</li> <li>- Socialist Economic System</li> <li>- Command Economy</li> <li>- Radical Nationalism</li> <li>- Import substitution</li> </ul>
<ul style="list-style-type: none"> <li>- Military Rule (1957-2014)</li> <li>- Controlled market economy</li> <li>- Natural resources exploitation</li> <li>- Liberalization of rice export (2003)</li> <li>- New capital at Naypyitaw (2005)</li> <li>- Large-scale privatization (2008-2009)</li> <li>- Permission of import; car, motorcycle, diesel (2010)</li> <li>- Myanmar General Election (2015)</li> <li>- Trade Liberalization</li> </ul>	<p>✓</p> <ul style="list-style-type: none"> <li>- Military Rule (1988-1997) New Regime</li> <li>- The transition toward a market economy</li> <li>- Agriculture-based &amp; export-oriented</li> <li>- Industries: agricultural, food processing, garment, agro-based consumer goods</li> <li>- Exports: agricultural products (beans, pulses, rice) timber (teak, and hardwood)</li> <li>- Inflows of FDI</li> <li>- Private Industrial Enterprise Law (1990)</li> <li>- Myanmar Tourism Law (1990)</li> <li>- Promote tourism industry</li> <li>- Initiated Industrial Zone in Yangon (1991)</li> <li>- Introduction of Tariff Law (1992)</li> <li>- Science and Technology Development Law (1994)</li> <li>- Privatization of state-owned enterprises (1995)</li> <li>- Joined WTO (1995)</li> <li>- Joined ASEAN (1997)</li> <li>- Trade Council (1997)</li> </ul>	<ul style="list-style-type: none"> <li>- Military Rule (1974-1988)</li> <li>- Centralized Planning</li> <li>- In-ward Looking Policy</li> <li>- Import substitution</li> <li>- Agro-based industries</li> <li>- Exports of agricultural products; beans, pulses</li> <li>- Foreign Investment Law (1988)</li> <li>- Inflows of ODA</li> <li>- State-owned Economic Enterprises Law (1989)</li> </ul>	<ul style="list-style-type: none"> <li>- Military Rule (1974-1988)</li> <li>- Socialist Program Party</li> <li>- Centralized Planning</li> <li>- In-ward Looking Policy</li> <li>- Import substitution</li> <li>- Agricultural economy</li> </ul>	<ul style="list-style-type: none"> <li>- Socialism</li> <li>- Import substitution</li> <li>- Domestic market</li> </ul>
		<p>✓</p> <ul style="list-style-type: none"> <li>- 'Doi Moi' Internal Economic Liberalization and Reform (1986)</li> <li>- Market-oriented economy</li> <li>- Local market-oriented, - Industry for a domestic market</li> <li>- Enhanced state economic sectors (1986)</li> <li>- Promote FDI</li> <li>- Law on foreign investment (1987) provided concrete preferential treatment to foreign investment</li> </ul>	<ul style="list-style-type: none"> <li>- Socialist orientation</li> <li>- Import substitution</li> <li>- Domestic market</li> <li>- Strong country and equity</li> <li>- Civilization upheld</li> </ul>	
				<p><b>VIE</b></p> <ul style="list-style-type: none"> <li>- Socialism</li> <li>- Import substitution</li> <li>- Domestic market</li> </ul>

				<p>SMEs business</p> <ul style="list-style-type: none"> <li>- SMEs development plan 2006-2010</li> <li>- Joined WTO (2007)</li> <li>- Promote cluster of foreign-invested enterprise (FIEs)</li> <li>; garment, consumer electronics, motor vehicles, and parts, recycling</li> </ul>
			<p>- Law on private enterprise</p> <ul style="list-style-type: none"> <li>- Equitization Program (1992)</li> <li>- Government's preferential loan for private enterprise</li> <li>- Joined ASEAN (1995)</li> <li>- Law on State Enterprise (1995, 1999)</li> </ul>	

Sources: 1) Author compiled from each country's national development plan, industrial and investment policies, various articles.

2) Referred from various publications, reports, and discussion papers of Institute of Developing Economies (IDE)

- Kaosa-ard (1988), Pawakaranond (1990) for Thailand
- Tsunashi (2005), Ohno (2006), Kuchiki (2007) for Malaysia, and Thailand.
- Vo Dai Luoc (1996), Ohno (2005), Sakata (2010) for Vietnam
- Hatukano (2010) for Cambodia
- Oraboune (2016), Nishimura ed.al. (2016) for Lao PDR
- Kudo (2001), Kudo (2005), Kudo (2010) for Myanmar

construction material industry. Since the 2000s, Laos has obtained the GSP privileges from the United States and European Union. Through the FDI promotion policy and National Export Strategy (2005), she has emphasized on the garment industry, organic agriculture, silk, handicraft, medicinal plants and herbs, and the tourism industry.

In addition, after joining the WTO in 2013, Lao has been successfully exported natural-based products such as wood products, mining, hydropower and cottage garments respectively. As a result, garment and apparels, motorcycle, electricity and tourism industry became leading industries and be the main source of national income for the prosperity of Lao's country. The share of the garment in total export has declined in 2001-2005 as a result of the world demand. In 2011-2015 the share was 8 percent of total export. She has to look for another strategic industry.

Foreign Investment Law and the privatization under the State-owned Economic Enterprises Law were an introduced during 1988-1989, however there were no concreted and flourished results. Later in the 1990s, there was the intensive promotion of FDI together with establishment of various attractive regulations aimed to liberalize trade and invite foreign investor such as the Private Industrial Enterprise Law (1990), the Industrial Zone in Yangon (1991), being membership of the WTO (1995) and ASEAN (1997) and setting up the Trade Council (1997) respectively. Myanmar has slightly gained trust and confidence from foreign investors. Domestic industries such as agricultural-based, food processing, garment, agro-based consumer goods and agricultural products such as beans, pulses, and timber such as teak and hardwood have been gradually exported. There was a liberalization of rice export in 2003, large-scale privatization during 2008-2009, permission on the importation of car, motorcycle and diesel in 2010 respectively. The real change has occurred after the Myanmar General Election in 2015. There are many attempts on the promulgation of foreign investment and trade laws to promote free entrance of foreign capital.

#### **4.2 Policy recommendation for CLMV's industrial development**

For CLMV, the experiences of Thailand may indicate that the external fluctuation was uncontrollable as external demand's disruption is not foreseeable. The Financial Crisis would have hard repercussion to export expansion and industrial planning. It may be not easy to set the strategic industries as what has been done in Thailand and East Asia in the last decades.

During the take-off period, the CLMV would require a sufficient level of capital and technology accumulation that can start up the industry. At this stage, CLMV may firstly rely on the domestic demand expansion as Thailand had experienced in 1980-1995. Since the domestic market may be small to reach optimal production level in each country. Thus, the Mekong economy may benefit from joining the WTO and looking intra-ASEAN market to reach the optimal scale of production. The next step, in order to join the Global Value Chain, the Mekong country would need to invite foreign direct investment from a counterparty, especially, ASEAN, Thailand, China, Japan and East Asia respectively. The domestic

production would require an upgrade of their product quality to meet global standard. In order to be able to catch up with Thailand, other ASEAN, the CLMV would need to nurture her labor skills and improve the technology appropriately.

Experiences of Thailand's industrial development policies such as liberalizing international trade and promoting foreign investment and incentives in an advanced industry such as electronics and electrical machinery industry would be necessary to start. However, automotive and transport equipment would require a very high capital investment, it may proper to plan for the value chain among the CLMV-ASEAN, Japan and China. Especially, the GVC with Thailand and China on her BRI would be a challenge. The agro-industry textiles and garment are an example of a good strategy for Cambodia and Myanmar. However, for Laos, the natural resource-related such as the electricity generation would be proper to pursue. However, she would need to look for a feasibility of long-term sustainable growth. This balances the exploitation and its benefit in the long-run. For this sake, Laos may consider nurturing the organic agriculture that can link to the health product industry and service sector e.g., tourism and health care industry. It would give Laos a new visionary. For Vietnam, the machinery and transport equipment also with high technology would be strategic industries. Vietnam has qualified young labor with skills improvement to fit for the future of these industries. Moreover, Vietnam has a large domestic market to cushion for any disruption from the global crisis. Vietnam has a good land link with Southern China to be her supplementary market destination.

Last, for Thailand, the sources of growth and causes of structural change have shown a declining competitiveness in some sectors but strong in the new technological oriented sector. Thailand would leave and relocate labor intensive to neighboring Mekong economy to gain the value chain as well exploiting large market. Thailand would decide to go for deeper capital-intensive industries in the decade to come. By this selection, it is unavoidable to invest in human capital in par with the physical capital investment. This is the next recommended topic to study.

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## Appendix

**Table A1** Classification and aggregation of sectors

No.	Classification	58 x 58 sectors	New Code
S1	Agriculture	(001-011)	01
S2	Mining and Quarrying	(012-014)	02
S3	Food Manufacturing	(015-022)	03
S4	Textile Industries	(023-024)	04
S5	Paper Industries and Printing	(025-026)	05
S6	Chemical Industries	(027-029)	06
S7	Petroleum Refineries	(030)	07
S8	Rubber and Plastic Products	(031-032)	08
S9	Non-Metallic Products	(033-034)	09
S10	Basic Metal	(035-036)	10
S11	Fabricated Metal Products	(037)	11
S12	Industrial Machinery	(038)	12
S13	Electrical Machinery and Apparatus	(039)	13
S14	Motor Vehicles and Repairing	(040)	14
S15	Other Transportation Equipment	(041)	15
S16	Other Manufacturing	(042-044)	16
S17	Electricity and Water Works	(045-046)	17
S18	Construction	(047-048)	18
S19	Trade	(049)	19
S20	Services (Restaurants and Hotels)	(050)	20
S21	Transportation and Communication	(051-052)	21
S22	Services (Banking, Insurance, Real Estate, other Services)	(053-057)	22
S23	Unclassified	(058)	23

Source: Author

**Table A2.** Thailand's GDP deflator, the base year 2010

<i>Year</i>	<i>GDP deflator (the base year 2002)</i>	<i>Inflation, GDP deflator (annual %)</i>	<i>* GDP deflator (the base year 2010)</i>
1975	27.73	3.49	21.12
1980	41.27	12.70	31.43
1985	50.48	2.18	38.45
1990	63.89	5.77	48.66
1995	83.21	5.74	63.38
2000	96.49	1.33	73.49
2005	111.18	5.09	84.69
2010	131.29	4.08	100.00
2015	143.91	0.59	109.61

Remark: \* Computed GDP deflator

Source: Compiled data from GDP deflator, the base year 2002, World Development Indicator, World Bank. (Accessed March 2018)