

A Review of Thailand's Intra-Industry Trade with ASEAN

Wanasin Sattayanuwat

Abstract— Thailand has an average IIT index of 46.29 during 2001-2012 and 42.15 in 2012. For PIS, Thailand has an average IIT indexed of 45.87. Thailand economy is mildly integrated with ASEAN. Auto part, electronics, ICT, and ships, boats, and floating structures are the sectors having high integration degree. There was an improvement in the PIS between 2001-2012 specifically in three sectors, healthcare, rubber-based, and wood-based. However on average these levels are still low. In order to achieve single market and production base, eliminating tariffs in ASEAN will not be sufficient.

Keywords—Thailand, ASEAN, Intra-Industry Trade, ASEAN priority integration sectors

I. INTRODUCTION

A “SINGLE MARKET AND PRODUCTION BASE” is one of the main part of ASEAN Economic Community (AEC) by achieving a free flow of goods, services, investment, capital, skilled labor, and more rapid liberalization of the 12 priority integration sectors (PIS). The priority sectors compose of eight goods sectors and four service sectors. The goods sectors include agro-based products, fisheries, healthcare products, rubber-based products, wood-based products, textiles and garments, electronics, information and communication (ICT), and automotive. The services sectors include e-ASEAN, healthcare, air travel logistics and tourism.

Last updated, in 2012 average tariff rate on intra-ASEAN impost was 0.68 percent which can be divided into 0.04 percent for ASEAN 6 and 1.37 percent for CLMV [1]. In addition under the AEC blueprint, all tariffs will be reduced to zero, and NTBs will be eliminated. Accordingly, trade liberalization among the ASEAN member states favors to intra-ASEAN trade.

Over the last two decades ASEAN partners have been continuously played a significant role in Thailand's international trade. According to the Bank of Thailand, Thailand's trade with ASEAN countries has been increasing 17.1 percent of total trade in 1995 to 20.2 percent of total trade in 2012. Thailand openness index has increased significantly from 49.17 percent in 1986 to 153.33 percent in 2012. In 2012, Thailand total trade accounts for 497.22 billions of \$US.

This paper establishes the degree of integration between Thailand and the rest of ASEAN as a group, focusing on the industry sector. Specifically this paper examines the degree of

integration in the AEC's priority industrial sectors and the degree of integration from the stage of the production.

II. DATA AND METHODOLOGY

Intra-industry trade (IIT) involves the import and export of similar goods. The extent of intra-industry trade is commonly measured by Grubel-Lloyd (G-L) indexes based on commodity transactions. For any particular product class i , an index of the extent of intra-industry trade in the product class i between countries A and B is given by the following ratio:

$$IIT_{i,AB} = \left[\frac{(X_i + M_i) + |(X_i - M_i)|}{(X_i + M_i)} \right] * 100 \quad (1)$$

The index shows the minimum value of zero indicating the trade flows in a particular industry for a particular country are totally inter-industry trade. The index shows the maximum value of 100 indicating perfect intra-industry trade (in this case X_i is equal to M_i). High level of IIT index indicates high degree of economic integration.

This study analyzes Thailand's IIT with ASEAN based on 4 - digit Harmonized Commodity Description and Coding¹ System (H.S.). I focus on only non-agricultural products which cover all HS25 – HS99². There are 1,057 HS four-digit codes in total. The estimation time span is 2001 -2012. All trade flows are measured on a value basis, in thousand of US Dollars. The data used in this analysis is based on data reported by the ITC calculations based on UN COMTRADE statistics.

I read IIT index in two interpretations. One is the average IIT index over the relevant period (IIT_t). Another is the growth of the IIT index over the period (ΔIIT). The average IIT index is a static measure capturing IIT for the relevant period. The growth of the IIT index captures the increase in IIT levels between two periods. The increase in the IIT index indicates increasing integration.

The resulting average IIT index over the time span 2001-2012 will be used as an indicator of the integration. The

¹ This IIT index suffers from categorical aggregation issues. Aggregating across improper categories can lead to a misrepresentation of the degree of intra-industry trade [2].

² Based on WTO, agricultural products cover (i) HS Chapters 1 to 24 less fish and fish products, plus (ii) HS code 2905.43 (mannito), HS Code 2905.44 (sorbitol), HS Heading 33.01 (essential oils), HS Headings 35.01 to 35.05 (albuminoidal substances, modified starches, glues), HS Code 3809.10 (finishing agents), HS Code 3823.60 (sorbitol n.e.p.), HS Headings 41.01 to 41.03 (hides and skins), HS Heading 43.01 (raw furskins), HS Headings 50.01 to 50.03 (raw silk and silk waste), HS Headings 51.1 to 51.03 (wool and animal hair), HS Headings 52.01 to 52.03 (raw cotton, waste and cotton carded or combed), HS Heading 53.01 (raw flax), HS Heading 53.02 (raw hemp) [3]

degree of integration is divided into 5 categories namely strong integration, moderately strong integration, mild integration, and weak integration. The degree of integration will be determined according to the following values of the IIT index (Table 1).

TABLE I
THE LEVEL OF INTEGRATION CLASSIFIED BY IIT INDEX

Value of IIT index	Classification
n/a	No intra-industry trade reported
0.00 – 0.5	No integration; One-Way Trade
0.50 – 24.99	Weak integration
25.00 – 49.99	Mild integration
50.00 – 74.99	Moderately strong integration
75.00 – 99.99	Strong integration

Source: Austria (2004), p84 [4]

The industrial good HS chapters to be covered are the following:

TABLE II
THE INDUSTRIAL GOODS SECTORS

Sectors	HS
Auto part	8409, 8609, 8707-08, 8716
Vehicle	8407-08, 8701-06
Electric	8414, 8418, 8422, 8450-51, 8486, 8501-05, 8508-13, 8516, 8530-31, 8535, 8536-39, 8542-45, 8547-48, 9405
Electronics	8443, 8469, 8470-73, 8507, 8517-19, 8522-25, 8527-29, 8532-34, 8540-42, 8548
Healthcare	2936, 2937, 3001-06, 3303-07, 3401, 9018
ICT	3818, 8469-70, 8472-73, 8504, 8517-18, 8520, 8523-25, 8527, 8529, 8531-34, 8536, 8541-44, 9009, 9026-27, 9030
Textile	5001-07, 5101-13, 5201-12, 5301-5311, 5401-5408, 5501-5516, 5601-5609, 5701-05, 5801-5811, 5901-5911
Garment	4203-4, 6101-6117, 6201-6217, 6501-6507
Rubber-Based	4001-17
Wood-Based	4401-21, 4501-04, 4601-02, 4701-07, 4801-23, 9401, 9403-04
Iron	7202-29, 7301-26
Jewelry	7101-05, 7113-18
Leather	4104-07, 4112-15, 4201-02, 4204-06, 4301, 6401-06, 9605
Machine	7321, 8401, 8405-06, 8410-13, 8416-17, 8419-42, 8444-49, 8452-68, 9019-25, 9101-914, 9301-06
Chemical	2601, 2707-2708, 2801-53, 2901-42, 3101-05, 3201-14, 3301-02, 3402-07, 3501-07, 3601-04, 3701-07, 3802-03, 3805-26
Ceramic	3816, 6815, 6901-14
Plastic	3901-26, 9405
Books, newspapers, pictures and others	4901-10
Ships, boats and floating structures	8901-08
Clocks and watches and parts	9101-9114
Musical instruments and parts	9201-9209
Toys, games and sports requisites	9501-08
Glass and glassware	7001-19

Source: Author's collect from GTAP and ISIC

Note: Some goods are included in more than one sector.

III. EMPIRICAL RESULTS

This section is composed of three parts; (A) overall level of intra-industry trade, (B) classified by industrial goods sectors,

and (C) classified by stage of production.

A. Overall level of Intra-Industry Trade, 2001-2012

Based on 4 - digit HS, there are 1,057 products in total. Of those 1,057 products, 845 are total number of IIT reported. On average, during 2001 – 2012 intra-industry trade between Thailand and the rest of the ASEAN as a group was moderate namely 7.93 percent in the share of strong integration classification (67 products) and 31 percent in the share moderately strong integration classification (262 products). The share of mild integration classification was about 33.73 percent (285 products) and the share of weak integration classification was about 27.34 percent (231 products) On average Thailand has an average IIT index of 46.29 during 2001-2012 and 42.15 in 2012. In other words, Thailand economy is mildly integrated with ASEAN. Degree of integration shows in table 3.

TABLE III
SHARE OF DEGREE OF INTEGRATION, OVERALL 2001-2012

Categories	Number of Products	Percent
Strong integration	67	7.39%
Moderately strong integration	262	31.01%
Mild integration	285	33.73%
Weak integration	231	27.34%
No integration: One-Way Trade	4	00.47%
Total Number of IIT reported	845	100.00%
An Average IIT index, 2001-2012 = 46.29		
An Average IIT index, 2012 = 42.15		
No intra-industry trade reported	212	20.05%
Total Number of Products (HS4)	1057	100.00%

Source: Author's Calculation

Of those 67 strong integration, machine, chemical, and ICT products occupy large percentage. The two former accounted for 10 products each and the latter accounted for 8 products. In addition, 5 were wood-based, 5 were plastic, 4 was iron, 3 were electronics, and 3 was textile. Electric, healthcare, garment, rubber-based, leather, and musical instruments and parts show strong integration in each of 1 product.

Taking into account the growth of the IIT index of those 67 strong integration classification over the period of 2001- 2012, 46 of them showed growth rate higher than 100 percent. The minimum growth rate of this classification accounts for 34 percent. The increase in the IIT index indicates increasing integration in this classification.

Of those 262 moderately strong integration classifications, 49 were machine, 32 were chemical, 18 were textile, 15 were garment, 14 were iron, 12 were wood-based, 11 were plastic, 10 were electric, 9 were ICT, and 9 were glass and glassware.

The rest of those 262 moderately strong integration classification were products namely auto part 5 products, electronics 5 products, healthcare 4 products, rubber-based 5 products, leather 4 products, and ceramic 4 products

Taking into account the growth of the IIT index of those 262 moderately strong integration classification over the period of 2001- 2012, 163 of them showed growth rate higher than 100 percent. The minimum growth rate of this classification accounts for 11 percent. The increase in the IIT index indicates increasing integration in this classification.

In sum, the above analysis of IIT suggests that on average

Thailand has intra-industry trade with ASEAN accounting for 39 percent at the 4 - digit HS over the period of 2001 – 2012.

TABLE IV
SHARE OF DEGREE OF INTEGRATION BY SECTOR

Sectors	Strong integration	Moderately strong integration	Mild integration	Weak integration	Total
Auto part		5 (100%)			5
Vehicle			4 (31%)	9 (69%)	13
Electric	1 (5%)	10 (50%)	6 (30%)	3 (15%)	20
Electronics	3 (25%)	5 (42%)	3 (25%)	1 (8%)	12
Healthcare	1 (7%)	4 (27%)	6 (40%)	4 (27%)	15
ICT	8 (33%)	9 (38%)	6 (25%)	1 (4%)	24
Textile	3 (4%)	18 (21%)	28 (33%)	35 (42%)	84
Garment	1 (2%)	15 (36%)	15 (36%)	11 (26%)	42
Rubber-Based	1 (9%)	5 (45%)		5 (45%)	11
Wood-Based	5 (10%)	12 (24%)	16 (32%)	17 (34%)	50
Iron	4 (8%)	14 (27%)	13 (25%)	20 (39%)	51
Jewelry		3 (30%)	1 (10%)	6 (60%)	10
Leather	1 (8%)	4 (31%)	4 (31%)	4 (31%)	13
Machine	10 (10%)	49 (51%)	31 (32%)	7 (7%)	97
Chemical	10 (8%)	32 (26%)	49 (40%)	33 (27%)	124
Ceramic		4 (24%)	7 (41%)	6 (35%)	17
Plastic	5 (18%)	11 (39%)	8 (29%)	4 (14%)	28
Books, newspapers, pictures and others	2 (18%)	3 (27%)	4 (36%)	2 (18%)	11
Ships, boats and floating structures		2 (33%)	3 (50%)	1 (17%)	6
Clocks and watches and parts		1 (11%)	4 (44%)	4 (44%)	9
Musical instruments and parts	1 (17%)		1 (17%)	4 (67%)	6
Toys, games and sports requisites		1 (17%)	5 (83%)		6
Glass and glassware		9 (50%)	6 (33%)	3 (17%)	18
others	11 (10%)	46 (42%)	2 (2%)	51 (46%)	110
Total	67	262	285	231	845

Source: Author's Calculate

B. Intra-Industry Trade by Sectors, 2001-2012

This part employs the average annual IIT during 2001 – 2012 to analysis the degree of integration in the AEC priority industrial sectors. I calculate weighted average to indicate the level of integration. According to table 5, the first 5 sectors are the ASEAN priority sectors, and the rest to the sectors are called non-priority sectors.

Table 5 indicates interesting points as follows:

The degree of integration in the priority sector of Thailand with the ASEAN as a whole is higher than the non-priority sectors.

Auto part, electronics, and ICT, which are the priority integration sectors, show highest degree of integration of Thailand with the region as a whole. All of these three sectors show moderately strong integration.

All the non-priority sectors show mild and weak integration except ships, boats, and floating structures in 2012 showing moderately strong integration.

TABLE V
THE LEVEL OF INTEGRATION BETWEEN THAILAND AND ASEAN CLASSIFIED BY SECTORS, 2001-2012

Industrial Goods Sectors	The level of Integration	
	Average 2001-2012	2012
Auto part**	Moderately Strong Integration	Moderately Strong Integration
Vehicle**	Weak Integration	Weak Integration
Electric**	Mild Integration	Mild Integration
Electronics**	Moderately Strong Integration	Moderately Strong Integration
Healthcare**	Mild Integration	Mild Integration
ICT**	Moderately Strong Integration	Moderately Strong Integration
Textile**	Mild Integration	Mild Integration
Garment**	Mild Integration	Mild Integration
Rubber-Based**	Mild Integration	Mild Integration
Wood-Based**	Weak Integration	Mild Integration
Iron	Mild Integration	Mild Integration
Jewelry	Weak Integration	Weak Integration
Leather	Mild Integration	Mild Integration
Machine	Mild Integration	Mild Integration
Chemical	Mild Integration	Mild Integration
Ceramic	Mild Integration	Mild Integration
Plastic	Mild Integration	Mild Integration
Books, newspapers, pictures and others	Mild Integration	Mild Integration
Ships, boats and floating structures	Mild Integration	Moderately Strong Integration
Clocks and watches and parts	Weak Integration	Mild Integration
Musical instruments and parts	Weak Integration	Weak Integration
Toys, games and sports requisites	Mild Integration	Mild Integration
Glass and glassware	Mild Integration	Mild Integration
Average all sectors	Mild Integration	Mild Integration

Source: Author's Calculate

Note: ** indicates the ASEAN priority industrial goods sector

Table 6 indicates that taking into account PIS, on average, compare to 1997 and 2001, Thailand has an improvement in three sectors namely healthcare, rubber-based, and wood-based. For electronics and textile, there was no improvement during 1997, 2001 and 2001-2012.

In addition, the findings show that there was an integration improvement in the PIS between 2002-2004 and 2001-2012. During 2002-2004, in PSI Thailand has an average IIT index of 33.5 [5] while during 2001-2012 an average IIT index become 45.87.

In sum on average the Thailand economy is moderately strong integrated with ASEAN as a result of significant level of IIT in Auto part, electronics, ICT, and ships, boats, and floating structures. The rest of the sectors show weak and mild integration.

TABLE VI

COMPARISON THE LEVEL OF INTEGRATION BETWEEN THAILAND AND ASEAN, 1997, 2001, 2001-2012, 2012

Sectors	Year	Degree of Integration
Automotive	1997, 2001	Mild Integration
	Aver 2001-2012	Weak Integration
	2012	Mild Integration
Electronics	1997, 2001	Mild Integration
	Aver 2001-2012	Mild Integration
	2012	Mild Integration
Healthcare	1997, 2001	Weak Integration
	Aver 2001-2012	Mild Integration
	2012	Mild Integration
ICT	1997	Strong Integration
	2001	Moderately Strong Integration
	Aver 2001-2012	Moderately Strong Integration
	2012	Moderately Strong Integration
Textile & Garment	1997, 2001	Mild Integration
	Aver 2001-2012	Mild Integration
	2012	Mild Integration
Rubber-Based	1997, 2001	Weak Integration
	Aver 2001-2012	Mild Integration
	2012	Mild Integration
Wood-Based	1997, 2001	Weak Integration
	Aver 2001-2012	Mild Integration
	2012	Mild Integration

Source: Author's calculation and Austria (2004)

C. Intra-Industry Trade by stage of production, 2001-2012

This part takes into account commodities IIT by stage of production consisting of primary, processed, part, capital, and consumption.

TABLE VII

THE LEVEL OF INTEGRATION BETWEEN THAILAND AND ASEAN CLASSIFIED BY STAGE OF THE PRODUCTION, 2001-2012

Stage of Production	The level of Integration	
	Average 2001-2012	2012
Primary	Weak Integration	Weak Integration
Processed	Mild Integration	Mild Integration
Part	Mild Integration	Mild Integration
Capital	Mild Integration	Mild Integration
Consumption	Mild Integration	Mild Integration

Source: Author's calculation

Comparatively, the lowest levels of IIT are in more primary stage of the production, while the higher levels of IIT are in products where there is higher level stage of the production. The higher IIT indices for Thailand and the ASEAN as a whole in the processed stage, part stage, and capital stage show that this can be successfully converted into production integration networks.

Auto part, electronic, and ICT are the sectors showing high economic integration between Thailand and ASEAN. All of them are in production stage of processed, part, and capital.

Especially for the automotive industry, that the auto part has high degree of IIT while the vehicle has low degree of IIT confirm that Thailand and the ASEAN as a whole gradually achieve the production base. This implies that Thailand import and export auto part in to order to assembly to be the final product, vehicle. In 2011, 58 companies among top 200 of global suppliers have chosen Thailand as a production base [6]. According to 2012 world production statistics of the

international organization of motor vehicle manufacturers, Thailand ranked the 9th in the world with 2.9 percentage of the total world production and with 2.532 million production capacity accounting for 2.9 percent of the total world production. Combined motor vehicle production in ASEAN 5, Indonesia, Thailand, Malaysia, the Philippines, and Vietnam, reached 4.36 million units accounting for 5.18 percent of the total world production. This figure shows that automotive industry is the significant industry for the region and for Thailand.

IV. CONCLUSION

Thailand has an average IIT index of 46.29 during 2001-2012 and 42.15 in 2012. For PIS, Thailand has an average IIT indexed of 45.87. Thailand economy is mildly integrated with ASEAN. Auto part, electronics, ICT, and ships, boats, and floating structures are the sectors having high integration degree. There was an improvement in the PIS between 2001-2012 specifically in three sectors, healthcare, rubber-based, and wood-based. However on average these levels are still low. In order to achieve single market and production base, eliminating tariffs in ASEAN will not be sufficient. ASEAN may have to do more such as rules of origin, trade facilitations and so on.

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Dr.Wanasin Sattayanuwat is currently a lecturer at the School of Economics and Public Policy, Srinakharinwirot University, Bangkok, Thailand. During 2000-2004, he was a researcher on the International Economic Relation, at the Thailand Development Research Institute Foundation (TDRI), Bangkok. He received a Ph.D. in Economics from the University of Nebraska-Lincoln in 2011 and a M.A. in Economics from the National Institute of Development Administration (NIDA), Bangkok in 2000. He earned the first degree in Industrial Engineering from the Prince of Songkla University, Thailand in 1997.