

INDONESIA'S INTRA -INDUSTRY TRADE WITH ASEAN

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Abstract

AFTA has been starting since 2003. This study will investigate Indonesia's bilateral trade with ASEAN member by examining intra-industry trade. The Grubel-Lloyd Index is applied to measure intra-industry trade. Intra -industry trade is classified based on factor intensity in the production process. There are natural resource intensive, unskilled labor intensive, physical capital intensive, human capital intensive and technological intensive.

This research shows that level of Indonesia's intra-industry trade with ASEAN-4 has increased rapidly since 1995. In particular, intra-industry trade level of physical capital intensive (PCI) and technology intensive (TI) is relatively high. An intra-industry trade level of human capital intensive (HCI) and unskilled labor intensive is at medium level. Meanwhile, intra-industry trade level of natural resources industry (NRI) tends to decrease.

Keywords: *Intra Industry Trade, Inter Industry Trade and Grubel-Llyod Index.*

INTRODUCTION

ASEAN was established on August 8, 1967 in Bangkok Thailand as an association among South East Asian countries (hereafter ASEAN). It cooperates in various aspects such social cultural, politic, education and economic aspect. After ending the cold world and growing economic regionalism across the world such as European Common Market and NAFTA, all members of ASEAN agreed to establish economic integration among the members.

The ASEAN heads of government met in January 1992 in Singapore and declared the ASEAN Free Trade Area (AFTA) known as the Singapore Declaration. The Singapore declaration announced that a free trade area would be established within 15 years from January 1993. To reduce the tariff among the members, the AFTA will use the Common Effective Preferential Tariff (CEFT). Existing tariff rate will be reduced to 20% within 5-8 years and then for follow-

ing seven years it will be reduced to 5%. Therefore by year 2008, Intra-ASEAN trade will have a tariff of maximum 5% or below (Ramasamy, 1994).

What are the possible welfare implications of regional trading arrangements for its member? There are some benefits of economic integration. According to Meier (2000), economic integration can create some benefits such as: (1) opening a new market for manufacture product (trade creation); (2) increasing gain of trade; (3) improving efficiency through increasing competition among the industry; and (4) stimulating investment.

The CEPT covers all product both agricultural and non-agricultural product. To faster tariff reduction, a fast track was established to allow 15 product categories to go through an accelerated pace of tariff reduction. The product categories consist of cement, chemical, pharmaceuticals, fertilizer, plastic, rubber products, leather products,

pulp, textiles, ceramic and glass products, gem and jewellery, copper cathodes, vegetable oil, electronic and wooden and rattan furniture. When time passed, however, all members agreed to accelerate AFTA in 2003 rather than in 2008.

This study will investigate Indonesia's bilateral trade with ASEAN member by examining intra-industry trade. In the trade literature, the amount of intra-industry trade (IIT) or trade in similar goods is often taken as a measure of the diversity, degree of specialization and degree of technical sophistication of its industrial sector (Hvrylshyn and Kunzel, 1997). Then intra-industry trade can be used to infer the country's ability to compete in a changing environment. The study will analyze IIT changes and evolution over the period 1995-2005 to shed light on the level of industrial specialization and the competitiveness of industrial sector for Indonesia in the AFTA started in 2003. However, this study focus on only 4 countries, that are, Singapore, Malaysia, Thailand and Philippine.

This paper is organized as follows: Section II presents an overview of Indonesia's trade relation with the ASEAN. Section III will explain the underlying theoretical concept of intra-industry trade; section IV reviews the methodology and data used in

calculating IIT indexes. Section V presents and discusses the results. Finally section VI will draw conclusions from the results obtained in this study.

An Overview of Indonesia's Trade Relation With The ASEAN

Japan and the US have been Indonesian most important trading partners. Indonesia's trade share with those two countries was over 40% of its total trade. However, Indonesia's trade with the ASEAN market has been increased since establishing AFTA. Until now, it accounts for approximately 25% of its total trade and Singapore is important destination of Indonesia's export.

Table 1 represents the total trade with respect to each country of ASEAN member during the period 1995-2005. Indonesian export with the ASEAN-4 (Singapore, Thailand, Malaysia and Philippine) has been always higher than its import. It means that Indonesia trade with the ASEAN-4 is always surplus. Indonesia's bilateral trade with Singapore is the most bilateral trade among the ASEAN-4 members. However, bilateral trade between Indonesia and Singapore has been decreased since economic crisis in the mid of 1997. On the other hand, for the rest of ASEAN member, the Indonesian bilateral trade has been increasing.

Table 1: Indonesia's Trade Share with The ASEAN-4*
1995-2005 (million net weight)

Year	Singapore		Thailand		Malaysia		Philippine	
	Export	Import	Export	Import	Export	Import	Export	Import
1995	112,045	5,862	2,995	1,936	3,079	1,841	1,909	104
1997	103,556	9,252	4,619	2,659	4,010	1,765	3,556	274
1999	61,022	8,192	5,014	3,374	4,963	2,467	3,675	72
2001	95,645	7,301	4,950	3,298	5,559	2,936	5,667	111
2003	22,072	10,712	6,983	3,858	8,360	2,521	4,320	175
2005	19,269	15,300	8,498	4,529	11,248	4,001	5,026	289

*Note: ASEAN-4 consist of Singapore, Malaysia, Thailand and Philippine

THEORETICAL REVIEW

International trade as an engine of growth has been a concern to economists since mercantilism. Classical trade theory operates under the assumption of perfectly competitive market such as absolute advantage of Adam Smith and comparative advantage of David Ricardo as well as Heckscher-Ohlin. The factor-proportions of Heckscher-Ohlin (H-O) reflects trade flows in complementary goods based upon the relative availability and intensity factor in production process. According to H- O theory, a trade flow between countries occurs in complementary good or inter - industry trade.

Modern trade theory challenges this traditional trade theory. Trade flow does not occur because of different in factor endowment but because of their similarity in factor endowment. A large portion of the output of modern economies involves differentiated products rather than homogenous products. As a results trade flow involves the exchange of differentiated products of the same industry or Intra-Industry trade. Intra-industry trade is based on inter-industry specialization. Each nation specializes in particular industry in which it enjoys a comparative advantage.

Many economists then try to construct measures of intra-industry trade. Grubel-Llyod is the first economists in introducing the intra-industry trade index to measure trade flow between differentiated products (Intra-Industry trade). The study of Grubel-Llyod for various industries in ten industrial countries in 1967 showed that nearly half of all trade among these ten industrial countries involved the intra-industry trade. Many studies after Grubel-Llyod have found that the more advanced and developed an economy, the more specialized its trade structure will be. It means that industrialized countries tend to have greater levels of intra-industry trade rather than developing countries.

METHODOLOGY

Commodity Classification

This study analyzes Indonesia's IIT with ASEAN based on SITC (*standard international trade classification*) codes. According to SITC one digit, commodity can be classified to be three categories, that is agricultural product, fuel, mineral and metal products and Industrial (manufactures) product (Hill, 2000). Agricultural products cover SITC 0 (food and live animals), 1 (beverages and tobacco), 2 (crude material excluding SITC 27 and 28) and 4 (animal & vegetable oil and parts). Fuel, Mineral and Metal products consist of SITC 27, 28, 3 (mineral fuels, lubricants) and 68 Manufactures product are SITC 5 (chemical), 6 (manufacture goods excluding 68), 7 (machinery& transport equipment) and 8 (miscellaneous manufactured articles).

According to Goeltom, manufactures product then can be classified in detail commodity classification based on factor intensity in the production process as follows: (1) Natural resource intensive (NRI) consisting of SITC 53, 61, 63, 66 (excluding SITC 664- 666); (2) Unskilled labor intensive (ULI) covering SITC 65, 664-666, 81-85, 89 (excluding 896, 897); (3) Physical capital intensive (PCI) consisting of SITC 51, 52, 67, 71-74, 751 ;(4) Human capital intensive (HCI) consisting of SITC 55, 62, 64, 69, 775, 78-79, 885, 896, 897 ; (5) Technological intensive (TI) SITC 54, 56-59, 752, 759, 76-77 (excluding SITC 775), 87-88 (excluding SITC 885), (Goeltom, 1996).

Analytical Framework

Measure of trade patterns

There are two types of trade pattern. One is inter-industry trade referring to traditional trade theory of Heckscher-Ohlin and another is intra-industry trade associating to the modern trade theory. Net exports divided by the sum of export and import val-

ues for a particular industry from Balassa is widely applied in calculating inter industry trade. Balassa's net export index then is used as measure of inter-industry trade. Meanwhile intra-industry trade is defined as the value of exports of an industry in one country which is exactly matched by imports of the same industry from another country divided by the sum of export and import values for a similar industry. The Grubel-Lloyd index is mostly used as a measure of intra-industry trade.

Inter-industry trade reflecting to trade in different products could be defined as:

$$\text{Inter-industry trade} = |X_{ij} - M_{ij}| \quad (1)$$

Where:

X_{ij} is export of industry i to country j

M_{ij} is imports of industry i from country j .

From equation (1) it is clear that intra-industry trade is simple all trade that is not inter-industry trade. Therefore, intra-industry trade is given by the residual of trade upon subtraction of inter-industry trade as follows:

$$\text{Intra-industry trade} = (X_{ij} + M_{ij}) - |X_{ij} - M_{ij}| \quad (2)$$

Following Grubel and Llyod, we can normalize equation to get a measure of intra-industry trade index by expressing as a percentage of total trade of an industry. Thus the intra-industry trade index can be written as:

$$\text{Intra-industry trade (IIT)} = \frac{(X_{ij} + M_{ij}) - |X_{ij} - M_{ij}|}{(X_{ij} + M_{ij})} = 1 - \frac{|X_{ij} - M_{ij}|}{(X_{ij} + M_{ij})} \quad (3)$$

The Grubel-Llyod index would vary from zero to 100. If there is no intra-industry trade, one of X_{ij} or M_{ij} will be zero so that the IIT index will be zero. Similarly if there

is a complete intra-industry trade, that is export equal to import ($X_{ij}=M_{ij}$), the IIT index will take a value of 100. The closer the index to its upper bound is the greater the proportion of total trade per industry i which represent intra-industry trade pattern. On the other hand, the closer it to its lower bound is the greater the extent to which inter-industry trade dominates

Decomposition of total trade growth

Based upon discussion before, the total trade (TOT) is the sum of inter-industry trade (Heckscher-Ohlin Trade = HOT) and intra-industry trade (IIT). Thus the total industry trade can be written as follow:

$$\text{TOT}_{ij} = \text{HOT}_{ij} + \text{IIT}_{ij} \quad (4)$$

Where:

$$\text{HOT}_{ij} = |X_{ij} - M_{ij}|$$

$$\text{IIT}_{ij} = (X_{ij} + M_{ij}) - |X_{ij} - M_{ij}|$$

Where TOT, HOT, IIT represent total trade, inter-industry trade and intra-industry trade respectively and i and k denote industry and country.

Using equation (4), then we can decompose total trade growth into two components, these are inter-industry growth (HOT) and intra-industry trade growth. Equivalently, we can express total trade growth as a percentage growth in total trade of industry i with country j over any period as follow:

$$\Delta \text{TOT}_{ij} = (1 - B_{ij}) \Delta \text{HOT}_{ij} + (B_{ij}) \Delta \text{IIT}_{ij} \quad (5)$$

Where B_{ij} is the Grubel-Llyod intra-industry trade index at the beginning of the period and variable with Δ shows the percentage change in each variable over a period in time.

EMPIRICAL RESULTS

Commodity Composition and Trade Patterns

Table 2 provides the pattern of manufacture export to ASEAN-4 based upon factor intensity. As a country with the compara-

tive advantage in natural resources, the contribution of manufacture export of natural resources intensive (NRI) to total manufacture export is relatively high during the period of observation. On the other hand, the contribution of unskilled labor intensive (ULI) is relatively small. This happens because every country has the same comparative advantage in unskilled labor because of relatively cheap in labor cost. However, trade among Physical Capital Intensive

(PCI) and Human Capital Intensive (CPI) tend to increase.

Meanwhile, the pattern of manufacture import from ASEAN is presented in table 3. Like export, because ASEAN members have a comparative advantage on unskilled labor, the share of ULI to total manufacture import from ASEAN is relatively small. By contrast, the import of PCI dominates import from ASEAN. Then it is followed by TI.

Table 2: Product Composition of Indonesia's manufacture export to ASEAN-4 1995 -2005 (%)

Product group	1995	1997	1999	2001	2003	2005
NRI	38.75	34.15	32.96	45.95	30.17	22.28
ULI	6.59	6.59	6.22	6.76	8.23	9.42
PCI	23.72	23.72	25.13	19.39	25.23	29.06
HCI	14.97	14.97	17.90	14.31	17.13	24.02
TI	20.59	20.59	17.79	13.59	19.25	15.22

Table 3: Product Composition of Indonesia's Manufacture Import from ASEAN-4 1995 -2005 (%)

Product group	1995	1997	1999	2001	2003	2005
NRI	20.76	24.89	3.40	5.26	3.63	22.75
ULI	2.06	2.42	1.43	1.52	4.93	1.81
PCI	46.48	41.66	63.23	56.65	50.87	41.12
HCI	5.14	7.72	8.99	13.93	10.93	13.80
TI	25.56	23.31	22.94	22.64	29.63	20.51

Table 4: The Regional Composition of Indonesia's Manufacture Export to ASEAN-4 1995 - 2005 (%)

Country	NRI	ULI	PCI	HCI	TI	
Singapore	1995	68.84	6.38	10.38	8.98	5.42
	1997	52.96	5.12	9.96	16.44	15.51
	1999	61.14	4.69	12.10	15.64	6.43
	2001	29.79	29.29	25.02	35.18	24.11
	2003	50.84	6.26	16.27	15.83	10.81
	2005	41.21	6.63	16.50	23.64	12.02
Malaysia	1995	9.42	6.89	41.04	24.46	18.19
	1997	34.12	5.23	21.52	15.95	23.18
	1999	3.70	10.26	33.97	31.19	20.88
	2001	34.92	36.84	31.72	43.06	18.66
	2003	30.17	9.88	26.33	20.46	13.17
	2005	16.26	9.66	32.52	28.18	13.38
Thailand	1995	7.81	12.18	52.66	10.20	17.15
	1997	4.83	11.87	46.60	6.48	30.22
	1999	3.55	7.13	56.55	7.52	25.25
	2001	3.11	11.85	14.96	15.28	54.80
	2003	6.68	7.14	36.30	11.44	38.44
	2005	6.27	11.61	44.09	17.69	20.33
Philippine	1995	5.58	9.35	45.47	8.96	30.63
	1997	3.47	9.68	49.65	14.78	22.42
	1999	4.29	17.53	22.98	14.67	40.53
	2001	62.69	5.32	10.93	7.49	13.58
	2003	4.07	10.24	31.99	18.39	35.31
	2005	5.06	14.18	35.06	22.75	29.95

Manufacture export to individual ASEAN-4 member is presented in Table 4. It shows that Indonesian export to Singapore is dominated by natural resources industry (NRI). Meanwhile physical capital industry dominates the Indonesia's export to the rest of the member. Export of manufacture products based on technology has been increased for all countries. As mentioned before, because of each country is relatively cheap labor cost, Indonesian export of unskilled labor-intensive product such as textile is relatively low for all countries.

Table 5 and Table 6 provide Indonesia's intra-industry trade with the ASEAN-4. The intra-industry trade based on the Grubel-Lloyd index is calculated at three-digit level of SITC. Table 5 shows that intra-

industry trade of natural resources industry (NRI) tends to decrease in the period 1995-2003. On the other hand, intra-industry trade of physical capital intensive (PCI) and technology intensive (TI) is relatively high. This implies that intra-industry trade of those products has become more important over time. An intra-industry trade level of human capital intensive (HCI) and unskilled labor intensive is medium level. In general, since starting AFTA in 2005, Indonesia intra-industry trade with AFTA-4 is relatively high for all product groups except ULI. High intra industry trade indicates that each member of AFTA takes advantage for relatively low tariff among ASEAN member by increasing trade with its member.

Table 5: Indonesia's Intra-Industry Trade with The ASEAN-4 (%)

Product group	1995	1997	1999	2001	2003	2005
NRI	54.13	80.35	9.55	11.3	13.52	96.87
ULI	36.61	50.53	20.09	21.2	53.09	30.03
PCI	92.13	76.38	89.96	78.9	90.28	86.90
HCI	43.77	64.45	39.27	67.7	55.56	69.17
TI	86.16	97.89	77.07	93.3	96.27	89.29

Sources: BPS various issues

Intra-industry trade level with the individual ASEAN member is shown in table 6. Indonesia' Intra industry trade level of PCI, HCI and TI is relatively high for all countries except with Philippine for PCI and HCI. Intra-industry trade level (IIT) of NRI

and ULI is low for all countries and the IIT of ULI tends to decrease for all countries. This implies that each country have been removed its comparative advantage to the competitive advantage.

Table 6: Bilateral Indonesia's Intra-Industry Trade with the ASEAN-4 1995-2005 (%)

Country	NRI	ULI	PCI	HCI	TI
Singapore 1995	4.36	26.57	33.64	97.91	55.34
1997	6.39	35.73	29.10	78.73	98.03
1999	2.97	17.87	50.18	62.51	86.03
2001	7.29	25.03	48.67	90.12	77.38
2003	7.01	97.73	56.27	72.74	82.31
2005	13.48	56.28	45.28	76.90	81.07
Malaysia 1995	66.48	23.24	69.76	17.09	79.97
1997	11.39	63.05	85.59	48.49	95.09
1999	85.59	16.98	94.12	9.29	86.75
2001	17.26	15.66	86.14	15.84	99.67
2003	19.79	13.52	93.93	18.13	97.53
2005	45.51	32.41	94.71	50.22	97.04
Thailand 1995	7.69	82.27	75.52	85.29	45.74
1997	4.68	85.10	82.91	90.57	67.19
1999	43.21	36.45	85.09	50.01	80.97
2001	92.07	41.88	30.78	65.45	91.74
2003	44.48	54.43	87.78	85.12	97.63
2005	88.98	43.71	70.70	92.42	74.67
Philippine 1995	0.63	8.58	30.95	24.64	56.57
1997	0.89	7.33	25.69	13.93	64.29
1999	3.05	2.23	1.83	7.11	26.64
2001	5.40	8.11	4.12	6.27	26.30
2003	4.73	4.06	5.50	14.50	30.09
2005	1.29	15.12	24.20	24.42	70.44

Indonesia's Trade Structure with the ASEAN

Table 7 presents a measure of how much each pattern of trade contributes to the growth of Indonesia's trade with the ASEAN-4 member. The trade growth results provided in table 6 are calculated by using equation (5) during 5 years for the periods 1995-1999, 1999-2003 and 2003-2005. Total trade growth is fluctuating during those periods.

Total trade growth can be separated to inter-industry trade growth (HOT) and intra-industry trade growth (IIT). During period 1995-1999, total trade growth is dominated by inter-industry trade. It is a reverse condition during 1999-2003 as the IIT dominates total trade growth. TOT dominates back the total trade growth during period 2003-2005. However, there is a special case where total trade growth of HI is always dominated by IIT for all periods.

Trade of HI among ASEAN members shows trade with similar industry.

Table 8 shows the decomposition of trade growth based on bilateral trade. Singapore, however, is still main source of Indonesian trade growth for all group products but it tends to decrease after the crisis. Then it is followed by Malaysia, Thailand and Philippine, respectively. The contribution of intra-industry trade growth tends to increase over time for all countries. During period 1995-1999, the contribution of inter-industry trade growth and intra-industry is relatively same. However, in the period 1999-2003 and 2003 -2005 the growth of total trade was largely due to increase in inter-industry trade. In product group, the total growth of TI is mostly caused by intra-industry trade growth for all countries during two periods. Then, it is followed by NRI, ULI, PCI and HCI, respectively.

Table 7: the Decomposition of Trade Growth: Total Trade

Product Group	1995-1999			1999-2003			2003-2005		
	TOT	HOT	IIT	TOT	HOT	IIT	TOT	HOT	IIT
NRI	0.14	0.57	-0.43	-0.11	-0.13	0.03	0.34	-0.82	1.17
ULI	0.34	0.39	-0.05	0.55	-0.07	0.62	-0.01	0.22	-0.23
PCI	0.64	0.09	0.55	-0.04	-0.01	-0.04	0.20	0.06	0.14
HI	1.40	0.89	0.50	0.02	-0.16	0.17	0.56	0.04	0.52
TI	0.63	0.24	0.39	0.23	-0.18	0.41	-0.08	0.06	-0.14

Table 8: the Decomposition of Trade Growth: Bilateral Trade

Product group	Country	1995-1999			1999-2003			2003-2005		
		TOT	HOT	IIT	TOT	HOT	IIT	TOT	HOT	IIT
NRI	Singapore	0.55	0.54	0.00	-0.45	-0.46	0.01	-0.10	-0.15	0.05
	Thailand	-0.95	-0.90	-0.06	1.07	0.58	0.49	0.44	-0.40	0.84
	Malaysia	-0.04	-0.20	0.16	5.56	5.12	0.44	0.99	0.28	0.71
	Philippine	0.51	0.47	0.04	-0.31	-0.31	0.00	0.13	0.16	-0.03
ULI	Singapore	0.23	0.27	-0.05	0.60	-0.78	1.39	-0.23	0.32	-0.54
	Thailand	-0.08	0.41	-0.49	0.23	-0.08	0.30	0.66	0.48	0.18
	Malaysia	1.27	1.11	0.15	0.60	0.55	0.05	0.01	-0.18	0.19
	Philippine	2.53	2.53	-0.01	-0.57	-0.57	0.00	0.36	0.19	0.17
PCI	Singapore	0.37	0.02	0.35	-0.23	-0.16	-0.07	0.34	0.30	0.05
	Thailand	1.54	0.13	1.41	-0.08	-0.04	-0.04	-0.10	0.14	-0.24
	Malaysia	-0.14	-0.25	0.11	0.31	0.02	0.29	0.29	0.01	0.28
	Philippine	-0.16	0.13	-0.29	0.03	-0.01	0.04	0.21	0.06	0.15
HCI	Singapore	1.17	0.79	0.38	-0.29	-0.18	-0.11	0.65	0.11	0.54
	Thailand	0.23	0.47	-0.24	1.93	-0.06	1.99	0.56	-0.03	0.59
	Malaysia	0.93	0.92	0.01	0.16	0.05	0.12	0.56	-0.04	0.60
	Philippine	1.89	1.93	-0.04	-0.06	-0.12	0.07	0.21	0.06	0.15
TI	Singapore	0.34	-0.26	0.60	0.13	0.06	0.07	0.21	0.05	0.16
	Thailand	0.24	-0.31	0.54	1.03	-0.14	1.17	-0.24	0.17	-0.41
	Malaysia	0.92	0.05	0.86	0.24	-0.10	0.34	-0.05	0.00	-0.05
	Philippine	1.13	1.13	0.00	-0.36	-0.28	-0.07	-0.21	-0.47	0.26

CONCLUSION

Trade growth has been contributed significantly to Indonesia economic growth since the mid of 1980. However, the destination of Indonesia export still focuses on Japan, the US and Singapore. The government must launch economic policy in order to exporters diversify their export destination. ASEAN market is a potential market for Indonesia's exporters since opening AFTA in 2003.

This paper investigates how Indonesia is bilateral trade patterns with the ASEAN member. This research showed that level of Indonesia's intra-industry trade with ASEAN-4 has increased rapidly since 1995. In particular, intra-industry trade level of physical capital intensive (PCI) and techno-

logy intensive (TI) is relatively high. An intra-industry trade level of human capital intensive (HCI) and unskilled labor intensive is medium level. Meanwhile, intra-industry trade level of natural resources industry (NRI) tends to decrease.

In addressing the relatively high level IIT of PCI, TI and HCI, policy option relating to export-oriented domestic industry need to be reviewed. The government must change export-oriented strategy from comparative advantage based on natural resources and unskilled labor to competitive advantage based on technology. In addition, the government must take into consideration how stabilize exchange rate to support export because most of export-oriented industry still relies upon imported inputs.

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