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An Analysis of Korea-Vietnam Bilateral Trade Relation

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Abstract

Republic of Korean – Vietnam relation has been rapidly deepened in all fields, especially trade and investment since the establishment of diplomatic ties in 1992. This paper analyzes the patterns and trends in the trade relations between the two countries in the past twenty years. Various trade indices such as Trade intensity, Trade complementarities, Intra industry and Revealed comparative advantages were used to describe the structure and composition in the Korea-Vietnam bilateral trade. The study results show that trade pattern between Korea and Vietnam is predominantly inter-industry trade and complementary. The main findings also suggest that there is significant potential for further growth of trade between two countries.

JEL code: F10, F13, F14

Key Words: Bilateral trade, trade pattern, intra-industry trade, revealed comparative advantage, Korea, Vietnam

I. Introduction

Republic of Korea – Vietnam relations have developed considerably since the establishment of diplomatic ties in 1992. The relationship has been rapidly deepened in all fields such as political and economic, social and cultural, trade and investment, education and people-to-people exchanges. The bilateral trade turn-over has surpassed 10 billion US dollar since 2008, marking an increase of 20 fold in comparison to the value of just 500 million US dollar in 1992. Two countries also agreed to upgrade bilateral ties from comprehensive cooperation relationship to the strategic partnership. In the economic field, both countries agreed to increase the two-way trade value up to 20 billion by 2015. Korea has for many years been among the leading investors in Vietnam. So far, Korea has more than 2,300 investment projects with the total value of over 21 billion US dollar in Vietnam. The cultural and people-to-people exchanges between Vietnam and Korea have been continuously promoted. There are over 90,000 Vietnamese people working, studying and living in Korea and almost the same number of the Korean people in Vietnam. Sharing many similarities in culture and history, the amicable bonds between our two countries and peoples are increasingly strengthened. Despite the significant advancement of economic relation between the two countries, there have been few studies focusing on Korea-Vietnam economic relations in general, and trade relation in particularly, in the existing literature.

The bilateral trade relationship between Korea and Vietnam reflects the complementary of both countries' natural advantages. Vietnam is a competitive, efficient, resource rich country, while Korea is renowned for its ability to produce competitive high-tech goods and services. While Vietnam's exports to Korea are concentrated in primary goods, Korea's exports to Vietnam are predominantly elaborately transformed manufactures. Thus, it is of interest to investigate trade between two countries comprehensively by reviewing trade relations and applying trade pattern indices such as Trade Intensity index, Trade Complementarity Index, Intra Industry Trade index and so on.

This paper outlines the major characteristics of Korea-Vietnam trade relations, specifically, to determine whether the two countries trade is complementary or competitive, whether or not there have been changes in trade composition, and which products have dominated the trade and enjoys a comparative advantage, etc. Based on the findings, the paper suggests the directions for developing further bilateral trade relation between the two countries.

This paper consists of the following sections: Section II presents the overview of Korea-Vietnam economic relationship; Section III will discuss the trend and structure of two countries trade; Section IV provides insights analysis of trade pattern between two countries using various trade indices; Section V summarizes the main findings and suggests direction for policy implications.

II. The Korea-Vietnam economic relationship

The Korean and Vietnamese economies are at differing levels of development, by which Korea is one of the advanced countries, while Vietnam has been a developing country for the last decades. Vietnam and Korea established official diplomatic relationship in 1992 and the two countries are now celebrating the 20th anniversary of the diplomatic ties.

During the short period of two decades, there has been great progress in bilateral relations. Trade volumes, which totaled \$500 million in 1992, have increased 26-fold to \$13.7 billion in 2010 and \$18.5 billion in 2011. The average annual growth rate of Korea's imports from Vietnam was about 25 percent, whereas Korean exports to Vietnam increased by an average growth rate of nearly 18 percent per annum during the period from 1993-2011. Korean investment in Vietnam has also increased substantially. By 2011, Korea became the leading investor to Vietnam with foreign direct investment (FDI) amounts of registered capital of \$22.3 billion in 3,072 projects. Bilateral economic relations between Korea and Vietnam have attained fast development thanks not only to their geographic proximity, cultural similarities and complementary economic structures but also to the active efforts of the Korean government to contribute to improving economic infrastructure and investment environment in Vietnam as well as to establish a solid foundation for mutually beneficial cooperation through the Official Development Assistance (ODA) to Vietnam. In particular, the support from the Economic Development Cooperation Fund (EDCF) through the Export-Import Bank of Korea (Korea Eximbank) has greatly contributed to the further enhancement of our bilateral relations. So far, Korea is Vietnam's second-largest ODA donor country. In fact, 20 percent, or 1.6 trillion won, out of the EDCF's total support amount of 8.1 trillion won was allocated to Vietnam, thus clearly demonstrating that Korea prioritizes Vietnam as a principle partner for economic cooperation.

Table 1. Vietnam – Korea relationship: Main Indicators

	Unit	Korea to Vietnam	Vietnam to Korea
Total trade	\$US million	18,549	18,549
- Export	\$US million	13,465	5,084
- Trade share	%	8.19	1.72
Investment			
- FDI	\$US million	22,389	3.2
- ODA	\$US million	1,200	-
Visitors	person	536,000	106,000
Residents	person	84,000	115,000

Source: Vietnam General Statistics Office – GSO

Korea International Trade Association – KITA

Korean Ministry of Foreign Affairs and Trade

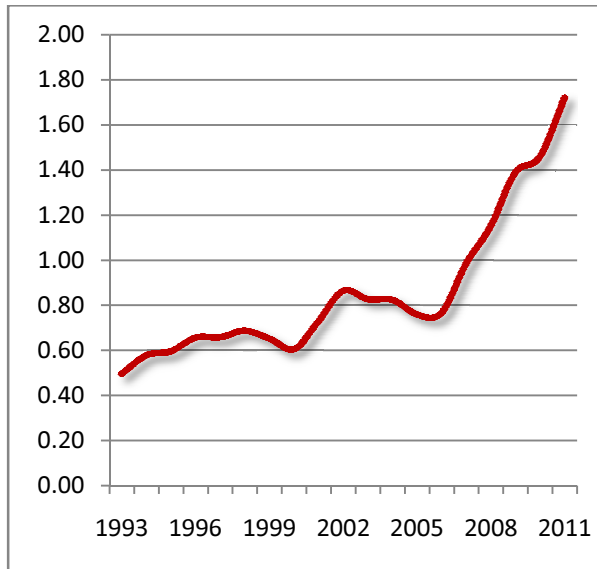
Vietnam has many attractive factors to Korean investors. First of all, Vietnam is an emerging market because of its political stability and economic fast development while there are economic instability and business overheating in other Asian countries. Second, Vietnam has a lot of similarities with Korea in history, culture, custom, and personality etc. Moreover, Vietnam has abundant natural resources such as coal and iron, and possesses inexpensive, diligent, excellent manpower. Finally, Vietnam has relatively large scale of domestic market with a population of over 84 million people and it can also act as a bridge to huge South East Asian markets of 500 million consumers. The Vietnamese Government has set a clear and determined target that the whole economy and society to be modernized and industrialized by 2020. In doing so, Vietnam is very much welcoming and facilitating large scale of foreign investment on the basis of mutual interest of Vietnam and foreign investors. As Vietnam has greatly improved the investment environment, particularly the infrastructure and legal system, most of the foreign investment projects have been doing very well. Among the foreign investors, the Korean businessmen are the most successful.

Table 2. Korea – Vietnam Bilateral Trade Volume and Growth: 1993-2011

	Export (\$US mil)	Inc. Rate (%)	Import (\$US mil)	Inc. Rate (%)
1993	728,268	67	90,629	58.1
1995	1,351,014	31.5	193,598	70.2
2000	1,686,025	16.7	322,441	22
2005	3,431,654	5.4	694,043	3.1
2011	13,464,922	39.5	5,084,246	52.6
Average		17.59		25.07

Source: Korea International Trade Association – KITA

Figure 1. Korea – Vietnam Bilateral Trade Shares, 1993-2011



Korea's trade with Vietnam



Vietnam's trade with Korea

Source: Vietnam General Statistics Office – GSO & Korea International Trade Association – KITA

Korea has been one of Vietnam's top trading partner since 1992. In 2011, Korea's exports to Vietnam were \$US 13,465 million, an increase of nearly 40 per cent compared to 2010. Vietnam is Korea's ninth largest export market, account for 2.43% of Korea's export in 2011. Vietnam is also one of Korea's largest export markets for industrial goods. The share of Vietnam's trade with Korea in Korea's total trade has been increased rapidly over years, as shown in figure 1. On the other hand, though Korea's trade share declined, Korea still has maintained in the top 10 trading partner with Vietnam in the past 20 years. As can be seen in table 2, except for the period during the Asian financial crisis, trade volume between two countries has increased rapidly, which is about 19% annually on average. The scale of bilateral trade relations deepened further in 2007, when the Korea-ASEAN Free Trade Agreement (merchandise) went into effect. In terms of volume, Korea's exports to Vietnam rose from only US\$728.3 million in 1993 to US\$13.5 billion in 2011, while its imports from Vietnam increased from US\$90.6 million to US\$5.1 billion in corresponding period.

III. Korea-Vietnam Trade: Trend and Structure

In terms of trade structures, overall, Korea's exports to and imports from Vietnam are reflective of normal trade patterns between a developed and a developing country. Almost all Korean exports to Vietnam are manufactured goods, accounting for more than 80% for many years. Over time, trade structure has shifted between primary and manufactured products, that is, the share of primary products declines, whereas the share of manufactured goods increases. The composition of bilateral trade is shown in figure 3. In 2010, Korea's exports to Vietnam are mainly composed of manufactured items, accounting for 88 per cent of Korea's total exports to Vietnam. In the Korea's side, Vietnam is an important supplier of primary products to Korea, including agricultural commodities, minerals and energy resources. In 2010, these exports accounted for 45% per cent of total Korea's imports from Vietnam.

Figure 2. Bilateral Trade Shares by category

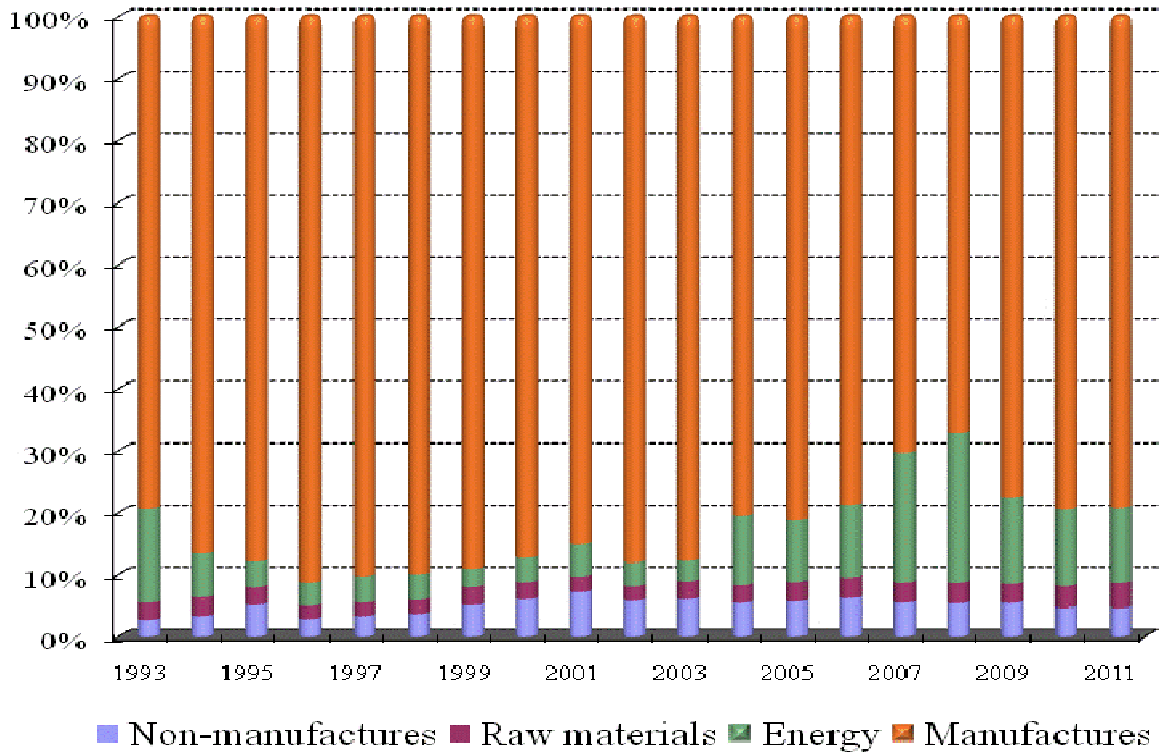
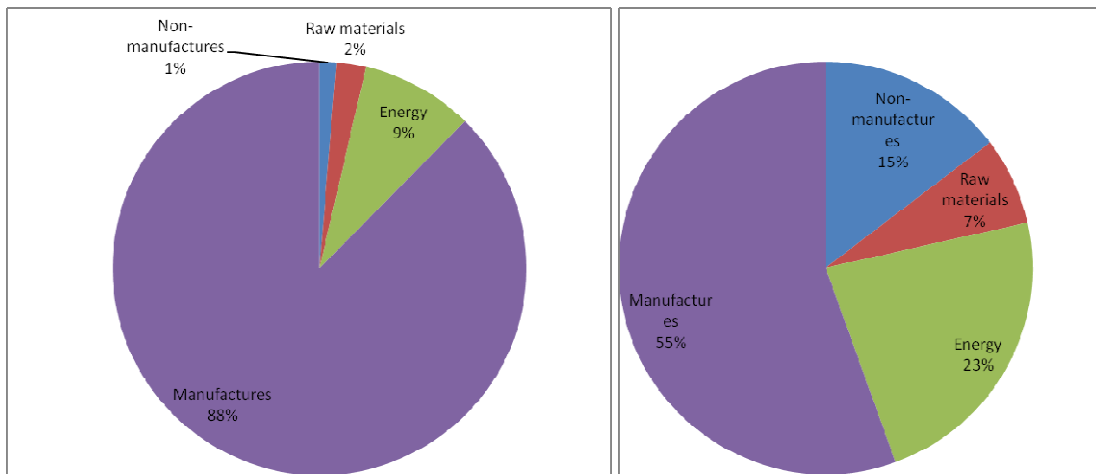


Figure 3. Bilateral Trade Shares by category in 2010



Korea's exports to Vietnam

Korea's imports from Vietnam

Source: Korea International Trade Association – KITA

Regarding commodity trade, Tables 3 and 4 show the top 10 products of Korea's exports to and imports from Vietnam. The top 10 Korea's export products to Vietnam totaled around US\$7.4 billion in 2010, accounting for 76.3 percent of the total Korea's exports to Vietnam. Korea's exports to Vietnam are predominately composed of manufactured items, which have not

changed much since 2000. During the period of 2000-2010, the textiles related products has remained the first position though its share in total Korea-Vietnam exports declined from 24.2 percent to 14 percent. Iron and steel imports from Korea have grown very rapidly since 2000, with value of trade increased over 20 times within ten years. The remaining exports are composed of machinery (5.9%), road vehicles (around 10%), telecommunication equipments and petroleum product. In 2010, telecommunication equipment parts replaced leather and leather manufactured goods as the major export items from Korea to Vietnam.

Table 3. Top 10 Products of Korea's Exports to Vietnam

2000	Value	%	2010	Value	%
Textile yarn, fabrics, made-up articles, n.e.s., and related products	407.2	24.2	Textile yarn, fabrics, made-up articles, n.e.s., and related products	1355.4	14.0
Road vehicles (including air-cushion vehicles)	175.6	10.4	Iron and steel	1287.2	13.3
Plastics in primary forms	126.1	7.5	Road vehicles (including air-cushion vehicles)	855.8	8.9
Machinery specialized for particular industries	98.8	5.9	Telecommunications and sound-recording and reproducing apparatus and equipment	848.8	8.8
Petroleum, petroleum products and related materials	76.2	4.5	Petroleum, petroleum products and related materials	844.2	8.7
Leather, leather manufactures, n.e.s., and dressed furskins	68.2	4.0	Plastics in primary forms	687.8	7.1
Miscellaneous manufactured articles, n.e.s.	61.2	3.6	Machinery specialized for particular industries	474.7	4.9
Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof	60.4	3.6	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof	415.9	4.3
Footwear	58.6	3.5	Non-ferrous metals	340.2	3.5
Iron and steel	56.1	3.3	General industrial machinery and equipment, n.e.s., and machine parts, n.e.s.	252.4	2.6
Total	1188.3	70.5	Total	7362.4	76.3

Note: Value in \$US Million; (%) is percentage of Korea-Vietnam total exports

Source: Calculated from UN Comtrade data, SITC rev.3 at 2-digit level

Vietnam's major export products to Korea are primary products, such as fish, articles of apparel, petroleum, textile related products, coal and petroleum, etc. Within primary products, the composition of Vietnam exports to Korea has changed slightly since 2000, with exports of agricultural products such as fish, coffee, vegetables and fruit declining, while other industry related exports expanded their shares. At the product level, Vietnam's exports are heavily concentrated on petroleum products, textiles, clothing and seafood, which together account for more than 50 per cent of Vietnam's total merchandise exports to Korea.

It has been demonstrated that while the total trade volume between the two increased significantly over the past decade, the commodities trade remained virtually unchanged. This shows that Korea's major export items to Vietnam continued to consist of capital goods and raw/subsidiary materials such as machinery, steel/metal products, and industrial textiles, whereas

Vietnam has principally exported primary products--such as agricultural and fishery products and consumer textiles--over the past decade. This is a typical inter-industry trade pattern between a developed country and a developing country. This trade pattern will be specifically examined in the next sections.

Table 4. Top 10 Products of Korea's Imports from Vietnam

2000	Value	%	2010	Value	%
Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof	72.0	22.3	Petroleum, petroleum products and related materials	587.0	17.6
Articles of apparel and clothing accessories	38.2	11.8	Textile yarn, fabrics, made-up articles, n.e.s	439.9	13.2
Textile yarn, fabrics, made-up articles, n.e.s	34.5	10.7	Articles of apparel and clothing accessories	386.6	11.6
Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof	23.8	7.4	Fish, crustaceans, molluscs and aquatic invertebrates, and preparations thereof	370.9	11.1
Vegetables and fruit	23.2	7.2	Coal, coke and briquettes	180.2	5.4
Miscellaneous manufactured articles, n.e.s.	22.6	7.0	Electrical machinery, apparatus and appliances, n.e.s., and electrical parts thereof	157.9	4.7
Coffee, tea, cocoa, spices, and manufactures thereof	20.1	6.2	Footwear	155.4	4.7
Furniture, and parts thereof;	13.1	4.1	Telecommunications and sound-recording and reproducing apparatus and equipment	115.4	3.5
Crude rubber (including synthetic and reclaimed)	10.1	3.1	Furniture, and parts thereof;	96.0	2.9
Footwear	9.9	3.1	Iron and steel	94.5	2.8
Total	267.3	82.9	Total	2583.8	77.6

Note: Value in \$US Million; (%) is percentage of Korea-Vietnam import

Source: Calculated from UN Comtrade data, SITC rev.3 at 2-digit level

The inter-industry trade pattern between Korea and Vietnam is also clearly revealed by Korea-ASEAN (The Association of Southeast Asian Nations) bilateral trade. The trade share by category of commodity for Korea with Vietnam and ASEAN is shown in table 5. Since 1995, Korea has been trading more raw materials and energy products, and less both manufactures and non-manufactures with ASEAN than Vietnam. Meanwhile, Vietnam exports more non-manufactures products to Korea than other ASEAN countries. The Korea's manufacturing trade ratio (export/import) as seen in figure 4 shows a big gap between Vietnam and ASEAN during the period of 1993-2011. This implies the dependence of Vietnam on Korea's manufactures exports is heavier than that of ASEAN countries.

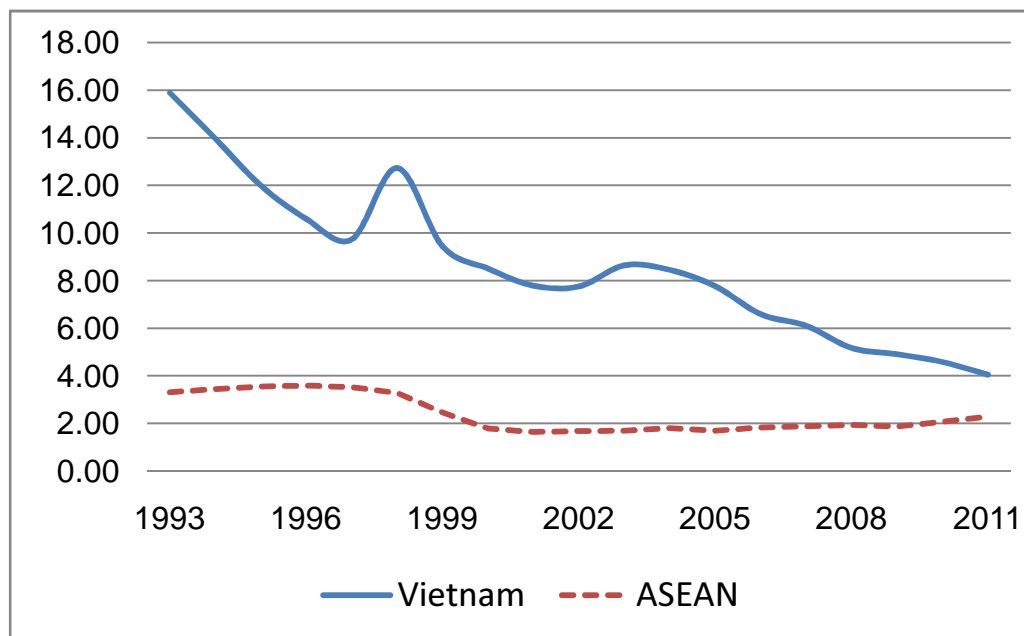
Table 5. Korea's Trade by Category with Vietnam and ASEAN

Non-manufactures		Raw materials		Energy		Manufactures	
Vietnam	ASEAN	Vietnam	ASEAN	Vietnam	ASEAN	Vietnam	ASEAN

1995	5.17	2.74	2.84	6.64	4.14	12.27	87.85	78.35
2000	6.14	1.88	2.70	3.69	3.93	18.09	87.22	76.33
2005	5.80	2.17	3.06	4.36	10.04	23.73	81.10	69.74
2010	4.72	2.48	3.49	5.65	12.43	25.95	79.36	65.92

Source: Calculated from Korea International Trade Association – KITA data

Figure 4. Korea’s Manufacturing Trade Ratio with Vietnam and ASEAN

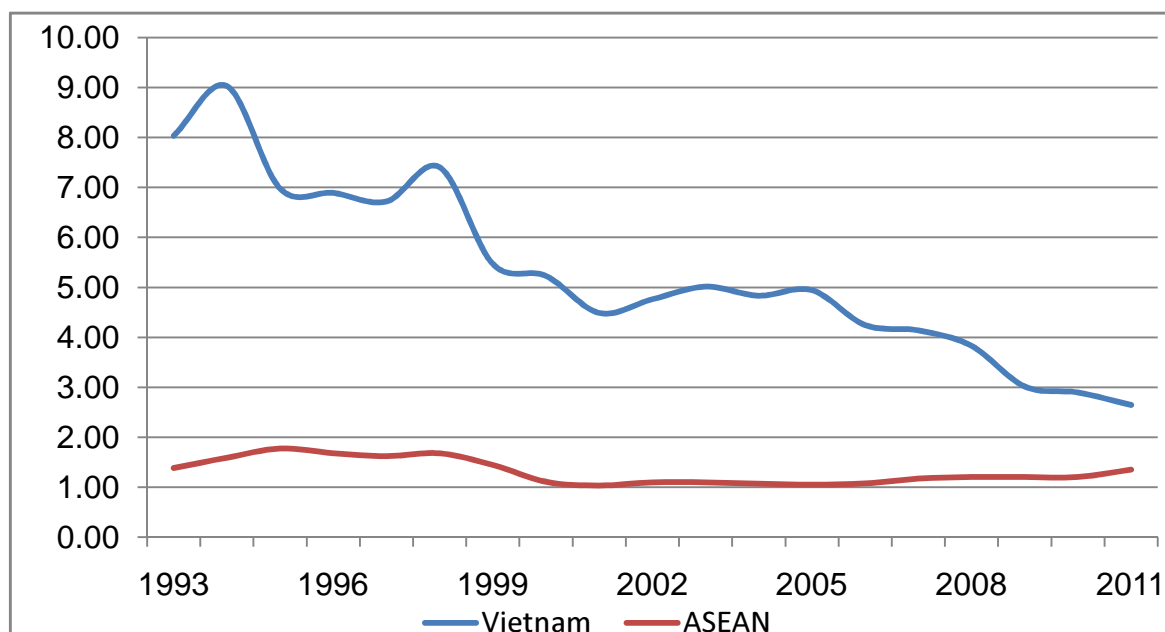


Source: Calculated from Korea International Trade Association – KITA data

For trade balance, Korea has maintained a trade surplus over Vietnam for the past 20 years. In 2011, Vietnam’s total trade deficit was US\$10.16 billion of which that suffered from Korea amounted to nearly US\$8.5 billion, or 83.2% of the nation’s total trade gap. The gap in trading with Korea clearly reveals the goods profile on both sides.

The trade ratio (export/import) of Korea-Vietnam and Korea-ASEAN (figure 5) again illustrates how serious is the gap of Korea-Vietnam bilateral trade comparing to other ASEAN members. Though Vietnam’s trade deficit with Korea has been decreasing, it is still much bigger than ASEAN’s corresponding figure.

Figure 5. Korean Trade Ratio with Vietnam and ASEAN



Source: Calculated from Korea International Trade Association – KITA data

IV. Trade Pattern Indices

This section provides the application of some major trade indices which reveal changes in commodity structure of trade and thus are most useful for the preparation of negotiating positions in trade negotiations as well as for formulation of development strategies, as they reflect directly or indirectly the competitive ability of a country's economic sectors or activities. A broad definition of a trade indicator is that it is an index or a ratio which can be used to describe and assess the state of trade flows and trade patterns of a particular country or countries and can be used to monitor these flows and patterns over time or across countries. Indicators can and should be used towards evidence-based policy making (Scott, 2005). Trade pattern indices can be categorized as follows:

Aggregate Trade Indices: Trade Shares, Trade Openness, Trade Intensity

Sectoral Trade Indices: Revealed Comparative Advantage Index, Intra-industry trade, Regional Orientation

Overlap Indices: Trade Complementarity

Trade intensity index

Trade intensity index – TII (export, import) measures the strength of bilateral trade flows and used to determine whether trade between the two countries is greater or smaller than what would be expected on the basis of their share in world trade. The export/import intensity index takes the ratio of an export/import share for a country to the corresponding export share of the world as a whole. TII is calculated as follows:

$$TII_{ij} = \frac{T_{ij}/T_{iw}}{T_{jw}/T_{ww}}$$

Where: T_{ij} , T_{iw} are the country's i export (import) to (from) country j and the world

T_{jw} , T_{ww} are the country's j imports (exports) from (to) the world and the world's total exports.

A value of TII_{ij} greater (less) than one implies a bilateral trade flow that is larger (smaller) than expected compared with two countries' trade with the rest of the world.

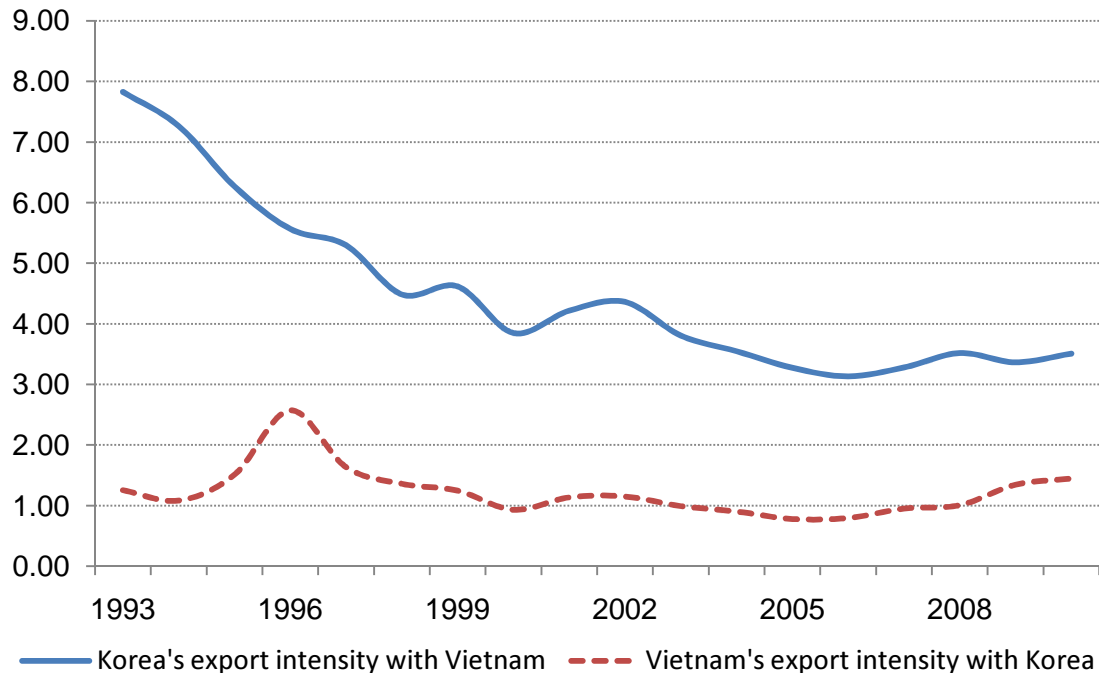
Figure 6 shows the export and import intensity of two countries in the period of 1993-2010. As it can be seen, Korea's export intensity with Vietnam was extremely high in this period, though it decreased gradually over time. This implies Korea's exports to Vietnam grew much higher than that to the rest of the world. Vietnam's export intensity with Korea fluctuates around unity, which indicates the growth rate of Vietnam's exports to Korea is similar with that of the rest of the world. Overall, the bilateral trade between Korea and Vietnam has been less intense than the respective trade of Korea and Vietnam with other countries in recent years.

Table 5. Trade Intensity between Vietnam and Korea

	1993	1996	1999	2002	2005	2008	2010
Korea's export intensity with Vietnam	7.83	5.57	4.62	4.36	3.27	3.52	3.51
Korea's import intensity with Vietnam	1.27	1.09	1.06	1.19	0.84	1.17	1.59
Vietnam's export intensity with Korea	1.26	2.57	1.25	1.15	0.78	1.01	1.45
Vietnam's import intensity with Korea	7.89	5.66	4.87	4.55	3.53	3.35	3.63

Source: Calculated from UN Comtrade data.

Figure 6. Vietnam – Korea Trade Intensity



Source: Calculated from UN Comtrade data.

Intra – industry Trade index

The intra-industry trade (IIT) is generally defined as the simultaneous export and import of goods in the same industry. Instead of specialization in an entire industry or activity, that is, inter-industry specialization, intra-industry specialization involves a country specializing in a narrow range of products within a given industry or in other words, IIT represents a simultaneous movement towards specialization in separate differentiated goods and achieves economies of scale in production of an industry.

Several alternative measures have been developed in the literature to estimate the degree of intra-industry trade (IIT). To measure the extent of IIT, this study uses the most widely preferred index, standard Grubel-Lloyd (G-L) index. The standard G-L intra-industry trade index is computed as follows:

$$IIT_i = 1 - \frac{|X_i - M_i|}{X_i + M_i}$$

where X_i and M_i stand, respectively, for the exports and imports of industry i . IIT index can vary between 0 and 1. The IIT_i is closed to 1 denotes more trade in industry i or intra-industry trade, whereas, IIT_i is closed to zero means inter-industry trade.

The IIT_i index across all goods is given by

$$IIT_i = 1 - \frac{\sum_k |X_i - M_i|}{X_i + M_i}$$

which averages the IIT_i index across all goods. The average IIT_i index can either be weighted by the share of each good in total trade (k) between pair of countries, as in the above formula, or it can be an unweighted average.

The IIT results of Korea-Vietnam trade is shown in table 6 and table 7. First of all, two countries trade was divided into one-way trade and two-way trade with their shares, as it is summarized in table 6. From 1993 to 2010, two-way trade has been increased dramatically, indicated by both the number of traded product and trade share. In 2010, two-way trade accounted for about 98% of total bilateral trade with 206 out of 240 product groups. This implies the significant trade expansion as well as trade diversification between two countries in the past two decades.

In terms of intra industry trade for specific commodities, the top 10 intra-industry trade products between Korea and Vietnam is reported in table 7. Overall, the top 10 products with high level of IIT differed at different times. In 1995, Clothing accessories, of textile fabrics (846) was the highest IIT. In 2000, 2005 and 2010, the products with highest IIT have changed from Insecticides, etc. (591), Pearls, precious stones (667), and Cutlery (696), respectively. Generally, almost all groups with high intra-industry trade fell within product groups of SITC six, seven, and eight (at the one-digit level), which are manufacturing industries. This is reasonable since intra-industry trade has taken place mainly in the manufacturing sector. On the other hand, the top 10 intra-industry trade products account for extremely small share of Korea-Vietnam exports, except textile related products.

Table 6. Summary of Korea-Vietnam Trade by Product Groups

Year	Total traded product groups	One way trade		Two way trade	
		No of product groups	% of total trade	No of product groups	% of total trade
1993	185	126	53.84	59	46.16
1995	205	119	36.57	86	63.43
2000	227	76	13.27	151	86.73
2005	234	54	5.65	180	94.35
2010	240	34	2.30	206	97.70

Source: Author's calculation from UN comtrade data, SITC rev.3, 3-digit

Table 7. Top 10 Intra-Industry Trade Index in Korea-Vietnam Trade

Code	1995	IIT	%	Code	2000	IIT	%
846	Clothing accessrs,fabric	0.98	0.21	591	Insecticides, etc.	0.95	0.03
666	Pottery	0.91	0.00	762	Radio-broadcast receiver	0.91	0.00
895	Office,stationery suppl	0.77	0.05	881	Photograph appar.etc.nes	0.90	0.01
658	Textile articles nes	0.69	0.25	897	Gold,silverware,jewl nes	0.84	0.02
667	Pearls,precious stones	0.68	0.00	062	Sugar confectionery	0.80	0.00
727	Food-process.mch.non dom	0.67	0.03	971	Gold,nonmontry excl ores	0.77	0.00
821	Furniture,cushions,etc.	0.67	0.03	211	Hides,skins(ex.furs),raw	0.76	0.00
634	Veneers, plywood, etc.	0.67	0.01	778	Electric.mach.appart.nes	0.76	0.48
652	Cotton fabrics, woven	0.66	2.21	716	Rotating electric plant	0.73	0.21
848	Clothng,nontxtl;headgear	0.62	0.29	773	Electr distribt.eqpt nes	0.72	1.03
Code	2005	IIT	%	Code	2010	IIT	%
667	Pearls,precious stones	0.99	0.01	696	Cutlery	1.00	0.03
778	Electric.mach.appart.nes	0.96	0.24	848	Clothng,nontxtl;headgear	0.99	0.12
663	Mineral manufactures,nes	0.95	0.28	592	Starches,inulin,etc.	0.95	0.14
897	Gold,silverware,jewl nes	0.94	0.19	654	Oth.textile fabric,woven	0.95	0.05
634	Veneers, plywood, etc.	0.94	0.01	693	Wire products excl.elect	0.94	0.08
884	Optical goods nes	0.93	0.04	292	Crude veg.materials, nes	0.92	0.04
629	Articles of rubber, nes	0.83	0.06	773	Electr distribt.eqpt nes	0.88	0.54
073	Chocolate,oth.cocoa prep	0.83	0.00	689	Misc.non-ferr.base metal	0.86	0.01
651	Textile yarn	0.82	2.35	663	Mineral manufactures,nes	0.86	0.11
659	Floor coverings, etc.	0.82	0.00	716	Rotating electric plant	0.86	0.39

Note: % denotes the product group's share in total Korea-Vietnam exports.

Source: Author's calculation from UN comtrade data

At the aggregate levels of IIT, it can be seen that the values of the Grubel-Lloyd index for Korea-Vietnam trade is low compared to Korea's trade with other selected ASEAN countries (table 8). The low levels of IIT indicate that traditional factor endowment theory still holds true for Korea-Vietnam trade. Overtime, the IIT's level of Korea-Vietnam trade has been the lowest compared with others. This again indicates the trade pattern of developing and developed country as well as the differences between two countries' trade structure. Overall, the trend of IIT between Korea and selected ASEAN economies has steadily increased over the period of 1993-2010. Among these, Singapore and Philippines have the highest levels of IIT with Korea, which are 0.51 and 0.44 in 2010, respectively.

Table 8. Intra-Industry Trade Index Average: Korea and Selected ASEAN countries

	1993	1996	1999	2002	2005	2008	2010
Indonesia	0.10	0.10	0.14	0.18	0.14	0.15	0.12
Malaysia	0.17	0.21	0.33	0.45	0.39	0.28	0.27
Philippines	0.17	0.26	0.33	0.51	0.52	0.40	0.44
Singapore	0.44	0.34	0.43	0.62	0.59	0.45	0.51
Thailand	0.13	0.20	0.34	0.41	0.37	0.31	0.31
Vietnam	0.06	0.12	0.13	0.11	0.14	0.14	0.16

Source: Author's calculation from UN comtrade data

The most obvious explanation for the occurrence of IIT is product differentiation (Krugman 1979, 1980; Lancaster 1980). Product differentiation occurs in a situation where individual firms in an industry produce different varieties of the same product which are close substitute in consumption and/ or production. In the presence of demand similarity between countries and preference diversity between consumers product differentiation generates IIT between countries. Products can differentiate in three main forms: horizontal differentiation (different attributes), vertical differentiation (different qualities) and technological differentiation (improved product range brought about by technical breakthrough).

In order to distinguish IIT into its vertical and horizontal components, existing literature shows the consistency in methodology which is based on the assumption that the difference in unit cost of export and import reflects the quality difference in goods of export and import between trading partners. Thus, this study uses the ratio of unit value (UV) of export and import as the proxies for product differentiation. Export (import) unit values are obtained by dividing the value of total exports (imports) to total amounts of exports (imports). IIT is considered as horizontal if the export and import values differ by less than α % (15, 25, i.e.) if they fulfill following condition:

$$1 - \alpha \leq \frac{UV_i^x}{UV_i^m} \leq 1 + \alpha$$

Vertical IIT then is defined as:

$$\frac{UV_i^x}{UV_i^m} \leq 1 - \alpha \text{ or } 1 + \alpha \leq \frac{UV_i^x}{UV_i^m}$$

The reason of using α percent in the calculations is that, the transaction costs are estimated to constitute approximately α percent of the product prices.

The Intra-industry trade levels IIT, VIIT and HIIT for Korea-Vietnam bilateral trade in the period of 1993-2010 are reported in Table 9. These indices are calculated from SITC 3-digit trade data and $\alpha = 25\%$. The result shows the remarkably changed trend in VIIT and HIIT in the corresponding period. Between 1993 and 2010, the share of vertical intra industry trade decreased from 96.5 percent to 70.16 percent, meanwhile share of trade in horizontally differentiated products increased dramatically from around 4 percent to nearly 30 percent. This indicates an improvement in Vietnam's trade, specifically exports, in terms of product's diversification and technology changes.

Table 9. Intra industry trade levels in the period of 1993-2010

Year	Intra Industry Trade (\$US million)						Non specified	
	Total	percent	VIIT	percent	HIIT	percent	value	percent
1993	378.0	100.00	363.1	96.05	14.8	3.93	0.10	0.03
1997	1,270.8	100.00	1,091.1	85.87	179.0	14.08	0.64	0.05
2000	1,741.9	100.00	1,473.1	84.57	268.0	15.39	0.75	0.04
2005	3,892.7	100.00	3,331.7	85.59	560.7	14.40	0.32	0.01
2010	12,683.9	100.00	8,898.6	70.16	3,784.2	29.83	1.06	0.01

Source: Author's calculation from UN comtrade data, SITC at 3 digits level

Trade complementarity index

The trade complementarity index (TCI) is a type of overlap index. It measures the degree to which the export pattern of one country matches the import pattern of another. A high degree of complementarity is assumed to indicate more favorable prospects for a successful trade arrangement. The TCI ranges between 0 and 1. It takes value 0 when there is no compatibility in trade flows between two countries, that is, when there is no product that is exported from one country and imported by the other one. On the other hand, the index takes value 1 when trade flows match perfectly, that is, when the export structure of one country is just the same as the import structure of the other country. Changes over time may tell us whether the trade profiles are becoming more or less compatible. TCI is measured as follows.

$$TCI_{ij} = 1 - \frac{\sum_{i=1}^n |M_{ij} - X_{jk}|}{2}$$

Where M_{ij} is the share of goods j in total imports of country i , and X_{jk} is the share of goods j in total exports of country k . There are two indices for each country pair, one taking i as exporter and one taking it as importer. Sometimes the two indices are quite different. The country in a bloc whose import pattern fits with its partners' exports will act as a trade engine for the bloc; the one whose export pattern fits with its partners' imports will benefit (in political economy terms) from the agreement.

The TCI for Korea-Vietnam trade during the period 1997–2010 is shown in table 10. The results of TCI indicate that bilateral trade between Korea and Vietnam is highly complementary. Taking Vietnam as importer, TCI is higher than that of as exporter. This means that Vietnam's import structure is compatible with Korea's export structure. On the other hand, lower TCI

values when taking Korea as importer means Vietnam's export structure is not highly compatible with Korea's import structures.

Table 10. Trade Complementarity Index of Korea-Vietnam trade

	1998	2000	2002	2004	2006	2008	2010
Korea-Vietnam	0.27	0.34	0.33	0.35	0.42	0.42	0.37
Vietnam-Korea	0.44	0.46	0.46	0.46	0.48	0.53	0.56

Source: Author's calculation from UN comtrade data

Trade Competitiveness: Revealed Comparative Advantages - RCA

In the theories of international trade, comparative advantage is an important concept for explaining pattern of trade. Comparative advantage underlies economists' explanations for the observed pattern of inter-industry trade. Revealed comparative advantage indices (RCA) use the trade pattern to identify the sectors in which an economy has a comparative advantage, by comparing the country of interests' trade profile with the world average. This study uses the Balassa (1965) measure of computing the RCA index, a ratio of product k's share in country i's exports to its share in world trade. This is calculated as follows:

$$RCA_i^k = \frac{X_i^k / X_i}{X_w^k / X_w}$$

where X_i^k , X_i are the country i's export of goods k and its total export, respectively.

X_w^k , X_w are the world's export of goods k and the world's total export.

Thus when the product's share in national exports is higher than the product's share in the world exports ($RCA > 1$), we interpret it as the country reveals comparative advantage in this particular product. In contrast, for products whose $RCA < 1$, country is said to reveal comparative disadvantage.

Although the index is usually computed in comparison to world trade, it is also possible to compute a bilateral RCA (BRCA), where there are several possible options. The BRCA2 gives us an indication of how much a given country is exporting to a given market relative to how much the world is exporting to that market. A bilateral RCA above one will tell us that for that particular good that country i have a revealed comparative advantage in country j's market, compared with the rest of the world, which is computed as follows:

$$BRCA_{ij}^k = \frac{X_{ij}^k / X_{ij}}{X_{wj}^k / X_{wj}}$$

Where X_{ij}^k , X_{ij} are the country i's export of goods k and its total export to country j, respectively.

X_{wj}^k , X_{wj} are the world's export of goods k and the world's total export to country j.

A value of this index smaller than one again reveals a comparative disadvantage but in country j, while index above one represents comparative advantage in country j.

In order to assess whether Korea-Vietnam bilateral trade is consistent with the comparative advantage principle, or Korea-Vietnam trade is complementary or competitive in nature, we formulated the RCA and BRCA for two countries in the period of 1997-2010. The summary of global RCA of Korea and Vietnam exports is reported in table 11. Overall, trade values of high RCA product groups ($RCA > 1$) account for over 80% of exports in both countries. However, while Korea is showing an increase trend in export's share of high RCA items, Vietnam is observing an inverse case. Though its number of products which have high RCA increased from 44 to 72, the export share of those items has slightly decreased in the period of 1997-2010.

In 1997, Korea displayed RCA in 57 product groups, out of the total 260. By 2010, about 57 product groups enjoyed comparative advantage. Thus, since 1997, the number of items enjoying comparative advantage remained unchanged. If we consider the number of product groups that have comparative disadvantage, then one observes that they are the majority. Hence, the measures for competitiveness improvement should be considered for both countries to promote their exports further.

Table 11. Summary of RCA in Korea and Vietnam exports

Korea's exports (Number of product groups)					
	Total	RCA \leq 1	Export share	RCA $>$ 1	Export share
1997	261	203	0.26	58	0.74
2000	261	197	0.20	64	0.80
2005	260	206	0.17	54	0.83
2010	260	203	0.18	57	0.82
Vietnam's exports (Number of product groups)					
1997	261	217	0.13	44	0.87
2000	261	216	0.15	45	0.85
2005	260	207	0.15	53	0.85
2010	260	188	0.17	72	0.83

As can be seen from table 12 and table 13, the product groups which have high RCA values are differed for two countries. In the period of 1997-2010, Korea enjoyed a comparative advantage primarily in manufactured products, machinery and transport equipment. Korea exhibits strong comparative advantage in synthetic fibers (266); ships, boats, and floating structures (793); optical instruments and apparatus (871); and knitted or crocheted fabrics (655). More importantly, Korea has been able to increase its comparative advantage in high-technology manufacture product groups such as optical instruments, nes (871); ship, boat, float. structure (793); and polymers of styrene (572).

On the other hand, Vietnam exhibited a comparative advantage mainly in either primary products or low-technology manufactured goods (SITC code 0, 2, 4, 8), specifically, those are rice (042), spices (075), natural rubber, gums (231), coffee and coffee substitutes (071), footwear (851), tea and mate (074), and men's non-knitted outerwear (842). Overtime, rice (042) has remained in the first position with significant high value of RCA. It is reasonable because Vietnam has been the second largest exporter of rice in the world since 1997. Several product

groups show significant increases in comparative advantage over time: wood in chips, particles (246); footwear (851) and fish etc (035).

Table 12. Top 10 product groups with high RCA values in Korea's exports

Code	Product name	RCA	Code	Product name	RCA
1997			2000		
883	cine.film exposd.develpd	10.23	266	synthetic fibres	7.66
971	gold,nonmontry excl ores	9.07	793	ship,boat,float.structrs	7.54
266	synthetic fibres	7.97	655	knit.crochet.fabric nes	6.93
653	fabrics,man-made fibres	7.41	653	fabrics,man-made fibres	5.46
793	ship,boat,float.structrs	6.86	656	tulle,lace,embroidry.etc	5.02
655	knit.crochet.fabric nes	6.79	572	polymers of styrene	4.71
656	tulle,lace,embroidry.etc	4.71	711	steam gener.boilers,etc.	3.85
871	optical instruments,nes	4.15	657	special yarn,txtl.fabric	3.83
611	leather	4.02	511	hydrocarbons,nes,derivts	3.77
776	transistors,valves,etc.	3.77	678	wire of iron or steel	3.28
2005			2010		
793	ship,boat,float.structrs	9.03	871	optical instruments,nes	11.69
871	optical instruments,nes	8.86	793	ship,boat,float.structrs	8.53
266	synthetic fibres	6.26	572	polymers of styrene	6.36
572	polymers of styrene	5.70	266	synthetic fibres	5.21
655	knit.crochet.fabric nes	5.26	655	knit.crochet.fabric nes	4.73
513	carboxylic acids,derivts	3.66	513	carboxylic acids,derivts	4.05
511	hydrocarbons,nes,derivts	3.43	711	steam gener.boilers,etc.	3.96
764	telecomm.equip.parts nes	3.37	232	synthetic rubber, etc.	3.91
674	flat-rolled plated iron	3.16	511	hydrocarbons,nes,derivts	3.42
656	tulle,lace,embroidry.etc	3.08	674	flat-rolled plated iron	3.39

Source: Author's calculation from UN comtrade data

Table 13. Top 10 product groups with high RCA values in Vietnam's exports

Code	Product name	RCA	Code	Product name	RCA
1997			2000		
042	rice	64.65	042	rice	44.23
075	spices	20.83	036	crustaceans,molluscs etc	31.05
036	crustaceans,molluscs etc	20.19	075	spices	25.57
231	natural rubber, etc.	19.36	245	fuel wood, wood charcoal	25.56
071	coffee,coffee substitute	16.98	071	coffee,coffee substitute	18.80
851	footwear	11.32	231	natural rubber, etc.	18.39
074	tea and mate	11.19	851	footwear	13.65
841	mens,boys clothng,x-knit	10.49	074	tea and mate	9.46

037	fish etc.prepd,prsvd.nes	6.65	841	mens,boys clothng,x-knit	8.49
261	silk	6.41	035	fish,dried,salted,smoked	7.68
2005			2010		
042	rice	43.08	042	rice	32.57
036	crustaceans,molluscs etc	28.11	246	wood in chips, particles	18.10
231	natural rubber, etc.	22.70	231	natural rubber, etc.	17.11
075	spices	18.27	075	spices	16.28
071	coffee,coffee substitute	15.00	036	crustaceans,molluscs etc	16.15
851	footwear	14.44	071	coffee,coffee substitute	13.35
246	wood in chips, particles	11.09	881	photograph appar.etc.nes	12.06
843	mens,boys clothing,knit	8.76	851	footwear	10.93
841	mens,boys clothng,x-knit	7.82	037	fish etc.prepd,prsvd.nes	9.03
074	tea and mate	7.67	841	mens,boys clothng,x-knit	8.54

Source: Author's calculation from UN comtrade data

Above are the comparative advantages of two countries' export in the world market. In order to assess the comparative advantages of each country's exports in its partner's market, the bilateral revealed comparative advantage (BRCA) was used. The results of BRCA for Korea-Vietnam trade is shown in table 14 and 15.

Table 14. Summary of BRCA in Korea's exports to Vietnam

	BRCA ≤ 1		BRCA > 1			
	Number of products	Export share (%)	Number of products	Export share (%)	primary goods	manufacture goods
1997	198	25.18	57	74.82	1.86	72.97
2000	187	24.01	70	75.99	1.80	74.19
2005	193	26.13	66	73.87	1.57	72.30
2010	193	17.47	66	82.53	10.25	71.77

Source: Author's calculation from UN comtrade data

Table 15. Summary of RCA in Vietnam's exports to Korea

	BRCA ≤ 1		BRCA > 1			
	Number of products	Export share (%)	Number of products	Export share (%)	primary goods	manufacture goods
1997	211	6.59	47	93.41	13.57	79.84
2000	214	4.11	45	95.89	31.73	58.75
2005	195	14.94	65	85.06	41.25	43.81
2010	197	13.54	62	86.46	43.76	42.70

Source: Author's calculation from UN comtrade data

As can be seen from table 14 and 15, the number of product groups which have comparative advantage ($RCA > 1$) have been increased over time for both countries, though these figures are minority in compared to total traded products. There were about 60 out of nearly 200 product groups enjoyed comparative advantage in 2010. In terms of export's share of comparative advantage products, Korea reported an increase trend, from 74.82% to 82.53% (of total export) in the period of 1997-2010. By contrast, the corresponding figure for Vietnam decreased in the same period. Consider the comparative advantage by sectors, products with $RCA > 1$ then grouped by SITC's product codes (primary goods = 0, 1, 2, 3, 4 and manufacture goods = 5, 6, 7, 8). Export's shares of two sectors are also reported in the same tables above. Again, Korea enjoyed comparative advantage mainly in manufactured product, which accounted for over 70% of total exports to Vietnam in the period of 1997-2010. On the other hand, Vietnam exhibited a strong advantage in primary sector as 43.76% of total Vietnam's export to Korea originated from this area in 2010. More over, the top 10 product groups with highest BRCA in Korea-Vietnam trade are totally different for two countries (table 16).

Table 16. Top 10 BRCA between Korea and Vietnam in 2010

Korea export to Vietnam			Vietnam export to Korea		
Code	Product name	BRCA	Code	Product name	BRCA
269	worn clothing, textl. artl	4.33	264	jute, oth. textl. bast fibr	90.52
686	zinc	3.79	246	wood in chips, particles	34.22
783	road motor vehicles nes	3.16	273	stone, sand and gravel	21.69
572	polymers of styrene	3.01	036	crustaceans, molluscs etc	21.68
655	knit. crochet. fabric nes	2.99	658	textile articles nes	20.94
232	synthetic rubber, etc.	2.88	037	fish etc. prepd, prsvd. nes	20.85
512	alcohol, phenol, etc. deriv	2.85	075	spices	16.96
782	goods, spcl transport veh	2.74	062	sugar confectionery	14.88
574	polyacetal, polycarbonate	2.67	071	coffee, coffee substitute	14.61
571	polymers of ethylene	2.64	841	mens, boys clothng, x-knit	13.67

Source: Author's calculation from UN comtrade data, SITC at 3 digits level

The overlap between the RCAs of Korea and Vietnam is reported in table 17. There are eleven product groups which evidenced a comparative advantage ($RCA > 1$) in both countries in 2010. These products out of the textile and electronic cluster like synthetic fibres, leather, textile yarn and flat-rolled iron etc. As it can be seen, the RCA's overlap between Korea and Vietnam was not significant. These product groups accounted for only 14.12% and 10.64% of Korea and Vietnam's exports in 2010, respectively. The information of RCA's analysis through table 12 to table 17 indicates that the structure of bilateral trade between Korea and Vietnam is complementary rather than competitive, as each country has a very different comparative advantage.

Table 17. Overlap RCA between Korea and Vietnam in 2010

Product code	Product Name	Korea		Vietnam	
		RCA	Export share (%)	RCA	Export share (%)
266	Synthetic fibres	5.21	0.23	2.29	0.10
611	Leather	1.11	0.17	2.17	0.33
651	Textile yarn	1.05	0.34	5.65	1.83
653	Fabrics,man-made fibres	2.03	0.48	1.58	0.37
655	Knit.crochet.fabric nes	4.73	0.79	1.28	0.21
657	Special yarn,txtl.fabric	1.50	0.41	2.09	0.57
673	Flat-rolled iron etc.	3.20	1.71	1.28	0.68
674	Flat-rolled plated iron	3.39	1.11	1.10	0.36
764	Telecomm.equip.parts nes	2.51	7.57	1.23	3.72
771	Elect power machny.parts	1.08	0.63	1.02	0.59
773	Electr distribt.eqpt nes	1.07	0.68	2.92	1.86
Total			14.12		10.64

Source: Author's calculation from UN comtrade data, SITC at 3 digits level

V. Summary and Conclusion

This paper has investigated two major issues in Korea-Vietnam trade relation: current situation and the possible implications for their future trade relations. The main findings are as follows.

First of all, Korea is the most important trading partner for Vietnam in the last 20 years. Meanwhile, Vietnam's trade with Korea has been significantly growing as Vietnam is now in the top 10 export markets for Korea. In term of trade balance, Korea has maintained a trade surplus over Vietnam up till now. Secondly, the commodity trade structure between Korea and Vietnam remained somewhat unchanged, even though bilateral trade between the two has expanded significantly over the past decades. Korea enjoys and exports to Vietnam predominately manufactured goods whereas her imports from Vietnam concentrated on primary goods. For trade intensity, export and import intensity indices indicate a strong export relationship for Korea with Vietnam, while the import intensity of goods from the Vietnam is lower than expected.

Third, Korea-Vietnam bilateral trade is primarily inter-industry trade. The low levels of IIT over the investigated period indicate that traditional factor endowment theory still holds true for Korea-Vietnam trade. This result also confirms the trade pattern of developing and developed country for the case of Korea-Vietnam trade.

Lastly, regarding the competitiveness of trade, the results of global and bilateral RCA show that Korea possesses a strong revealed comparative advantage in manufactured products and machinery and transport equipment. Vietnam, on the other hand, enjoys a comparative advantage largely in either primary products or low-technology manufactures. This result is also consistent with the information of trade complementarity index as trade between two countries is complementary rather than competitive.

As indicated in research objectives, this paper is just exploratory and preliminary. The existing composition and pattern of trade between the two countries confirm what we expected.

The impetus of the freer trade with these two countries is clear. The trade relationship between the Korea and Vietnam in has been gradually intensive and stable, but further strength and development is needed. The findings of this paper may serve as recommendations in a way that the usage of trade indices as an input into the process of evidence-based policymaking in for policy makers to improve bilateral trade between two countries. Korea and Vietnam are now considering a free trade agreement (FTA) between the two. Thus, the FTA will be a good opportunity to help Vietnam and Korea to enhance further the significance of economic relationship between two countries.

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