A STUDY ON THE FEASIBILITY OF ECONOMIC INTEGRATION IN NORTHEAST ASIA

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This paper analyzes economic feasibility of regional integration in the Northeast Asia, and provide a feasible approach for the regional economic integration. It also suggests that the Northeast Asian Free Trade Area should be pursued with a long-term perspective, and it is essential for the three countries to actively pursue coordination for the successful launch of regional economic integration.

I. INTRODUCTION

Economic cooperation among Korea, Japan and China can be pursued through various approaches.[1] But according to the international criteria, the most desirable form of economic integration would be to create a preferential trading bloc among member countries by eliminating tariff and non-tariff barriers. However, this option has so far not been under serious consideration, due to the socialist regime of China, the attitude of Northeast Asian countries suspicious toward Japan because of the history of the past, and the fear of the aggravation of existing economic gaps.

There are several motives for economic integration in the Northeast Asia. A

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[1] Several economists suggested models for economic integration in the Northeast Asia. However, most of them are about the establishment of 'partial' integration among specific areas (cities or provinces), not covering the whole territories of member countries. However, this approach is not consistent with the WTO rule on regional trading blocs. Refer Cheong (1999) and Kim (1998) for discussion about models for economic integration in the region.

trading bloc can minimize risk and uncertainty, and can reduce disadvantage accruing to countries outside regional trading blocs. Through the formation of a trading bloc, member countries can also seek solution of pending trade issues, and strengthen the political and diplomatic ties necessary for strengthening the international community. All this, in the long run, is expected to improve the economic situation of each country and contribute to continued growth. Economic cooperation should be pursued through a preferential trading bloc that is compatible with WTO rules and that can gain momentum in the process of implementation.

Unlike other papers on the economic integration in the Northeast Asia summarized in Cheong (1999) and Kim (1998), this paper will investigate economic possibility of economic integration in the Northeast Asia and provide a feasible approach for the economic integration. Since the formation of an FTA requires a long-term deliberate process, we have to consider not only the economic aspect but also political elements. In particular, it would be difficult to overcome the different political system of China in the short term. In addition, generally, the conclusion of an FTA is more feasible when the number of countries participating is small. Thus, we will examine the possibility of a Korea-Japan FTA, which could incorporate China at some later date after evaluating China's will towards trade liberalization and its progress in improving its institutions.

II. EVALUATION OF THE FEASIBILITY OF ECONOMIC INTEGRATION IN THE NORTHEAST ASIA THROUGH THE EXPANSION OF MARKET ACCESS

The need for economic cooperation among the Northeast Asian countries has been reemphasized after recent changes in the international economic environment, especially after the East Asian financial crisis. To overcome the financial crisis, though different forms of international economic cooperation could be utilized for stimulating internal demand, the surest form would be to conclude an FTA among the countries with large trade volumes. Since the feasibility study of a Korea-Japan FTA was proposed by Okura, the Japanese ambassador to Korea in September 1998, the discussion on the viability of an FTA between Korea and Japan has been vitalized. In addition, a feasibility study on an FTA among Japan, China and Korea was also suggested in the ministerial meeting between Korea and Japan in November 1998.

There was also an opportunity for dialogue by political leaders on a Korea-China-Japan FTA. Especially, the changes in the international trade environment after the Asian financial crisis made the three economies reorient their trade policy toward regionalism. Leaders of Korea, Japan and China met during the ASEAN+3 meeting at Manila, November 1999, and discussed strengthening economic cooperation in the region. Furthermore, it was agreed that the three countries would proceed a joint study for economic integration in the region.

To examine the economic feasibility of Northeast Asian regional economic integration through the expansion of market approach, let us analyze the economic effects of trade liberalization between Korea and Japan, prior to exploring a simulation of economic integration of the three countries. In order to evaluate the economic feasibility of a trading bloc, first of all, it is necessary to predict the overall effect that economic integration would cause on the whole economy. If possible, it is desirable to make a general evaluation of expected economic effects with full consideration of the real economic situation. In judging the validity of the creation of a trading bloc, the most important criterion is to compare the real income before and after its establishment. However, in order to measure exactly the variations in the real income, we need to construct an economic model that will take into account the effect of the formation of a trading bloc on the macroeconomic variables as well as across all industrial sectors, which requires a considerable number of academic researchers and great effort. This paper concentrates on analyzing the influence of trade liberalization on the macroeconomic variables and trade patterns of the Northeast Asia using a CGE model, data and parameters that enable us to estimate the economic effect of the elimination of tariff barriers.[2]

As shown in Table 1, if Korea and Japan completely eliminate tariff barriers on a preferential basis, Korea is projected to lose by USD 2.0 billion annually, and its trade balance with Japan will worsen by USD 7.1 billion.[3] On the contrary, it appears that Japan will realize substantial gains. International trade

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[2] This paper employs a computational general equilibrium model (CGE) for the estimation of the effects of trade liberalization on the trade pattern. The basic structure of the model and discussion of parameters are provided at the Appendix. Also refer to Cheong (1998) for detailed discussion of the model, data and parameters.

[3] As shown at Cheong (1998), representative consumer in each region determines the expenditure share for each of the composite commodities. A Cobb-Douglas formulation is specified for the top nest. The household's utility level, u_r, will depend on the consumed amounts of the composite goods. Mathematical form of the top nest is given below. That is, consumer preferences at the top nest will be defined as a product of composite demands for all final commodities (both imported and domestic, c_r^i), powered with expenditure shares (δ_r^s):

$$u_r = \prod_{i=1}^{N} c_r^{i^{\delta_r^i}} * S_r^{\delta_r^s}, \text{ where } \sum_{i=1}^{N} \delta_r^i + \delta_r^s = 1, \text{ where } S_r \text{ is savings in region } r.$$

Since the CGE model is static, savings are controlled to remain constant during the simulation. In order to measure money equivalent values of changes in welfare, we calculate the regional equivalent variation (EV) as seen below.

$$EV_r = Y_0^* \left(\frac{u_r^n - u_r^0}{u_r^0} \right), \text{ where } Y_0 \text{ is the regional income level before the policy, and}$$

u_r^n and u_r^0 denote the utility level after policy and before policy, respectively. In a non-linear CGE model, EV is defined as $(V_b - V_r)^* P_b$, where V is the indirect utility level, and P is the price level. The subscripts b and r imply base case and revised case, respectively. A linear CGE model like the model used for this paper cannot calculate EV with this formula, since the variables in a linear CGE model is represented as percentage changes, not levels.

[Table 1] Economic Effects of Removal of Tariffs between Korea and Japan

Variables/Economies	Korea	Japan
Welfare(%)	-0.49	0.14
Equiv. Variation(bil. $)	-1.982	6.057
Nominal Income (%)	0.48	0.27
Con. Price Index(%)	0.60	0.23
% Change of Exports 1)	2.44	0.44
% Change of Imports 1)	3.26	1.03
TOT(%)	-0.04	0.28
Overall Trade Balance (bil. $)	-13.68	
Trade Balance with Japan (bil. $)	-70.89	

Note: 1) Quantity basis
Source: Cheong (1998), "Economic Effects of the Korea-Japan FTA"

theory teaches that, in general, a small economy's trade liberalization will correct the distortion of resources allocation and intensify the specification of production and trade. As a result, trade liberalization will bring welfare gains to a small country. However, we observe the opposite result with a Korea-Japan FTA. This exceptional result can be explained by the special conditions of both countries' economies. Korea's major industries overlap with Japan and thus are trade competitors, while Korea has weaker international competitiveness. Moreover, Korea's general tariff rates are higher than Japan's. Therefore, trade liberalization between the two countries will enhance Japanese price competitiveness over Korea's. Korea's dependence on high-tech industrial products from Japan will be higher, while Korea's industry structure will tend towards the development of low value-added industries such as textiles, clothing, shoes, etc, which will deteriorate the overall efficiency of resource allocation in Korea.

Next, a simulation was performed by adding China to the Japan-Korea FTA. Results similar to those shown in Table 1 were obtained in the case of the Korea-China-Japan FTA. The trade liberalization of the whole Northeast Asian region, however, would increase intraregional trade in a considerable way but at the same time, there is also a possibility that it would deteriorate the regional trade imbalance. This shows the importance of having a well-thought out strategy in achieving regional economic integration.

Table 2 shows the expected increases in intraregional exports under a scenario where Korea, China and Japan completely eliminate tariff barriers.[4] As for the

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[4] Due to the lack of information on NTBs, the removal of NTBs was not considered in this paper.

[Table 2] Impact of Removal of Tariffs in the Northeast Asian Region on Intraregional Exports

(Unit: million dollars US)

Origin\Destination	Korea	Japan	China	Total
Korea	-	332.00	22,385.67	22,717.67
Japan	8,506.73	-	52,122.21	60,628.94
China	4,664.93	19,310.44	-	23,975.37
Total intraregional trade increase				107,321.98

* This is an expected increase in export value (primary and manufacturing sectors) by country

trade creation effect, Korea, Japan and China are expected to increase their intraregional trade by USD 22.7 billion, USD 60.6 billion, and USD 24.0 billion respectively, amounting to USD 107 billion total trade creation effect. Japan, with its strong international competitiveness in the manufacturing sector, would enjoy the highest trade creation effect, which means it will obtain the greatest gains under a trilateral FTA. The expected increase in exports by region is, in Korea's case, USD 332 million, and USD 22.4 billion exported to Japan and China respectively. In China's case, its exports to Korea would increase by USD 4.7 billion and its exports to Japan would increase by USD 19.3 billion. With the highest trade creation effect predicted, Japan is expected to increase its exports to Korea and Japan by USD 8.5 billion and USD 52.1 billion respectively.

Based on Table 2, Table 3 presents the variations in trade balance of the three countries when tariffs are eliminated. While the formation of a trading bloc is expected to increase the intraregional trade balances of Korea and Japan, that of China is likely to worsen by the exact amount of improved trade balance of Korea and Japan. Korea's trade balance with Japan will deteriorate by USD 8.2 billion, while that with China will improve by USD 17.7 billion. Japan will improve its trade balance with Korea and China by USD 8.2 billion and USD 32.8 billion respectively. This, in fact, means that China will experience a deterioration of its trade deficit in the amount of USD 50.5 billion in its trade balance with Korea and Japan.

If we relate the results shown in Table 3 to the relevant trade balances for a recent year, a trilateral FTA is expected to change the pattern of the intraregional trade balance. First of all, in Korea's case its trade deficit, which amounted to USD 9.7 billion in 1997, would be reversed to an equilibrium level. Also, the trade balance patterns of China and Japan would reverse. Japan would experience a trade surplus of USD 41 billion, which would be a reversal of its 1997 position; in 1997 it recorded a trade deficit of US 7.0 billion. In comparison, in 1997, China suffered a trade deficit of USD 3.5 billion with

[Table 3] Impact of Removal of Tariffs on Trade Balances in Northeast Asia

(unit: million dollars US)

	Korea	Japan	China	Expected variation of Intraregional trade balance	Trade balance in 19971)
Korea		-8,173.73	17,720.74	9,546.01	-9,680
Japan	8,174.73		32.,811.77	40,986.47	-6,999
China	-17,720.74	-32,811.77		-50,532.51	16,679

Note; 1) Intraregional trade balance among Korea, Japan and China.
  2) Sources: KOTIS

Korea but enjoyed a trade surplus of USD 20 billion with Japan, which resulted in a USD 16 billion trade surplus. In the simulation, China would experience a USD 50.5 trade deficit.

To sum up, the formation of an FTA would substantially improve Korea's and Japan's trade balances, while China would experience a sizeable increase in its trade deficit.[5] This indicates that simple enhancement of market access by removing tariffs and non-tariff barriers (NTBs) within a short period of time is not a feasible approach for economic integration in Northeast Asia. Therefore, in creating an FTA, measures to mitigate anticipated problems should be devised.

III. SEARCHING FOR FEASIBLE APPROACHES

NAFTA is purported to have had market access expansion effects. Based on the discussion in Chapter II, however, it appears difficult to create a Northeast Asian FTA which would be similar to the NAFTA. However, it cannot be concluded that establishing an FTA which is mutually beneficial is impossible. Rather, it can be said that the results imply the necessity for designing an FTA such that all member countries can benefit, as opposed to simple trade liberalization. The simulation results have been derived based on the assumption of simple trade liberalization, which assumes complete elimination of tariffs between member economies at the same time. Therefore, the following can be one appropriate approach for the formation of an FTA, which meets the needs of the

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[5] Table 3 shows only approximate variations of intraregional trade balance among the three prospective member countries of an FTA. Thus, the exact impact of tariff elimination on the trade balance of the three countries may be revealed through further work on this topic. The formation of an FTA among the three countries will lead to trade creation, but the huge increase in trade among the three might result in reduction of exports to non-member countries. Therefore, the net impact of an FTA can be analyzed through the investigation of its impact on trade balances with non-member countries.

current situation of the Northeast Asian region.

Basically, an alternative approach could be the introduction of flexible market access. To relieve the problems relating to the extension of market access, we should consider the international competitiveness of the countries in addition to the tariff rate system. The simple average applied tariff rates of Japan, Korea and China for 1998 are 4.9%, 7.9% and 16.9% respectively. Table 4 summarizes tariff structures of the three countries. The overall tariff structures of Korea and Japan have not changed since 1995.[6] However, since China has liberalized trade substantially since 1995 as a part of China's progress toward membership in the WTO, Table 4 reports China's tariff structures for 1995 as well as 1999. According to the table, 87%-89% of total tariff lines of Japan and Korea have tariff rates which are lower than 10%, while China charges higher than 10% tariff rates for more than 68% of all tariff lines.

[Table 4] Tariff Structures of Korea, Japan and China.

(Unit: %)

Simple average MFN Tariff Rates	Korea	China		Japan
		1995	1999	
0%	1.5	1.7	3.1	43.9
0.1 ~ 10%	86.6	8.5	28.5	45.4
10 ~ 20%	4.6	16.5	37.7	8.5
20 ~ 30%	2.2	24.3	18.2	1.9
30 ~ 40%	3.2	10.6	9.6	0.2
40 ~ 50%	0.7	8.5	1.1	0.1
50 ~ 60%	1.2	11.3	0.5	0
60 ~ 70%	0	4.0	0.5	0
70 ~ 80%	0	5.4	0.5	0
80 ~ 90%	0	7.6	0.1	0
90 ~ 100%	0	0.7	0.5	0
Higher than 100%	0	0.9	0.2	0
Total	100	100	100	100

Note: 1) Tariff structures for Korea, Japan and China(1995) are based on UNCTAD's Trade Analysis and Information System, Winter 98/99, whose base year is 1995.
2) Tariff structure for China (1999) was calculated from data from APEC tariff database.
3) The numbers of tariff lines(HS 6) for Korea, Japan and China are 5,016, 4,959 and 4,945('95)- 5,116('99) respectively.

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[6] The base years of tariff rates in Table 4 are 1995. Refer to APEC (1996-1999) Individual Action Plan for marginal modifications of tariff rates after 1995.

Table 4 displays the importance of trade liberalization scenarios when the three countries try to establish a trading bloc. Trade liberalization with equal rates of reduction will definitely increase exports of Japan to the other two countries and Korea's exports to China. The impact on trade will be further affected by the relative level of each nation's international competitiveness. According to the IMD(1999) report, Japan's competitiveness ranking is 8th in the world, while China and Korea rank as 26th and 31st, respectively. This can explain the underlying reasons for China's huge deterioration of trade balance under the FTA of the three countries, shown in Table 3.

Of the three countries, Japan has the lowest tariff rates: the country charges no tariff at all for 44% of its tariff lines, and another 45.4% of its tariff rates are lower than 10%. Even though Japan maintains the lowest tariff rate system, especially in industries where Japan is competitive, it maintains high tariff rates on items such as textiles, clothing and shoes, in which both China and Korea have a great deal of interest (Refer to Table 5). For example, Japan charges 27% tariff rates for footwear, which is more than double Korea's tariff rate for the same item.

[Table 5] Examples of Japanese Tariff Peaks on Items of Concern

HS Code	Description	Tariff Rates	
		General	WTO
420292010	Trunks or suit-cases, with outer surface of plastic sheeting	10	8.8
420292090	Trunks or suit-cases, with outer surface of textile materials	10	8.8
420310100	Articles of apparel and clothing accessories, of leather or of composition leather	40	17.5
420310200	Other articles of apparel and clothing	12.5	10.9
500720032	Silk goods	20	10
610610012	Women's or girl's blouses, shirts and shirt-blouses, knitted or crocheted	14	11.6
610620011	Blouses, shirt-blouses, open shirts of man-made fibres	16.8	13.9
610711000	Men's or boys' underpants, briefs of cotton	11.2	9.3
611020029	Jerseys, pullovers, cardigans of cotton	11.6	11.1
611030022	Jerseys, pullovers, cardigans of acryl	11.6	11.1
620213200	Women's or girls' overcoats, carcoats of man-made fibres	11.2	11.6
640299010	Shoes Sandals	20 20	8.8 10
640391011	Footwear with outer soles of rubber or composition leather for gymnastics, athletics or similar activities	27	27
640399011	Other footwear with outer soles of rubber or composition leather	27	27
640411010	Tennis shoes, canvas shoes	10	8.8

Source: UNCTAD (1999), *Trade Analysis and Information System.*

Considering tariff structures of the three countries and degree of international competitiveness, it would be possible to apply tariff reductions with different lengths of implementation periods, depending on the strength of the industry, or the country. For example, let us consider asymmetric trade liberalization, which would allow Korea and China to have a longer implementation period for tariff reductions. Also, another possible alternative would be to ease the conditions for invoking the safeguard mechanism, in order to reduce injury to weak industries which might occur during the implementation period, and to secure the necessary time for restructuring.

The paper also considers several approaches, such as the linkage of trade liberalization and investment, in order to realize a feasible FTA for the region. In case of the Korea-Japan FTA, one way to compensate Korea's losses would be to arrange for specific Japanese investment commitments into those sectors in Korea which would be most seriously affected by a worsening sectoral trade balance. This can be considered a serious component of the Korea-Japan FTA. The economic growth pattern of Korea follows that of Japan, which has caused Korea to form a special economic relationship with Japan. As a result, Korea has imported intermediate goods and machinery from Japan and assembled export products. Specifically, Korea's import dependence on machinery from Japan is as high as 31.5-33.1% for 1995 to 1997, and commands 38-41% of Korean imports from Japan for the period from 1995 to 1997. According to Cheong's study (1998), when Korea liberalizes trade with Japan, most of its manufacturing sectors are expected to experience a deterioration in trade balances with Japan. Among these sectors, it was predicted that the machinery sector would experience the highest level of deterioration. Therefore, it can be suggested that the most seriously damaged sectors, such as machinery, can be compensated with special industrial cooperation, such as Japanese commitments for FDI in the sector or through the provision of technology.

Finally, we can take a long-term perspective in propelling economic integration of the Northeast Asian countries. First of all, trade regimes in the respective countries should be harmonized through strengthened cooperation, which can serve as frameworks for economic integration for the medium and short term.[7] Then, based on unified trade regimes, elimination of tariff and non-tariff barriers through gradual and asymmetric approaches can be followed for the purpose of expanding market access. Following these steps, we can temporarily mitigate the negative side effects which may be incurred through simply expanding market access by securing time in advance for enterprises in the region to acclimatize themselves to the new trade environment.

Some examples of feasible approaches towards cooperation in trade regimes

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[7] Strongly preferential modifications of trade regimes without the formation of a trading bloc consistent with the WTO could cause trade disputes with other countries. Thus, for the time being, it is necessary to coordinate trade rules in an MFN-consistent manner.

could take the following suggested forms. Firstly, differences in customs proce-
dures are regarded as a significant trade barrier because it can shrink
intraregional trade by delaying customs clearance. Therefore, coordinating the cus-
toms procedures of the three countries and resolving problems in customs proce-
dures are a prerequisite to enlarging intraregional trade among the three coun-
tries. Cooperation related to customs procedure should be directed towards
simplifying the customs clearance process in order to improve promptness of
clearance. It should be also coordinated in a way consistent with the Interna-
tional Customs Clearance process. Concerning the rules of origin, we could
consider admitting the accumulated value-added of goods where the production
process takes place in two or more countries of the region, or extending the
exemption period of the rules of origin (ROO) certificate on the same products.

In the case of government procurement, it would be possible to apply a
lower threshold for government procurement contracts than are presently applied,
and to establish mechanisms to share information and data related to a bid or
procurement issues. Also, a Mutual Recognition System in which a bidder
satisfies one country's criteria and then is automatically recognized by the other
member countries could be considered. In addition, it is necessary to establish a
common bidding qualification procedure among the three countries. The following
are other ways in which cooperation among Korea, Japan and China could be
furthered in this area: standardization of registration forms for open bids,
establishment of trilateral supply networks and after service systems, cooperation
to investigate the credit ratings of foreign companies, and facilitating contract
formation.

As regards conformity and standards issues, Korea, China and Japan could
make a Mutual Recognition Agreement (MRA) and cooperate to establish a
technological infrastructure for conformity and standardization. In the service
sector, reduction of existing regulations and expansion of the scope of
concessions are appropriate ways of cooperation. Korea, China and Japan show
considerable differences in dealing with foreign direct investment. Investment
liberalization is a very significant factor in encouraging productive and market-
oriented cooperation in the Northeast Asia region and in motivating technology
transfer, which is an indispensable element for continuous growth. Thus, reaching
an agreement on investment liberalization is an essential prerequisite for econo-
mic development in Northeast Asia. An agreement ought to be made in such a
way as to prohibit member countries from establishing new obligatory clauses or
investment conditions. It should contain as principal elements such provisions as
transparency, nondiscrimination, a right of establishment as well as national treat-
ment.

IV. SUMMARY AND POLICY RECOMMENDATIONS

It is difficult to provide a conclusive position on the viability of the Nor-

theast Asian Free Trade Area, since the study is still on going. However, based on the results analyzed so far, the following conclusion can be conservatively presented.

Firstly, the need for economic cooperation between Northeast Asian countries is increasing due to several factors. These are the deepening of the economic interdependence among the three countries; the need for the prevention of overlapping investment in major regional industries; as a response to the formation of economic blocs in the world economy and the growing number of fields requiring the coordination of common interests such as fishing activity rights and the problem of trans-boundary pollution.

None of the Northeast Asian countries has joined any regional trade agreement so far but and Japan and Korea have recently renewed their interest in concluding some kind of regional trade agreement. Also, China has intensified its trade liberalization process and tried to modernize its institutions in order to become a member of the WTO. Thus, the possibility of establishing Northeast Asian economic cooperation is higher than ever before.

However, we still face some obstacles in achieving any kind of economic integration in the form of a Free Trade Area because of widening intraregional trade imbalance, deterioration of the overall efficiency of resource allocation, the economic differences between members, China's adherence to its socialist regime and also a lingering and bitter history in the region.

Therefore, in creating the Northeast Asian Free Trade Area, we need to implement a strategy that will gradually lead to regional economic integration while overcoming the aforementioned obstacles. Based on the research, we suggest the following initiatives for the creation of the Northeast Asian Free Trade Area.

Due to the special characteristics of the Northeast Asian economy, it seems difficult to realize economic integration centered on the expansion of market access, as in the case of NAFTA, at the start of integration. The current industrial and trade structure and tariff system of the region will prevent China from adopting the expansion of market access because it will result in a large trade surplus for Japan and a significant trade deficit for China. In the case of Korea-Japan FTA, Korea is expected to suffer a serious trade imbalance with Japan but in the case of Korea-China-Japan FTA, Korea appears to achieve trade balance in the intraregional trade. With the deterioration of trade balance with Japan, Korean government will face a serious political problem in pursuing an FTA with Japan. Thus, both countries should introduce some policies for reducing Korea's trade imbalance. In order to mitigate the problem of Korea's worsening trade balance with Japan under an FTA, it is needed to device a differential liberalization scheme over time. That is, Japan liberalizes trade first, and Korea will do later. Another idea is to transfer Japanese technology to Korean firms.

The Northeast Asian Free Trade Area should be pursued with a long-term

perspective and it is essential for the three countries to actively pursue coordination for the successful launch of regional economic integration. In the short-term, we need to standardize and modernize the differing trade norms of each country, such as customs procedures, anti-dumping rules, harmonization of product classification, rules of origin, etc, in order to lay the groundwork for economic integration and we should implement a common incentive policy to accelerate the restructuring and cooperation of regional industries.

In the mid-term, we should facilitate intraregional trade by reducing tariff rates of concern for the three countries as well as for Japanese tariff rates with high customs duties.

In the long-term, we should create the Northeast Asian Free Trade Area by achieving mutually preferential trade liberalization based on a liberalization scenario designed to solve the regional trade imbalance.

The liberalization scenario consists of the differential liberalization based on the early trade liberalization of Japan and the subsequent liberalization Korea and China at the midpoint of Japan's liberalization process. In addition to tariff reduction, deliberate measures for promoting intraregional trade, such as preferential ROO, will be needed.

In order to carry out this long-term economic integration program successfully, we need to create the Northeast Asian Economic Integration Promoting Commission composed of high level officials and professionals from each country, which will occur when there exits a favorable environment within each of the three countries for integration. The commission will be responsible for preparing long-term plan for integrating the three economies and for overseeing the integration process into a single free market.

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APPENDIX: Parameters and the Structure of the CGE Model

1. Parameters

[Table A1] shows the classification of regions and industry sectors. The classification of industry sectors is based on the similarities of production requirements in intermediate goods and primary production factors.

[Table A1] Classification of Production Sectors

Production Sector
(1) Agriculture (AGR)
(2) Other Primary Sectors (OFS)
(3) Processed Foods (OFD)
(4) Beverage and Tobacco (BT)
(5) Resource Based Industry (RSC)
(6) Textiles and Clothing (CLO)
(7) Chemical and Plastic (CRP)
(8) Paper, Lumber, and Pulp (PPL)
(9) Light Manufacturing (LMF)
(10) Fabricated Metal Products (FMP)
(11) Other Manufacturing (OMF)
(12) Machinery and Equipment (ME)
(13) Vehicle (TNP)
(14) Services (SVC)

Delete, please The CGE model employs the GTAP database version 4 (See Hertel (1998) for the database). The data for world production, consumption, trade, etc are disaggregated into 14 production sectors. Production sectors consist of two primary sectors (AGR, OFS), 11 manufacturing sectors (PFD, BT, RSC, CLO, CRP, PPL, LMF, FMP, OMF, ME, TNP) and one service sector. In addition to a system of equations and database, a CGE model needs a set of parameters specifying characteristics of economic agents such as consumers and producers. Table A2 presents two sets of elasticity of substitution. The first set of elasticities is a set of parameters for the Armington assumption between domestically-produced goods and imports (σ_d), and the second is for imports from different sources (σ_m). Refer to Hertel (1998) for the detailed discussions on the parameters.

[Table A2] Elasticities of Substitution

	σ_d	σ_m
(1) AGR	2.20	4.40
(2) OFS	2.79	5.52
(3) PFD	2.20	4.40
(4) BT	3.10	6.20
(5) RSC	2.80	5.60
(6) CLO	3.31	6.98
(7) CRP	1.90	3.80
(8) PPL	2.14	4.47
(9) LMF	2.80	5.60
(10) FMP	2.80	5.60
(11) OMF	2.16	4.75
(12) ME	2.80	5.60
(13) TNP	5.20	10.40
(14) SVC	1.94	3.81

Source: Hertel(1998), GTAP Database version 4

2. The Structure of the CGE Model

(1) Household utility and demand structure

$$u_r = \sum_i \delta_r^i * c_r^i, \text{ where } \sum_i \delta_r^i = 1$$
$$d_{cr}^i = c_r^i + \sigma_c^i * \{ p_r^{ci} - p_{cr}^{di} \}$$
$$m_{cr}^i = c_r^i + \sigma_c^i * \{ p_r^{ci} - p_{cr}^{mi} \}$$
$$p_r^{ci} = \Theta_r^{ci} * p_{cr}^{mi} + (1 - \Theta_r^{ci} * p_{cr}^{di})$$

(2) Production technology

$$q_r^i = LEONTIEF (q_r^j, z_r^{1i}, z_r^{2i}, z_r^{3i}, ,,)$$
$$d_{zr}^{ji} = z_r^{ji} + \sigma_f^j * \{ p_r^{ji} - p_{zr}^{dji} \}$$
$$m_{zr}^{ji} = z_r^{ji} + \sigma_f^j * \{ p_r^{ji} - p_{zr}^{mji} \}$$
$$p_r^{ji} = \Theta_r^{ji} * p_{zr}^{mji} + (1 - \Theta_r^{ji}) * p_{zr}^{dji}$$
$$q_{er}^{ji} = q_r^j - \sigma_v^j * (p_{er}^{ji} - p_r^j)$$
$$p_r^j = \sum_k \omega_r^{jk} * p_{er}^{jk}$$

(3) Relationships between price and policy variables

$$p_{rs}^i = p_{rs}^{ci} + t_{rs}^i$$

$$p_{rs}^{fi} = p_r^{mi} - s_{rs}^i$$
$$p_{cr}^{mi} = p_r^i + t_{cr}^{mi}$$
$$p_{zr}^{mji} = p_r^i + t_{zr}^{mji}$$

(4) Market clearing conditions

$$l_r = \sum_j l_r^j$$
$$k_r = \sum_j k_r^j$$
$$q_r^i = d_{cr}^i + \sum_j d_{zr}^{ji} + \sum_s m_{sr}^i$$
$$m_r^i = m_{cr}^i + \sum_j m_{zr}^{ji}$$

(5) Demand for import

$$m_{sr}^i = m_r^i - \sigma_m^i * (p_{sr}^i - p_r^i)$$
$$p_r^i = \sum_s \xi_{sr}^i * p_{sr}^i$$

Ψ : the scale parameter with a positive value

Φ : a scale parameter

Θ_r^{ci} : import share of consumption good i in region r

Θ_r^{ji} : import share of intermediate good i by industry j in region r

ω_r^{jk} : value added share of primary endowment k by industry j in region r

δ_r^i : the share of total expenditure on the composite commodity i of national income in region r.

σ_c^i : the consumer elasticity of substitution between domestic and imported goo i

σ_f^i : firm j's elasticity of substitution between the domestically-produced intermediate and the imported intermediate

ξ_{sr}^i : region r's share of import i by source (from region s)

σ_m^i : Armington demand elasticity of good i

u_r : the percentage change in regional utility in region r

c_r^i : the percentage change in demand for the consumption of composite goo i

d_{cr}^i : region r's consumption demand for domestic good i

m_{cr}^i : region r's consumption demand for imported good i

VA_r^i : the demand for value added by the production sector i in region r

z_r^{ji} : the conditional demand by the production sector i in region r for intermediate good j

p_r^{ji} : firm j's price index for composite intermediate good i in region r

p_{zr}^{dji} : the price which firm j in region r pays for domestically-produced

(imported) intermediate good i

p_{zr}^{mji} : the price which firm j in region r pays for imported intermediate good i

p_{sr}^{i} : Region r's price of good i imported from region s

p_{sr}^{ci} : Region r's household price for good i from region s

p_{sr}^{fi} : Price for intermediate good i from region s faced by production sector j in region r

p_{r}^{mi} : domestic market price of good i in region r

p_{er}^{ji} : price of primary endowment i by industry j in region r, i labor, capital

p_{r}^{j} : composite price index for value added used by industry j in region r,

t_{rs}^{i} : import tariff imposed on good i from region r in region s

s_{rs}^{i} : export subsidy on good i from region r in region s

t_{cr}^{mi} : tax on imported good i charged on consumer in region r

t_{zr}^{mji} : tax on imported good i charged on producer in region r

q_{r}^{i} : total output of production sector i in region r

l_{r} : total supply of labor in region r

k_{r} : total supply of capital in region r

l_{r}^{j} : labor employed for production sector j in region r

k_{r}^{j} : capital employed for production sector j in region r

q_{er}^{ji} : demand for primary endowment i by industry j in region r, i labor, capital

q_{r}^{j} : value added demanded by industry j in region r

x_{sr}^{i} : region s's import of commodity i from region r