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This paper is from the
GTAP Annual Conference on Global Economic Analysis
https://www.gtap.agecon.purdue.edu/events/conferences/default.asp

Does Sequence Matter in Free Trade Area?

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Abstract

Economically, geo-politically, culturally, and even historically, Korea is surrounded by her major trading partners, i.e., China, Japan, and the United States. In regard to Free Trade Area (FTA), Korea is currently negotiating with Chile that is chosen partly because Korea-Chile Free Trade Area is expected to give the smallest adverse effects on each economy. As long as Korea is on the track of trade liberalization, Korea should consider an FTA with her major trading partners, China, Japan, and the United States in the foreseeable future. At that point, pros and cons will come to the surface, consequently, we will want for sound judgments. Identifying dynamic effects by induced capital formation, this paper at least answers which country should be the first FTA partner for Korea, and which sequence is favorably related to her growth. China, Japan, and the United States are the object of investigation.

JEL Classification: C53, D58, F15, F21

Key Words: Capital Accumulation, Free Trade Area, Sequence, Korea, the United States, Japan, China

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I. Background

Historically, the role of trade policy in capital accumulation and the consequent economic growth has been closely related in Korea. As a small open economy, Korea may raise the rate of return on capital by trade liberalization, which eventually helps Korea to cease to be small through induced capital accumulation. In fact, the long-lasting saving and investment boom experienced by Korea over the 1960-95 period was initiated and maintained to a significant degree by the trade reform (Nam and Kim 2000). This dynamic aspect of trade liberalization was emphasized by Baldwin(1992); Trade liberalization induces capital accumulation(decumulation) if the liberalization raises(lowers) the return to capital.

Nam and Kim(2000) claim that for the period of 1960-1995, there has been no lack of investment demand in Korea, while domestic investment has exceeded the domestic saving capacity. Hahn(1995) also shows that more than 30 percent of seemingly high saving rate in Korea still falls short of the optimal saving rate for her long-run optimal growth. Hong(1997) focused on foreign capital inflows over the period of 1970-1990, and positively concluded that the role of foreign direct investment in the manufacturing growth of Korea. As for a role of foreign capital, Korea has witnessed enormous inflows of foreign direct investments after Asian crisis in 1997, which has been contributing to recovery from the crisis by fast accumulating foreign exchange reserves and by driving further structural reforms. Korea needs capital for her sustainable growth, and it would be desirable that capital should be provided with trade liberalization as a momentum.

In recent years, regionalism in the form of Free Trade Area (henceforth FTA) is world-widely discussed and negotiated. Every member country in the World Trade Organization joins more

than one FTA except Korea and Mongolia although Korea is currently in negotiation with Chile for FTA affairs. Korea and Chile are not proximate economies and thus not in the welfare-improving natural bloc mentioned by Krugman(1991), let alone are not mutually major trading partners. They are mainly attracted to each other because of trade complementarity. Being on the track of trade liberalization, however, Korea will come to consider FTA with her major trading partners, the United States, China, and Japan. Once FTA agreement is reached with any of these countries, there could be a centripetal force around the Korean peninsular like a domino effect professed by Baldwin(1993) due to both geo-political and economic reasons. The impacts of the FTA with her major trading countries will be certainly greater on the Korean economy in terms of capital formation and growth than they otherwise would be (Casella 1996).

This paper addresses the dynamic effects in each FTA scenario and the sequence issue of FTA, that is, which country should be the first FTA partner for economic growth in Korea? , who should join the next?, and who should be the last? Crude guess would be that the scenario with greater dynamic effects should be chosen earlier than the one with smaller dynamic effects if we put the priority on the economic growth.

II. Description

Macroeconomic data for the regions in the FTA simulation model are presented in Table 1. As seen in Figure 1, the US accounts for almost 59 percent of the GDP in the entire region, followed by Japan that accounts for 31 percent of regional GDP. Korea and China are relatively small at present, each accounts for 3 and 7 percent of regional GDP respectively.

Figure 1.

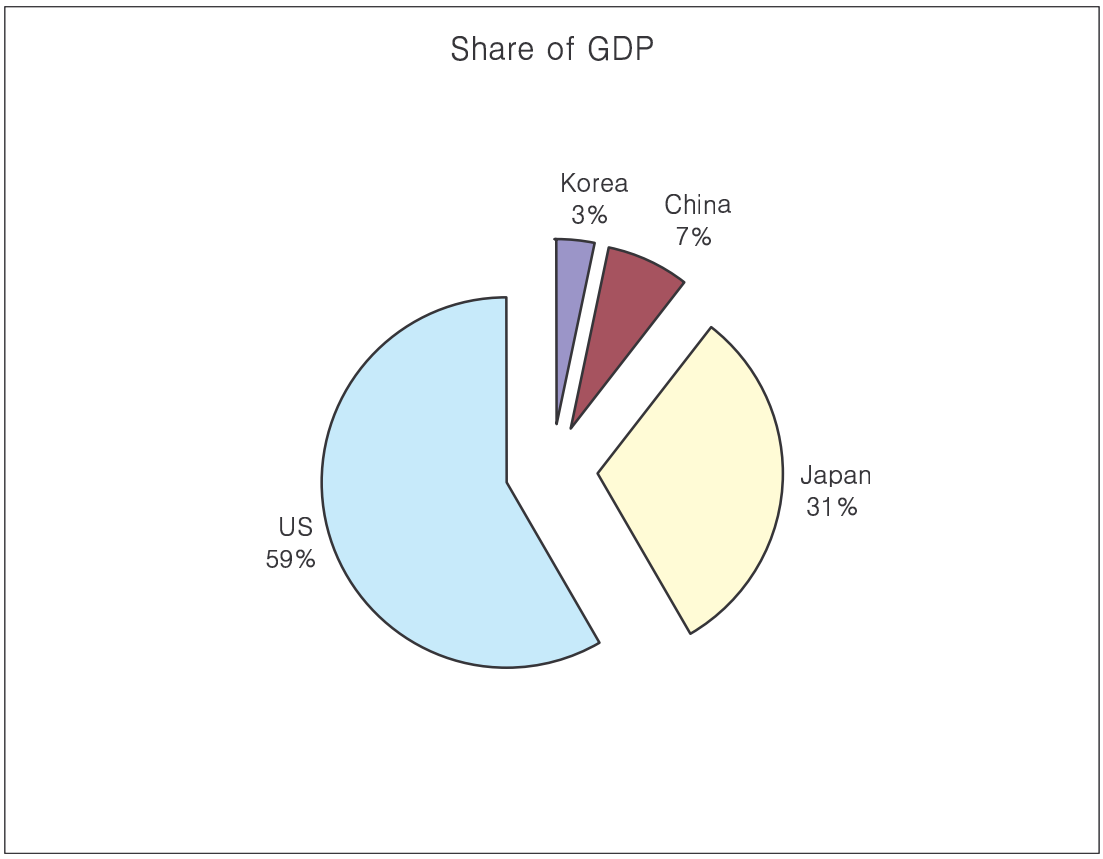


Table 1.

	Korea	***China***	***Japan***	***US***
GDP	445611.9	996281.8	4253850	7955888
Share of GDP	0.03	0.07	0.31	0.59
Exports	165174.5	312426.8	515709.1	869701.6
Imports	158711.5	313085.9	418255.5	1032047
EXP/GDP	0.37	0.31	0.12	0.11
IMP/GDP	0.36	0.31	0.10	0.13
	Korea	***China***	***Japan***	***US***
Factor Shares				
Land	0.024	0.042	0.003	0.003
Unskilled labor	0.384	0.416	0.372	0.361
Skilled labor	0.16	0.119	0.228	0.257
Capital	0.429	0.404	0.396	0.375
Natural Resources	0.003	0.019	0.001	0.003
Share of World's Capital Stocks				
	0.016	0.032	0.185	0.221

Source: GTAP database version 5, the year of 1997

Table 2. Share of Korea's Trading Partner

	China	Japan	US	ROW
Export from Korea	0.185	0.1	0.163	0.552
Import to Korea	0.071	0.181	0.198	0.55

Source: GTAP database version 5, the year of 1997

Korea is more dependent on trade than any other country. In the case of the US, export as a share of GDP is 11 percent whereas it is up to 37 percent for Korea. A similar pattern holds for imports as a share of GDP. This high trade dependency implies that trade liberalization causes significant impacts on Korea and China. The trade regime in Korea has room to be liberalized.

Appendix 2 presents ad valorem import protection rates by sector and by country of origin for the regions that are the main object of policy simulations.

III. Simulation Design

We use a Computable General Equilibrium (CGE) model of the Global Trade Analysis Project(GTAP). The GTAP model has been widely used to assess the impact of trade liberalization (see Hertel, 1997). Based on the GTAP database version 5, each country or region has 30 sectors including agriculture, seaweeds, fishery, forestry, service and 25 disaggregated industrial sectors. In order to compare the sequences of FTA, our simulations are designed as follows.

(1) Starting point: base data is on the year of 1997

(2) First event: China's accession to the World Trade Organization(see Appendix 1)

(3) Second event: Korea starts an FTA with one of economies(China, Japan, the United States)

(4) Third event: One of the two remaining economies joins.

(5) Fourth event: The last economy joins.

Table 3.

Scenarios	First event	Second event	Third event	Fourth event
1	China WTO	Korea-China	-Japan joins	-US joins
2	China WTO	Korea-China	-US joins	-Japan joins
3	China WTO	Korea-Japan	-China joins	-US joins
4	China WTO	Korea-Japan	-US joins	-China joins
5	China WTO	Korea-US	-China joins	-Japan joins
6	China WTO	Korea-US	-Japan joins	-China joins

After each event, the base data is updated from the latest simulation. The model was implemented and solved using GEMPACK(Harrison and Pearson 2000).

IV. Theory

This paper attempts to measure dynamic benefits of trade liberalization following Francois et al.(1996), and add another dynamic aspect, i.e., sequence of preferential free trade area. One of the distinguishing features of the model is that goods are differentiated by region of origin and are modeled as imperfect substitutes. On the demand side, this is reflected by the so-called Armington assumption where a constant elasticity of substitution (CES) specification is used to incorporate imperfect substitution between domestically produced goods and imported goods.

In the model, a representative consumer of each region has Cobb-Douglas utility function with respect to three components of final demand- private household expenditures, government expenditures, and savings- at the upper-tier. Composite demand of domestic and foreign goods is formed as,

$$C_{ir} = a[D_{ir}^{\frac{\sigma_i - 1}{\sigma_i}} + M_{ir}^{\frac{\sigma_i - 1}{\sigma_i}}]^{\frac{\sigma_i}{\sigma_i - 1}} \quad (1)$$

where σ_i is the elasticity of substitution between domestic and foreign goods in industry or commodity i with constant $a > 0$. All sectors are assumed to be perfectly competitive and operate under constant returns to scale. Each sector's production has a nested structure. At the top level, production is formed by a Leontief-type fixed coefficient function of value added and intermediate inputs, where Q_{ir} is industry output of commodity j in region r, QVA_{jr} is value-

added in industry *j* of region *r*, and I_{ijr} is demand for commodity *i* for use in *j* in region *r*.

$$Q_{i,r} = \min[QVA_{j,r} \ , I_{i,j,r}] \tag{2}$$

Composite intermediate goods, I_{ir} are aggregated in the CES form with domestic and foreign ones as,

$$I_{ir} = b[ID_{ir}^{\frac{\sigma_i - 1}{\sigma_i}} + IM_{ir}^{\frac{\sigma_i - 1}{\sigma_i}}]^{\frac{\sigma_i}{\sigma_i - 1}} \tag{3}$$

where $b > 0$, ID_{ir} and IM_{ir} denote domestic and foreign intermediate inputs i in region r respectively. Firms decide on the sourcing of their imports, and then based on the resulting composite import price, they determine the optimal mix of imported and domestic goods.

Value added is decomposed into labor, capital, land, and natural resources based on the substitution elasticity among these primary inputs. Labor supply is assumed to be fixed in all regions and for all time periods, but move freely across sectors. Capital is fully mobile across sectors and across regions. The utility-maximizing consumers save additional income and invest it across the world responding to the return on the capital (Francois et al. [1996]). The capital stock increases until the economy reaches the steady state.

Static gain is resulted from efficient allocation of fixed regional endowments triggered by the liberalization of trade. The dynamic gain from capital formation is revealed by endogenizing changes in the beginning of period capital stocks and by allowing them to grow until the higher static gain growth rates of capital fall back to their steady state growth rates of zero percent. In addition to that, with endogenized saving rates, a larger propensity to save would lead to even greater investment and thus higher steady state levels of capital and income until the percentage

change in the real current rate of return equals zero.

There are a number of studies which seek to determine the long-run effects of a shock. Arndt et al.(1997) implement forecasts of changes to physical and human capital, agricultural land, population, labor force to determine the long-run effects of China's growth on the world economy in the general equilibrium structure, which does not allow capital stocks to respond endogenously to the shock itself. Whamsley(1997) has endogenous capital stock and adjusted the database to represent the steady-state in order to do a comparative approach. McDougall and Ianchovichina(1996) made more significant change by incorporating dynamic investment behavior with time variable where ownership accounting in capital is included.

V. Results

A. Three Scenarios: Impacts on the Korean Economy

Among three scenarios, Korea-China, Korea-Japan, Korea-US FTA's, dynamic effect (or Baldwin effect) in the form of capital accumulation is the greatest in the Korea-China FTA. Ownership of capital is not tracked, so GDP is not an accurate indicator for the impact on welfare, but the rates of GDP growth and welfare effects move in the same direction in the Korean case. In the case of Korea-China FTA, capital stock increase by 6.02 percent, which raises share of world's capital stocks held by Korea from 1.6 to 1.8 percent.

Table 4.

With both static and dynamic effect	**Korea-China**	**Korea-Japan**	**Korea-US**
Rate of growth	3.59	0.6	2.8
Capital stock increase	6.02	1.13	5.45
Allocative effect	5764.5	746.4	3227.3
Terms of trade effect	4535.8	-1123.7	3164.2
If there were no dynamic effect	**Korea-China**	**Korea-Japan**	**Korea-US**
Rate of growth	0.86	0.18	0.34
Capital stock increase	0	0	0
Allocative effect	3831.2	818.6	1507.5
Terms of trade effect	1306.5	545.5	-397.4

Note 1. Growth and capital stock increase: Percent, 2. Contribution to the Equivalent Variations: US$ Million

If there were only static effects and thus no capital accumulation, the rates of growth in Korea would be much smaller in all three scenarios. Baldwin effect is substantial in the case of the Korea. Admitting centripetal forces around the Korean peninsular, the next major trading partner will join sooner or later. This sequence issue will be discussed in the next section.

B. Six Sequences: Impacts on the Korean Economy

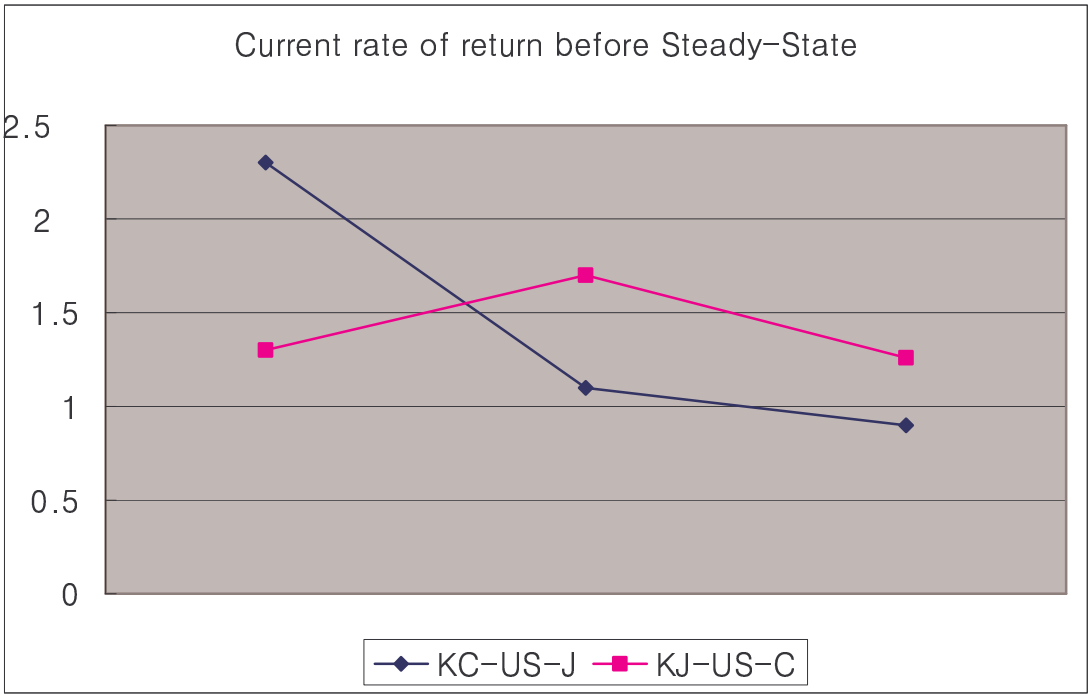
In terms of GDP growth in Korea, Korea-China-US-Japan is the best scenario, whereas Korea-Japan-US-China is the worst one. The GDP gap between these two scenarios is approximately US$ 26 billion that is about 0.5~0.6 percent of the GDP in Korea. According to Baldwin(1992), the endogenous rise in capital will boost the European Community GDP by an extra 0.6 percent, the magnitude of which is approximately equals to that of the European integration in 1992. Simulation results reveal that the different sequences make differences in capital stock increase and growth of the Korean economy. If the dynamic effect is expected

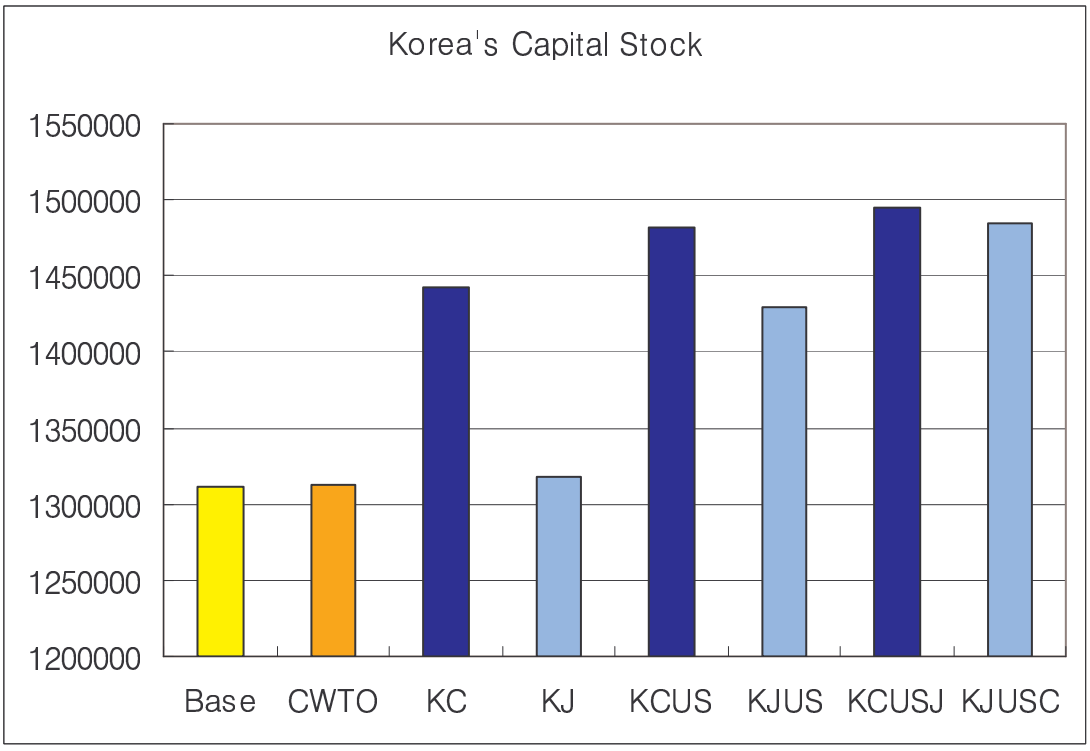
considerably such as the inflows of foreign direct investment, Korea should be cautious to sequences. Sequence matters because the size of effects by tariff variations depends on the state of the economy. It will affect not merely the economic impacts, but also the sustainability of trade liberalization in the sense that the future look different depending on from where it is viewed(O'Driscoll and Mario 1985). The experience of the first event will form memory and expectation for the second event of FTA. We may think this aspect from net present value. The earlier gain is not discounted as much as the later gain if it is calculated as a present value.

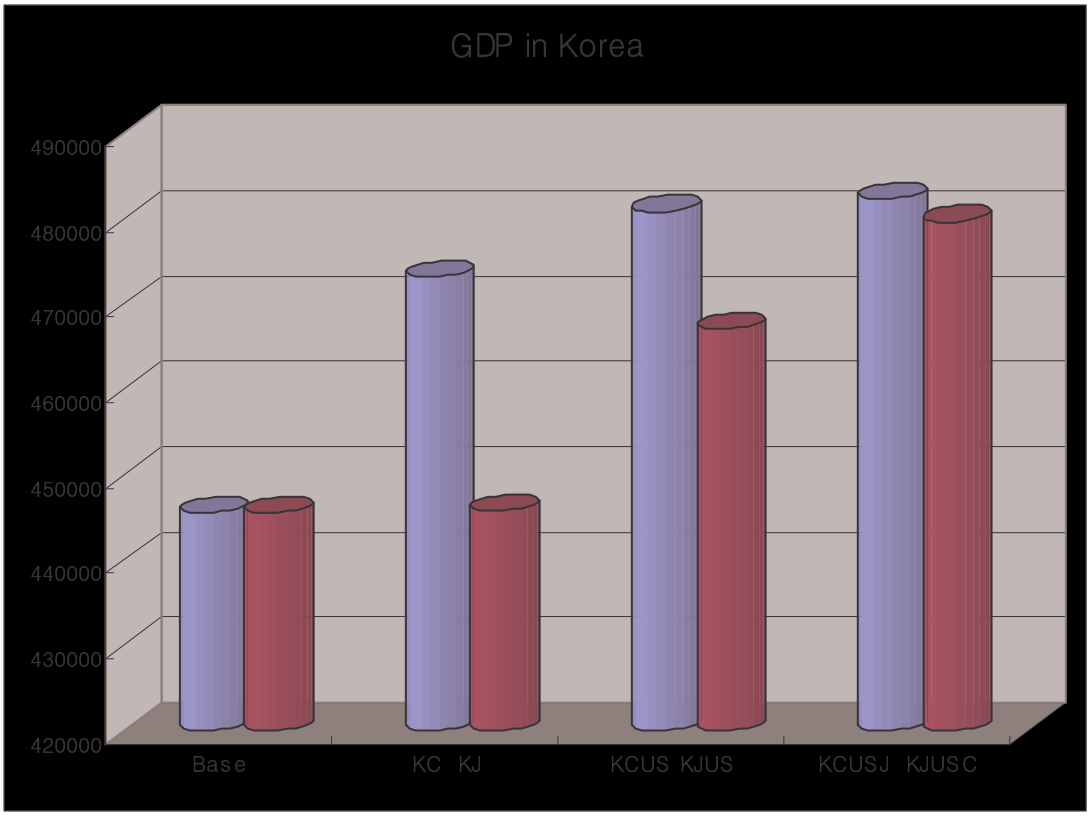
Korea-China FTA which brings the greatest increase in capital stock of Korea should be the first priority, the United States, the second, and Japan, the third. The main culprit of making a difference between sequences is the effect of capital accumulation and high return on capital triggered by zero tariff moved from relatively high tariff levels of China. Certainly, this simulation laboratory assumes that the Chinese economy is finished the transition process to the market economy and that there is no non-tariff barriers as well as tariff barriers. More importantly, we did not consider how long it would take to have a whole effect from each sequence.

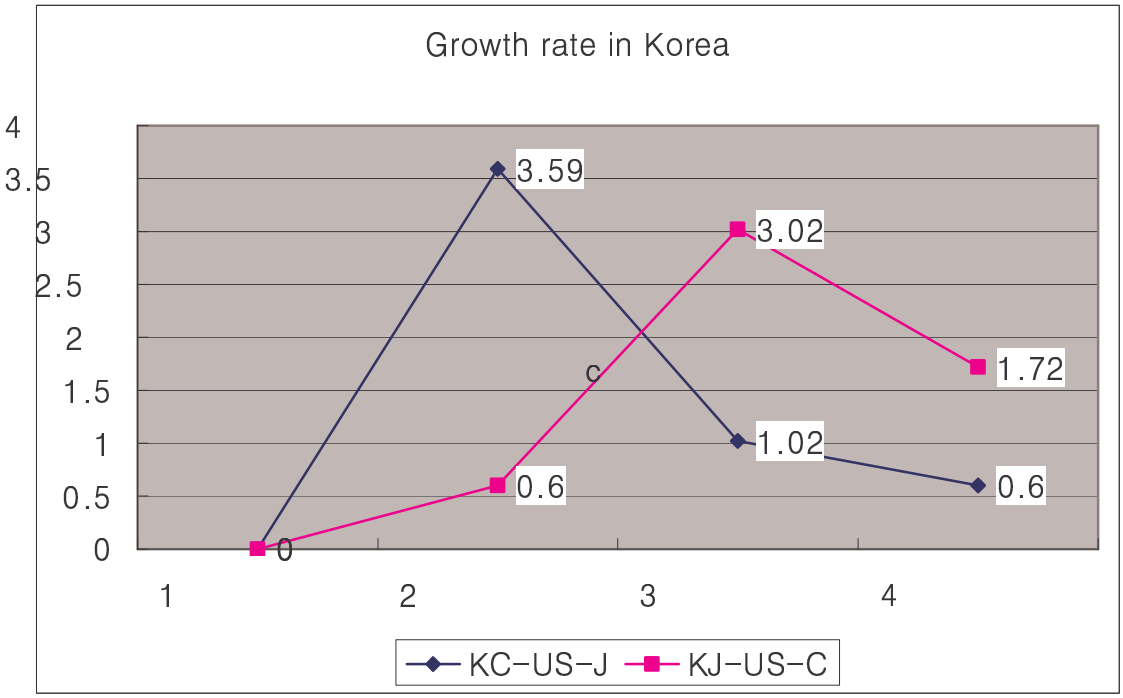
Trade liberalization may raise or lower the return to capital by the Stolper-Samuelson theorem. Consequently, liberalization has effects similar to a subsidy (tax) on the steady-state capital stock. The resulting capital accumulation (decumulation) amplifies(mitigates) the standard output effects of the liberalization. Figure 2 reveals how rate of return on capital, capital stock, GDP level, the rate of GDP growth depend on which sequence we are in.

Figure 2.


Current rate of return before Steady-State
2.5
2
1.5
1
0.5
0
KC-US-J
KJ-US-C


Korea's Capital Stock
1550000
1500000
1450000
1400000
1350000
1300000
1250000
1200000
Base
CWTO
KC
KJ
KCUS
KJUS
KCUSJ
KJUSC


GDP in Korea
490000
480000
470000
460000
450000
440000
430000
420000
Base
KC KJ
KCUS KJUS
KCUSJ KJUSC


Growth rate in Korea
4
3.5
3
2.5
2
1.5
1
0.5
0
1
2
3
4
3.59
3.02
1.72
1.02
0.6
0.6
0
KC-US-J
KJ-US-C

VI. Policy Implications

This paper proposes a long run strategy for the Korean trade policy. In selecting FTA partner or sequence, Korea should be aware that she is a small open economy with small share of GDP and capital stock, which means the rate of return on capital is likely to be higher after trade liberalization than large open economy with already great share of world's capital stock. Hence, she should take a direction of subsidizing capital accumulation through trade liberalization if she gives priority to the economic growth. In the same spirit, the FTA partner that would raise Korea's capital stock, should be treated with the first priority. If you would like to see Korea as larger open economy than before, bigger big bang should come before smaller big bang, not the other way around.

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Appendix 1. China's Tariff Rates and Projected Reduction Schedule by Sector

Industry	Initial Tariff Rate	Tariff after the WTO entry	Year of Implementation
Plant-based fibers	6.9	4.7	2002
Natural synthetic rubber	24	20	2002
Seaweeds	15	9.7	2004
Forestry	2.4	1.7	2002
Fishery	17.1	10.5	2005
Coal	4.4	4.4	2000
Oil	3.8	3	2000
Gas	7.1	5.9	2002
Minerals	5	4.3	2005
Processed marine products	22.1	11.9	2005
Beverages	63	36	2005
Textiles	25.4	10.3	2005
Wearing apparel	32.9	16.1	2005
Leather products	21.5	17.5	2005
Wood products	14.3	5.2	2005
Paper products, publishing	14.7	5.4	2008
Petroleum, coal products	8	5.5	2005
Plastic products	11.4	6.9	2005
Glass ceramic	17.8	15	2004
Ferrous metals	8.9	5.1	2004
Non-ferrous metals	8.1	5.5	2004
Metal products	13.7	11.4	2004
Motor vehicles and parts	41.3	14.7	2005
Transport equipment nec	12.3	8.2	2005
Electronic equipment	18.1	9	2005
Machinery and equipment nec	15.6	10	2005
Manufactures nec	21.8	16.4	2005
Other industries	13.9	7.2	2005
Average	16.8	10.1	

Notes: Initial tariff rates are the estimates of the simple-averaged sectoral tariff rates in 1999. The projected tariff rates after the WTO entry and the schedule of tariff reduction are based on the bilateral agreement between China and the United States.

Source: Cheong (2001) based on information from the US Trade Representatives.

Appendix 2. Tariff Structure

(Ad valorem percentage rate in 1997)

FROM KOREA TO	*CHINA*	*JAPAN*	*US*
Plant-based fibers	3	0	9.7
Natural synthetic rubber	0.8	22.1	21.5
Seaweeds	13.2	5	0.6
Forestry	4.5	4.7	0.1
Fishery	16.4	6.8	0
Coal	3.1	0	0
Minerals	3.2	0	0.2
Processed marine product	23.6	38.3	11.4
Beverages	24.8	16.2	3
Textiles	21.7	9.1	13.2
Wearing apparel	23.9	12.3	14.9
Leather products	12.5	14.5	13.6
Wood products	12.6	1.2	1.7
Paper products, publishing	11.1	2.1	1.3
Petroleum, coal products	4.9	3.4	2.3
Plastic products	13.2	2.6	3.9
Glass ceramic	13.3	0.8	4.6
Ferrous metals	9	2.6	3.9
Non-ferrous metals	1.9	1.3	2.1
Metal products	13.5	1.3	3.7
Motor vehicles and parts	26.7	0	2.4
Transport equipment nec	6.7	0	0.4
Electronic equipment	7.7	0	0.6
Machinery and equipment	11.6	0.2	2.6
Manufactures nec	18.3	2.6	4.2
Agriculture	13.9	59.1	10.2
Other Industries	12.7	54.7	0.9
Total	333.6	258.9	133.5

TO KOREA FROM	*CHINA*	*JAPAN*	*US*

Plant-based fibers	2	2	2
Natural synthetic rubber	68.7	68.7	68.7
Seaweeds	9.9	9.9	9.9
Forestry	3.8	2.3	2
Fishery	14.7	11.7	19.8
Coal	1	0	1
Minerals	3	3.4	1.9
Processed marine product	51.4	51.4	51.4
Beverages	39.7	39.7	39.7
Textiles	9.5	8	7.7
Wearing apparel	8	8	7.2
Leather products	7.3	6.1	6.3
Wood products	5.6	7.8	5.7
Paper products, publishing	5.3	6.3	3.7
Petroleum, coal products	6.7	6.7	6.7
Plastic products	7.5	7.7	7.3
Glass ceramic	6.7	7.5	8
Ferrous metals	5.3	7.2	3.2
Non-ferrous metals	5.1	6.8	4.1
Metal products	8	8	6.2
Motor vehicles and parts	7.7	8	8.4
Transport equipment nec	5.5	2.8	0.7
Electronic equipment	8	8	8
Machinery and equipment	8	7.9	7.6
Manufactures nec	7.8	6.8	7.3
Agriculture	243.5	35.1	133.1
Other Industries	7.1	7.1	7.1
Total	562.6	347.4	439.8

Source: GTAP database version 5.