

Progress, Potential Impacts of Trade Agreements: Trade Modeling Issues and Implication for Korean Agriculture

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Abstract

Korean economy has experienced rapid growth with export-oriented strategy and industrialization under the GATT system. As the Doha round negotiations of the WTO have been standoff since 2001, Korea has actively engaged in the regionalism through FTA negotiations with over 50 countries as alternative trade mechanisms for national economic growth. The Korean government positively promotes FTAs which will improve the deteriorated balance of payment due to the global financial crisis. The objectives of this paper are to analyze trade liberalization focusing on FTAs and to review related issues of agricultural market opening in Korea. Up to now, Korea's efforts to trade liberalization are evaluated to be successful because damage to agricultural sector seems not to be serious as different from those expected before FTAs. Before starting new FTAs and TPP negotiations, the government prepares future-oriented rules of food safety, open dialogues mechanism on market opening with all levels of people, future plan for sustainable food security and ex-post evaluation of concluded FTAs. A challenge of agricultural trade liberalization is to maintain public value of agriculture called to multi-functionality in the future situation that the significance of agriculture in the national economy is likely to decline. Positive trade liberalization provides new opportunities as well as challenges within and between sectors. Therefore, it is a present challenge to define new directions and roles of the Korean agriculture under open agricultural and food system.

Keywords: Trade liberalization, FTA, TPP, Food Security, Food Safety

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I. Introduction

Korean economy has experienced rapid growth with export-oriented strategy and industrialization under the GATT system. However, agriculture sector has been declining since the low productivity of farming has migrated young farmers to urban areas and the Korean government has allocated its budget to manufacturing sector. In addition, the Korean agriculture has undergone significant structural changes since the conclusion of the Uruguay Round (UR) negotiations in December 2003. As the UR agreements of agriculture under the WTO have been implemented since 1995, all agricultural commodities except rice have been gradually imported and also agricultural subsidies have reduced significantly. As a consequence of the UR agreements, Korea's import liberalization rate for agricultural and forest products has reached 99.1% since only 16 rice-related products were exempted to import.

As the Doha round negotiations have been standoff since 2001, member countries in the WTO have made efforts to contract regional trade agreements such as EU and NAFTA. In accordance with the global proliferation wide spread of regional agreements in the world, Korea has also started Free Trade Agreement (FTA) negotiations with numerous countries aggressively. While the Korean economy has been benefitted in the multilateral trading system of the GATT, Korea has actively engaged in the regionalism through FTA negotiations with over 50 countries as a complementary trade mechanism. The reason is that the Korean government positively expects that FTAs will improve the deteriorated balance of payment due to the global financial crisis and also will provide new economic growth opportunities for the near future. In the pursuit of a series of FTA negotiations, the Korean government has

been confronted with strong objections from farmers' associations since the competitiveness of agricultural sector is relatively weak and food security would be worsen after the successful establishment of numerous FTA agreements.

The objectives of this paper are to analyze trade liberalization focusing on FTAs and to review related issues of agricultural market opening in Korea. For this purpose, we review Korean agricultural situation and food security and consumers' safety concern on imported food, the situation and prospect of agricultural trade liberalization by the WTO, FTAs and TPP, and finally discuss implication and future task of agricultural trade liberalization. .

II. Situation of Korean Agriculture and Food Security

Food situation in Korea may be characterized by increasing demand, insufficient production capacity to meet domestic consumption, and increasing imports of major agricultural products. Strong demand has been boosted mainly by successful industrialization and economic growth since the 1970's. While the demand for food has been increasing, production capacity has declined for major staple crops. As a result, Korea becomes more dependent on foreign products to cover excess demand of food.

Table 1 summarizes the demand-supply situation of total grains in Korea. The situation may be characterized by rapidly increasing consumption, steadily decreasing production, and thus declining food self-sufficiency. Most increase in grain consumption is caused by feed grains because of a rapid growth of meat consumption since the mid 1980's. In contrast, the grain for food use has decreased from 6.8 million tons in 1980 to 5.0 million tons in 2012. As meat consumption increases, grain import becomes the major component of

food supply. As a result, the self-sufficiency ratio for grain dropped to 23.6% in 2012 from 80.5% in 1970 as shown in Table 2. And also, Korea's grain self-sufficiency ratio ranks the lowest in OECD countries. Recently, anxiety of a food crisis has escalated since more than 76% of total grain consumption, 15 million tons, was imported in 2012 from unstable global food market. Due to westernization of food consumption, low profitability of grain farming and trade liberalization, it is expected that the self-sufficiency ratio of grain will continuously decline in the future if no special countermeasures is provided. The heavy dependence of food supply on imports has been causing concerns to Koreans about food security.

Table 1. Grain Supply-Demand Situation in Korea

(Units: million metric tons)

Year	Production	Imports	Exports	Consumption	Food	Feed
1970	7,097	2,115	-	8,825	6,863	584
1980	7,048	5,051	-	12,596	6,860	2,472
1990	7,013	10,022	1	16,282	6,302	6,301
1995	5,816	14,258	-	19,974	6,127	9,373
2000	5,931	14,624	-	19,961	6,164	9,285
2005	5,718	13,851	-	19,847	5,329	8,783
2010	5,510	14,808	-	19,946	5,166	9,741
2012(P)	4,748	15,188	-	20,154	4,976	9,659

Source: Ministry of Agriculture, Food and Rural Affairs, 『Statistical Yearbook of Agriculture, Food and Rural Affairs 2013』

Table 2. Grain Self-Sufficiency Ratios

(Units: percent)

Year	Total Grain	Rice	Barley	Wheat	Corn	Soybeans
1970	80.5	93.1	106.3	15.4	18.9	86.1
1980	56	95.1	57.6	4.8	5.9	35.1
1990	43.1	108.3	97.4	0.05	1.9	20.1
1995	29.1	91.4	67.0	0.3	1.1	9.9
2000	29.7	102.9	46.9	0.1	0.9	6.4
2005	29.4	102.0	60.0	0.2	0.9	9.7
2010	27.6	104.6	24.3	0.9	0.9	10.1
2012(P)	23.6	86.1	17.3	0.7	0.9	10.3

Source: Ministry of Agriculture, Food and Rural Affairs, 『Statistical Yearbook of Agriculture, Food and Rural Affairs 2013』

Rice is the most important crop for farm economy as well as daily diet in Korea. Rice is also a major source of farm income since it dominates agricultural production in terms of cultivated area, volume, and production value. As the economy grew and consumers became richer, the per capita consumption of rice fell from 136.4 kg in 1970, 119.6 kg in 1990, and 93.6 kg in 2000 and to 69.8 kg in 2012. Accordingly, the total consumption of rice also declined in spite of population growth. As shown in Table 3, a significant decrease in planted area for rice was a major factor behind the rapidly declining rice production. During the peak period of the UR negotiations from 1991 to 1995, a 153 thousand hectare, 12.6% of rice planted area was reduced. Conversion of the rice paddy field to upland for more profitable products and non-agricultural use was the main cause of sharp decline in rice production.

The Uruguay Round (UR) agreements made the Korean agricultural situation even worse. The Korean government had to gradually reduce government subsidies for the rice

price support program since the reduction of domestic support under the UR agreements has been implemented. What is more important is that, due to the reduction of price support, rice is no longer a stable source of income. The UR agreements also opened Korea rice market under a quota system called to minimum market access (MMA). In addition, Korean government extended minimum market access of rice imports until 2014 instead of tariffication through the 2004 rice negotiation with the WTO member countries which increased the MMA import two times more than 400 thousand tons. Eventually, Korean government decided to import rice with tariffication after 2015. Judging from historical facts that imports of cheaper foreign commodities, such as wheat, corn and cotton, almost completely wiped out production of those crops in Korea; consequently, the future for rice production cannot be optimistic.

Table 3. Rice Situation in Korea

Year	Planted Area (hectares)	Yield (metric ton/ha)	Production (thousand ton)	per capita consumption (kg)
1970	1,203	3.30	3,939	136.4
1975	1,218	3.86	4,669	123.6
1980	1,233	2.89	3,550	132.4
1985	1,237	4.56	5,626	128.1
1990	1,244	4.51	5,606	119.6
1995	1,056	4.45	4,695	106.5
2000	1,072	4.97	5,291	93.6
2005	980	4.90	4,768	80.7
2010	892	4.83	4,295	72.8
2012	849	4.73	4,006	69.8

Source: Ministry of Agriculture, Food and Rural Affairs, 『Statistical Yearbook of Agriculture, Food and Rural Affairs 2013』

The World Food Summit in 1996 defined a holistic perspective of food security: “The food security exists when all people at all times have access to sufficient, safe, nutritious food to maintain a healthy and active life.” This definition implies that the food security should include four dimensions: availability, stability, access, and utilization of food. World prices for major food commodities such as grains and vegetable oils have risen sharply to historic highs. Retail food prices in each country have also risen for the last food crisis, raising concerns around the world. Figure 1 shows annual real food price index. Real price of food shows downward trend from the middle of 1970 to 2000. And also, there were several short rises in 1980, 1983, 1988, and 1996. However, food price began to rise steadily since 2000 and reached the level of the mid-1980s in 2004. In addition, food price rose sharply since early 2006. In 2011, real food price reached the highest level since middle of 1970s.

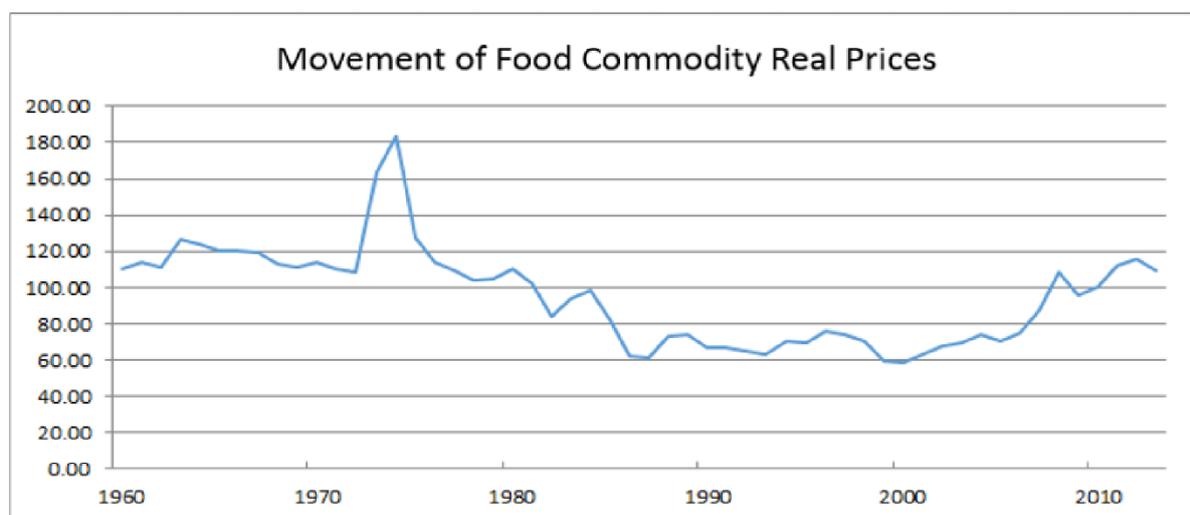


Figure 1. Movement of Food Commodity Real Prices

Source: World Bank Food Commodity Real Price Data.

Rising food commodity prices make severe negative impact to low income consumers and food importing countries. The reasons are as follows. First, lower income

consumers spend a larger share of their income on food. Second, consumers in food-deficit countries are vulnerable because they must rely on imported supplies, usually purchased at higher world prices.

In the situation that we consider food situation in the Korean Peninsula, combined with the recent spike of global food prices, the food security situation in Korea becomes more unpleasant since North Korea's food security in nutritional and distributional points are projected to be worsened over the next decades. In the past years, household food rations from the North Korea's Private Distribution System (PDS) have been unable to satisfy nutritional requirements of about 70 percent of its total population. Despite favorable weather in late 2000s, North Korea exhibited below-average food production due to the long-term decline of soil fertility and persistent shortages of farm inputs, such as fuel and fertilizer. Since macroeconomic stagnation was also expected to be sustained for a while, North Korea would be highly dependent on food aid and external assistance to mitigate chronic food problems.

Even though it was generally expected that trade liberalization would improve the global food security, chronic importing countries feel uncertain whether or not they may obtain food stably in the future. In particular, high dependency of grain import in South Korea and political uncertainties as well as severe food insecurity in North Korea may threaten national security more in the Korean Peninsula in the situation that global food prices are rising and uncertain.

III. Progress and Challenges for Agricultural Trade Liberalization

1. Trade liberalization under the WTO System

Korea has been a strong supporter of the multilateral trading system under the GATT and the WTO. The past GATT negotiations have traditionally promoted trade liberalization and tariff reduction in only manufactured products. However, the UR negotiations especially included trade liberalization of agricultural and service sectors. According to the UR agreement, Korea opened all agricultural markets except rice and reduced tariffs and domestic supports since 1995. The implementation periods of the UR agreement were 6 years ending in 2000 for member countries and 10 years up to 2004 for developing countries respectively. In accordance with the expiration of the UR agreement, the WTO launched a new round, the Doha Development Agenda (DDA) in November 2001. However, the DDA negotiation came to a standstill deadlock since it was difficult for all 153 members to reach a mutual agreement in 10 negotiation areas. During the DDA negotiations, individual countries searched for trading partners in the name of regional trade agreement. As the WTO system has got loosed and regionalism, especially FTA, has formed the keynote of free trade in the world.¹

While Korea has actively participated in multilateral negotiations, the future of the DDA is recognized to be pessimistic to be concluded in the near future. Therefore, Korea has been actively pursuing FTAs with major trading partners to overcome current economic difficulties originated from global financial crisis.

¹ According to the WTO, total 285 regional trade agreements in the world are in effect until December 2010.

2. Progress and Prospect of Korea's FTA Promotion

While Korea participated in FTA negotiations late in early 2000s, it has recognized significance of FTAs, and also participated in FTA negotiations positively. For the successful promotion of FTAs, the Korean government established a roadmap on FTAs in 2003 and set up the FTA Promotion Committee in 2004. Finally, in 2005, the government established an aim for an 'advanced trade nation' and finalized Korea's FTA policy as follows: First, Korea aims to pursue FTAs with large advanced economies or economic blocs and promising emerging markets. Second, Korea aims to pursue FTAs that are high-level in terms of degree of liberalization and comprehensive in terms of coverage and scope. Third, Korea adopts a multi-track approach when negotiating FTAs, meaning that the negotiations can be carried out simultaneously with more than one country when necessary. Fourth, in order to achieve national consensus as part of the negotiation process, Korea aims to pursue a wide range of outreach efforts with the public and private sectors.²

As a consequence of the above efforts, Korea has become one of the countries which are active in promoting FTA negotiations. The FTAs with 9 economic blocs and 45 nations such as Chile, Singapore, EFTA (European Free Trade Association)³, ASEAN, India (CEPA), EU, Peru, USA and Turkey are in effect. After the FTAs with six countries and three economic blocs came into force, the trade amount with the partners has increased 1.2-3.2 times, and the growth rate of trade has become 0.6-0.8 times higher than before the agreements was not in effect. It was higher by 1.5-1.7 times in comparison to the growth rate

² It is shown in the homepage at Ministry of Foreign Affairs and Trade

³ A free trade organization founded in 1960 is composed of 4 countries, Switzerland, Norway, Iceland and Liechtenstein.

of trade with entire nations, as well.

On the other hand, there are 3 concluded FTAs with the Colombia, Australia and Canada, which waits for congressional ratification in both countries. Korea also tries to make a conclusion in some other FTA negotiations with China, China-Japan, Indonesia, Vietnam and New Zealand. Other 3 FTAs with GCC, Mexico and Japan are broken off in negotiations and on the procedures of working-level discussion.

In 2013 and 2014, Korea has made a series of successful FTA negotiations with big and small economies: a supplemental FTA negotiation with Colombia in February 2013, the official sign of a FTA between Korea and Australia in February 2014, the conclusion of Korea-Canada FTA in March 2014, the opening of Korea-China-Japan FTA in March 2013 and the progress of FTA negotiations with Indonesia, China, Vietnam and New Zealand. More specific information about present conditions of Korea's FTA is offered in Table 4.

It is predicted that FTAs bring beneficial effects on the Korean economy. Especially, promoting FTA negotiations with gigantic economies such as the US, EU, China and Japan would have great effects on domestic economy. However, it would also accompany severe damages on relatively less competitive sectors like the Korean agriculture. While FTAs fall farm prices and income, social welfare increases since people might enjoy more choice of food and consume all commodities at a low price without any seasonal and locational limitation.

Korea started FTA negotiations with countries which would make minimal impacts on agriculture and then moved forward to major trading counties. Korea chose Chile as the first negotiating country because it is located in the diagonally opposite side of the earth and then negotiated Singapore and EFTA for minimizing the damage to agriculture and food system.

According to agreements of FTAs in effect, the concession of the Korea-Singapore FTA excluded the most sensitive items such as rice, apple, pear and others; therefore, the proportion of the exception was 33.3%. This negotiation also adopted strict rules of origin and custom clearance to prevent imports through roundabout routes. In addition, the governments agreed with adopting bilateral safeguard policy to protect vulnerable sectors. The Korea-EFTA FTA negotiation also had the low level of concession, because EFTA also had high level of protection to agriculture and regards the multi-functionality of agriculture as important like Korea. Thus, the concession with EFTA had 65.8% of the exemption. The Korea-ASEAN FTA agreement has chosen a means of protection such as exemption from the concession and gradual removals of trade barriers about sensitive products. The concession of CEPA (Comprehensive Economic Partnership Agreement) with India had 44.8% of exception on agricultural products. Meanwhile it has not adopted import quota or agricultural safeguard system due to classifying most sensitive items to exemption from the concession. Three FTAs and one CEPA in effect are assessed that they have low level of concession or sufficient protection mechanisms. Therefore, it is generally expected that they have rarely negative impacts on the Korean agriculture.

Chile, the US, and EU are the highly competitive in agriculture. Therefore, it is still controversial and under public discussion whether or not FTAs with the US and EU are concluded and beneficial to Korea. With regard to the ratification of the National Assembly on FTAs with the US and EU in Korea, both the ruling party and the government decided the position that they would submit the ratification of the Korea-EU FTA firstly and wait the Korea-US FTA's ratification until the US Congresses pass the ratification since the FTA with the US would influence the national economy including agriculture as well as politics and

social activities enormously.

Table 4. Progress of FTAs in Korea (January 2015)

Classification	Countries	Progress
FTAs in effect (11)	Chile	April 1 st , 2004
	Singapore	March 2 nd , 2006
	EFTA	September 1 st , 2006
	ASEAN	June 1 st , 2007
	India (CEPA)	January 1 st , 2010
	EU	July 1 st , 2011
	Peru	August 1 st , 2011
	USA	March 15 th , 2012
	Turkey	May 1 st , 2013
	Australia	December 12 th , 2014
	Canada	January 1 st , 2015
Concluded FTAs (4)		·The negotiation has been concluded on June 25 th , 2012.
	Colombia	·The agreement has been signed on February 21 th , 2013. ·Ratification on April 29 th , 2014.
		·The 1 st negotiation was taken on June, 8 th -12 th , 2009.
	New Zealand	·The 6 th negotiation was taken on March, 26 th -28 th , 2014. ·Initialing on December 22 th , 2014.
		·The joint research completed on May 28 th , 2010.
	China	·The 1 st negotiation was taken on September 28 th , 2010. ·The 11 th negotiation was taken on May 26 th -30 th , 2014. ·Settlement on November 10 th , 2014.
	Vietnam	·The 1 st negotiation was taken on September 3 rd -4 th , 2012. ·The 5 th negotiation was taken on May 20 th -23 th , 2014. ·Settlement on December 10 th , 2014.
FTAs under negotiation (6)	Indonesia	·The 1 st negotiation was taken on July 12 th , 2012. ·The 6 th negotiation was taken on November 3 th – 8 th , 2013. ·The 7 th negotiation was taken on February, 2014.
	Korea-China- Japan	·Announced commencement of negotiation on November 20 th , 2012. ·The 6 th negotiation was taken on November, 2014.

FTAs under consideration (8)	RCEP	·Announced commencement of negotiation at the East Asia Summit (EAS) on November 20 th , 2012. ·The 6 th negotiation was taken on December, 2014.
	GCC	·The 1 st negotiation was taken on July, 9 th -10 th , 2008. ·The 3 rd negotiation was taken on July, 8 th -10 th , 2009.
	Japan	·The 1 st negotiation was taken on December 22 th , 2003. ·The 6 th negotiation was taken on 2004.
	Mexico	·The 1 st negotiation was taken on December 5 th – 7 th , 2007. ·The 2 nd negotiation was taken on June 9 th – 11 th , 2008.
	Malaysia	·Feasibility study on Korea-Malaysia FTA held from May, 2011 to December, 2012.
	MERCOSUR	·The memorandum of understanding signed on July 23 th , 2009. ·A joint research by private was started on August 17 th , 2009.
	Israel	·The 3 rd joint research was taken on April 15 th , 2010. ·Feasibility study on Korea-Israel FTA held from August, 2009 to August, 2010.
	GCC	·The 1 st negotiation was taken on July, 9 th -10 th , 2008. ·The 3 rd negotiation was taken on July, 8 th -10 th , 2009.
	Russia	·The 2 st negotiation was taken on July, 2008.
	Central American Countries	·Completion of joint studies with Panama, Costa Rica, Guatemala, Honduras and El Salvador between 2010 and 2011. ·The conference (Possibility of promotion) was taken on October, 2012.
	SACU	·Agreement of joint studies on December 2008.
	Mongolia	·Agreement of joint studies on October 2008.

Source: Ministry of Foreign Affairs and Trade

3. Korea's Perspectives on Joining the TPP

It was firstly known to public by a foreign press in 2010 that the Korean government was considering taking part in the TPP (Trans-Pacific Partnership)⁴. Most Asia-Pacific

⁴The TPP is a multilateral free trade agreement for integrating the economies of the Asia-Pacific region. In order to eliminate all tariffs by 2015, original four members (P4), Brunei, Chile, New Zealand and Singapore, entered into force on May 2006.

countries are currently interested in joining the TPP since the US announced its interest to negotiate with the P4 countries in September 2008. Eight additional countries, including Australia, Japan, Canada, Malaysia, Mexico, Peru, United States, and Vietnam, are currently participating in TPP negotiations. And also, the Philippines, South Korea, and Taiwan have also expressed their interests to join the TPP. Currently, the US led the TPP negotiations with P4 countries.

Therefore, it is expected that the TPP's influence would become considerable in near future. Bitter disputes would be predicted if the Korean government officially announces joining the TPP, considering that the TPP pursues more comprehensive liberalization and faster tariff elimination than any FTAs and the WTO multilateral negotiations. Moreover, there are countries that have interests in exports of agricultural products, and some nations considering the TPP are competitive in agriculture and food system.

After President Lee Myung Bak mentioned interests in joining the TPP at an interview with the Asahi Newspaper during the 2010 APEC Summit on November 13th, 2010, the government accelerated to study TPP impacts to the Korean economy. For example, Ministry of Food, Agriculture, Forestry and Fisheries (MFAFF) just started analyzing TPP agreements as well as all concluded FTA agreements in P4 countries and is planning to investigate the TPP's impact on the Korean agriculture and food system this year. On the other hand, the MFAFF made a declaration against TPP to the trade-related Ministries in the government. Even though the preparation of TPP is in the initial stage, the public concerns have already been proliferated in agricultural and sensitive sectors because market opening after joining the TPP would be very tremendous.

IV. Review of Agricultural Agreements in Major FTAs

1. Korea-Chile FTA

Korea's concession in the Korea-Chile FTA is on the Table 7. According to the concession, agricultural products, which are recognized as sensitive items in Korea, will be discussed again after the successful conclusion of the DDA negotiations. However, some products, which will be renegotiated after the DDA such as beef, chicken meat, milk serum, plum, mandarin and other vegetables, are opened the market with a tariff rate quota (TRQ). Instead of delaying tariff reduction after the DDA conclusion, Korea guaranteed Chile to export a certain volume of imports at a low in-quota tariff under the TRQ system. Rice, apple and pear are exempted from tariff elimination because rice is a major staple; apple and pear are exempted due to exotic insects and quarantine negotiation problems. In addition, fresh grape was allowed to apply seasonal tariffs in harvesting season in Korea since grape from Chile is very competitive. Agricultural products in short-term tariff elimination period which is below 5 years show the largest proportion as 54% of total products. Products belonging to long-term tariff elimination period which is more than 10 years are 14.6% of total products.

Table 5. Korea's Concession in the Korea-Chile FTA

Concessions Type/ Tariff Removal Periods	Commodities	Numbers of Items in HS 10 digit (%)
Exception	rice, apple(fresh), pear(fresh)	21(2%)
Seasonal Tariff	grape(fresh)	1
Discussion after the DDA Negotiation	·vegetables: pepper, garlic, etc.	373(26%)
	·grains: barley, bean, etc.	
	·livestock products: eggs, honey, etc.	
	·fruits: tangerine, jujube, etc.	

	·others: watermelon, green tea, etc.	
TQR and the Discussion after the DDA Negotiation	Beef(400ton), chicken meat(2,000ton; frozen, processed), milk serum(1,000ton), plum(280ton), mandarin(100ton), other vegetables(100ton)	18(1%)
16 years	prepared milk powder, other fruits(dried), etc. ·livestock products: pork, mutton, etc.	12(0.8%)
10 years	·vegetables and flowers: cut-flower, tomato, etc. ·fruits: lemon, dried grape, etc.	197(13.8%)
9 years	other fruit wines ·fruits: peach can, jam, etc. ·livestock products: turkey-meat (600ton of TRQ)	1
7 years	·grains: corn for seed, potato, etc. ·vegetables: other vegetables (frozen), etc. ·others: walnut, etc. ·livestock products: horse, lamb, turkey, etc.	40(2.8%) with 6 items with TQR
5 years	·flowers: tulip, lily (dormant), etc. ·vegetables: leaves of plants, cabbage, etc. ·others: almond, nuts, coffee, etc. ·livestock products: seed bull, breeding pig, etc.	545(38%)
0	·grains: wheat, rye, etc. ·others: golden syrup, beet, etc.	224(15.6%)
Total		1,432(100%)

Source: Ministry of Food, Agriculture, Forestry and Fisheries.

The Korea-Chile FTA was expected to be painful during the negotiation since this agreement was the first signed FTA. Korea therefore introduced a domestic agricultural compensation mechanism for closing orchards for greenhouse grape, kiwi and peach before signing FTA with Chile. It was evaluated to have effects of supporting prices and increasing productivity. According to a study by government sponsored research institute, KREI, the effect of supporting price was estimated about 3~4 percent in greenhouse grape and 1.5 percent in peach. In addition, it may contribute to improving productivity because the targets

of closing orchards were focused on old trees and old farmers. However, the domestic compensation mechanism has some issues to be revised. The reasons are that the compensation mechanism supporting 80 percent of the price gap between market price and base price never worked out, and also the indemnity for closing orchards was too much and supported too many farms.

While the Korea-Chile FTA substitutes imports from other countries to Chile products and also expands imports by tariff reduction and removal, overall evaluation on the Korea-Chile FTA impacts is not serious because domestic production in major importing commodities from Chile, such as pork, grape, red wine, kiwi and others, is also growing.

2. The Korea-U.S. FTA

The Korea-US FTA was concluded in April 2007 and officially signed in June 2007; however, follow-up measures were delayed in both countries. As the congressional ratification procedure was delayed in the U.S., the early ratification opinion was retreated in the government and the National Assembly. According to the demand of revising the Korea-US FTA from the US automobile industry and the Democratic Party, the US government asked a supplementary negotiation. Therefore, both countries renegotiated and concluded the modification of the initial agreement on automobile and pork in December 3rd 2010. At the supplementary negotiation, Korea extended two more years of a grace period for removing tariffs on pork to January 1st 2016; however, conceded to eliminate automobile tariffs within four years.

In the Korea-US FTA, Korean and U.S. negotiators discussed several sector specific issues. The elimination of tariffs on manufactured goods was discussed at early stages of the negotiation. The tariff elimination of agricultural products was regarded as the most difficult

issue at the final stage of the negotiation. Thus, two countries agreed to exempt rice from tariff elimination and also agreed to eliminate 40% tariff on beef over 15-year period. In addition, Korea has a right to impose safeguard tariffs on imported U.S. beef. However, the FTA with the U.S. was agreed with the highest level of concession contrary to the past concluded FTAs as shown in Table 6. According to the concession, agricultural products in short-term tariff elimination are over 60 percent of total items. Rice is also exempted from tariff elimination like other previous FTAs.

It is possible that agriculture sector in Korea is highly damaged from FTA with U.S. The annual average reduction of farm production value was projected to 700 billion won (\$ 626 million US dollar). Especially, 70 percent of agricultural damages from FTA with U.S. come from livestock sector and 23 percent from fruit sector. Therefore, the government

While the Korea-US FTA is still controversial in Korea, the general public supports its ratification since, two recent surveys by new media resulted in 60% for and 27.3% against and 55.2% for and 28.5% against. The Korean government determined the basic position of the ratification in February 2011. The government position is the ratification of the Korea-EU FTA first and that of the Korea-US next. Therefore, both the ruling party and the government will promote the ratification of the Korea-US FTA in the National Assembly with the consideration of the US progress and situation.

The Korea-US FTA did not set a good precedent for future since Korea still negotiates FTAs with other big countries such as China, Japan, Australia, New Zealand and other countries. It is concerned that other countries may also ask for the additional negotiation after concluding FTA negotiations with Korea.

Table 6. Korea's Concession in the Korea-U.S. FTA

Concessions Type/ Tariff Removal Periods	Commodities	Numbers of Items (%)
Exception	Rice	16(1.0%)
Current Level & TRQ	orange, honey, etc.	15(1.0%)
17 years, Seasonal Tariff	Grape	1(0.1%)
15 years, Seasonal Tariff	potato for chips	0(0.1%)
18 years & TRQ	Ginseng	4(0.3%)
15 years & TRQ	cheese, wheat, etc.	10(0.6%)
12 years & TRQ	sub-feed, modified starch	6(0.4%)
10 years & TRQ	butter, modified milk powder, others(for infants), etc.	11(0.8%)
20 years	apple(Fuji), pear(Asian)	0(0.1%)
18 years	red ginseng	3(0.2%)
16 years	sugar	2(0.1%)
15 years	beef, eggs, etc.	98(6.5%)
12 years	milk cow, frozen onion, etc.	34(2.2%)
10 years	peach, frozen drumstick, etc.	332(24.1%)
9 years	fresh strawberry	1(0.1%)
7 years	beer, ice-cream, etc.	41(2.6%)
until 2014.1.1	pork, etc.	21(1.4%)
6 years	corn oil, etc.	2(0.1%)
5 years	orange juice, tomato juice, etc.	317(20.6%)
3 years	Seaweeds	33(2.1%)
2 years	avocado, lemon, etc.	6(0.4%)
0 years	grape juice, coffee, etc.	578(37.9%)
Total		1,531(100%)

Source: Ministry of Food, Agriculture, Forestry and Fisheries.

3. The Korea-EU FTA

The Korea-EU FTA negotiations started in May 2007 and were finally concluded in July 2009 after the 8th round meetings. Both countries expected that this FTA would be in effect after the congressional ratifications in July 2011. The Korea-EU FTA agreements on removing trade barrier in agricultural market have been reached asymmetrically, considering the agricultural competitiveness of both countries. The details of the Korean concession are shown in Table 7. In general, the concession scope is similar to the Korea-US FTA, but flexibilities on tariff elimination to sensitive products like rice, livestock and dairy products and others were introduced. Korea's tariff removal type and periods on agricultural products are quite extensive from instantly to 20 years. Along with extensive tariff removal periods, various concession types such as exemption, seasonal tariff, TRQ and the combination of concession types and the period of tariff removal were introduced to minimize damages. EU consistently insisted the same concession as the Korea-US FTA during the negotiation periods, yet Korea differentiated the concession allowing a longer period of tariff elimination in pork and dairy products. Particularly, the 10-year grace period of tariff removal in pork belly and neck was allowed. Contrastingly, in the Korea-US FTA's agreements, pork tariffs was set to be removed by January 1st 2016. In dairy products, the period of tariff removal is as same as the Korea-US FTA, but the lower TRQ requirement was obtained.

Economic impacts on Korean agriculture by the implementation of the Korea-EU FTA is expected to be quite great, nevertheless the agreement in agriculture was reached asymmetrically because the present proportion of commodities which are in low tariff level is 67.6% in EU and, on the contrary, 20.8% in Korea.

The annual average reduction of farm production value is about 177.6 billion won (\$159 million USD), which is less than one-third of the FTA with the US. The 93% of production value reduction would be concentrated on livestock sector and half of this reduction comes from pork. Damages to the domestic livestock sector in the Korea-EU FTA is severer than that the Korea-US FTA. The government announced a supplementary policy for improving the competitiveness of the livestock sector to allocate 2 trillion won (\$1.8 billion US dollar) for the next 10 years in November 2010.

Table 7. Korea's Concession in the Korea-EU FTA

Concessions Type / Tariff Removal Periods	Commodities	Numbers of Items (%)
Exception	rice, rice related goods	16(1.09%)
Current Tariffs	soybean, wheat, etc.	26(1.77%)
Current Tariff &TRQ	honey, powder milk, etc.	12(0.82%)
Seasonal Tariff &TRQ	orange(September-February: current tariff+TRQ, March-October: 7 years)	1(0.07%)
Seasonal Tariff	grapes(May 1st-October 15th: 17 years, October 16 th -April 30 th : 5 years)	1(0.07%)
15 years & TRQ	cheese, malt, etc.	6(0.41%)
12 years & TRQ	sub-feed, modified starch, etc.	8(0.55%)
10 years & TRQ	butter, modified milk powder, etc.	11(0.75%)
20 years	apple, pear	2(0.14%)
18 years	green tea, ginger, etc.	7(0.48%)
16 years	white sugar	1(0.07%)
15 years	mandarin, jujube, etc.	92(6.28%)
13 years	Chicken meat(frozen breast and drumstick), sweet potato, etc.	27(1.84%)
12 years	Chicken meat(cold-storage), mixed juice(grape), etc.	16(1.09%)
10 years	pork(pork belly, cold-storage neck), tangerine juice	274(18.69%)
7 years	pork(cold-storage edible innards), tomato, etc.	47(3.21%)
6 years	pork(frozen trotter, sealed one), etc.	3(0.20%)
5 years	pork(others), olive oil, etc.	287(19.58%)

3 years	orange juice, margarine, etc.	13(0.88%)
2 years	Avocado(fresh), lemon, prune(dried)	0(0.20%)
0 years	black tea, flower, feed, etc.	613(41.81%)
Total		1,466(100%)

Source: Ministry of Food, Agriculture, Forestry and Fisheries.

4. The Korea-China FTA

The first negotiation of the Korea-China FTA held on September 2004. Korea and China concluded the negotiation on November 10th, 2014. Both countries expected that this FTA would be in effect in the near future after the congressional ratifications. The Korea-China FTA agreements on removing trade barrier in agricultural market have been reached asymmetrically, considering the agricultural competitiveness of both countries. Korea's positions on the concession are as follows. The percentage of concession such as tariff elimination, partial reduction of tariff and TRQ is about 64% which is very low level in comparison to 97.9% of the Korea-US FTA and 96.3% of the Korea-EU FTA. Tariffs of normal products should be eliminated within 10 years. Tariff of sensitive products should be eliminated within 20 years. Highly sensitive products are excluded in the concession. In particular, most fresh agricultural products such as rice, beef, pepper, garlic and onion, etc. were exempted in tariff elimination. The market access opportunity by TRQ and partial reduction of tariff was provided to Chinese interest products such as sesame, soybean, red bean and wild sesame. The details of the Korean concession are shown in Table 8.

The Chinese concession is as follows. Normal products such as frozen beef, pork, chicken and fresh fruits must eliminate tariffs within 10 years. However, the case of culinary vegetables must eliminate tariffs within 10 years regardless of the fresh and frozen. In the

case of sensitive product, fresh meat (beef, pork, chicken), pasta and instant noodle must eliminate tariffs within 20 years. But kimchi and coffee based preparation also should be eliminate tariffs within 20 years. In the case of highly sensitive product, 102 items including rice, sugar, flour, tobacco and etc. are excluded from the concession. And the other 1,029 items (91%) will be applied elimination of tariffs.

The Korea-China FTA has a number of advantages. China is the Korea's largest trading partner. In addition, South Korea is the third largest trading partner of China. Korea has comparative advantage and trade surplus in manufacturing sector: thus, China has flexibility in manufacturing sector. However, manufacturing industry between Korea and China has the different stage of development and structure of vertical division of labor. Therefore, two countries have a competitive and complementary relation. . However, Korea is showing trade deficit within agricultural and fishery industries. When viewed from a long-term perspective, government must expand the investment for the sustainable development of upland agriculture.

Table 8. Korea's Concession in the Korea-China FTA

Concession Type		Korea-China FTA(%)	Major Item
Normal product	Immediately	13.4	Forage preparation, Jam, Fruit jelly, Seeds for vegetables
	5 year	13.0	Albuminometer matter, Wool, Animal hair, Raw silk, Raw hide, Orange juice, Green coffee
	10 year	10.2	Apple, Pear, Grape, Peach, Strawberry (Fresh), Beef, Pork, Chicken (Freeze), Sausage, Roasted coffee, Water

Total		36.6	
Sensitive product	15 year	12.5	Beef, Pork, Chicken (Fresh), Pasta, Fruit juice, Vegetable juice, Natural honey, Process cheese
	20 year	14.8	Kimchi, Nonalcoholic beverages, Seasoning, Instant noodle, Coffee preparation, Flour preparation, Soy sauce, Fermented wine, Duck meat (Freeze)
Total		27.4	
Highly sensitive product	TRQ and Partial reduction	2.0	Prepared groceries (20% → 18.4%)
	Exception	34.0	Rice, Sugar, Dried ginseng, Chestnut, Vegetable fat and oil, Cream, Milk, Wheat, Flour, Saccharide
Total		36.1	
Total amount		100.0	

Source: Ministry of Agriculture, Food and Rural Affairs.

V. Modeling Potential Impact of Trade Agreements^{5 6}

Structural models, non-structural time-series models and mathematical programming models have been used to analyze various policy effects and project short-term and long-term economic conditions. According to research purposes, each model can be used individually and also two or three models can be used simultaneously.

Structural models estimate behavioral equations based on economic theories and econometrics and then conduct economic projections and policy simulations for the medium term for 5-10 years. Structural models are composed of single equation models and simultaneous equation models. Single equation models estimate demand or supply equation individually and conduct projections and simulation with one equation under the ceteris paribus. This is a typical partial equilibrium analysis. Simultaneous equation models estimate demand and supply simultaneously and conduct economic analyses. Simultaneous equation models can be classified as a partial equilibrium model and a general equilibrium model. Even a simultaneous equation model estimates supply and demand simultaneously; it is a partial equilibrium model if it ignores other sectors such as general economy and financial sector.

⁵ We don't have any model simulation results for Korea-China FTA available now. Currently, government sponsored research institutes are very cautious to release simulation results because Korea-China FTA has significant impact to all industries.

⁶ According to Article 11 on impact assessment of the law of Trade Treaty Agreement Procedure and Implementation, Minister of Ministry of Trade, Industry and Energy should conduct the impact assessment on national economy, fiscal budget, related industry and employment after the agreement of a trade treaty. Minister can ask the impact assessment to research institutes including government sponsored institutes such as KREI, KIEP and KDI, etc.

Non-structural models based on time-series have been actively used since 1980 because structural models failed explaining drastic structural changes in economy such as oil shocks and financial crisis. Non-structural models analyze and forecast economies for the short-run based on data regularity using high frequency data such as daily, monthly and quarterly. Non-structural time-series models are composed of single time-series models and multiple time-series models. Single time series models are AR, MA and ARIMA models. Multiple time-series models are vector autoregression(VAR), vector error correction model(VECM) and multiple autoregressive heteroskedasticity model(MARCH). However, non-structural time-series models have limitation to consider various policy programs related to agriculture and to analyze medium term and long run projections. In particular, non-structural models can not consider many policy variables such as target price and tariff rate quota and have also difficulties to get relatively high frequency data such as monthly data because agricultural production mostly move yearly basis. Above limitations, non-structural models cannot analyze the interaction between commodities and between agricultural and non-agricultural sectors.

Mathematical programming models are based on normative economics and conduct long-term projections such as impacts of climate changes in 2050 and policy analyses. Linear programming and non-linear programming models, input-output model, computable general equilibrium models are classified as mathematical programming models. Mathematical programming models are based on optimization methods and are used to find optimal farm management plans for optimal combination of outputs and inputs to maximize profit or minimize cost. However, these models are based on strong assumptions of utility and cost functions such as weakly separable assumption to get solutions. And also, mathematical

programming models are hard to analyze small policy changes and are arbitrary to define objective functions and policy preference functions.

The agricultural sector models have developed to analyze policy changes such as farm policies, environmental regulation and monetary and fiscal policies, impacts of trade liberalization such as the Uruguay Round Agreement and FTAs and exogenous shocks such as oil shocks and financial crisis to agricultural and food system.

Agricultural sector models are categorized according to the manner in which they recognize the linkages between agriculture and the rest of the general economy. First generation models consider agriculture as a separate and independent sector. Agriculture in these stand-alone models is influenced by relatively few exogenous macroeconomic variables such as GDP, interest rates and price index. In this first generation models, disturbances originating in agriculture are assumed to have no impact on the rest of the economy.

Second generation models are those which project events in agriculture in a recursive manner. A macroeconomic model is first used to project a set of macroeconomic variables which appear in the agricultural sector model. This macroeconomic information is then used to solve the agricultural sector model. Finally, the solution values in the agricultural sector model are fed back to solve the macroeconomic model again. Thus, while agriculture has an impact on the general economy in the second generation models, the impact is delayed one period under the recursive linkage between agriculture and general economy.

Third generation models is to make the endogenization of the linkages between agriculture and general economy since late 1970s. Third generation model is more realistic than first and second generation models since agriculture and general economy have always been connected directly and indirectly. The linkages between agriculture and the general

economy are treated in a fully simultaneous fashion.

The Korea University (KU) model was developed in 1999 to analyze the impact of the next WTO round after the Uruguay Round. The KU model was a third generation model to analyze both agriculture and general economy simultaneously. The KU model was composed of general economy, grain sector, livestock sector, fruit sector and vegetable sector. The KU model used to analyze impacts of trade liberalization, monetary and fiscal policy changes to agriculture.

The modified KU model was used to analyze the impacts of the Korea-US FTA to agriculture in October 2006 before the conclusion of the Korea-US FTA and July 2007 after the conclusion of the Korea-US FTA. These two projects were supported by the Nonghyup Economic Institute. According to the limitation of project time, agricultural sectors were analyzed under the recursive structure as second generation models and the general economy was not included. The supply equations in grain, vegetable and fruit sectors were calculated as the multiplication of planted acreage and yield equations. Planted acreage equation is a function of expected price ($E(P_t)$), wage rate of previous year and planted acreage of previous year. Yield equation is a function of previous yield and trend. Demand equation is a function of real price and real per capita GNI. The impacts of the Korea-US FTA were analyzed by the following equations. Imported price (P^w_t) from US is determined by US dollar price (P^{us}_t), exchange rate (EX), tariff, and quality premium. If imported price from US is higher than domestic wholesale price (P^d_t), expected price is determined by domestic wholesale price. If imported price from US is lower than domestic wholesale price (P^d_t), expected price is determined by domestic wholesale price. The domestic supply at $t+1$ will be determined by expected price, wage and previous supply. Demand (D_t) is a function of price and per capita

GNI. Supply of domestic products (S_t^d) is a function of expected price ($E(P_t)$), wage and previous supply(S_t^d).

$$P_t^w = P_t^{us} * EX * (1 + \text{tariff}) * (1 + \text{quality premium})$$

$$\text{if } P_t^w > P_t^d, E(P_t) = f(P_t^d)$$

$$\text{if } P_t^w < P_t^d, E(P_t) = f(P_t^w)$$

$$D_t = f(P_t^d, \text{PGNI}_t)$$

$$D_t = S_t^d + \text{IM}_t$$

$$S_t^d = f(E(P_t), \text{wage}_t, S_{t-1}^d)$$

1. Economic Impact Studies in the Korea-US FTA

Several studies on potential effects of the Korea-US FTA were conducted. According to United States International Trade Commission (USITC)⁷, in the case that the Korea-US FTA is implemented, the US GDP would increase about \$10.1 billion - \$11.9 billion. This result was simulated under the assumption of full removal of tariffs and tariff-rate-quotas. In addition, the US exports would increase about \$9.7 billion-\$10.9 billion. Especially, the increase of the US exports comes mainly from agricultural products, electronics, machinery,

⁷ The Commission's analysis of the possible economy-wide effects of the removal of tariffs and TRQs under the FTA includes a number of measures of U.S. economic activity, including the possible impact on U.S. exports, imports, production, and employment. The method chosen for the quantitative analysis is a computable general equilibrium (CGE) simulation. The specific CGE model used for this analysis is the Global Trade Analysis Project (GTAP) model. The model includes domestic economic activity and trade patterns for the United States and Korea, as well as for multiple regions of the world economy and for multiple products produced in those regional economies. The model describes production and trade in 54 aggregate industry sectors, including 40 merchandise sectors and 14 service sectors. (It is not confidential. Please see the attached report)

transportation equipment, and passenger vehicles. And also, the US import would increase about \$6.4 billion-\$6.9 billion. Especially, this perspective appears mainly in industry of textiles, apparel, leather products, footwear, machinery and electronics. The ERS of USDA also analyzed the Korea-US FTA impacts using a static global GTAP model. The ERS model analyzed the impact of instantaneous tariff elimination and ignored dynamic effects.⁸ It is a typical long-run policy simulation model.

Korea University conducted two studies on the potential impact of the Korea-US FTA to agricultural and food system. The first study was an ex-ante study before the conclusion of the Korea-US FTA (2006) and the second was an ex-post study after the conclusion of the Korea-US FTA (2007). Korea University (KU) Model⁹ is composed of two different models. The first model is a commodity specific econometric model to estimate dynamic direct effects of the Korea-US FTA and the second model is an input-output model to estimate indirect and induced effects. A government sponsored research institute, Korea Rural Economic Institute (KREI), analyzed the economic impact of the Korea-US FTA using an agricultural sector model.¹⁰

2. Issues and Controversies of Economic Impact Studies

Every model has different model structure and assumptions; thus, it should be careful

⁸ The ERS model is static because it assumed perfect tariff elimination after the Korea-US FTA conclusion instantly and did not consider tariff removal period up to 20 years.

⁹ Nonghyup Economic Research Institute supported two research projects for KU model before and after the Korea-US FTA.

¹⁰ The Korean government always used the models which were developed by government sponsored institutes such as KREI, KIEP and KDI.

to interpret the impact study results. KREI model¹¹ considered substitution effect between domestic goods and imported goods. However, due to data availability problem, the KREI model assumed most elasticities of substitution between domestic and imported goods instead of estimation.¹² Also, the KREI model didn't analyze the impacts on processed food. KU Model considered multiple scenarios but KREI model analyzed only one scenario of the Korea-US FTA. Three scenarios of the KU model are: (1) 50% reduction of quality premium, (2) no change of quality premium, and (3) considering substitution elasticities in beef and pork. Table 8 and Table 9 show the comparisons of KU and KREI model results.

Table 8. Direct Effects of KU and KREI Model Results on the Korea-US FTA¹³

	Korea University Model (Direct Effect)	KREI Model (Direct Effect)
After 5 years	471-792 billion won	446.5 billion won
After 10 years	861-1485 billion won	895.9 billion won
After 15 years	1251-2127 billion won	1036.1 billion won

¹¹ KREI used GTAP model to analyze the impact of Korea-US FTA before the conclusion and has used an econometric sector model, KASMO (2008) after the conclusion of Korea-US FTA because KREI realized the problems of GTAP model to analyze the impact of agricultural sector. KASMO is composed of five sectors: macroeconomic variables, input prices, farm production, livestock and overall farm economy. Farm production has grain, vegetables, fruits, special crop and others.

¹² Most import elasticities in KREI model were assumed except beef and pork because there was no import record on most agricultural products. In order to assume demand elasticities of imported goods, KREI referred demand elasticities of domestic products and considered the difference of demand elasticities of domestic and imported products in beef and pork.

¹³ Effects of KREI and KU model results are based on the price level in 2006.

Table 9. Effects of KU and KREI Model Results on the Korea-US FTA

	Korea University Model (Direct+Indirect+Induced Effect)	KREI Model (Direct Effect)
After 5 years	1-1.76 trillion won	446.5 billion won
After 10 years	1.8-3.3 trillion won	895.9 billion won
After 15 years	2.6-4.8 trillion won	1036.1 billion won

Significant differences among model results brought political conflicts and social costs¹⁴, increased uncertainties in farm economy, and also might have misguided government compensation policies and structural adjustment. Trade modeling has several limitations because most studies have weak foundation of microeconomics due to data problems and strong assumptions on product differentiation.¹⁵ Particularly, it is needed to

¹⁴ Government had problems to introduce the compensation programs for farm damages because models showed different results. And also, opposition parties asked researchers working in government sponsored research institutes such as KREI and KIEP showed simulation results in the Congress.

¹⁵ Examples of assumptions of product differentiation are that models assumed import elasticities of demand and also assumed quality premiums on domestic goods compared to imported goods.

estimate consumer preference and WTP on domestic and imported goods and food safety premium using non-hypothetical approach such as experimental auctions.

3. Importance of Product Differentiation and Food Safety in Trade Modeling

Agricultural trade liberalization would increase the probability of importing food related foreign diseases. Continuous food safety scares have intensified public awareness and concern all over the world. Since the 1980s parallel with trade liberalization, cases of Bovine Spongiform Encephalopathy (BSE), Swine Fever, Foot-and-Mouth Disease (FMD) and Avian Influenza have appeared in many countries, resulting sometimes in death. These food safety crises have escalated consumers' demand for high quality food and increased food safety standards. Food safety problems have also caused a loss of consumer confidence in food marketing chains. After the outbreak of BSE or 'mad cow' disease in Europe and the U.S., food safety concerns about imported beef intensified in Korea and resulted in consumers desiring more information about the distribution and safety of imported beef.

After the opening of the Korean beef market, the percentage of total beef consumption that was imported reached over 50 percent. The heavier dependence on imported beef, however, increased the public's concerns about getting beef-related diseases in the country. Especially, beef from the U.S., which accounted for 60 percent of all imported beef, was temporarily stopped in 2004 due to the 'mad cow' disease. The Korean government did not reopen its beef market to the U.S. until 2007. The increasing dependency on imported beef has made Korean consumers more concerned about the safety of imported beef. Moreover, due to the significantly higher price of Korean beef compared to imported beef, the number of cases of retailers disguising imported beef as Korean beef has also increased. These problems have caused a loss of consumer confidence in food marketing chains and increased

anxiety about food safety.

Lee, Han, Nayga and Lim (2011) have studied food safety issues on imported beef in Korea. They estimated Korean food shoppers' willingness to pay (WTP) for the traceability system of imported beef by an experimental auction. Table 10 shows the mean bids across the four information treatments. According to their results, consumers are generally willing to pay a 39 percent premium¹⁶ for the traceable imported beef over similar beef without traceability. It means consumers held relatively positive attitudes toward the new traceability system. Moreover, consumers would value a traceability requirement or system for imported beef due to concerns about food safety since the Bovine Spongiform Encephalopathy (BSE) or 'mad cow' disease problem has been an especially sensitive issue in Korea, and consumers' food safety standards have risen due to this problem.

Table 10. Mean bids across the information treatments

(Unit: AUD)

	Information			
	No	Positive	Negative	Two sided
Mean	1.47	1.48	0.75	1.07
Median	1.46	1.47	0.49	0.98
SD	0.58	0.39	0.72	0.47

In the process of reopening the Korean beef market to the US, Korea experienced a series of uproar because a lot of people believed the government decided importing unsafe U.S beef to conclude the Korea-US FTA successfully. Just after the inauguration of the

¹⁶ The price of imported US beef without traceability was about AUD \$3 for 200 g pack.

President, Lee Myung Bak, this rumor spread all over the country in an instant and people came to streets with candle lights and asked the government to withdraw the decision of reimporting the U.S. beef for six months. Eventually, this uproar made the first Minister of Food, Agriculture, Forestry and Fisheries resign after only six months' service. In addition, the government promised a remarkable improvement in quarantine system, food safety standards and traceability system of imported beef with special funding for livestock development. This is a historical accident related to the Korea-US FTA. It happens that consumers did not believe the safety of imported U.S. beef.

Lee, Han, Nayga and Yoon (2012) have studied food safety issues on imported rice in Korea. They estimated Korean consumers' valuation for domestic rice and imported rice from China and the USA. They estimated Korean consumers' willingness to pay (WTP) for domestic, Chinese, and US rice, the non-hypothetical experimental auction approach. . Table 11 presents the mean bids across the three information treatments. According to their results, Korean consumers do not value the domestic rice higher than either Chinese or the US rice when no information about the rice products is given to them. However, when given information about country of origin or food miles, consumers' bids are higher for domestic rice than for the two imported rice products.

Table 11. Mean bids by treatment

Country	Round	Treatment (unit: KRW/4kg)		
		No information	COOL	Food mileage
<i>China (25 persons)</i>				
	1	6,760	6,504	7,508
	2	6,624	7,017	7,650

	3	6,592	7,429	8,086
	4	6,894	8,057	7,518
	5	6,984	8,184	7,546
	Mean	6,783	7,438	7,662
<i>USA (25 persons)</i>				
	1	7,152	6,784	6,820
	2	7,212	7,032	6,286
	3	7,242	7,433	6,606
	4	7,142	7,577	6,180
	5	6,912	7,653	6,516
	Mean	7,132	7,296	6,478
<i>Korea (25 persons)</i>				
	1	6,748	7,476	7,172
	2	6,620	8,100	7,760
	3	6,568	8,444	8,460
	4	6,956	8,528	8,628
	5	7,244	8,628	8,340
	Mean	6,827	8,235	8,072

According to the proliferation of FTAs, consumers strongly demanded that the Korean government improve food safety system and also provide the policy instruments such as traceability system to choose safer food. Therefore, it is of utmost importance to keep developing food safety and traceability system with trade liberalization. Therefore, we should consider product differentiation and food safety premium to evaluate economic impacts of trade liberalization.¹⁷

VI. Implications and Suggestions

¹⁷ Past studies did not consider product differentiation and food safety premium properly; therefore, there were political and academic debates on the creditability of FTA simulation results.

Korean economy has experienced rapid growth with export-oriented strategy and industrialization under the GATT system. As the Doha round negotiations of the WTO have been standoff since 2001, Korea has actively engaged in the regionalism through FTA negotiations with over 50 countries as a complementary trade mechanism. The Korean government positively promotes FTAs which will improve the deteriorated balance of payment due to the global financial crisis.

It is predicted that FTAs bring beneficial effects on the Korean economy. Especially, promoting FTA negotiations with gigantic economies such as the US, EU, China and Japan would have great effects on domestic economy. However, it would also accompany severe damages on relatively less competitive sectors like the Korean agriculture. While FTAs fall farm prices and income, consumer welfare could increase since consumers consume all commodities in the world without any seasonal and locational limitation.

Korea started FTA negotiations with countries which would make minimal impacts on agriculture and then moved forward to major trading counties such as the US and EU. Korea chose Chile as the first negotiating country because it is located in the diagonally opposite side of the earth and then negotiated Singapore and EFTA for minimizing the damage to agriculture and food system.

Overall evaluation of trade liberalization in agriculture is positive because economic impacts were not serious as expected before FTA agreements. In addition, structural changes in agriculture, mainly through public investment, have been achieved relatively successful after active participation of agricultural trade liberalization. This favorable adjustment to trade liberalization comes from national concerns to agriculture because people in the nation allow the government to allocate fiscal budgets to agriculture. Up to now, agricultural trade

liberalization is positively evaluated; nevertheless, the following suggestions should be considered in the future FTA and TPP negotiations.

First, the government should review current rules and regulations on food safety and SPS (Sanitary and Phytosanitary) measures in detail and, if necessary, intensify them to prevent foreign diseases through imported food from spreading out all the country in advance. Since import-related diseases may threaten the life of people, they are controllable with an in-depth preparation and public education. The government makes a full disclosure of correct information on food safety and traceability procedures related to imported food. It cannot be emphasized enough that public investment on food safety system is the first priority of agricultural and food policy to avoid social uproars like ‘mad cow disease’ scare in reimporting the US beef in 2007 in the era of trade liberalization.

Second, in order to achieve national consensus and to persuade people damaged by trade liberalization, the government promotes a wide range of efforts with NGO leaders, consumers, business and academia. The existence of gainers and losers in trade negotiations is inevitable; therefore, the government prepares follow-up measures and policies for sectors and industries that would be expected to be damaged. While tremendous damages were expected in fruit farms after the Korea-Chile FTAs, it is evaluated the competitiveness of fruit farms has improved due to a successful series of countermeasure after the FTA. The government should open a line of communication with people of all levels of society such as farm and NGO leaders. It is an indispensable action of government in the front of the Korea-China FTA and the TPP since farmers, NGOs and small businesses are very anxious about them.

Third, the government should establish diverse measures such as a major staple, rice policy, diversification of importing channels and international collaboration for sustainable food security as a chronic food deficit country. It is an urgent policy issue because a series of recent grain price spikes invokes the importance of food security to the people in chronic food importing countries such as Korea and Japan.

Fourth, it is necessary to evaluate FTAs in effect and concluded as well as case studies of FTAs and the TPP on trading partners. Ex-post studies for the evaluation of FTAs contribute to distinguish between right and wrong parts on negotiations and countermeasures since these evaluations these studies might be very useful to prepare forthcoming FTAs and the TPP.

Agricultural trade liberalization is expected to be further accelerated since Korea is planned to negotiate or currently to negotiate with numerous countries. Particularly, negotiations of the TPP and the FTA with China would have great impacts on the Korean agricultural and food system. As a result, agricultural imports are likely to increase in line with the expansion of trade liberalization and economic growth because consumers demand diverse high-quality food products. As agricultural liberalization is accelerating, the share of agriculture in national economy would decline gradually and lose the role of multi-functionality in agriculture. Therefore, it is a future challenge how to balance between the expansion of trade liberalization and the public value of agriculture.

References

- Ahn, Byeong Il and Jo, Yong Deuk (2009). "Analysis of the Impacts of the Korea-US FTA on pork Market in Korea" *Journal of Agriculture and Life Science*. 43(2), 55-64
- Choi, Se Kyun, Kim, Tae Hoon, and Jeong, Dae Hee. (2009). *The Assessments on Impacts of Implementing FTAs on the Agricultural Sector and Countermeasure*, Research Report, Korea Rural Economic Institute.
- Choi, Se Kyun., Kim, Tae Hoon., and Jeong, Dae Hee. (2009). *The Assessments about Impacts of Implementing FTAs on the Agricultural Sector and Countermeasure*, Research paper, Korea Rural Economy Institute.
- Choi, Sung Jin, Cho and Yoo Jung Geun. (2007). "Industrial Trade Creation Effect Analysis after Korea-U.S. FTA: Including an Analysis on the Change of the Social Welfare in the Rice Market" *Journal of Economic Research* 12, 1-25.
- Eor, Myung Guen., Jeon, Hyung Jin., Moon, Han Pil., and Lee, Ji Young. (2011). *In-depth Analysis of the Ripple Effects by the Korea-China FTA on the Agricultural and Forestry Sector*, Korea Rural Economic Institute.
- Han, Doo Bong., Lim, Jung Bin., An, Dong Hwan., and Seo, Sang Taek. (2007). *Impacts of the Korea-U.S. FTA Agreements on the Agricultural Sector*, Institute of Life and Natural Resources, Korea University.
- Kim, Hwa Nyun., and Jeong, Ho Sung. (2009). *Outcomes and the Problems of Korean concluded FTAs*, Research Report, Samsung Economy Research Institute.
- Lee, Ji Yong, Doo Bong Han, Rodolfo M. Nayga, Song Soo Lim. (2011). "Valuing Traceability of Imported Beef in Korea: An Experimental Auction Approach" *Australian Journal of Agricultural and Resource Economics* (forthcoming)
- Park, Sung Yong, Park and Kim, Suk Chul. 2010. "A study on the Types of and Cases Involving Increasing Consumer Welfare Due to FTA" *International Commerce and Information Review*. 12(4), 127-149.
- Son, Hwang Je. (2009). *The Major Contents and Impacts Analysis of the Korea-EU FTA*, Research Report, Nonghyup Economic Research Institute.

Wonnacott, Ronald J. 1996. "Free-Trade Agreements: For Better or Worse?" *The American Economic Review*. 86(2), 62-66.