Agribusiness & Applied Economics Report No. 619 **October 2007**

Implications of the U.S.-Korea Free Trade Agreement for Agriculture and other Sectors of the Economy

Renan Zhuang
Jeremy W. Mattson
Won W. Koo

Center for Agricultural Policy and Trade Studies
Department of Agribusiness and Applied Economics
North Dakota State University
Fargo, North Dakota 58105-5636

Acknowledgments

The authors extend appreciation to Dragan Miljkovic and Richard Taylor for their constructive comments and suggestions. Special thanks go to Edie Nelson, who helped to prepare the manuscript**.**

A single copy of this publication is available free of charge. Please address your inquiry to the Department of Agribusiness and Applied Economics, North Dakota State University, PO Box 5636, Fargo, ND 58105-5636, phone 701-231-7441, fax 701-231-7400, or email ndsu.agribusiness@ndsu.edu. This publication is also available electronically at the following web site: http://ageconsearch.umn.edu/.

Table of Contents

List of Tables

List of Figures

Abstract

This paper examines the effects of the U.S.-Korea free trade agreement (KORUS FTA) on various sectors of the economy in the two countries using a general equilibrium model. Additional analysis focuses on the agricultural sector. Our analysis indicates that the increase in U.S.-Korea bilateral trade volume in recent years has been through intra-industry trade of high-technology products. Under the KORUS FTA, the bilateral trade volume would increase for virtually all the sectors, and GDP and social welfare would improve for both countries. However, producers of textile products in the United States and producers of agricultural and food products in South Korea would suffer from the FTA. This agreement could benefit U.S. agriculture, but the benefits could be greater in the long run as duties on beef and other meat products are eliminated.

Keywords: Korea, free trade agreement, trade creation, trade diversion

Highlights

The bilateral trade volume between the United States and South Korea has grown substantially, from $33.2 billion in 1989 to $78.3 billion in 2006. With the exception of the 1995 to 1997 period, the United States has maintained a trade deficit with South Korea,. The U.S. trade deficit jumped from $6.3 billion in 1989 to $19.8 billion in 2004. Over the past two years, the U.S. trade deficit with South Korea has started to improve, declining to $16.1 billion in 2005 and $13.4 in 2006. Although the United States has had a trade deficit with South Korea, it has had a consistent trade surplus of about $2 billion to $3 billion in agricultural products.

Investigation of the trade data provides five important empirical facts. First, the increase in U.S.-Korea bilateral trade in recent years is due mainly to increased bilateral trade in differentiated high-technology products. Second, while the United States has increased its exports of high-technology products to South Korea, its imports of the products have increased more rapidly, resulting in an increase of the U.S. trade deficit with South Korea over time. Third, the importance of the mid-technology sector in U.S.-Korea bilateral trade tends to decline over time in terms of trade share, even if the trade volume in the sector has increased steadily since 1989. Fourth, trade shares in the textile and agriculture and food sectors are small and tend to decrease over time. This is particularly true for the textiles sector due to the third country effect. Finally, bilateral trade in the services sector accounts for only a small portion of the total U.S.-Korea bilateral trade volume, although the sector is the largest in both economies.

Under the Korea-U.S. Free Trade Agreement (KORUS FTA), bilateral trade between the United States and South Korea could increase through both inter-industry and intra-industry trade. Major increases in inter-industry trade would include an increase in U.S. exports of agricultural and food products to South Korea and an increase in Korean exports of textile products to the United States. The two countries could also increase their intra-industry trade of high-technology manufacturing products. U.S.-Korea overall bilateral trade (all sectors combined) would increase substantially, and the U.S. trade balance with South Korea could improve for all sectors except the textiles sector.

The KORUS FTA would improve the national welfare for both countries. The effects of the FTA on GDP and household income in both countries would be positive. South Korea benefits more from the FTA in terms of per capita welfare gain and per capita GDP increase. U.S. producers in the agri-food and high-tech sectors would benefit from the FTA, and South Korean producers in the textiles and high-tech sector would benefit. By contrast, producers in the U.S. textiles sector and the agri-food sector in South Korea might suffer from the FTA. Thus, it may be important to compensate those groups in order to smoothly implement the agreement.

This agreement could benefit U.S. agriculture, though the short-term impacts may be smaller than the long-run effects. The benefits could be greater in the long run as duties on beef and other meat products are eliminated. U.S. agricultural imports from Korea would not likely increase significantly under trade liberalization because U.S. agricultural tariffs are lower, and Korea does not have the production capacity to be a significant exporter of agricultural products to the United States.

The market for bulk and agricultural commodities in Korea is fairly flat, but imports of these products are needed to support the domestic processing industry. With the exception of rice and a few dairy products, domestic production in Korea cannot meet the demand of the domestic processing industry. The FTA could improve U.S. market share for bulk commodities. The largest potential for growth in U.S. exports to Korea is likely for consumer-oriented products, including processed foods, meat products, dairy products, fruits, and nuts. A growing economy has led to increased demand for these products. Exports of meat products could benefit the most from a free trade agreement, especially since Korea imposes high tariffs for meat products. However, Korean beef duties will be phased out over a 15-year period, so the benefits to U.S. exporters will not be seen immediately. Similarly, the duties on pork and poultry meats will be phased out over periods of 7 to 12 years.

Implications of the U.S.-Korea Free Trade Agreement for Agriculture and other Sectors of the Economy

Renan Zhuang, Jeremy W. Mattson, and Won W. Koo[1]

Introduction

The bilateral trade volume between the United States and South Korea has been growing substantially since 1989. According to U.S. statistics, the bilateral trade volume between the two countries increased from $33.2 billion in 1989 to $78.3 billion in 2006, an average annual growth rate of 5.2%. The United States has had a trade deficit with South Korea, with the exception of the 1995 -1997 period. The U.S. trade deficit jumped from $6.3 billion in 1989 to $19.8 billion in 2004, a record high. Over the past two years, the U.S. trade deficit with South Korea has started to improve, declining to $16.1 billion in 2005 and $13.4 in 2006. Although the United States has a trade deficit with South Korea, it has had a consistent trade surplus of about $2 billion to $3 billion in agricultural products.

South Korea is the tenth largest economy in the world, with an annual GDP rapidly approaching one trillion U.S. dollars. While South Korea was the seventh-largest export market for the United States in 2004, the United States was South Korea's third-largest trading partner (third-largest import supplier behind Japan and China) and second-largest export market (behind China) in 2005 (Manyin 2006; The CalTrade Report 2006). Moreover, South Korea is the fifth-largest market for U.S. agricultural exports (behind Canada, Mexico, Japan, and China), and the United States provides over one-fifth of South Korea's agricultural imports (Foreign Agricultural Services 2006b).

Informal discussions on a U.S.-Korea free trade agreement (FTA) started in the mid 1980s but were suspended in the 1990s due to disputes over tariff concessions in the agricultural sector under the Uruguay Round of the World Trade Organization (WTO) negotiation and disputes over the screen-quota issue (Cheong 2004; Lee and Lee 2005). The two countries agreed to resume informal talks on an FTA at the U.S.-Korea Business Meeting held in Hawaii in January 2001 (Cheong 2004). On February 2, 2006, the two countries formally announced commencement of FTA talks beginning in May 2006 (Office of the United States Trade Representative 2006; Cooper and Manyin 2006). The two countries concluded FTA negotiations on April 1, 2007. The Korea-U.S. (KORUS) FTA is the United States' most commercially significant FTA in 15 years.

Many previous studies (e.g., Choi and Schott 2001; Cheong 2004; Lee and Lee 2005; Kiyota and Stern 2005) have argued that a U.S.-Korea FTA would benefit the economies of both countries, but with mixed projections. For example, the U.S. International Trade Commission (2001) argued that U.S. income would increase by $20 billion (or 0.23% of GDP) and South Korea's income would increase by $3.9 billion (or 0.69% of GDP). Note that the United States would gain more in terms of absolute value, but South Korea would gain more in terms of

[1] Research Assistant Professor, Research Assistant, and Professor and Director in the Center for Agricultural Policy and Trade Studies at North Dakota State University, Fargo.

percentage increase of GDP, since South Korea's GDP is much smaller than that of the United States. They also projected that U.S. exports to South Korea would increase by $19 billion, while U.S. imports from South Korea would increase by $10 billion. Choi and Schott (2001) argued that a U.S.-Korea FTA would substantially increase bilateral trade and contribute to a significant improvement in income for both countries. U.S. income would increase by $8.9 billion (or 0.13% of GDP) and South Korea's income would increase by $10.9 billion (or 2.41% of GDP). Thus, South Korea would gain more in terms of both an absolute increase in GDP and percentage increase in GDP. They also projected that the U.S.-Korea FTA would produce trade diversion effects for Japan and China. More recently, Lee and Lee (2005) argued that a U.S.-Korea FTA would provide a significantly positive opportunity for long-term and dynamic economic growth for both countries. They projected that a U.S.-Korea FTA would shrink South Korea's bilateral trade surplus with the United States but in the long run would improve South Korea's GDP. The Foreign Agricultural Service (FAS) of the U.S. Department of Agriculture (2006b) argued that U.S. agricultural exports to South Korea would significantly increase under a free trade agreement.

All the previous studies focused on alternative cuts in tariffs and non-tariff barriers under the FTA rather than the actual agreement. Furthermore, few researchers have analyzed trade creation and diversion effects of a U.S.-Korea FTA on various sectors of the two economies. The objective of this study is to fill this gap in the research by examining the effects of the KORUS FTA on the individual sectors of the economy in the two countries. Special attention is given to the following tasks: (1) to identify characteristics of U.S.-Korea bilateral trade; (2) to study the effects of the U.S.-Korea FTA on the economies of both countries; and (3) to analyze trade creation and diversion effects of the FTA. The FTA is expected to enhance U.S.-Korea bilateral trade and promote economic growth for the two countries.

The paper is organized as follows. The next section examines the key characteristics of U.S.-Korea bilateral trade by sectors since 1989[2] and provides an overview of the tariff reduction and elimination schedules of the two countries. This is followed by a discussion of the data and model used for this study, including a brief description of the trade flows in various sectors for the selected countries and regions in the base year (2001). The simulation results are then presented, and our findings are discussed. Additional analysis of the implications of the agreement for agriculture is presented in the following section. The section on agriculture includes discussion on the characteristics of Korean agriculture and U.S.-Korean agricultural trade and the likely effects of the FTA on trade for individual commodities. Finally, the last section presents the conclusions of the paper.

U.S.-Korea Bilateral Trade and Tariff Elimination Schedules under the KORUS FTA

Characteristics of U.S.-Korea Bilateral Trade

The predominant mode of U.S.-Korea bilateral trade has shifted from inter-industry trade to intra-industry trade (Noland 2004). In particular, the trade pattern was inter-industry trade on the basis of differences in resource endowments prior to1994. The United States exported land-

[2] Data are not available prior to 1989.

intensive and natural resource-based industry goods (e.g., agriculture and food products) and technology and capital-intensive goods to South Korea and imported labor-intensive products (e.g., textiles) from that country. However, intra-industry trade between the two countries has increased significantly in the high-technology product sector since 1995. A major increase in trade of high-technology products between the two countries demonstrates the surge in bilateral intra-industry trade based on product differentiation (Krugman 1980, 1981; Head and Ries 2001). The two countries have also increased their bilateral trade in differentiated mid-technology products.

Comparisons between trade volumes and trade surpluses, by sectors, can give us insight on the bilateral trade patterns between the two countries. In this study, we examine U.S.-Korea bilateral trade in six sectors: agriculture and food (agri-food), natural resource-based industries (natural-res), textiles, mid-technology products (mid-tech), high-technology products (high-tech), and others. The sectors are determined on the basis of the standard international trade classification (SITC) 2-digit code. The agri-food sector includes primary agricultural goods (e.g., grains, live animals, fruit, and vegetables) and processed food (e.g., beverages, tobacco products, and meat products). The natural-res sector includes coal, gas, wood, and petroleum products. The textiles sector includes apparel, clothing, and footwear. The mid-tech sector includes fertilizers, chemical materials, nonferrous metals, and furniture. The high-tech sector includes machinery, transport equipment, and scientific instruments. Others include transaction services.

Table 1 summarizes U.S.-Korea bilateral trade in the six industrial sectors over the period from 1989 to 2006. The United States has trade surpluses with South Korea in the agriculture and food sector and, until recently, the natural resource-based industries. The United States has a trade deficit with South Korea in the high-technology sector which has increased over time. The United States also has a trade deficit with Korea in the textiles sector, but this deficit has decreased over time. In fact, both U.S. exports and imports of textile products have decreased since 1990, due to the third-country effect in the market. Since other countries such as China, Thailand, Indonesia, and Latin American countries have become more competitive in producing textile products, both the United States and South Korea have increased their imports of these products from these countries. For the mid-technology sector, the U.S. trade balance with Korea averaged $0.196 billion, with a standard deviation of $0.940 billion, and for the services sector, the United States had a small trade surplus with South Korea prior to 1997 but had a trade deficit afterwards.

The relative importance of each sector has changed over time. The share of textile products in U.S.-Korea bilateral trade decreased sharply from 23.1% in 1989 to 3.6% in 2006. The share of agriculture and food products decreased slightly from 5.6% in 1989 to 4.0% in 2006, and the share of mid-technology products decreased from 21.6% to 19.2% in the same period. The shares for the natural resource-based industry products and services are relatively small, averaging 4.1% and 1.6%, respectively. By contrast, trade of high-technology products has taken the lion's share of the bilateral trade between the two countries, jumping from 44.2% in 1989 to 64.8% in 2006. U.S.-Korea bilateral trade volume in the high-technology sector has increased from $14.7 billion in 1989 to $50.8 billion in 2006. The U.S. trade deficit with South Korea in the high-technology sector has also increased from $3.5 billion in 1989 to $21.0 billion in 2004 and $12.5 billion in 2006.

Table 1. U.S. - Korea Bilateral Trade Volumes by Sector (1989 - 2006)

U.S. Exports to South Korea (billion U.S. dollars)							
Year	AgFood	NRes	Textiles	MidTech	HighTech	Others	Total
1989	1.64	1.38	1.38	3.36	5.58	0.13	13.5
1990	1.59	1.78	1.54	3.42	5.88	0.17	14.4
1991	1.39	1.67	1.22	3.65	7.29	0.29	15.5
1992	1.51	1.50	1.18	3.22	6.94	0.27	14.6
1993	1.29	1.63	1.10	3.25	7.27	0.24	14.8
1994	1.59	1.41	1.23	3.82	9.66	0.31	18.0
1995	2.92	1.79	1.42	5.59	13.24	0.45	25.4
1996	3.22	1.68	1.23	5.11	14.63	0.71	26.6
1997	2.30	1.67	1.20	4.82	14.61	0.46	25.1
1998	1.76	0.75	0.80	3.11	9.79	0.33	16.5
1999	2.26	1.08	0.69	3.87	14.63	0.43	23.0
2000	2.30	1.05	0.94	4.86	18.30	0.46	27.9
2001	2.28	0.86	0.99	4.50	13.18	0.39	22.2
2002	2.47	0.88	0.82	4.89	13.11	0.43	22.6
2003	2.74	1.16	0.84	5.40	13.54	0.42	24.1
2004	2.31	1.51	0.81	6.89	14.41	0.40	26.3
2005	2.10	1.60	0.78	6.70	16.06	0.43	27.7
2006	2.79	2.13	0.74	7.23	19.12	0.44	32.5
U.S. Imports from South Korea (billion U.S. dollars)							
Year	AgFood	NRes	Textiles	MidTech	HighTech	Others	Total
1989	0.21	0.19	6.29	3.83	9.10	0.14	19.7
1990	0.19	0.13	6.37	3.89	7.76	0.14	18.5
1991	0.19	0.14	5.35	3.64	7.53	0.17	17.0
1992	0.17	0.21	4.82	3.48	7.85	0.17	16.7
1993	0.17	0.20	4.24	3.13	9.20	0.18	17.1
1994	0.17	0.22	3.61	3.35	12.13	0.18	19.7
1995	0.18	0.21	3.11	3.53	16.90	0.25	24.2
1996	0.18	0.14	2.67	3.42	15.83	0.44	22.7
1997	0.18	0.20	2.82	3.54	15.97	0.45	23.2
1998	0.15	0.29	3.15	4.58	15.28	0.48	23.9
1999	0.18	0.44	3.35	4.75	21.94	0.60	31.3
2000	0.20	0.79	3.62	5.20	29.81	0.67	40.3
2001	0.22	0.84	3.42	4.68	25.28	0.74	35.2
2002	0.25	0.58	3.35	4.54	26.09	0.77	35.6
2003	0.26	0.54	3.04	4.44	27.97	0.72	37.0
2004	0.29	0.98	3.08	5.57	35.39	0.86	46.2
2005	0.33	2.07	2.40	6.80	31.30	0.89	43.8
2006	0.33	3.06	2.10	7.81	31.64	0.88	45.8

Source: U.S. Department of Commerce (www://tse.export.gov)

Investigation of the data provides five important empirical facts. First, the increase in U.S.-Korea bilateral trade in recent years is due mainly to increased bilateral trade in differentiated high-technology products. Second, while the United States has increased its exports of high-technology products to South Korea, its imports of the products have increased more rapidly, resulting in an increase of the U.S. trade deficit with South Korea over time. Third, the importance of the mid-technology sector in U.S.-Korea bilateral trade tends to decline over time in terms of trade share, even if the trade volume in the sector has increased steadily since 1989. Fourth, trade shares in the textile and agriculture and food sectors are small and tend to decrease over time. This is particularly true for the textiles sector due to the third country effect. Finally, bilateral trade in the services sector accounts for only a small portion of the total U.S.-Korea bilateral trade volume, although the sector is the largest in both economies.

Tariff Reduction and Elimination Schedules in the KORUS FTA

Under the KORUS FTA, nearly 95% of bilateral trade in consumer and industrial products becomes duty-free within three years after the inception of the agreement and most of the remaining tariffs will be eliminated within 10 years. In this section, we provide an overview of the tariff reduction and elimination schedules of the United States and South Korea for the six aggregated sectors used in our analysis, based on the U.S.-Korea FTA text which was signed by the United States and South Korea on June 30, 2007 and, as of August 2007, is waiting for approval from Congress.

For the agriculture and food sector, the major products that South Korea exports to the United States are vegetables and fruits and other miscellaneous edibles. Some of these products already enter the United States duty-free, and the tariffs for those products that have them will be eliminated entirely on the date the KORUS FTA enters into force. Major U.S. agriculture and food exports to South Korea are cereals, meat, and dairy products. While rice is excluded from the KORUS FTA, Korean tariffs on corn for feed, wheat for feed and milling, and soybeans for crushing will be eliminated immediately. Tariffs on beef products will be eliminated gradually within 15 years after the FTA enters into force. Tariffs on frozen pork products will be eliminated by 2014, and tariffs on fresh and chilled pork products will be phased out within 10 years. Tariffs on most poultry cuts including legs will be fully removed within 10 years. For dairy products, Korea will use tariff-rate quotas (TRQs) that provide immediate duty-free access that is double the current shipment volume of U.S. dairy exports. Almost two-thirds of U.S. agricultural exports to Korea will become duty-free immediately when the KORUS FTA is implemented.

For the natural resource-based industries, most Korean exports to the United States are petroleum products, nonmetallic minerals, and metalliferous ores. Tariffs on Korean exports of these products to the United States will be eliminated immediately after the KORUS FTA enters into force. Some of these products already enter duty-free. Major U.S. exports in the sector include cork and wood products, metalliferous ores, nonmetallic minerals, petroleum products, and coal and briquettes. Korean import tariffs on most of these products will be eliminated immediately once the FTA enters into force. Tariffs on some of the wood products will be eliminated in 3-5 years.

For the textiles sector, both sides agreed to provide reciprocal duty-free access immediately for most textile and apparel goods. Major U.S. exports to South Korea in this sector include textile yarn and fabrics, textile fibers, hides and skins, and leathers. Major Korean exports in this sector are articles of apparel and clothing, footwear, and fabrics. Apparel products made in South Korea will qualify for preferential treatment under the agreement if they use U.S. or Korean fabric and yarn, thereby supporting U.S. fabric and yarn exports. U.S. and Korean customs authorities may conduct unannounced site visits to Korean producers of textile products and the United States is allowed to impose a special textile safeguard should damage to U.S. domestic producers occur due to import surges.

In the mid-technology sector, major U.S. exports include chemical products, paper and paper board, manufactures of metals, nonferrous metals, and iron and steel. Major Korean exports to the United States in this sector include travel goods (e.g., handbags), rubber manufactures, iron and steel, miscellaneous manufactured articles, and manufactures of metals. Most mid-technology manufacturing goods will be or will continue to be duty-free immediately after the KORUS FTA enters into force.

As discussed earlier, the United States and South Korea have increased their intra-industry trade of high-technology manufacturing products. These products include motor vehicles, telecommunication equipment, electrical and networking machineries, transport equipment, and professional scientific instruments. Most products in the high-technology sector will be duty-free immediately under the KORUS FTA if they are not already. Tariffs on some of the high-tech products will be fully removed on January 1 of the third year after the FTA enters into force. In particular, the KORUS FTA is expected to increase U.S. competitiveness in the Korean automobile market. Under the agreement, Korean tariffs on most U.S. priority passenger vehicles and trucks will be eliminated immediately. Korea also agreed to address specific auto non-tariff barriers to ensure they do not impede the market access of U.S. automobiles.

South Korea also significantly improved upon its WTO commitments in services, providing meaningful market access commitments that extend across virtually all major service sectors. Significant progress was made in the area of express delivery services, legal services, health care services, education services, and research and development services, and so on.

Model and Data

There are two economic approaches to evaluate the effects of policy changes on a set of endogenous variables: partial equilibrium and general equilibrium models. The partial equilibrium models are relatively simple and typically focus on only a few sectors of the entire economy. By contrast, general equilibrium models are complex and may capture the complicated interplay of effects that may be induced by policy changes in the entire economy (Lee and Lee 2005). Since the KORUS FTA would cover virtually all traded goods in various industrial sectors between the two countries, a computable general equilibrium (CGE) model would excel beyond an econometric or a partial equilibrium model, in the sense that the former allows complex interactions among a wide range of economic variables across various sectors in an economy.

Similar to many previous studies (e.g., Choi and Schott 2001; U.S. International Trade Commission 2001), we also use the multi-region Global Trade Analysis Project (GTAP) model in this study. However, our aggregation of industries and countries are different from that used in previous studies. The GTAP model is a static general equilibrium model, and thus simulation results using this model are comparatively static in nature (Hertel 1997; DeRosa and Gilbert 2005). The assumptions in the GTAP model include a constant return to scale and perfect competition, which are similar to basic trade models and theories (e.g., the Ricardian model, the Hechscher-Ohlin model, and the Stolper-Sammuelson theorem). Also, the model assumes that input factors such as labor and capital are perfectly mobile across the various sectors in an economy and traded products are differentiated by country of origin (Armington 1969).

The 87 countries and regions covered in the GTAP Version-6 database are aggregated into seven countries and regions: the United States, South Korea, China (mainland), the European Union,[3] Japan, other Asian countries (OAsia), and the rest of world (ROW). The 57 commodity sectors covered in the original database are aggregated into seven sectors: agriculture and food, rice,[4] natural-resource-based industries, textiles, mid-technology products, high-technology products, and services.

The trade flows among the selected countries and regions in the base year 2001 provide the following observations. First, South Korea, China, and Japan are the most important trade partners in Asia for the United States. U.S. exports (all sectors combined) to Japan alone ($71.94 billion) surpassed its exports to all other Asian countries ($60.32 billion), excluding South Korea and China. Second, U.S. exports (all sectors combined) to South Korea ($29.41 billion) surpassed its exports to China ($29.00 billion), even though the U.S. bilateral trade with South Korea is much smaller than that with China. Third, the high-technology sector dominates any other single sector in terms of U.S. bilateral trade volume with any country or region. In particular, the United States imports a tremendous amount of high-tech products from Japan. Fourth, the United States is the most important market for South Korea's high-tech products.

This study uses the standard general equilibrium (GE) closure, which is the classification of the variables in the model as either endogenous or exogenous. For the standard GE closure, import tariff rates and export taxes are exogenous, thus, these variables may be subjected to a shock in order to examine the effects of the changes of these exogenous variables on the endogenous variables. It is assumed that other countries and regions would not retaliate and that all other factors such as population and endowment of primary factors remain unchanged from the observations for the base year 2001. One of the limitations of the GTAP model is that it assumes constant return to scale regardless of sectors. However, the high-tech sector may experience an increasing return to scale, and an FTA would particularly encourage the member countries to specialize in production and explore higher degree of scale economies. Thus, it is assumed that the productivity in the high-tech sector in the United States and South Korea would increase by 1% under the KORUS FTA.

[3] European Union 15

[4] Because rice is excluded from the KORUS FTA, we treat rice as different from other agricultural products.

Two scenarios are considered in our simulation based on our earlier discussion about the tariff elimination schedules under the KORUS FTA. For scenario one, U.S. tariffs on imports from South Korea are fully eliminated for all sectors.[5] Korean tariffs on imports from the United States are fully eliminated for all the sectors except the rice sector and the agriculture and food sector. Rice is excluded from the KORUS FTA and thus we assume Korean tariffs on rice imports would remain unchanged from the base year. Korean tariffs on U.S. agricultural and food products are reduced by 66.7% since two thirds of U.S. agricultural exports to Korea will become duty-free immediately under the KORUS FTA, as we discussed earlier. For scenario two, Korean tariffs on U.S. agricultural and food products are reduced by 95% within 10 years, and tariff cuts in other sectors are the same as in scenario one.

Results and Discussion

This section is divided into three parts. First, effects of the KORUS FTA on GDP, household income, national welfare, and terms of trade are presented. Second, effects of the FTA on production in various sectors in the two countries are examined. Finally, trade creation and trade diversion effects of the KORUS FTA on each sector of the two economies are discussed.

Changes in GDP, Household Income, National Welfare, and Terms of Trade

Table 2 summarizes the changes in GDP, household income, national welfare, and terms of trade in the selected seven countries and regions under the two scenarios. U.S. GDP would increase by about $18 billion (or 0.18% of GDP) under both scenarios. The GDP in South Korea would increase by $3.8 billion (or 0.88% of GDP) under scenario one and $3.6 billion (or 0.85%) under scenario two. The GDP in all other countries and regions would tend to decrease slightly, but the decreases are negligible in terms of percentage changes. Household income in the United States would increase by 0.24% and 0.25% under the two scenarios, respectively. Household income in South Korea would increase by 1.10% under scenario one and 0.92% under scenario two. Household income for all other countries and regions would decrease slightly by different amounts, ranging from 0.02% in ROW to 0.05% in China.

The national welfare, measured by Equivalent Variation in income,[6] in the United States would increase by $22.33 billion under scenario one and $23.23 billion under scenario two. The national welfare in South Korea would increase by $4.15 billion and $3.46 billion under the two scenarios, respectively. The welfare in all other countries and regions would decrease by different magnitudes, ranging from $0.48 billion in other Asian countries to $1.79 billion in the EU. U.S. per capita welfare would increase slightly by $80.5 under scenario one and $83.7 under scenario two. Similarly, per capita welfare in South Korea would increase by $87.2 under

[5] GTAP does not have protection data (import tariffs and export taxes) for the services sector.

[6] Equivalent Variation in income is the amount of money that would have to be taken away from the consumer before the price change to leave him/her as well off as he/she would be after the price change. In other words, it measures the maximum amount of income the consumer is willing to pay to avoid the price change.

scenario one and $72.7 under scenario two. Per capita welfare for all other countries and regions would decrease slightly by different amounts, ranging from $0.2 in other Asian countries to $11.0 in Japan.

Table 2 - Changes in GDP, Household Income, Welfare (EV), and TOT in Each Country

Country and Region	GDP (billion U.S.$)	GDP (%)	Household Income (%)	Welfare (billion U.S.$)	Per Capita Welfare (U.S.$)	TOT (%)
Scenario 1: Korean Agricultural and Food Tariffs Cut by 66.7%						
USA	18.20	0.18	0.24	22.33	80.5	0.30
South Korea	3.75	0.88	1.10	4.15	87.2	0.36
China	-0.11	-0.01	-0.05	-0.56	-0.4	-0.09
Japan	-0.19	-0.01	-0.04	-1.38	-10.8	-0.22
Other Asian Countries	-0.10	-0.01	-0.04	-0.47	-0.2	-0.05
EU	0.00	0.00	-0.02	-1.67	-4.4	-0.05
ROW	-0.27	0.00	-0.02	-1.15	-0.5	-0.03
Scenario 2: Korean Agricultural and Food Tariffs Cut by 95%						
USA	18.12	0.18	0.25	23.23	83.7	0.38
South Korea	3.62	0.85	0.92	3.46	72.7	0.05
China	-0.06	-0.01	-0.05	-0.55	-0.4	-0.09
Japan	-0.24	-0.01	-0.04	-1.40	-11.0	-0.20
Other Asian Countries	-0.06	-0.01	-0.04	-0.48	-0.2	-0.06
EU	0.00	0.00	-0.03	-1.79	-4.8	-0.05
ROW	-0.20	0.00	-0.02	-1.32	-0.6	-0.04

Note: TOT and EV refer to Terms of Trade and Equivalent Variation in income, respectively.

While the national welfare of other countries and regions would decrease, the global welfare would increase by about $21.2 billion under both scenarios. This is not surprising since we assume that the economic situations and trade policies for all other countries and regions remain unchanged under the KORUS FTA. Free trade improves welfare since it encourages efficient producers to produce more and inefficient producers to produce less. South Korea benefits more than the United States does from the KORUS FTA in terms of percentage increase of GDP and household income.

Terms of trade would also change across the countries and regions. The terms of trade for the United States would increase by 0.30% under scenario one and 0.38% under scenario two. The terms of trade for South Korea would increase by 0.36% and 0.05% under the two scenarios, respectively. Terms of trade for all other countries and regions would decrease by different amounts, ranging from 0.03% in the ROW to 0.22% in Japan.

Effects of the KORUS FTA on Production

The KORUS FTA is expected to affect production across the industrial sectors in the two countries (Table 3). In general, changes in production pattern follow the Hecksher-Ohlin theorem. For instance, the United States is more advanced in the high-technology sector than other countries because it is a capital and technology-abundant country. As expected, the United States would increase its production of high-tech products under the KORUS FTA. Similarly, the United States would increase its production of agricultural and food products (land-intensive products). By contrast, South Korea would dramatically increase its production of textile products (labor-intensive products).

Table 3 - Changes in Industrial Output Values in the United States and South Korea

Sectors	Scenario 1		Scenario 2	
	USA	Korea	USA	Korea
Changes in Output Values (billion U.S. dollars)				
Agri-Food	10.16	-7.10	16.88	-12.98
Natural-Res	-1.40	-0.69	-1.55	-0.71
Textiles	-4.22	5.97	-4.84	7.82
Mid-tech	-5.18	-2.36	-6.02	-1.78
High-tech	9.71	1.07	7.52	1.46
Services	75.64	8.38	82.26	7.36
Percentage Changes (%)				
Agri-Food	1.07	-10.87	1.78	-19.88
Natural-Res	-0.34	-1.77	-0.38	-1.81
Textiles	-1.56	17.14	-1.79	22.43
Mid-tech	-0.27	-1.61	-0.31	-1.21
High-tech	0.54	0.54	0.42	0.73
Services	0.60	1.76	0.65	1.55

Note: Rice is not affected by the KORUS FTA, since it is excluded from the agreement, so it is not included in the table. For scenarios 1 and 2, Korean tariffs on U.S. agricultural and food products are cut by 66.7% and 95%, respectively.

Specifically, U.S. production in the agri-food sector would increase by $10.16 billion (1.07%) under scenario one and $16.88 billion (1.78%) under scenario two. U.S. production in the high-technology sector would increase by $9.71 billion (0.54%) and $7.52 billion (0.42%) under the two scenarios, respectively. U.S. production in the services sector would increase by 0.60% and 0.65%, respectively. Since GTAP does not have protection data for the services sector (thus no tariffs are cut for the sector in our simulation), the removal of tariffs in other sectors indirectly give more protection to the services sector. Thus, the production in the services sector in the two countries would tend to increase. By contrast, U.S. production in the textiles, mid-technology, and natural-res sectors would decrease, ranging from 0.27% in the mid-technology

sector (scenario one) to 1.79% in the textiles sector (scenario two). Since the GTAP model assumes that factor endowments (capital, labor, land, etc.) remain unchanged from the base year 2001 and that input factors (e.g., labor and capital) are perfectly mobile among the sectors of each economy, the increase in production in the agri-food, high-tech, and service sectors means that while more resources are allocated to those sectors, the resources allocated to other sectors such as natural-res, textiles, and mid-tech sectors are reduced, which in turn would result in a decrease in the production in these sectors. If factor endowments were allowed to increase (e.g., capital accumulation and increase of labor force) and factors have limited mobility, the U.S. production in these other sectors would not be reduced as much. Based on our results, we conclude that U.S. farmers and high-tech product producers and the consumers of textile products would benefit from the FTA. However, U.S. producers of textile products might suffer from the FTA.

For South Korea, production of textiles products would increase by $5.97 billion (17.14%) under scenario one and $7.82 billion (22.43%) under scenario two. Production in the high-tech sector would increase by $1.07 billion (0.54%) and $1.46 billion (0.73%), respectively. Production in the services sector would increase by $8.38 billion (1.76%) and $7.36 billion (1.55%), respectively. Production in all other sectors, including agri-food, natural-res, and mid-tech, would decrease by differing amounts. In particular, production in the agri-food sector would decrease by $7.1 billion (10.87%) under scenario one and $12.98 billion (19.88%) under scenario two. Production in natural-res and mid-tech sectors would decrease by less than two percent. Again, since the model assumes that all factor endowments are fixed, an increase in production in some sectors would necessarily result in a decrease of production in other sectors in the economy. Producers in the agriculture and food sector in South Korea would suffer from the KORUS FTA, while producers in the textiles sector would benefit from the FTA.

Trade Creation and Trade Diversion Effects

Table 4 summarizes the changes in exports in the six sectors for the seven selected countries and regions under scenario one. As expected, U.S.-Korea bilateral trade would increase essentially for all sectors. In particular, U.S. exports to South Korea in the agriculture and food sector would increase by $6.44 billion. U.S. exports to South Korea in the high-tech and mid-tech sectors would increase by $2.89 and $1.75 billion, respectively. South Korea's export sales to the United States in the textiles and high-tech sectors would increase by $4.97 and $2.02 billion, respectively. Total U.S.-Korea bilateral trade (all sectors combined) would increase by $19.71 billion (export sales for the United States and South Korea would increase by $11.91 billion and $7.80 billion, respectively).

Free trade agreements can affect trade through trade creation and trade diversion. Trade creation occurs when trade volume between two countries increases as a result of the displacement of domestic production. Trade diversion occurs when increases in trade with a country belonging to a trade agreement displaces trade with third-party countries. For the agriculture and food sector, trade creation occurs since South Korea would reduce its production of agricultural and food products by about 10.9% (Table 3) and increase its imports from the United States. Trade diversion also occurs since South Korea would decrease imports from other countries and the United States would decrease exports to other countries. Specifically, U.S.

agricultural and food exports to South Korea would increase by $6.44 billion while its exports to all other countries and regions would decrease slightly by $1.85 billion. As a result, the net increase in U.S. total exports (with its all trading partners) of agricultural and food products would be $4.59 billion under the KORUS FTA (Table 4). South Korean agricultural and food imports would increase by a net total of $2.84 billion as imports from all countries except the United States would decrease by a sum of $3.60 billion. The United States would increase its imports of agricultural and food products slightly from South Korea and other trading partners. Total U.S. imports in the sector would increase by $1.02 billion. South Korea would increase its exports to all countries slightly by a sum of $0.62 billion.

Trade creation also occurs for the sector of natural resource-based industries. The United States and South Korea would reduce their production by 0.34% and 1.77%, respectively (Table 3). However, the two countries would increase their exports in the sector to each other while their exports to all other countries and region would decrease slightly, creating trade diversion. Specifically, the United States would increase its exports to South Korea (by $0.54 billion) while decreasing its exports to all other countries and regions (by $1.06 billion). As a result, total U.S. exports in the sector would decrease by $0.52 billion. The United States would increase its imports from all countries and regions by a total of $0.57 billion. South Korea would divert its imports in the sector from other countries and regions to the United States, with a net decrease in imports by $0.16 billion (an increase of $0.54 billion in imports from the United States and a decrease of $0.70 billion in imports from other countries and regions). South Korea would also slightly decrease its total exports in the sector, by $0.15 billion.

For the textiles sector, both trade creation and trade diversion occur. The United States would decrease its production of textile products, and the reduced production is solely replaced by an increase in imports from South Korea. Specifically, U.S. imports from South Korea would increase by $4.97 billion while its imports from all other countries and regions would decrease by a sum of $1.82 billion (trade diversion effect). Since the trade creation effect dominates the trade diversion effect, total U.S. imports in the sector would increase by $3.15 billion. It is generally believed that the “third” countries (China, OAsia, and ROW) are more efficient producers of textile products than South Korea because of lower labor cost in those developing countries. However, the United States would divert its imports from these more efficient non-member countries and regions to less efficient South Koreas producers under the KORUS FTA. While U.S. exports to South Korea in the sector would increase slightly ($0.24 billion), its exports to all other countries and regions would decrease by $0.82 billion, resulting in a net decrease of $0.58 billion. While South Korea’s exports of textile products to the United States would increase by $4.97 billion, its exports to all other countries and regions would decrease slightly by $0.20 billion, resulting in a net increase in exports of $4.77 billion. South Korea’s imports of textile products from all its trading partners would increase by $0.75 billion.

Table 4 - Changes in Exports by Sectors under the KORUS FTA (billion U.S. dollars)

	Importers							
Exporters	*USA*	*Korea*	*China*	*Japan*	*OAsia*	*EU*	*ROW*	*Total*
USA								
Agri-Food	0	6.44	-0.10	-0.41	-0.14	-0.25	-0.95	4.59
Natural-Res	0	0.54	-0.02	-0.11	-0.06	-0.25	-0.62	-0.52
Textiles	0	0.24	-0.03	-0.04	-0.03	-0.10	-0.62	-0.58
Mid-tech	0	1.75	-0.24	-0.52	-0.32	-1.89	-3.72	-4.94
High-tech	0	2.89	0.21	0.29	0.34	1.53	2.38	7.64
Services	0	0.06	-0.11	-0.43	-0.37	-2.67	-1.65	-5.17
Total	0	11.91	-0.29	-1.21	-0.58	-3.63	-5.18	1.02
Korea								
Agri-Food	0.14	0	0.04	0.27	0.04	0.04	0.10	0.62
Natural-Res	0.11	0	-0.09	-0.09	-0.03	-0.01	-0.05	-0.15
Textiles	4.97	0	-0.07	-0.02	-0.04	-0.02	-0.05	4.77
Mid-tech	0.68	0	-0.57	-0.23	-0.32	-0.16	-0.49	-1.08
High-tech	2.02	0	-0.02	-0.05	-0.06	0.00	-0.13	1.77
Services	-0.12	0	-0.02	-0.06	-0.06	-0.38	-0.21	-0.85
Total	7.80	0	-0.72	-0.18	-0.46	-0.53	-0.82	5.09
China								
Agri-Food	0.03	-0.85	0	0.00	0.00	0.00	0.02	-0.80
Natural-Res	0.03	-0.04	0	0.01	0.01	0.01	0.03	0.04
Textiles	-0.32	0.25	0	-0.09	0.00	0.00	0.10	-0.06
Mid-tech	0.76	-0.06	0	0.02	0.02	0.03	0.17	0.94
High-tech	-0.47	-0.20	0	-0.25	-0.17	-0.19	-0.41	-1.70
Services	0.06	0.01	0	0.00	0.00	0.02	0.01	0.10
Total	0.10	-0.90	0	-0.32	-0.15	-0.14	-0.08	-1.49
Japan								
Agri-Food	0.01	-0.17	0.00	0	0.00	0.00	0.01	-0.15
Natural-Res	0.02	-0.02	0.01	0	0.01	0.01	0.03	0.07
Textiles	-0.01	0.05	0.04	0	0.01	0.00	0.01	0.11
Mid-tech	0.44	-0.13	0.16	0	0.13	0.10	0.27	0.98
High-tech	-0.29	-0.55	-0.04	0	-0.22	0.03	-0.30	-1.37
Services	0.08	0.04	0.00	0	0.02	0.10	0.07	0.32
Total	0.26	-0.79	0.18	0	-0.05	0.25	0.09	-0.05
OAsia								
Agri-Food	0.13	-0.60	0.00	-0.01	-0.02	0.00	0.04	-0.47
Natural-Res	0.02	-0.07	0.01	0.00	0.00	0.00	0.02	-0.02
Textiles	-0.43	0.09	0.00	-0.02	-0.01	-0.03	0.02	-0.38
Mid-tech	0.30	-0.07	0.04	0.01	0.04	0.00	0.13	0.46
High-tech	-0.49	-0.30	-0.14	-0.32	-0.67	-0.21	-0.43	-2.56
Services	0.20	0.07	0.00	-0.01	0.00	0.05	0.04	0.34
Total	-0.28	-0.88	-0.10	-0.36	-0.65	-0.18	-0.17	-2.62
EU								
Agri-Food	0.17	-0.49	0.00	-0.02	-0.01	-0.30	0.05	-0.60
Natural-Res	0.06	-0.01	0.00	0.00	0.00	0.05	0.08	0.17
Textiles	-0.16	0.09	0.00	-0.03	-0.01	-0.16	0.00	-0.27
Mid-tech	1.23	-0.12	0.04	0.00	0.03	-0.07	0.97	2.08
High-tech	-1.44	-0.34	-0.30	-0.29	-0.43	-4.90	-3.37	-11.08
Services	1.27	0.41	-0.02	-0.12	-0.01	0.13	0.18	1.84
Total	1.12	-0.45	-0.29	-0.46	-0.43	-5.25	-2.10	-7.86
ROW								
Agri-Food	0.54	-1.48	-0.03	-0.08	-0.06	-0.18	0.01	-1.28
Natural-Res	0.33	-0.56	-0.01	-0.09	-0.07	-0.25	0.06	-0.58
Textiles	-0.91	0.04	-0.03	-0.01	-0.03	-0.21	-0.04	-1.20
Mid-tech	2.00	-0.16	0.06	-0.04	-0.02	-0.33	0.44	1.94
High-tech	-3.14	-0.22	-0.21	-0.23	-0.32	-1.20	-1.34	-6.69
Services	0.97	0.25	-0.06	-0.10	-0.02	-0.03	0.05	1.06
Total	-0.21	-2.13	-0.29	-0.55	-0.53	-2.20	-0.83	-6.74
Total								
Agri-Food	1.02	2.84	-0.09	-0.25	-0.20	-0.68	-0.72	1.91
Natural-Res	0.57	-0.16	-0.11	-0.27	-0.13	-0.44	-0.45	-0.99
Textiles	3.15	0.75	-0.09	-0.22	-0.10	-0.52	-0.58	2.40
Mid-tech	5.41	1.21	-0.51	-0.75	-0.46	-2.31	-2.22	0.37
High-tech	-3.81	1.27	-0.51	-0.86	-1.53	-4.94	-3.61	-13.99
Services	2.45	0.85	-0.20	-0.73	-0.44	-2.78	-1.51	-2.36
Total	8.79	6.76	-1.50	-3.08	-2.86	-11.67	-9.09	-12.65

Note: Numbers in the table represent the changes in exports from the country in row to the country in column. For example, 6.44 in the first row and second column represents U.S. exports of agricultural and food product to South Korea, or South Korea's imports from the U.S.

For the mid-technology products, the United States and South Korea would decrease their production by 0.27% and 1.61%, respectively (Table 3). The two countries would increase their exports of mid-tech products to each other, but this is due largely to trade diversion as exports to other countries decrease. Specifically, U.S. exports to South Korea would increase by $1.75 billion, and its exports to all other countries and regions would decrease by a total of $6.69 billion. As a result, total U.S. exports in the sector would decrease by $4.94 billion. U.S. imports from all countries and regions would increase by $5.41 billion due to trade creation. South Korea would increase its exports of mid-tech products to the United States, but it would reduce its exports to all other countries and regions, resulting in a net decrease of $1.08 billion in exports. Similarly, South Korea would increase its imports of mid-tech products from the United States by $1.75 billion and divert its imports from all other countries and regions by $0.54 billion. As a result, South Korea's total imports in the sector would increase by $1.21 billion.

For high-technology products, both the United States and South Korea would increase their production in the sector by about 0.54% (Table 3). Total U.S. exports would increase dramatically by $7.64 billion. In particular, U.S. exports to South Korea, ROW, and the EU would increase by $2.89, $2.38, and $1.53 billion, respectively. While U.S. imports from South Korea would increase by $2.02 billion, its imports from all other countries and regions would decrease by a total of $5.83 billion. As a result, total U.S. imports would decrease by $3.81 billion. For South Korea, while its exports to the United States in the high-tech sector would increase by $2.02 billion, its exports to all other countries and regions would decrease slightly, by a sum of $0.25 billion, resulting in a net increase of $1.77 billion in exports. South Korea would also divert its imports of high-tech products from other trading partners to the United States. While South Korea's imports from the United States would increase by $2.89 billion, its imports from other countries and regions would decrease by $1.62 billion. Thus, South Korea's total imports in the high-tech sector would increase by $1.27 billion.

For the sector covering services, while U.S. exports to South Korea would increase slightly ($0.06 billion), its exports to all other countries and regions would decrease ($5.23 billion), resulting in a net decrease of $5.17 billion. In contrast, U.S. imports in the sector from South Korea would decrease slightly, by $0.12 billion, while its imports from all other countries and regions would increase by $2.57 billion, resulting in a net increase of $2.45 billion. South Korean exports in the sector to all destinations would decrease by a sum of $0.85 billion, while imports from all sources would increase by a sum of about $0.85 billion.

U.S. trade (with all countries and regions) would increase in all sectors except the services sector. In particular, U.S. trade in agri-food, high-tech, and textile sectors would increase by $5.61 billion,[7] $3.83 billion, and $2.57 billion, respectively. Similarly, South Korea's trade would increase in all sectors except the natural resource-based industries sector. South Korea's trade in the above sectors would increase by $3.47 billion, $3.04 billion, and $5.52 billion, respectively. Under the KORUS FTA, the U.S. bilateral trade balance with South Korea in the agri-food, natural-res, mid-tech, high-tech, and services sectors would improve by $6.31 billion, $0.43 billion, $1.06 billion, $0.86 billion, and $0.18 billion, respective. However, the U.S. trade balance with South Korea in the textiles sector would deteriorate by $4.73 billion.

[7]Which is equal to $4.59 billion (increase in exports) plus $1.02 billion (increase in imports).

For scenario two, in which Korean import tariffs on U.S. agriculture and food products are cut by 95%, U.S. exports to South Korea in the agriculture and food sector would increase further.[8] Specifically, U.S. exports of agricultural and food products to South Korea would increase by $11.35 billion and Korean exports of textile products would increase by $5.45 billion under scenario two. The changes in U.S.-Korea bilateral trade in other sectors are similar in magnitude to those under scenario one. U.S.-Korea overall bilateral (all sectors combined) would increase by about $25.3 billion.

Implications for Agriculture

The GTAP model indicates that the U.S. Agri-Food sector would benefit the most from the FTA. The model estimates that U.S. exports of Agri-Food products to South Korea would increase by $6.44 billion with a 66.7% reduction in tariffs and $11.35 billion with a 95% tariff reduction. These are dramatic increases from the $2.79 billion exported from the United States to South Korea in 2006. However, the GTAP model may not capture some of the details of U.S.-Korean agricultural trade, so more in depth analysis is necessary. This section provides details for Korean agriculture and U.S-Korean agricultural trade, followed by an analysis of tariff reductions on trade for individual commodities.

Korean Agriculture

Rice is the main crop produced in Korea (Table 5). Approximately 1 million hectares are devoted to rice production in the country. Korea does not export or import a significant quantity of rice. Because of decreases in Korean rice consumption, the Korean government is attempting to reduce rice production through rice area reduction programs. Rice is the only grain grown in significant quantities. Other grains, such as wheat and corn, must be imported to meet demand. Korea consumes approximately 9 million metric tons of corn per year, 2 million metric tons for food and 7 million metric tons for feed, but the country produces just 60-80 thousand metric tons. Fruits and vegetables, such as cabbage, onions, watermelons, apples, pears, and citrus, are the most significant products grown in Korea other than rice. Peppers, garlic, potatoes, barley, and soybeans also are produced.

[8] For scenario two in which Korean import tariffs on U.S. agriculture and food products are cut by 95%, the changes in exports are not reported in Table 4, but they are available upon request.

Table 5. Korean Agricultural Production, 2005

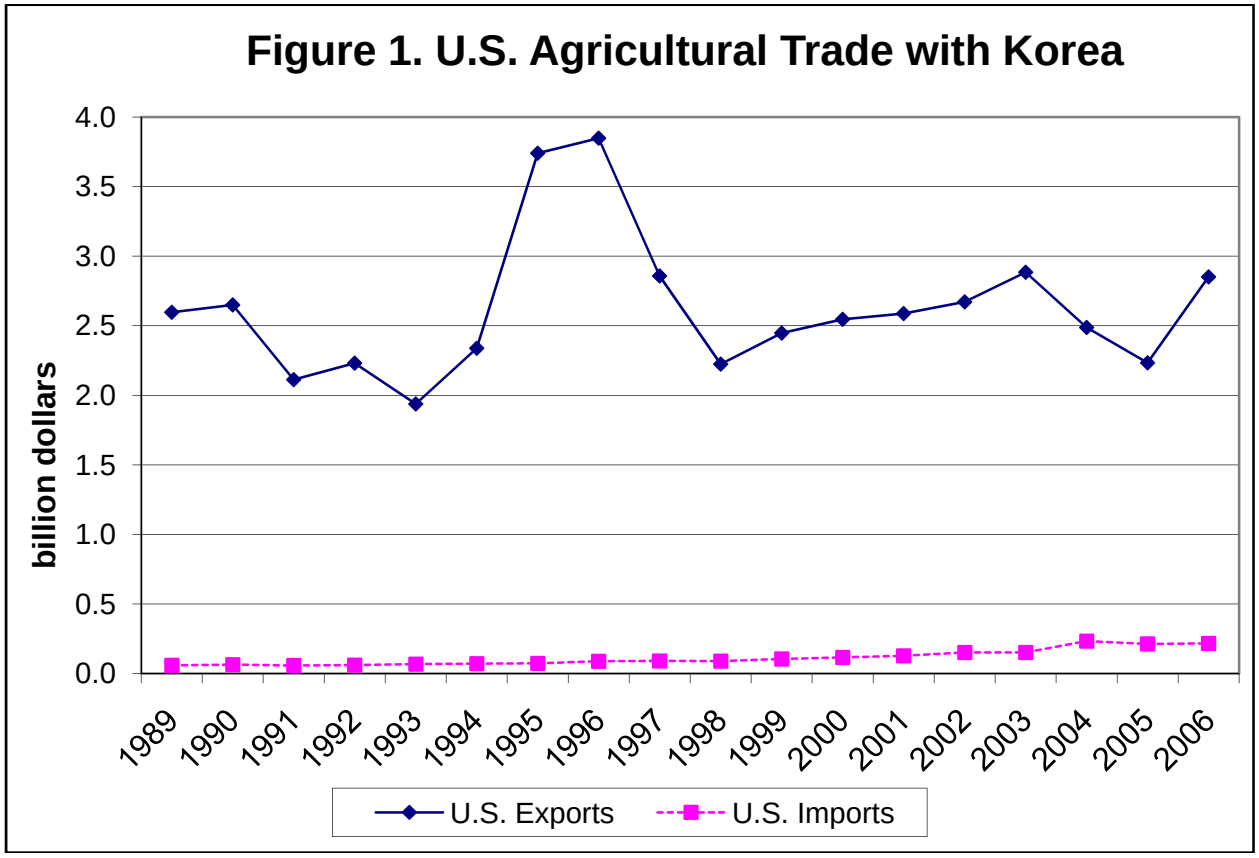
Major Crops	Area Harvested ('000 hectares)	Production ('000 metric tons)
Rice, Paddy	980	6,435
Vegetables & Melons	329	
Chilies & Peppers, Green	67	395
Cabbages	42	2,603
Onions	37	1,537
Watermelons	23	905
Garlic	32	375
Fruit excl Melons	163	
Apples	27	368
Grapes	22	381
Pears	22	443
Tangerines, mandarins, clem.	22	638
Soybeans	105	183
Barley	61	287
Chestnuts	39	76
Potatoes	33	894
Other Crops		
Corn	15	73
Wheat	2	8
Meat and Dairy Production		
Milk		2,234
Pork		899
Bird eggs		543
Chicken meat		536
Beef		218

Source: FAOSTAT

U.S. Agricultural Trade with Korea

The United States has maintained a large trade surplus with Korea for agricultural products (Figure 1). Korea is one of the top markets for U.S. exports of agricultural products, but the country exports little agricultural goods to the United States. The U.S. agricultural trade surplus with Korea totaled $2.63 billion in 2006. U.S. agricultural exports to Korea have ranged between $2 billion and $3 billion in most years. Exports peaked at $3.74 billion in 1995 and $3.85 billion in 1996 but then declined sharply to previous levels. After increasing to $2.88 billion in 2003, exports dropped to $2.23 billion in 2005 and then rose again to $2.85 billion in 2006. The decline in 2005 was due, to a large extent, to Korea's ban of U.S. beef. Overall, U.S. agricultural exports to Korea over the last 15 years have been rather stagnant. Exports of many products are below the highs reached in the mid 1990s, but the country remains an important market for U.S. exports. Korea ranked as the fifth largest market for U.S. agricultural exports in 2006. Until recently, the country had been the fourth largest market for U.S. agricultural products, behind Canada, Mexico, and Japan; but exports to China now surpass those to Korea, and exports were also slightly greater to Taiwan in 2005. Meanwhile, Korea has not been a

significant supplier of U.S. agricultural imports. The country ranked as the 38th largest exporter of agricultural products to the United States in 2006. Agricultural imports from Korea have slowly been increasing, from $64 million in 1990 to $217 million in 2006, but are still quite small.



Source: FAS/ESDA, U.S. Trade Internet System

U.S. Imports from Korea

U.S. agricultural imports from Korea include fruit, mostly pears; wheat products such as pasta, noodles, biscuits, and wafers; dairy products; wine; soups and sauces; and sugar and confectionary products (Table 6). Korea is the second largest exporter of pears to the United States, behind Argentina. With the exception of pears, however, Korea is not a major supplier of these products to the United States. Most U.S. imports of pasta and noodles and biscuits and wafers are from Canada, Mexico, and European countries, but Korea does rank as the seventh largest exporter of pasta and noodles to the United States. Though imports of dairy products and wine have increased from Korea, they represent just 0.5% and 0.1% of total U.S. imports of those products, respectively.

Table 6. U.S. Agricultural Imports from Korea, 2002-2006

	2002	2003	2004	2005	2006
	----------million dollars----------				
Total Ag Imports	151.2	151.4	232.9	211.6	217.6
Pears	15.1	12.1	14.7	21.6	21.5
Pasta & Noodles	13.2	10.4	13.1	12.1	13.5
Dairy Products	7.0	8.7	9.7	11.5	12.9
Biscuits & Wafers	8.1	9.3	8.8	10.7	11.8
Wine	2.2	4.0	4.6	3.9	5.0
Soups & Sauces	1.5	1.9	3.1	3.6	4.0
Sugar & Related Products	4.5	3.4	4.4	5.1	3.3
Confectionery Products	4.2	3.1	4.0	3.4	2.6

Source: FAS/USDA, U.S. Trade Internet System

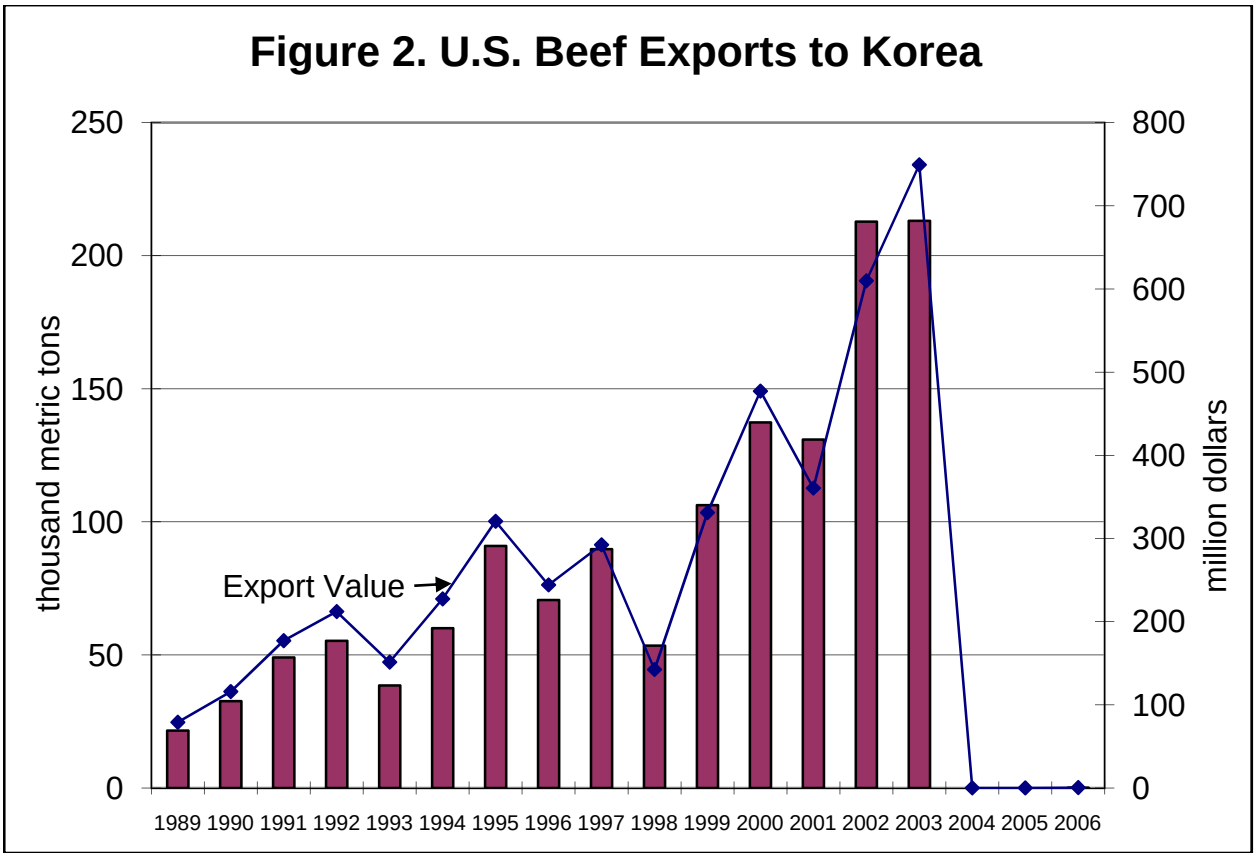
U.S. Exports to Korea

The major U.S. agricultural exports to Korea include beef, corn, cowhides, pork, wheat, soybeans, and cotton (Table 7). Other exports include poultry meat, oranges, and dairy products. Beef had been the top U.S. agricultural export to Korea in terms of value prior to the country's ban of U.S. beef. U.S. beef exports to Korea had steadily increased to 213 thousand metric tons valued at $750 million in 2003 (Figure 2). Beef accounted for a quarter of total U.S. agricultural exports to Korea in 2003, in dollar terms. Furthermore, the country represented about a quarter of the U.S. export market for beef. However, the United States shipped no beef to Korea in 2004 or 2005 and very little in 2006 because of the ban. Prior to the ban, Korea was the 2nd or 3rd largest export market for U.S. beef, behind Japan and similar to Mexico.

Table 7. U.S. Agricultural Exports to Korea, 2002-2006

	2002	2003	2004	2005	2006
	----------million dollars----------				
Total Ag Exports	2,672	2,884	2,488	2,234	2,851
Beef & Veal	610	749	0	0	0.4
Corn	79	42	542	234	718
Bovine Hides, Whole	311	286	262	250	221
Pork	38	75	48	136	212
Wheat, Unmilled	187	205	231	185	188
Soybeans	247	282	285	199	113
Cotton	103	146	157	154	103
Dairy Products	41	44	44	59	66
Oranges & Tanger., Fresh	71	81	89	99	61
Poultry Meats	79	50	26	46	56

Source: FAS/USDA, U.S. Trade Internet System



Source: FAS/USDA, U.S. Trade Internet System

U.S. exports of corn, soybeans, wheat, and cotton to Korea have declined since the highs reached in 1995 and 1996 (Table 8). Corn exports to Korea have varied substantially from year to year, ranging from a high of 8.8 million metric tons in 1995 to less than 400 thousand metric tons in 2003. Corn exports to the country increased significantly to 6.0 million metric tons in 2006. Korean imports of soybeans from the United States increased from 825 thousand metric tons in 1990 to a high of 1.54 million metric tons in 1996 but have since declined to 440 thousand metric tons in 2006. U.S. exports of wheat to Korea have slowly declined over the last couple decades. U.S. cotton exports to the country have also fallen over this time period. In 2006, Korea was the third largest export market for U.S. corn, the seventh largest market for U.S. wheat, the tenth largest market for U.S. soybeans, and the eighth largest market for U.S. cotton.

Table 8. U.S. Agricultural Exports to Korea for Selected Commodities, 1991 - 2006

	Export Value (million dollars)						Export Quantity (thousand metric tons)					
	Corn	Soybeans	Wheat	Cotton	Beef	Pork	Corn	Soybeans	Wheat	Cotton	Beef	Pork
1991	178	240	209	359	177	4	1,530	1,059	1,649	214	49	2
1992	203	246	235	348	212	3	1,803	1,103	1,481	242	55	1
1993	49	247	228	298	151	2	454	1,011	1,516	218	39	1
1994	254	225	227	313	227	6	2,471	925	1,503	213	60	3
1995	1,095	336	260	361	321	27	8,844	1,421	1,461	198	91	12
1996	1,256	437	328	257	244	24	7,964	1,536	1,613	138	71	9
1997	447	372	226	224	292	26	3,397	1,249	1,333	127	90	9
1998	463	304	212	267	142	19	4,393	1,280	1,479	165	53	9
1999	572	227	210	65	331	35	6,045	1,188	1,664	49	106	18
2000	203	266	181	96	477	28	2,294	1,375	1,567	74	137	13
2001	276	219	173	161	361	22	3,068	1,180	1,327	128	131	12
2002	79	247	187	103	610	38	826	1,186	1,237	103	213	21
2003	42	282	205	146	749	75	371	1,070	1,304	112	213	27
2004	542	285	231	157	0	48	4,329	864	1,430	108	0	22
2005	234	199	185	154	0	136	2,175	760	1,180	127	0	61
2006	718	113	188	103	0	212	6,044	440	1,132	74	0	94

Source: FAS/USDA, U.S. Trade Internet System

Products that have experienced export growth to Korea in recent years include pork, oranges, and dairy. As U.S. beef exports to Korea disappeared, U.S. exports of pork products to the country increased significantly, growing from $48 million in 2004 to $212 million in 2006. Korea ranked as the fourth largest export market for U.S. pork in 2006, behind Japan, Mexico, and Canada. Although exports of oranges to Korea had been increasing rapidly, they dropped off considerably in 2006. Korea ranked as the second most important U.S. export market for oranges behind Canada from 2002 to 2005 and the fourth largest market in 2006. The country was also the seventh largest market for U.S. exports of dairy products in 2006.

Korea's total agricultural imports equal approximately $12 billion per year. The United States had an estimated market share in Korea of about 26% in 2006 (Table 9). The U.S. market share for bulk product exports to Korea has varied from 28% to 46% in recent years. In 2005/06 U.S. market share for corn exports to Korea was 63%, which was up from 26% in 2004/05 (FAS 2007a). China has been a major exporter of corn to Korea, competing with U.S. corn. The U.S. market share for wheat exports was 31% in 2005/06. Korea imports wheat both for milling purposes and for feed. The country imported 3.76 million metric tons of wheat in 2005/06, with 2.22 million metric tons consisting of milling wheat (FAS 2007a). The United States has a market share of about 50-55% of Korea's milling wheat market. U.S. wheat competes with Australian wheat for Korea's noodle wheat market and with Canadian wheat for the bakery wheat market (FAS 2005b). The United States had been the dominant supplier of soybeans to Korea, but U.S. market share has declined from 98 percent in 1993/94 to just 43% in 2005/06, with the competition coming from Brazil (FAS 2007b).

Table 9. Korea Agricultural Imports (million U.S. dollars)

	2003			2004			2005			2006 (f)		
	World	U.S.	U.S. Market Share	World	U.S.	U.S. Market Share	World	U.S.	U.S. Market Share	World	U.S.	U.S. Market Share
Consumer	3779	1564	41%	3494	785	22%	4121	819	20%	4644	993	21%
Intermediate	3063	823	27%	3689	729	20%	3986	765	19%	4306	809	19%
Bulk	3011	839	28%	3614	1678	46%	3156	1031	33%	3036	1373	45%
Total	9853	3226	33%	10797	3192	30%	11263	2615	23%	11986	3175	26%

Note: (f) is a forecast based on January-July data.

Sources: FAS/USDA 2005a, 2006a.

The U.S. market share for Korean consumer-oriented imports dropped from 41% in 2003 to 21% in 2005, largely because of Korea's ban of U.S. beef. Korea is a growing market for exports of consumer-oriented products. Red meat is the most significant consumer-oriented product imported by Korea. Other consumer-oriented imports include fresh or processed fruits and vegetables, fruit and vegetable juices, snack foods, poultry meats, processed dairy products, and other various products. The United States is the major supplier of consumer-oriented product exports to Korea, and China and Australia are the top competitors. In 2003, the U.S. market share for red meat exports to Korea was 66 percent. The United States also had a market share of 45 percent for fresh fruit, 25 percent for processed fruit and vegetables, 37 percent for poultry meat, 25 percent for snack foods, and 16 percent for dairy products (FAS 2005a).

Potential Effects from Trade Liberalization

The trade agreement with Korea would likely have a more significant impact on U.S. agricultural exports than it would on U.S. agricultural imports because Korean agricultural tariffs and trade barriers are larger than those in the United States, and resource endowments favor exports of agricultural products from the United States to Korea. According to the Office of the U.S. Trade Representative (USTR) (2007a), Korea imposes tariffs of 30% or higher for beef, most fruits and nuts, many fresh vegetables, starches, peanuts, peanut butter, various vegetable oils, juices, jams, and some dairy products.

Korea has also established tariff-rate quotas for a number of products. In-quota tariffs for these products are low, but above-quota tariff rates are prohibitive for some products. For example, above-quota tariff rates are 176% for skim and whole milk powder, 243% for honey, 304% for potatoes, 324% for barley, and 513% for malting barley (USTR 2007a). Korea also restricts imports of value-added soybean and corn products by aggregating raw and value-added products under the same quota (USTR 2007a).

Korean rice imports are restricted by the Minimum Market Access (MMA) quota commitment under international agreement. The United States is allocated a quota of 50 thousand metric tons per year. The largest share of the quota goes to China. Under the MMA quota, Korea's rice imports have grown from zero to 4 percent of domestic consumption over the last decade. Korea could become a significant market for U.S. rice exports if the quota level was increased, but this agreement does not increase access to the Korean rice market.

Table 10 shows current Korean tariffs on a number of agricultural products and the time by which they will be duty-free under the FTA. Wheat, corn, soybeans, and cotton, among other commodities, will be duty-free immediately. These are major exports to Korea, but the elimination of the tariffs may have only a minor impact on trade since the current duties in place are already low for most of these commodities. Table 10 indicates a high tariff on corn, but Korea administers a tariff rate quota (TRQ) for corn, and this is the over-quota tariff. The in-quota tariff is zero or close to zero, and Korea has been keeping the quota level high enough to meet the import demand. The tariff restrictions, similarly, are already low for wheat and cotton.

The agreement could have a more significant impact on U.S. soybean exports. The immediate elimination of duties on soybeans and the phase out of soybean oil tariffs will give U.S. exporters an advantage over South American soybean exporters. The agreement does not eliminate duties on food-grade soybeans, but it creates a 10,000 metric ton duty-free TRQ immediately, which will increase to 25,000 metric tons in year 3 and then increase 3% each year after. The above-quota duty for food-grade soybeans, though, will remain at the prohibitive 487%.

The market for bulk and intermediate products in Korea is fairly flat, but imports of these products are needed to support the domestic processing industry. With the exception of rice and a few dairy products, domestic production in Korea cannot meet the demand of the domestic processing industry. The FTA could improve U.S. market share for bulk commodities. The significant growth projected for the Korean textile industry under the FTA could also have a positive impact on U.S. cotton exports to the country.

The largest potential for growth in U.S. exports to Korea is likely for consumer-oriented products, including processed foods, meat products, dairy products, fruits, and nuts. A growing economy has led to increased demand for these products. Korean per capita consumption of rice continues to decline while consumption of wheat-based products, meats, and fruits increase. Exports of meat products could benefit the most from a free trade agreement, especially since Korea imposes high tariffs for meat products. However, Korean beef duties will be phased out over a 15-year period, so the benefits to U.S. exporters will not be seen immediately. Similarly, the duties on pork and poultry meats will be phased out over periods of 7 to 12 years.

Table 10. Korea Agricultural Tariffs

Product	Current rate (%)	Years until duty-free
Beef	40	15
Pork	22.5-25	7
Poultry meat	18-20	7-12
Wheat	1.8	Immediately
Durum	3	Immediately
Malting barley	513*	15
Other barley	317*	15
Corn for feed	328*	Immediately
Wheat flour	4.2	5
Soybeans	487*	Immediately
Soybeans for human consumption	487*	Quota established**
Canola	10	Immediately
Sunflower seeds	25	2
Soybean oil	5.7	5-10
Sunflower seed oil	10	5
Canola oil	10-30	5-10
Soybean meal	1.8	Immediately
Peas, beans	20	5
Cow hides	2	Immediately
Cotton	1	Immediately
Oranges	50	Quota increases**

*Over quota duties.

**Over-quota duties will remain in place.

There are also some non-tariff barriers for U.S. exports to Korea. The FAS (2005a) notes that frequent changes in food regulations, food safety concerns, biotech issues, and onerous inspection and customs clearing procedures are challenges for U.S. exporters of consumer-oriented food products. Food safety concerns led to temporary bans in 2004 on imports of oranges from California and of raw poultry meat from the United States, as well as the ban on U.S. beef following the U.S. BSE discovery. The agreement does not address Korea's restrictions on imports of U.S. beef products related to BSE. Removing the restrictions on imports of U.S. beef would have a significant impact on the U.S. beef and cattle industry.

Summary and Conclusions

In this study, we have examined the characteristics of U.S.-Korea bilateral trade since 1989. We used a general equilibrium model (a multi-region GTAP model) to examine the effects of the KORUS FTA on various sectors of the economy under two different scenarios in the two countries.

The U.S.-Korea bilateral trade volume has been growing substantially since 1989. This is especially true for bilateral trade of differentiated high-technology products between the two countries. While U.S. exports of high-technology products to South Korea have increased, its imports of high-technology products from South Korea have increased more rapidly, resulting in a growing U.S. bilateral trade deficit. The relative importance of other sectors (e.g., mid-

technology and textiles) in U.S.-Korea bilateral trade tends to decline over time, since an increase in South Korean wages has made its labor-intensive goods less competitive.

Under the KORUS FTA, the bilateral trade between the United States and South Korea could increase through both inter-industry and intra-industry trade. Major increases in inter-industry trade would include an increase in U.S. exports of agricultural and food products to South Korea and an increase in Korean exports of textile products to the United States. The two countries could also increase their intra-industry trade of high-technology manufacturing products. U.S.-Korea overall bilateral trade (all sectors combined) would increase dramatically and U.S. trade balance with South Korea could improve for all sectors except the textiles sector.

The KORUS FTA would improve the national welfare for both countries. The effects of the FTA on GDP and household income in both countries would be positive. South Korea benefits more from the FTA in terms of per capita welfare gain and per capita GDP increase. U.S. producers in the agri-food and high-tech sectors would benefit from the FTA, and South Koreas producers in the textiles and high-tech sector would benefit. By contrast, producers in the U.S. textiles sector and the agri-food sector in South Korea might suffer from the FTA. Thus, it may be important to compensate those groups in order to smoothly implement the KORUS FTA.

The limitations of the GTAP model may include the following two aspects. First, the data are based on the year 2001. There are some major changes over the past five years across the sectors in the economies throughout the world, particularly in the high-technology sector. Second, assumptions in the GTAP model including constant return to scale, fixed resource endowment, perfect competition, and perfect mobility of labor across the sectors may be too restrictive and could lead to biased results. However, the study provides useful information regarding the effects of the KORUS FTA on the various sectors of the two economies.

This agreement could benefit U.S. agriculture, though the short-term impacts may be smaller than that estimated by the GTAP model. The benefits could be greater in the long run as duties on beef and other meat products are eliminated. U.S. agricultural imports from Korea would not likely increase as significantly under trade liberalization because U.S. agricultural tariffs are lower, and Korea does not have the production capacity to be a significant exporter of agricultural products to the United States.

References

Armington, P.S. (1969), "A Theory of Demand for Products Distinguished by Place of Production," IMF Staff Papers 16:159-78.

Cheong, Inkyo (2004), "East Asian Economic Integration: Implications for a U.S.-Korea FTA," American Enterprise Institute for Public Policy Research, http://www.aei.org/docLib/20041026_Cheong.pdf (accessed on March 6, 2006)

Choi, I. and J. J. Schott (2001), "Free Trade between Korea and the United States?" Institute for International Economics, Washington, D.C.

Cooper, W. H. and M. E. Manyin (2006), "The Proposed South Korea-U.S. Free Trade Agreement (KORUSFTA)," CRS Report for Congress, Order Code RL33435.

DeRosa, D. A. and J. P. Gilbert (2005), "Predicting Trade Expansion under FTAs and Multilateral Agreements," Working Paper series number WP 05-13, Institute for International Economics, Washington, D.C.

Head, K., and J. Ries (2001), "Increasing Returns versus National Product Differentiation as an Explanation for the Pattern of US-Canada Trade," *American Economic Review*, 91, 858-876.

Hertel, T. (1997), *Global Trade Analysis: Modeling and Applications*, New York: Cambridge University Press.

FAOSTAT. Food and Agricultural Organization of the United Nations. http://faostat.fao.org/ Accessed August 2007.

Foreign Agricultural Service, U.S. Department of Agriculture (2005a), Exporter Guide Annual 2005. GAIN Report No. KS5049. Global Agriculture Information Network. September 28.

Foreign Agricultural Service, U.S. Department of Agriculture (2006a), Exporter Guide Annual 2006. GAIN Report No. KS6103. Global Agriculture Information Network. October 2.

Foreign Agricultural Service, U.S. Department of Agriculture (2005b), Grain and Feed Annual 2005. GAIN Report No. KS5015. Global Agriculture Information Network. April 1.

Foreign Agricultural Service, U.S. Department of Agriculture (2007a), Grain and Feed Annual 2007. GAIN Report No. KS7029. Global Agriculture Information Network. May 1.

Foreign Agricultural Service, U.S. Department of Agriculture (2007b), Oilseeds and Products Annual 2007. GAIN Report No. KS7013. Global Agriculture Information Network. February 26.

Foreign Agricultural Service, U.S. Department of Agriculture (2006b), "Statement by Agricultural Secretary Mike Johanns Regarding the Initiation of Free Trade Agreement Talks with South Korea," http://www.fas.usda.gov/scriptsw/PressRelease/pressrel_dout.asp?Entry=valid&PrNum=0015-06 (accessed on February 18, 2006)

Foreign Agricultural Service, U.S. Department of Agriculture. U.S. Trade Internet System. Available at: http://www.fas.usda.gov/ustrade/ Accessed August 2007.

Kiyota, K. and R. M. Stern (2005), "An Assessment of the Economic Effects of the Menu of U.S. Trade Policies," *Global Economy Journal* Vol.5: N0.4, Article 22.

Lee, J. and H. Lee (2005), "Feasibility and Economic Effects of Korea-U.S. FTA," Korea Institute for International Economic Policy (KIEP), Policy Analyses 05-02. http://www.kiep.go.kr/eng/e_sub03/sub01_2.asp?sort=01&seq=20060124142516 (accessed on March 9, 2006)

Krugman, P.R. (1980), "Scale Economies, Product Differentiation, and the Pattern of Trade," *American Economic Review* 70, 950-959.

Krugman, P. R. (1981), "Intraindustry Specialization and the Gains from Trade," *Journal of Political Economy* 89, 959-973.

Office of the United States Trade Representative (2007a), National Trade Estimate Report on Foreign Trade Barriers.

Office of the United States Trade Representative (2006), "United States, South Korea Announce Intention to Negotiate Free Trade Agreement." http://www.ustr.gov/Document_Library/Press_Releases/2006/February/United_States,_South_Korea_Announce_Intention_to_Negotiate_Free_Trade_Agreement.html (accessed on February 18, 2006)

Office of the United States Trade Representative (2007b), "Proposed United States - Korea FTA Texts."http://www.ustr.gov/Trade_Agreements/Bilateral/Republic_of_Korea_FTA/Draft_Text/Section_Index.html (accessed on May 31, 2007)

Manyin, M. E. (2006), "South Korea – U.S. Economic Relations: Cooperation, Friction, and Prospects for a Free Trade Agreement (FTA)," CRS Report for Congress, Order Code RL30566.

Noland, M. (2004), "The Strategic Importance of U.S.-Korea Economic Relations," The Institute for International Economics, Washington, D.C. http://www.keia.org/2-Publications/2-3-Monograph/Monograph2004/Noland.pdf (accessed on March 9, 2006)

The CalTrade Report (2006), “U.S., Korea to Start FTA Negotiations”, http://www.caltradereport.com/ (accessed on March 11, 2006)

U.S. Department of Commerce, Trade Statistics Express/National Trade Data, www://tse.export.gov

U.S. International Trade Commission (2001), “U.S.-Korea FTA: The Economic Impact of Establishing a Free Trade Agreement (FTA) Between the United States and the Republic of Korea,” Investigation No. 332-425, USITC Publication 3452.