

The views and evaluations of the KORUS FTA and its cost-benefit analysis

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Summary

In general, parties who oppose to KORUS FTA have cited historical precedence of previous trade agreements like NAFTA that undermined worker rights. In particular, as KORUS FTA was negotiated under President Bush, many labor groups and opponents have called on President Obama to either modify or completely renegotiate the agreement. In December 2010, Obama administration announced that they have negotiated a compromise that allowed for a 5-year reduction of tariffs for the U.S. market while Korea would allow greater access into their own. This compromise has placated some critics of the agreement, but still falls short of their demands.

With regards to the economic impact, many studies estimate that the U.S. agriculture industry would gain substantially from the agreement as South Korea's tariffs are exceptionally high in these commodities. Per capita, the South Koreans would benefit to a greater extent than the U.S., however, on the absolute scale all estimate the U.S. benefits more from the agreement.

Views and Opinions of various parties

Congressional Research Services

Cooper, Manyin, Jurenas, and Platzner (2011) discuss the renegotiation of the KORUS FTA that occurred under the Obama administration. One element that was renegotiated was an extension the South Korea tariff phase out period by 2 years in exchange for automobile concessions for the United States. Although the agreement comes short of complete access for the U.S. beef industry to the Korean market, it is still supported by the U.S. beef industry as it does make significant progress in achieving this goal by gradually eliminating the beef tariff rate from 40% over 15 years. With regards to SPS issues, the U.S. and South Korea agree to establish a bilateral committee to deal with any issues should they arise. Moreover, they have agreed not to have recourse to dispute settlement for SPS matters under this agreement and that they would utilize the formal process established under the WTO's SPS agreement.

The United States Trade Representative

The Office of the United States Trade Representative reports that the KORUS FTA will lead to an expanded export market for U.S. agriculture. Particularly, U.S. beef will gain better access to the Korean market due to a substantial decrease in the beef tariffs. More than two-thirds (in value) of tariffs will be eliminated once enacted, however, several commodities will have a gradual phase in period.

The Chamber of Commerce/US-Korea Business Council

The US-Korea Business Council in conjunction of the Chamber of Commerce believe that the KORUS FTA is necessary to continue U.S. competitiveness in Korea. As South Korea is seeking FTAs with the EU and other countries, the US must adopt the agreement to avoid losing to these countries.

AFL-CIO

The AFL-CIO believes the Obama administration comes short in its commitment to labor rights and that the KORUS FTA is detrimental to both American and Korean labor. In particular, they argue that the labor provisions do not meet international standards and does not adequately protect against currency manipulations. Moreover, they believe there is a possibility that goods produced in the Kaesong Industrial Complex in North Korea may be exported by South Korea. They believe that the failure of previous trade agreements like NAFTA and the CAFTA in delivering their promises of more jobs are more likely to be repeated with the KORUS FTA.

Public Citizen

Public Citizen believes that KORUS FTA will promote offshoring, environmental damage and health degradation. They believe that the financial deregulation provisions that were agreed to before the financial crisis in 2008 are likely to contribute to further economic distress. Thus, they do not support the KORUS FTA as it stands (Wallach, 2010).

National Farmers' Union

The NFU opposes the KORUS FTA because they believe it will not lead to an increase in jobs and would lead to an increase in the US trade deficit. They would like improvements to prevent currency manipulation and labor, environmental, food and health protections (2011).

Peterson Institute of International Economics

Schott (2007) has a neutral assessment of the KORUS FTA. He notes that the agreement is somewhat unbalanced in favor of the United States. However, this is due to the fact that the initial barriers to the Korean market are significantly higher than that of the United States.

Economic Policy Institute

Scott (2010) believes that previous estimates on the cost-benefits of FTAs have been grossly misleading. Like other critics they believe that the current KORUS FTA gives too many benefits to the Korean automobile industry, allows for currency manipulations and does not protect labor rights.

Korean Confederation of Trade Union

KCTU feels that a KORUS FTA undermines Korean sovereignty, especially for dictating its economic policy. They iterate support for American organizations (e.g. labor unions) that believe that the KORUS FTA does not support laborers' rights in both countries and gives too many concessions to corporations. Moreover, KCTU believes that the U.S. exploited the military situation with North Korea to exert pressure on South Korea during the negotiations.

Others

A letter of 550 unions and trade groups was sent to the Obama White House in opposition of the KORUS FTA. They believe that provisions for financial deregulation and unfair foreign investor protection hurt the U.S. economy. Similar to the arguments during NAFTA, they believe that the agreement will increase environmental degradation and undermine workers' rights.

Cost-Benefits Estimates

Schott, Bradford and Moll (2006)

Schott et al (2006) test the KORUS FTA under two scenarios in the medium- and long-run: 1) full liberalization 2) partial liberalization with exceptions for rice. Table 1 reports their results. Under scenario 2, they estimate that the South Korea could gain upwards to \$27.58 billion in the medium run and \$51.80 in the long run. They contend that the US gains more under partial liberalization with rice excluded due to the subsidies they commit to rice. If US producers had full access to the Korean economy, the aggregate US would be smaller due to resources shifting to this sector as well as subsidies. Table 1 reports their results. Table 2 provides results on the output shifts for different commodity groups. It should be noted that with full liberalization, the Korean rice sector contracts substantially in comparison with partial liberalization.

Table 1: Welfare effects of KORUS FTA					
		Medium Run: Fixed Capital Stock		Long Run Capital Growth	
Country		Rice Excluded	Pure FTA	Rice Excluded	Pure FTA
Korea	Billions of dollars	20.22	27.582	40.887	51.799
	% of GDP	2.58	3.51	5.21	6.6
United States	Billions of dollars	6.325	0.766	13.693	8.835
	% of GDP	0.05	0.01	0.1	0.07
Japan	Billions of dollars	0.478	1.676	0.702	1.962
	% of GDP	0.01	0.03	0.01	0.04
ROW	Billions of dollars	-5.512	-4.153	-9.39	-7.483
	% of GDP	-0.02	-0.02	-0.04	-0.03

Source: Schott, Bradford, and Moll (2006)

Table 2: Change in Output (percent)										
			Medium term				Long term			
			Rice excluded		Pure FTA		Rice excluded		Pure FTA	
Category	Share of output		SK	US	SK	US	SK	US	SK	US
Paddy rice	0.0078	0.0001	-0.7	-3.1	-98.5	641.8	1.9	-3.0	38.7	673.3
wheat	0.0013	0.0004	21.7	-6.1	57.1	-12.0	24.4	-5.9	62.9	-14.1
Vegetables and fruits	0.0091	0.0015	10.3	-0.9	34.5	-2.8	13.5	-0.9	39.5	-2.8
other primary products	0.0149	0.0168	-75.4	6.5	-52.1	5.5	-76.0	6.9	-52.7	5.9
beef	0.0020	0.0048	110.4	-0.6	110.1	-0.8	120.9	-0.6	121.9	-0.8
other meat	0.0044	0.0039	95.3	-0.7	95.6	-1.0	105.2	-0.7	106.5	-1.0
dairy	0.0032	0.0047	23.9	-0.1	22.7	-0.2	32.5	0.0	32.3	-0.1
processed rice	0.0067	0.0001	8.2	0.0	363.1	-21.1	12.0	0.1	286.0	-20.9
other food products	0.0283	0.0280	19.3	0.3	24.6	0.1	26.0	0.4	32.5	0.3
textiles	0.0236	0.0081	12.4	-1.4	13.8	-1.4	16.7	-1.3	18.9	-1.4
wearing apparel	0.0082	0.0061	27.6	-0.8	28.9	-1.0	30.1	-0.7	31.8	-0.8
leather products	0.0042	0.0009	62.1	-1.3	64.6	-1.5	61.5	-1.2	64.2	-1.4
chemical, rubber and plastic products	0.0669	0.0399	-0.4	-0.4	0.5	-0.4	4.5	-0.4	6.1	-0.4
iron, steel and nonferrous metals	0.0426	0.0141	8.9	-0.9	9.9	-1.0	15.3	-0.9	17.4	-1.1
motor vehicles	0.0444	0.0260	-3.2	-0.3	-2.6	-0.4	-0.8	-0.4	0.0	-0.4
other transport	0.0128	0.0108	-15.5	-0.5	-14.1	-0.7	-13.4	-0.6	-11.5	-0.7
electronic equipment	0.0715	0.0196	-15.7	-0.5	-15.2	-0.7	-10.4	-0.7	-0.5	-0.9
other machinery and equipment	0.0773	0.0439	-13.6	-0.5	-12.8	-0.5	-8.7	-0.5	-7.2	-0.6
other manufactured goods	0.0800	0.0694	34.3	-0.7	35.6	-0.7	39.3	-0.7	41.4	-0.7
trade and transport services	0.1142	0.1741	0.6	0.0	1.9	0.0	5.9	0.0	8.0	0.0
business services	0.1282	0.2133	-2.4	0.0	-2.4	0.0	2.4	0.0	3.1	0.0
other services	0.2485	0.3134	0.7	0.0	0.7	0.0	4.3	0.1	4.8	0.1

Source: Schott, Bradford, and Moll (2006)
SK=South Korea; US=United States

United States International Trade Commission (2007)

Christ et al (2007) estimates that a fully implemented KORUS FTA would lead to a net gain of \$10.1-11.9 billion for the United States, however, the aggregate change to U.S. output and employment would be negligible. The U.S. would expect to experience declines in textiles, wheat, and wearing apparel, but they estimate that this would offset by gains in other agricultural commodities. A complete summary of export shifts may be found in the Appendix I.

Fabiosa, Hayes, and Dong (2007)

Fabiosa et al (2007) exclusively examine the U.S. livestock's gain from the KORUS FTA. They estimate up to \$2 billion gains for the U.S. meat industry. For beef, they predict that there may be some trade diversion effects, but for pork and poultry they estimate a combination of trade creation and diversion.

Zhuang, Mattson, and Koo (2007)

Per capita, Zhuang et al estimate that South Korea would benefit more from the FTA, while the United States would benefit more on the absolute scale. Their first scenario is complete elimination of tariffs in most sectors in Korea and the U.S. and a 2/3 reduction in the agricultural sector (except for rice). For their second scenario they assume a tariff reduction of 95% for agriculture while the other sectors stay the same. They determine that the U.S. agricultural exports to Korea would increase by \$6.44 billion in scenario 1 and up to \$11.35 billion in scenario 2.

Table 3: Welfare effects of a KORUS-FTA						
Country	GDP (Billion \$US)	GDP (%)	Household Income (%)	Welfare (Billion \$US)	Per Capita Welfare (\$US)	TOT (%)
Scenario 1- Korean Agricultural and Food Tariffs Cut by 66.7%						
USA	18.2	0.18	0.24	22.33	80.5	0.3
South Korea	3.75	0.88	1.1	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	-0.1	-0.01	-0.04	-0.47	-0.2	-0.05
EU	0	0	-0.02	-1.67	-4.4	-0.05
ROW	-0.27	0	-0.02	-1.15	-0.5	-0.03
Scenario 2- Korean and Agricultural 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	-1.4	-11	-0.2
Other Asian Countries	-0.06	-0.01	-0.04	-0.48	-0.2	-0.06
EU	0	0	-0.03	-1.79	-4.8	-0.05
ROW	-0.2	0	-0.02	-1.32	-0.6	-0.04

Source: Zhuang et al (2007)

Cho and Yoo (2007)

Cho and Yoo (2007) estimate that a KORUS FTA may lead to an increase of Korean exports by \$108.1 million in transport industries and \$1.14 million in telecommunication. For the U.S., exports are expected to increase by \$25.16 million in precision industries, \$4.42 million in telecommunication, and \$0.27 million in computer industries. They also estimate what the social welfare effects would be if the rice market was liberalized. Converted using the 2007 exchange rate (1 dollar to 929.2 won)¹, they estimate that the social welfare from rice liberalization would increase by \$2.31 billion with consumers gaining \$9.33 billion but producers losing \$7.20 billion.

¹ <https://www.cia.gov/library/publications/the-world-factbook/fields/2076.html>

Kiyota and Stern (2007)

Kiyota and Stern (2007) test several different bilateral policy components: 1) elimination of agricultural tariffs and subsidies; 2) elimination of manufacturing tariffs; and 3) service liberalization. In (1) they estimate that the U.S. may lose up to \$1.4 billion but South Korea may gain \$50 million in net welfare. With (2) the U.S. gains up to \$7.27 billion while Korea gains \$4.48 billion. With (3) they estimate that the U.S. welfare would increase by \$19.2 billion while Korea would increase by \$5.46 billion. Under a combined scenario of (1), (2), and (3) they estimate that the net benefits from liberalization to be \$25.12 billion and \$9.28 billion for the U.S. and Korea respectively. At the sectoral level, Korea would gain mostly in its apparel sector with an estimated output expansion of 15.5% while it would suffer the most in agricultural commodities like grains and oil seeds. Table 2 details these results.

They also take into account increases in capital due to higher FDI flows to Korea. They estimate that a 1% increase in Korea's capital stock results in a welfare increase of \$19.3 billion and a 5% increase in capital stock results in a welfare increase of \$59.4 billion.

Table 4: Global Welfare Effects of a KORUS FTA

	1	2	3	4	5	6	7	8	9	10	11	12	13
	Agricultural Protection										Real Returns		
	Tariff		Export Subsidy		Manufact. Tariffs		Service Barriers		Total		Capital	Labor	T.O.T.
Countries and areas of the world	% of GDP	Billions of Dollars	% of GDP	Billions of dollars	% of GDP	Billions of Dollars	% of GDP	Billions of dollars	% of GDP	Billions of Dollars	%	%	%
Japan	0.01	0.83	0.00	-0.01	0.00	-0.09	0.00	0.24	0.01	0.97	0.01	0.00	0.01
United States	-0.01	-1.40	0.00	0.05	0.04	7.27	0.11	19.20	0.14	25.12	0.03	0.02	0.05
EU and EFTA	0.01	0.74	0.00	-0.01	0.00	0.08	0.00	0.39	0.01	1.21	0.00	0.00	0.01
Canada	0.01	0.10	0.00	0.00	0.01	0.08	0.01	0.09	0.02	0.28	0.01	0.00	0.00
Australia	0.01	0.05	0.00	0.00	0.01	0.03	0.01	0.04	0.02	0.12	0.01	0.01	0.01
New Zealand	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.00	0.02	0.01	0.01	0.01	0.00
Hong Kong	0.02	0.05	0.00	0.00	0.02	0.05	0.00	0.00	0.04	0.10	0.02	0.02	0.02
Korea	-0.07	-0.50	-0.02	-0.16	0.61	4.48	0.74	5.46	1.26	9.28	1.36	1.53	-0.28
Singapore	0.01	0.01	0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.03	0.01	0.01	0.00
Taiwan	0.01	0.05	0.00	0.00	-0.02	-0.11	0.01	0.04	-0.01	-0.03	0.00	-0.01	0.00
China	0.08	1.69	0.00	0.00	0.02	0.44	0.00	0.07	0.11	2.20	0.11	0.08	-0.03
India	0.00	0.02	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.04	0.00	0.00	-0.01
Indonesia	0.02	0.05	0.00	0.00	0.01	0.01	0.01	0.02	0.03	0.08	0.02	0.01	0.01
Malaysia	0.02	0.03	0.00	0.00	-0.04	-0.06	0.02	0.02	-0.01	-0.01	0.01	-0.01	0.01
Philippines	0.02	0.03	0.00	0.00	-0.01	-0.01	0.01	0.02	0.02	0.03	0.01	0.01	0.00
Thailand	0.03	0.06	0.00	0.00	-0.02	-0.05	0.01	0.01	0.01	0.02	0.01	-0.01	0.00
Vietnam	0.04	0.02	0.00	0.00	0.05	0.03	0.01	0.00	0.10	0.06	0.07	0.07	-0.06
Russia	0.01	0.04	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.04	0.00	0.00	0.00
Turkey	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	-0.01
Mexico	0.01	0.09	0.00	0.00	0.00	0.01	0.01	0.07	0.02	0.17	0.00	0.00	0.00
Argentina	-0.01	-0.05	0.00	0.00	0.00	-0.01	0.00	0.01	-0.01	-0.05	0.00	0.01	-0.03
Brazil	0.05	0.48	0.00	0.00	0.00	0.02	0.00	0.02	0.06	0.51	0.07	0.03	-0.03
Chile	0.02	0.02	0.00	0.00	0.01	0.01	0.01	0.01	0.03	0.04	0.02	0.02	0.01
Colombia	0.01	0.01	0.00	0.00	0.01	0.01	0.00	0.00	0.02	0.02	0.00	0.01	0.00
Peru	0.01	0.01	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.03	0.00	0.00	0.01
Uruguay	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.00	0.01	0.01	0.00
Rest of Asia	0.02	0.07	0.00	0.00	0.00	-0.02	0.00	0.01	0.01	0.06	0.01	0.01	-0.02
Rest of Middle East	0.01	0.11	0.00	0.00	0.01	0.11	0.02	0.18	0.03	0.39	0.02	0.01	0.01
Rest of Central and Latin America	0.01	0.04	0.00	0.00	0.01	0.05	0.00	0.03	0.02	0.12	0.01	0.01	0.00
Africa	0.01	0.09	0.00	0.00	0.01	0.09	0.00	0.03	0.02	0.21	0.02	0.01	0.01
Total		2.73		-0.15		12.43		26.05		41.04			

Source: Kiyota and Stern (2007)

Lee and Song (2008)

Lee and Song focused their study on the impact of the KORUS FTA on South Korea. They simulated its effects using three different models (See Methodology section). They estimated that total trade in manufacturing would increase by \$2.55 billion dollars while they would gain a positive net balance with the United States of \$796 million.

Table 5: Welfare effects of a KORUS FTA for Korea			
	Static	Capital Accumulation	TFP Productivity Gains
GDP (%)	0.32	1.28	5.97
Welfare (\$US Millions)	170	398	2086
Sectoral Changes (in %)			
Rice	1.01	1.20	1.90
Crop	-32.33	-32.32	-34.11
Vegetables and Fruits	1.21	0.58	1.09
Meat Products	1.60	-5.03	-4.09
Food products	16.43	18.55	19.96
Extraction	6.50	5.91	5.56
Textiles and clothes	16.59	21.84	25.29
Chemicals	0.38	2.14	5.92
Metal and metal products	-3.56	-1.61	2.12
Transports	-1.28	-0.01	4.63
Electrical	-3.32	-1.29	5.32
Machinery	-4.50	-2.42	2.03
Other manufacturing goods	-0.64	1.32	3.79
Service 1	0.09	1.01	4.63
Service 2	0.00	0.95	4.57
Service 1 = nonpublic services such as construction, business, communication, and financial services Service 2 = public services such as health, defense, and education			
Source: Lee and Song (2008)			

The Chamber of Commerce/US-Korea Business Council

Baughman and Francois (2009) estimate that failure to implement the KORUS FTA will result in a loss in goods and service exports of \$35.1 billion, a loss in GDP of \$40.4 billion, a net welfare loss of \$25.2 billion, and a loss of 345,017 jobs for the United States.

Economic Policy Institute

The economic policy institute focuses their criticism on the potential of increased trade deficits that they argue will result in increased job loss. Citing historical precedence, they believe that further trade liberalization will induce job loss rather than job growth. However, they do not use any econometric techniques to discern causality of job losses to FTAs and thus, they attribute all macroeconomic shocks to the trade regimes.

Wainio, Gehlar, and Dyck (2011)

A study conducted by the United States Department of Agriculture estimated the implications of potential FTAs. Of the three pending US FTAs, they note that the KORUS FTA would yield the most benefits to the United States because of the size of the Korean economy and its relatively high tariffs on agriculture goods. They estimate that beef trade alone would increase by \$550 million or 29% of US agriculture trade growth. Table 4 details their results.

Table 6: Estimated effect of KORUS FTA				
	Tariff Average	Base (\$US Millions)	Change (\$US Millions)	Percent Change
Rice	450	48	-1	-2.8
Wheat	2.2	299	30	10
Other Grains	0	1,237	-12	-1
Fruits and vegetables	51.5	281	133	47.3
Oilseeds	5	357	50	13.9
Cotton	1	116	14	12.3
Beef	37.3	701	563	80.3
Poultry and pork	24.9	291	276	94.9
Other livestock products	4.2	316	49	15.4
Oilseed products	6.8	90	34	37.3
Dairy products	44	64	93	145.9
Processed food and fish	18.4	926	404	43.7
Other agricultural products	46.6	237	301	127
Total Agriculture		4,962	1,933	38.9

Source: Wainio et al (2011)

Cost Benefits Methodology

Schott, Bradford and Moll (2007) use an applied general equilibrium model with the GTAP 6 database. They assume perfect competition, constant returns to scale and factor mobility across sectors domestically. They assume that capital stock is fixed, but allows it to increase after liberalizing. Their model uses 22 sectors, five factors of production (unskilled labor, skilled labor, capital, land, and natural resources) and four regions- Korea, Japan, the United States and the rest of the world.

Christ et al (2007) use a comparative static CGE model using the GTAP 7 database to estimate the marginal effects of the agreement from the baseline. They simulated full liberalization of all goods except for a few agricultural commodities that were subject to partial-liberalization. Due to Bovine spongiform encephalopathy (BSE), the trade data reflected a reduce levels of beef trade. As a result, they assumed that by their 2008 baseline, beef trade would return to its pre-BSE levels. They also assume that all provisions are phased in immediately and that there is no transition period.

Cho and Yoo (2007) use a Panel Model and Simultaneous Equations Model. They use quarterly data from the Korea International Trade Association, the Bank of Korea, International Finance Statistics from the IMF, the Integrated Database obtained by the WTO, the National Agricultural Cooperation Federation, the Bank of Korea, Korea National Statistical Office(KNSO), and Korea Agro-Fisheries Trade Corporation. Their period of review is 1988 to 2006. They classified the raw data into specific groups according to HS codes. They test the following equations simultaneously using fixed effects:

$$\ln(RP_t) = \alpha_1 + \beta_1 \ln(YD_t/POP_t) + \gamma_1 \ln CGP_t + \delta_1 \ln WR_t + \zeta_1 \ln RP_{t-1} + \eta_1 \ln PGP_{t-1} + \theta_1 \ln PVP_{t-3} + e_{1t}$$

$$\ln(Qds_t) = \alpha_2 + \beta_2 \ln(YD_t/POP_t) + \gamma_2 \ln CGP_t + \delta_2 \ln WR_t + \zeta_2 \ln RP_{t-1} + \eta_2 \ln PGP_{t-1} + \theta_2 \ln PVP_{t-3} + e_{2t}$$

With RP being the real price of rice at 40kg. Qds is a variable representing equilibrium quantity of rice distributed in Korea. POP is Population of Korea, YD is the real disposable income. CGP is a weighted average price of grains except rice which consumers purchase. WR is the wage rate of agricultural workers. PGP is the weighted average price of grains except rice. PVP is a weighted average price of vegetables per 40kg.

Fabiosa et al (2007) utilize the Food and Agricultural Policy Research Institute's model. This is a multimarket, partial equilibrium, and non-spatial model. The model also incorporates macroeconomic variables such as inflation and population, as well as parameterized policy instruments.

Zhuang et al (2007) use a CGE model based on the GTAP database using a 2001 base year. They assume a 1% increase in productivity due technology imports. However, like most GTAP simulations they assume perfect factor mobility, constant returns to scale, perfect competition, and fixed resource endowments. They aggregate countries to be the United States, South Korea, China, Japan, EU, Other Asia and the Rest of the World. They aggregate commodities to be agriculture and food, rice, natural resource based industries, textiles, mid-technology products, high-technology products and services.

Kiyota and Stern (2007) uses the Michigan Model of World Production and Trade, covering 27 sectors across 30 countries and regions using data from GTAP version 6. They obtain employment and sectoral data from UNIDO. The Michigan model provides a comparative static estimates on the tariff reduction. Unlike the GTAP model, the Michigan model does not rely on the Armington assumption. Thus. they model imperfect competition where products are differentiated not by country of origin, but by firm. Consumption a two stage procedure where the first stage has a Cobbs-Douglas utility function and the second has a constant elasticity of substitution function. Production is also modeled in two stages where the first stage has intermediate inputs with capital and labor used in fixed proportions. In the second stage capital and labor are combined using a constant elasticity of substitution function. To determine supply prices they assume that perfectly competitive firms operate such that price is equal to marginal cost and monopolistically competitive firms maximize profits by setting price as an optimal markup over marginal cost. They assume all barriers are removed at the same time rather than phases. A detailed description of their methodology can be found in Kiyota and Stern (2007).

Baughman and Francois (2009) utilize a computable multi-sector general equilibrium model using the GTAP 7 database. On the production side, they model all sectors and firms produce at the most technologically efficient way while capital stock remains fixed with constant returns to scale. On the demand side, single representative, composite households comprise each region and the household owns its factor of production and sell it to the firm. They estimate the impact of Korean FTAs with the EU and Canada, and then the United States in order to find their results. They do not test for the effect of the KORUS FTA without the implementation of the Korean-Canada or Korea-EU FTAs.

Lee and Song (2008) use three GTAP CGE model with a constant difference in elasticity of consumer demand. In the first, they use a traditional GTAP model and simulate an immediate reduction in tariffs for those that are scheduled for a 5-year reduction and then follow the KORUS FTA's schedule for remaining tariffs. In the second they include recursive capital accumulation and simulate tariff and non-tariff barriers reductions in manufacturing and agriculture (except for rice). In this simulation, they did not model elimination of tariffs in the service sectors. In their third model, they estimate improvements in Korea's total factor productivity of 1.2 and 1% in its manufacturing and service sectors, respectively. Table 5 details their model aggregation.

Table 7: Model Aggregation		
Countries	Sectors	
Korea	Rice	Textile and cloth
New Zealand	Crop	Chemicals
Australia	Vegetable and fruit	Metal
United States	Meat	Transportation
EU	Food	Electrical products
Japan	Extraction (including fishery)	Machinery
China	Nonpublic service	Other manufacturing products
ROW	Public service	

Source: Lee and Song (2008)

Wainio, Gehlar, and Dyck (2011) utilize a static CGE model based on the GTAP database. They assume immediate full implementation of the tariff reductions based on 2004 tariff levels. They assume constant difference elasticity of demand and constant returns to scale. Moreover, their model (as with any CGE model) does not capture the effect of SPS and other non-tariff barriers to trade.

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