A tariff-line approach to capturing trade gains from an FTA: the case of the proposed KORUS FTA

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Abstract. *The proposed FTA between Korea and the United States is comprehensive and detailed. Agricultural liberalization is done on a 10-digit tariff line basis. One way to model the trade effect of the model is to use a tariff-line approach. This approach is described in the paper, and illustrated with selected results, including for chilled beef, corn for processing, and oranges.*

Background

The Republic of Korea (South Korea, referred to as 'Korea') has only 48 million people, but has been one of the 10 largest export markets for U.S. agriculture for several decades. Korea's land base for agriculture is relatively small, and land tenure is fragmented. Therefore, it has been difficult for Korea's relatively small farms to produce incomes that compare to urban incomes. Furthermore, Korea's land is well-suited to rice production, but rice consumption in Korea has been falling significantly for some time. Korea does not have good resources for producing livestock feed, but consumption of livestock products has grown quickly.

As a result, Korea imports more agricultural products than it exports. In recent years, imports have risen to $12 billion, while exports have approached $2 billion. The United States is Korea's largest supplier of agricultural products, with about a 25 percent share of Korea's agricultural imports from all sources in recent years (figure 1). This share has been declining; in the mid-1990s, it was over 40 percent. Korea's agricultural imports from the United States have varied, but have been close to $3 billion for the last decade (nominal dollars), with no trend. The record level for imports from the United States was reached in 1996, at over $4 billion.[2]

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[2] Korean import data, accessed 9/21/07 through the World Trade Atlas.

One reason for the decline in the U.S. share is the structural shifts that have occurred in Korea's economy. Korea was a major processor of cotton and hides into textile and leather goods. It imported most of the cotton and hide inputs from the United States. However, as Korea's labor costs rose relative to other Asian countries, its textile firms either shrank or shifted processing to other countries, and the spinning of cotton also shifted off-shore, decreasing Korea's cotton imports from the United States and other suppliers. Similarly, tanning of raw hides decreased as shoe and other leather-goods production shifted to other countries. In 1990, cotton fiber and raw hides accounted for 47 percent of the total value of U.S. agricultural exports to Korea. This part of the U.S. export portfolio has been declining for the last 15 years; in 2006, the share of cotton and hides was 16 percent of total agricultural exports, and the nominal value of cotton and hide exports was 36 percent of 1990 levels.[3]

In addition to the structural shift that reduced imports of inputs to the textile and leather industries, Korea turned increasingly to new trade partners. China became a major source of corn for Korea's animal industries. Australian and Canadian wheat made inroads into a major U.S. export market. Korean consumers imported increasing amounts of processed foods and beverages from Europe. In 2003, Korea signed a free trade agreement with Chile that gave Chilean suppliers lower tariffs on some imports important to the United States. U.S. suppliers have faced stiff competition in the Korean market in the last decade.

Korea's base agricultural tariffs

Korea's tariff rates for agricultural products on average appear to be low, with 64 percent of its 1525 tariff lines at or below 25 percent (figure 2). However, ad valorem tariffs on the remaining 36 percent of the tariff lines are high, with 26 percent between 25-50 percent and 7 percent ranging from 50 to over 887 percent. Almost all (93 percent) of these high tariff lines represents over-quota ad valorem tariff rates on products with tariff rate quotas (TRQ). In-quota rates are generally much lower.

[3] USDA FATUS data, accessed 9/21/07 at http://www.fas.usda.gov/ustrade .

While these high tariff lines account for a small share of the total lines of all agricultural products (7 percent), they are very important from the point of view of U.S. agricultural products and accounted for 34 percent of the total value of Korea's imports of U.S. agricultural products during 2004-06. However, some of these TRQs are designed to protect small niches within the larger commodity category, and not to raise input costs for Korean producers. To ensure that this is the case, Korea has made prolific use of 'adjustment' or 'autonomous' TRQs and tariffs. In these cases, Korea annually sets a TRQ quantity large enough to accommodate all trade, and reduces in-quota tariffs to zero or nearly zero. Thus, Korea's tariffs on corn for feed have been 0 from 1997 to the present, wheat for feed tariffs have been 0 from 2003 on, and tariffs on soybeans for crushing have been 1 percent or less from 2001 on; in each case, there has been no effective limit on the quantity imported. Therefore, if the base tariff rates on these products are dramatically reduced by the FTA, U.S. exports of these products to Korea should not experience significant increases. Table 1 presents selected products for which effective tariff rates are low.

For other commodities, Korea's tariffs were often high enough to deter trade, although in some cases, such as soybeans for food uses, imports arrived even after very large over-quota tariffs were paid. Table 2 presents tariffs and TRQs for selected commodities that show the range of duties typical of Korea's tariff schedule.

The proposed FTA

In March 2007, U.S. and Korean negotiators reached agreement on a free trade proposal. Until it is ratified by the two governments, the agreement is not final, and has no legal effects. The proposed agreement cuts across goods, services, and investments, and affects most Harmonized System (HS) tariff lines that did not already have bound (permanent) zero duties.

In agriculture, Korean negotiators sought to phase in tariff reductions and sometimes sought to retain significant tariffs even after full implementation of the FTA. In both cases, their strategy was to reduce the shock of tariff elimination and allow Korean producers to adjust to changes over time. As a result, the FTA implementation period is long; indeed, it is infinite in a few cases. Tariffs may be adjusted over one year, five years, seven years, or other intervals. The proposed agreement groups HS tariff lines into 'staging categories,' of which there are 23 for agricultural products. Most staging categories specify a time for implementation of duty-free status, and define annual reductions prior to the full implementation date. Some staging categories do not lead to duty-free status, and two staging categories involve no changes to Korea's current import regime for certain HS lines, for example rice and over-quota rates on certain dairy products.

In 16 cases, new TRQs are established specifically for agricultural products from the United States.[4] These country-specific TRQs apply to one or more HS lines of related products. All of these TRQs have specified annual increases in quantity. Most of the country-specific TRQs lead to full liberalization after a specified period of years (i.e., no quantitative limit on imports from the United States, and zero tariff duty), but 5 of them have indefinite duration, with the size of the TRQ continuing to increase each year. Table 3, drawing on details in the proposed agreement,[5] shows commodities for which country-specific TRQs would be established.

The FTA proposal provides a detailed methodology for defining and applying safeguard measures. These measures would provide temporary tariff protection if imports from the United States exceeded specified amounts in a given period. This would allow prices faced by Korean producers to rise temporarily. There are 30 designated commodities or commodity groups in the agriculture sector for which negotiators designed such measures to protect Korean producers. If a safeguard is triggered, Korea can "a) suspend the

[4] In addition, there are 3 TRQs for imports of fish from the United States.
[5] Appendix 2-B-1.
http://www.ustr.gov/assets/Trade_Agreements/Bilateral/Republic_of_Korea_FTA/Final_Text/asset_upload_file961_12759.pdf

further reduction of any rate of customs duty…; b) increase the rate of customs duty" [not to exceed the MFN rate]; or c) increase seasonal tariffs. A safeguard can only be applied once for each commodity. The safeguard cannot be in force more than three years. If it lasts more than one year, the temporary tariff level must be reduced at regular intervals. At the end of a safeguard period, the tariff reverts to the level that would have been in place in that year if the safeguard action had never been taken.[6] Thus, the maximum impact of a safeguard would be three years of higher tariffs on U.S. imports than would have been imposed under other provisions of the FTA. Since a safeguard cannot be used more than once, this is a temporary 'bump' in tariff reductions.

For some commodities affected by safeguards, initial quantities of imports face lower or zero tariffs, while additional quantities of imports face higher, safeguard tariffs. Therefore, for those commodities, not all U.S. imports face the higher safeguard tariffs. In effect, this constructs TRQs for some commodities for the period of the safeguard. For instance, in year one of the proposed agreement, apple imports from the United States under 9,000 tons[7] would enter at the reduced rate that would apply without the safeguard (41.5 percent), but imports above 9,000 tons would face a 45 percent safeguard duty. In year ten of the implementation, if a safeguard were invoked, imports from the United States under 13,911 tons would have zero duty, but imports over that quantity would face a duty of 33.75 percent. In some cases, such as apples, the safeguard mechanism can be applied even after tariffs on U.S. imports have gone to zero. For apples, the FTA tariff facing U.S. shipments becomes zero in year ten and thereafter. However, if actual imports from the United States exceed designated trigger levels (which rise each year), safeguard tariffs can be applied as late as the 23rd year after the agreement.[8] However, it is important to consider that a safeguard can be applied only once. Appendix table 1 shows products for which safeguards are proposed.

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[6] Chapter Ten, Trade Remedies; Section A: Safeguard Measures. http://www.ustr.gov/assets/Trade_Agreements/Bilateral/Republic_of_Korea_FTA/Final_Text/asset_upload_file979_12709.pdf

[7] References to tons mean metric tons.

[8] Annex 3-A, Agricultural Safeguard Measures, p. 3A-6. http://www.ustr.gov/assets/Trade_Agreements/Bilateral/Republic_of_Korea_FTA/Final_Text/asset_upload_file979_12709.pdf

The negotiations in the agricultural sector used the HS tariff schedule as a framework. The proposal includes a comprehensive table which shows the liberalization agreed upon for each tariff line. The 10-digit HS tariff code; a description of the product; the staging category (indicated by letters A-Y); and the safeguard status are indicated in the table.[9]

Capturing effects on imports from the U.S.

The KORUS FTA is a very complex agreement and thus difficult to capture using existing models. As previously discussed, the agreement includes complex phase-outs of tariffs, often in conjunction with MFN and U.S.-specific tariffs and/or safeguards. Most economic models operate at product levels that aggregate many tariff lines, and very few models possess the ability to incorporate quotas and safeguards in the analytic framework. For example, computable general equilibrium models such as GTAP [10] generally operate at broad levels where the entire set of agricultural tariff lines (1525 for Korea) is aggregated to 10-15 products. The resulting calculated tariff protection can be very different from that actually applied at the tariff line or product level. If the aggregation has been done using trade weights, tariffs may be biased downward, since there is less trade as tariffs get higher. Similarly, when simple averages are used, very large tariffs in lines where no trade exists, and no future trade is expected, can bias the results upward. Using the upwardly-biased tariff averages, along with trade data for tariff lines with lower tariffs where trade occurs, can lead to large overestimates of the benefits of trade liberalization.

Computable general equilibrium models such as GTAP also do not have the ability to take into consideration phase-outs in quotas and safeguards. Most analysts tend to

[9]Korea Tariff Schedule, Annex 2-B. http://www.ustr.gov/assets/Trade_Agreements/Bilateral/Republic_of_Korea_FTA/Final_Text/asset_upload_file786_12756.pdf

[10] Global Trade Analysis Project. The standard GTAP model is a multiregion, multisector, computable general equilibrium model, with perfect competition and constant returns to scale. Bilateral trade is handled via the Armington assumption. https://www.gtap.agecon.purdue.edu/

approximate the market access reform generated by quota expansion and safeguard phase-outs by treating this as a reduction in tariff. Unfortunately, this again can lead to biased analysis with a tendency to overestimate the gains from the agreement, particularly in the case of the proposed KORUS FTA, where some quotas will continue to exist even with the full implementation of the agreement. Finally, in many existing models such as GTAP, tariff data used by the model may be older (2001). Korea, having defined itself as a developing country, fully implemented its Uruguay Round commitment in 2005, a slower implementation phase-in than in developed countries. Therefore, the outdated tariff data in other models could have higher tariffs than the actual base tariffs currently levied by Korea. This can further lead to overestimating the gains from the proposed FTA.

The modeling exercises done in this study do not claim to estimate possible outcomes with precision. However, they are designed to capture trade gains at the tariff line, taking into consideration the details of tariff phase-outs, and the complexities of MFN and U.S.-specific TRQs. Nevertheless, there are some simplifying assumptions made in the modeling. Some are conservative (leading to more moderate increases in trade) while others are optimistic (leading to stronger increases in trade). The analysis, based on extremely detailed tariff and trade data at the tariff line, permits a much more meticulous assessment of the effects of liberalization than would be possible using aggregate data.

A combination of two estimation approaches has been used in this modeling exercise. The first, the ERS Tariff-Line Trade Estimates Framework (or Cline Model), applies the tariff line estimation process used by Cline et al. (1978) to evaluate policy alternatives considered during the Tokyo Round. The second approach, the Non-Residual Trade TRQ Formulation, takes into consideration product markets that are sufficiently impeded or controlled that imports can be modeled as direct functions of prices, and adapts the approach outlined by Morath and Sheldon (1999).

The Cline Model

The Tariff-Line Trade Estimates Framework or Cline Model is a partial equilibrium model that calculates the static impacts of cutting tariffs. In other words, it gives us a picture of what the base year would have looked like under a different set of tariffs. It allows us to draw some conclusions about how tariffs distorted U.S. agricultural exports in the base year, as well as which commodities and which destinations would have benefited most from reducing or eliminating these policy distortions.

The model is made up of a reduced form equation that calculates, at the tariff-line level, the increase in imports that would result from a proposed change in the MFN tariff. The trade data specifically designate the individual suppliers of any given commodity and the actual ad valorem equivalent tariff assessed on each trade flow. The calculation of increased imports in a given tariff category is based on the following simple method: the percentage increase in import value equals the percentage change in the import price caused by the tariff reduction, multiplied by the import demand elasticity. The percentage decline in the price of the import equals the change in the tariff divided by unity plus the original tariff. In short, for imports within a tariff line where the MFN rate is greater than zero, the increase in imports as a result of a cut in the tariff is:

$$\Delta MI_{i,j} \approx MI_{i,j} * ((1 + t_1) / (1 + t_0) - 1) * e$$ [11]

$MI_{i,j}$ = Import value from supplier i of commodity j (in dollars);
t_0 = Base MFN tariff rate;
t_1 = New MFN tariff rate; and
e = Price elasticity of import demand.

[11] Because large tariff changes may occur in the scenario, the form below actually is used. The equations below and above approach the same result when tariff changes are small.

$MI1_{i,j} = MI0_{i,j} * ((1 + t_1) / (1 + t_0))$ ^ e

$MI0_{i,j}$ = Base import value from supplier i of commodity j (in dollars); and
$MI1_{i,j}$ = New import value from supplier i of commodity j (in dollars).

Non-Residual Trade TRQ Formulation

When trade for a given country/commodity market is sufficiently impeded or controlled, imports can be modeled as a direct function of prices. This approach is incorporated into the analysis of potential changes in imports from the United States, resulting from liberalization of those tariff lines that have WTO TRQs, or will have newly-negotiated U.S.-specific TRQs. The domestic price is the residual price variable, whose adjustment causes the country's supply to equal use. The model uses the following approach:

[in-quota import price] = [world price] + [in-quota tariff]
[over-quota import price] = [world price] + [over-quota tariff]

Then, in-quota imports are a function of the in-quota import price; over-quota imports are a function of the over-quota price; and

[total imports] = Min ([TRQ], [in-quota imports])
+Max (0, [over-quota imports] – [TRQ])

In other words, total imports equal the imports that would be taken at the in-quota tariff, with a ceiling of the TRQ quantity, plus any imports exceeding the TRQ, that would be taken at the over-quota tariff.

Assumptions

To implement our combined modeling approach, some assumptions are necessary. We assume an infinite elasticity of export supply, so as import demand increases when tariffs are cut, the demand can be met by suppliers without an increase in the world price. There are also no cross-elasticities in the model to cause the imports of one good to change as prices of competing goods change. This assumption is reasonable when a uniform cut is implemented across all products. However, when lesser cuts are implemented on sensitive and special products, lack of cross-elasticities could bias the results. Different KORUSA FTA schedules of tariff reductions by tariff line also lead to different tariff cuts. The commodity import mix changes under new tariffs, since goods with higher

tariffs will see their import prices cut by greater amounts, leading to greater percentage increases in imports for these products.

The key inputs to the model—besides trade flows and tariffs—are the elasticities used. Price elasticities of import demand at the tariff-line level generally are unavailable. However, we were able to obtain most price elasticities of Korea's import demand at the HS-6 tariff-line level from the World Bank (Kee, Nicita, & Olarreaga, 2007). In some important cases, elasticities from other published sources were used as well.[12] When no published elasticity was available, a default import elasticity of -3 was used.

For each tariff line, we directly modeled Korea's response to the price including tariff, and to any TRQs, for imports obtained from the United States. We did not use an Armington type of approach to directly model Korea's substitution between foreign country suppliers, when relative prices from those sources would change because of KORUS FTA tariff reductions. Complete implementation of the latter approach also would have required direct calculation of the increase in Korea's overall import demand for the tariff line, as an overall price index fell. An Armington type of formulation would have required an elasticity of substitution as well as the elasticity of import demand for each tariff line. If a simplified Armington type of formulation had used an ordinary trade-weighted price index, and the elasticity of substitution had equaled the elasticity of import demand, then that method would have given the same results as our simpler approach. It could be argued that we implicitly assumed that the elasticity of substitution was equal to the elasticity of import demand for each tariff line. Given the difficulty of obtaining elasticities of substitution by tariff line for Korea, our simpler approach was necessary. In addition, our simpler approach allowed straightforward calculation of trade in the presence of TRQs. If elasticities of substitution generally are larger (smaller) than elasticities of import demand, then to that extent, our simpler approach will have tended to underestimate (overestimate) trade changes.

[12] Henneberry and Hwang, 2007; Sung 1997.

The KORUS FTA model operates under the following additional assumptions. All U.S.-specific TRQs are assumed to be filled. Imports beyond these TRQs are allowed, as the TRQ formulation adjusts U.S. exports to Korea in response to lower effective prices from the United States. The basis for U.S. trade (except beef) is the average level of Korean imports from the United States from 2004 through 2006. For beef and related products, 2003 is the basis. At the end of 2003, Korea banned imports of U.S. beef. This analysis assumes that the beef trade will be restored outside of the FTA framework, with Korea lifting its ban unilaterally. If 2004-06 were used as the base for beef and related products, the base imports from the United States effectively would be 0. This could be misleading in a number of ways: beef trade after modeling the FTA could be very small (reflecting the tiny base) or very large (reflecting recovery of pre-2004 trade as well as effects of the reduced tariff). Finally, it is assumed that safeguard mechanisms are not applied. While it may be likely that Korea will make use of them, it is impossible to predict when that might occur for each tariff line. Imports exceeding a trigger level will not necessarily invoke a safeguard: Korea may hold off, desiring to use its one-time safeguard capacity in a later year.

Basing the analysis on existing trade and market shares can lead to conservative estimates for products that currently have low trade and very high tariffs. Our model also does not allow new U.S. exports to Korea for those products that the U.S. currently does not export. For these products, U.S. exports only are allowed in the model if they have a new negotiated U.S.-specific TRQ. In addition, the model does not take into account economic growth in Korea, which should lead to additional import demand. For these reasons, the model is likely to under-estimate the total trade gain, despite over-estimates for some products where we assume that all U.S.-specific quotas are filled.

Results

Modeling results provide line-by-line increases in trade related to reduced tariffs or increased TRQs, or both. Examination of some of the changes illustrates the way the model works, and also shows the complexity of the FTA (table 4).

Two categories of chilled beef show increases of 25 percent. The elasticity used for both categories is derived from econometric estimates of behavior in the late 1990s and early 2000s, and represents a percentage change in the amount of beef imported from the United States as a consequence of a percentage change in the import price[13] (including tariff). Import prices for U.S. chilled beef cuts decline by almost 29 percent from the base period, in the 15th year after the FTA takes effect. This leads to a 25-percent increase in the amount imported. Because the model is static, the best interpretation of this result is that, if Korean tariffs were cut to 0 (from the current 40 percent) today, the increase in the annual amount of chilled beef imports from the United States would be 25 percent. This assumes that beef trade would again flow freely at the 2003 level, as the base condition. Because the tariff treatment is the same, and the same elasticity is used, the same percentage result holds for both of the chilled beef cut categories.

A 25-percent increase in chilled beef imports from the United States would cause prices within Korea for similar products to fall as the price of U.S. chilled beef fell, leading to adjustments in both demand and supply. The model does not deal with these adjustments—there is no representation of any part of the market except imports from the United States. The reasons for the increase in imports from the United States can be inferred qualitatively, but not quantitatively. Part of the increased imports from the United States would be new beef consumption, as Koreans purchased more beef in reaction to lower prices. Some consumption of other goods could be replaced by chilled beef purchases, as the price of beef relative to other prices fell. This is particularly plausible in the case of pork (however, the model does not include cross-price effects to other commodities or even to other tariff lines for the same commodity). Another part of the increased imports from the United States would replace reduced supply from domestic cattle raisers and/or competing exporters, such as Australia's beef industry, as they cut back sales in the face of lower prices for U.S. imports.

[13] Henneberry and Hwang, 2007; Sung, 1997.

U.S. corn used for processing (i.e., not for feed, seed, or popcorn) in Korea would almost double in quantity by the 15th year. It would benefit in two ways. While other exporters to Korea would continue to face a 2-percent tariff within a TRQ, U.S. exporters would immediately receive tariff-free treatment within the TRQ, giving U.S. supplies an advantage in this competitive market. After 5 years, U.S. suppliers would be exempt from the TRQ entirely, and not face the potential 328-percent over-quota tariff. This would free U.S. corn for processing from the risk of paying a high tariff in case a TRQ limit were reached, further giving it an advantage over competitors. In the model, the tariff decrease from the over-quota tariff provided most of the increased trade. This is questionable, because in practice, the WTO TRQ has never been allowed to bind imports; instead, autonomous TRQs have been used that usually are above expected trade levels.

These U.S. advantages would be permanent, after the 5-year phase-in. Thus, the increase in imports from the United States would chiefly come at the expense of competing exporters, since Korean corn production is quite small. The Korean TRQ has acted to limit expansion of Korea's corn sweetener industry. With the exemption of U.S. imports from the TRQ, such an expansion would no longer be out of the question. It is possible that new uses of U.S. corn (such as in plastics) might also contribute to the rise in imports.

Imports of U.S. oranges rise by 17 percent, after 15 years, as prices drop by 17 percent. The present (base) situation is a 50-percent tariff, applied both within and over a TRQ amount. Thus, the current WTO TRQ is not effective. Under the proposed FTA, a new TRQ for U.S. imports is set up, which provides duty-free access during the in-season period, September-February. The TRQ begins at 2,500 tons, and subsequently increases by 3 percent per year, indefinitely (for example, in year 15, it approaches 4,000 tons). In the period September-February, imports from the United States beyond the TRQ amounts would pay a 50-percent tariff. In the out-of-season period March-August, the tariff would fall to 30 percent at the beginning of the implementation period, and then be reduced to 0 over six years. Because for six months there is no limitation (after year 6), and for six months the tariff above the U.S. TRQ remains at 50 percent, the model uses

the final tariff at half the higher amount: 25 percent. This is conservative, because the within-quota tariff is 0, but optimistic, because the more restrictive regime applies during the largest marketing season for U.S. oranges.

The examples above show the complexity of the proposed agreement. Much of this complexity reflects the status quo in Korea's treatment of agricultural imports. A system of quantitative controls (e.g., the WTO TRQs) in practice could restrict agribusinesses within Korea, and is thus loosened by year-to-year adjustment, or autonomous quotas. These are also used to provide relief from ordinary tariff burdens. Other complexities result from Korea's desire to slowly phase in many changes in tariffs and TRQs, and to construct some seasonal tariff regimes on certain products, including oranges, that limit the scope of liberalization. Several tariff lines may jointly face a WTO or KORUS TRQ. The sets of WTO TRQ tariff lines in general do not match the sets of KORUS TRQ tariff lines. Handling these overlapping TRQ sets adds to the difficulty of modeling their implications.

Conclusions

The proposed KORUS FTA has individual treatment for over 1300 tariff lines covering agricultural products. The time horizon is uneven; tariff reduction is phased in according to over 20 different schedules. The current tariff regime, which includes both WTO TRQs and autonomous TRQs, will continue for countries aside from the United States. In some cases, new U.S.-specific TRQs will give U.S. exporters limited opportunities for tariff-free exports, while in many more cases, the eventual result will be the complete ending of limits to U.S. exports. These complexities present a challenge to modeling the results of the FTA.

The Cline and Non-Residual Trade TRQ models illustrated in this analysis offer a way to capture much of the detail within the agreement. They require knowledge of the tariff regime, base-period trade data, unit values, and an estimate of a price elasticity for each tariff line. With such information, estimates of the impact of the FTA can be made for

each year in the implementation period. The strength of these estimates is the level of detail that they incorporate. Models using aggregated data run the risk of distorting liberalization outcomes by applying inappropriate tariff treatment and inappropriate parameters (such as elasticities) to groups of products that differ in their market and trade characteristics. Many models also do not deal with TRQs in a satisfactory way.

Examples of the varying kinds of trade flows that need to be considered are

- chilled beef, which receives a phased-in elimination of an ad valorem tariff over 15 years, leading to a 25-percent increase in Korean imports from the United States;
- corn for processing, which receives elimination of the current in-quota tariff and a phased-in elimination of the over-quota tariff over five years, while other countries continue to face WTO and autonomous tariffs;
- oranges, which receive a seasonally-differentiated trade regime for U.S. oranges, including an in-season, U.S.-specific TRQ that is initially small and grows indefinitely, and an elimination of out-of-season tariffs that is phased in over six years.

However, the tariff-line approach used here has serious limitations. The model is static, and the results are changes from the base period level, given a change in tariff treatment. Actual trade flows are dynamic, and trade 10 years into the implementation will change as the Korean, U.S., and world economies change. This is important partly because the proposed FTA is implemented in annual increments. In particular, income change is not reflected in the approach illustrated here. Another limitation is caused by the simplicity of the model (simplicity, of course, can also be viewed as a strength). Cross-price effects are not captured. Especially for the meats involved in U.S.-Korea trade, such effects are likely to be important. Vertical linkages also are not reflected. Meats offer an important example: as Korea's imports of U.S. meats increase, Korean meat production is likely to fall. In that case, imports of feedstuffs also will fall.

The proposed KORUS FTA will be one of the largest bilateral trade agreements in history, if it is ratified. Its terms directly affect only the United States and Korea. This, and the level of detail in the agreement, present major difficulties for the existing stock of trade models. The tariff-line approach outlined here offers one way to provide insight into the possible outcomes of a bilateral agreement.

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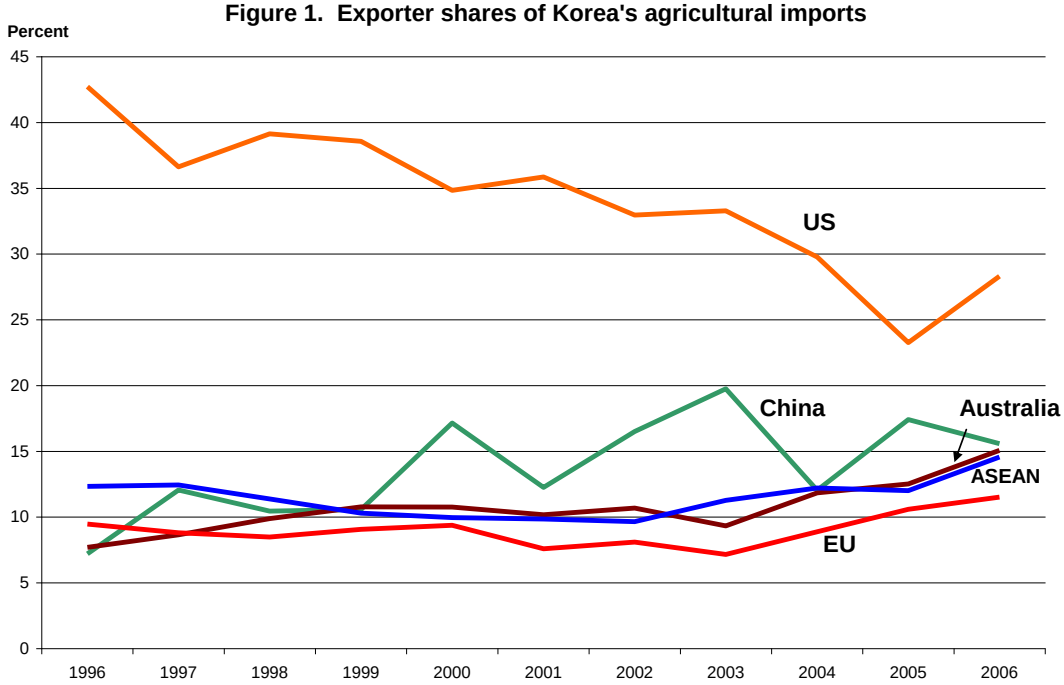
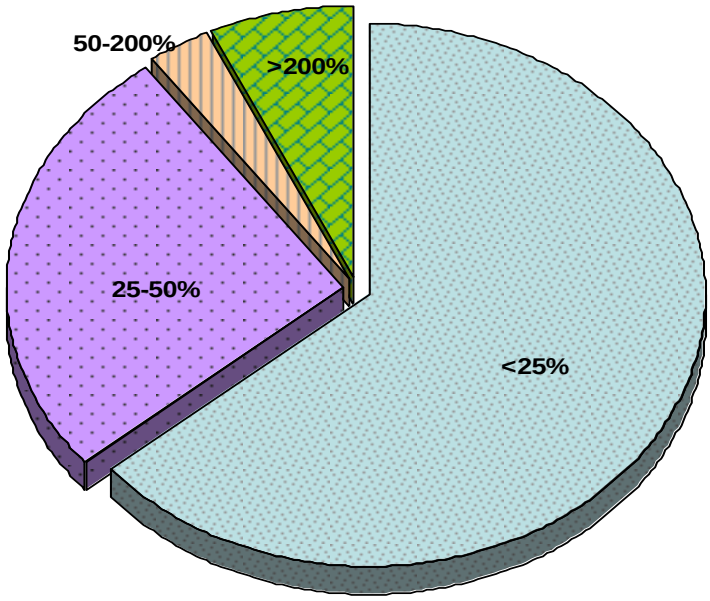
Figure 1. Exporter shares of Korea's agricultural imports



Source: Korean trade data

Figure 2. Korea's current agricultural tariff profile



Note: Although only 158 lines out of a total of 1525 have base tariff rates >50%, they account for 93% of lines with TRQ and 34% of average US exports to Korea in 2004-2006.

Table 1. Products with low applied tariffs before the proposed FTA

Product	Bound tariff	Over-quota tariff	In-quota tariff	Adjustment tariff , 2007	Quota size, 2007	Imports, 2006,	Value of U.S. imports, 2006
	percent				*1,000 tons*		*Mil. US$*
Wheat for feed	1.8			0		1279	0.4
Wheat for milling	2			1		2213	225
Corn for feed		328	2	0	8000	6757	752
Corn for processing		328	3	2	2150	1907	87
Barley for feed, unhulled		324 or 326 won/kg	5	2	50000	6000	0
Soybeans for crushing		487% or 965 won/kg	5	1	1200	861	89
Soybean oil	5					271	20
Soybean meal	2	2	1	1	1700	1709	3
Hides & skins	5			0			327
Cotton	2			0		216.3	117

Source: KS7007, 2/7/07.

Table 2. Selected products with high tariffs before the proposed FTA

Product	Bound tariff	Over-quota tariff	In-quota tariff	Adjustment tariff , 2007	Quota size, 2007	Imports, 2006,	Value of U.S. imports, 2006
		percent			*1,000 tons*		*Mil. US$*
Beef, chilled/frozen	40					326	813
Pork, frozen	25					301	145
Pork, chilled	22.5					10	35
Poultry meat and offal	20					64	41
Offal, except poultry	18					42	74
Milk powder, low fat		176	20		1	7	0
Milk powder, whole		176	40		1	2	0
Butter		89	40		0.4	2	0
Cheese	36					44	25
Potatoes, fresh/chilled		304	30		21	18	1
Onions, fresh/chilled		135% or 180 won/kg	50		21	38	1
Garlic, fresh/chilled		360% or 1,800 won/kg	50		15	14	0
Peppers, fresh/chilled		270% or 6,210 won/kg	50		7	0	0
Oranges		50	50		57	124	117
Apples	45					0	0
Barley, malting		513	30	20	37	21	0
Barley, other		300-324%, or 326-361 won/kg	20		24	6	0
Barley malt		269	30	10	147	121	0
Soybeans for food use		487% or 965 won/kg	5		186	266	69
Sausage	18					6	11
Poultry meat, prepared	72					15	1
Pork, prepared	27-54					4	1
Beef, prepared	72					0	0
Pasta	54					63	0
Orange juice, chilled/frozen	54					34	12
Grapefruit juice, chilled/frozen	30					1	0
Instant coffee	54					2	2
Protein concentrates	54					15	7
Water, unsweetened	13.1					6 (kl)	0
Beer	30					26 (kl)	5
Wine	30					22 (kl)	12
Dextrin	13					9	1

Table 3. Proposed TRQs for Korean imports of U.S. products

Product	4-digit HS codes	Duration *years*	Rate of growth/year *percent*	Initial quantity *tons*
Dairy powders	0402	indefinite	3	5000
Food whey	0404	9	3	3000
Butter and dairy fats	0405	9	3	200
Cheeses, some varieties	0406	14	3	7000
Honey, natural	0409	indefinite	3	200
Potatoes, fresh/chilled, not for chipping	0701	indefinite	3	3000
Oranges	0805	indefinite	3	2500
Barley, except malting	1003	14	2	2500
Malt and malting barley	1107, 1003	14	2	9000
Corn starch	1108	14	3	10000
Food-use soybeans, identity-preserved	1201	indefinite	3	10000
Ginseng, raw white	1211	17	About .2 tons/year	5.7
Fodder, other	1214	14	0	200000
Dry milk preparations	1901	9	3	700
Animal feeds, supplementary	2309	11	3	5500
Dextrins	3505	11	3	14000

Note: only certain 10-digit lines are included in the TRQs. The 4-digit codes, presented here for reference, contain those lines as well as many others not in the TRQs.

Table 4. Selected results by tariff line

Descriptor	HS 10-digit	base value 1/	elasticity	intitial tariff	final tariff	number of years	WTO TRQ	autonomous TRQ	proposed U.S. TRQ	final value	value change	change in %
		Mil. US$		*percent*						*Mil. US$*		*percent*
Corn, not for feeding, not seed	1005909000	66.1	-1.220	328	0	7	yes	yes	yes	106.8	40.7	61
Oranges 2/	0805100000	120.8	-1.011	50	0 for out-of-season	6 for out-of-season	yes	no	for in-season	145.0	24.2	20
Swine cuts, frozen	0203299000	93.1	-1.038	25	0	by 2014	no	no	no	112.5	19.3	21
Steer hide	4101501022	294.2	-3.000	2	0	0	no	no	no	311.5	17.3	6
Bovine cuts boneless, fresh or chilled	0201300000	61.8	-0.860	40	0	15	no	no	no	77.0	15.2	25
Skim milk powder 2/	0402101010	0.4	-3.934	176	n/a	n/a	yes	no	indefinite	10.4	10.0	2637
Grape juice	2009690000	9.6	-3.000	45	0	0	no	no	no	18.5	8.9	93
Wheat for milling	1001909030	248.1	-1.996	1.8	0	0	no	yes	no	256.9	8.8	4
Soybeans for food use 2/ 3/	1201009000	0.0	-0.998	487	n/a	n/a	yes	yes	indefinite	8.3	8.3	n/a
Food preparations	2106909099	99.4	-0.975	18	0	5	no	no	no	106.5	7.2	7
Dried mushrooms	0712319000	9.6	-3.000	30	0	5	no	no	no	16.2	6.6	69
Walnuts, shelled	0802320000	21.3	-1.269	30	0	6	no	no	no	27.6	6.3	29
Red wine	2204211000	8.2	-5.546	15	0	0	no	no	no	14.1	5.9	72
Bovine edible offal, frozen	0206299000	42.9	-0.898	18	0	15	no	no	no	48.8	5.9	14
Bovine cuts bone in, fresh or chilled	0201200000	23.3	-0.860	40	0	15	no	no	no	29.0	5.7	25
Dextrins and other modified starches	3505105000	0.9	-1.061	385.7	0	10	yes	no	yes	5.8	4.9	560

Sources: See text.

Notes:

1/ The base values are the average Korean imports from the United States, 2004-2006, except for bovine cuts and edible offal, for which the base values are the import levels for 2003.

2/ U.S.-specific TRQS for these lines have no termination date; they continue indefinitely, with 3-percent annual volume increases.

3/ The HS line is newly-created; base-period imports of food-use soybeans from the United States under other HS lines were $84.8 million in 2004-06.

Appendix Table 1. Proposed safeguards on agricultural products

Description	4-digit HS codes	Duration *years*	Rate of growth/year *percent or as specified*	Initial trigger *tons*
Beef	0201, 0202	15	6,000 tons	270000
Pork	203	10	6	8250
Onions	0703, 0712	18	204.4 tons, or 0	2904
Garlic	0703, 0711, 0712	18	82.1 tons, or 0	1148
Peppers	0709, 0711, 0904	18	59.1 tons, or 0	827
Beans	713	15	60 tons, 24 tons	238
Sweet potatoes	714	10	53 tons, 21 tons	212
Roots & tubers, nesoi	714	10	0	30
Apples	808	23	0, 3	9000
Green tea	902	18	.6 tons, or 0	8.3
Ginger	910	18	41 tons, or 0	573
Malt & malting barley	1107, 1003	15	2	9000
Barley (not malting)	1003	15	2	2500
Popcorn	1005	7	1,278 tons, or 511 tons	5112
Corn, not for feed	1005	7	46,887 tons, or 18,754 tons	187547
Buckwheat	1008	15	63 tons, or 25 tons	250
Cereal, groats, worked grains	1102, 1103, 1104	15	8 tons, or 10, 12, 15, or 18 tons	128
Potato intermediate products	1105	10	3	5000
Corn starch	1108	15	3	10000
Potato starch	1108	15	60 tons, or 24 tons	239
Manioc starch	1108	15	108 tons, or 43 tons	433
Sweet potato starch	1108	15	50 tons, or 20 tons	202
Other starch	1108	15	13 tons, or 5 tons	53
Peanuts	1202	18	10 tons, or 0	140
Sesame seeds	1207	18	254 tons, or 0	3561
Ginseng	1211, 1302	20	2.4 tons, or 0	62
Sesame seed oil	1515	18	2 tons, or 0	30
Sugar	1701	20	3	833071
Alcohol	2207	15	59 tons, or 24 tons	236
Dextrins	3505	12	3	14000

Note: nesoi = not elsewhere specified or indicated.