# HOW MUCH IS IT WORTH TO PROTECT SENSITIVE PRODUCTS WITH TARIFF-RATE QUOTAS? — A KOREAN CASE

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**Keywords**

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**Abstract**

The tariff-rate quota (TRQ) system is a hybrid import regime that conveys both tariff- and quota-like characteristics. Established by the tariffication process during the Uruguay Round, TRQs harmonize the needs for improved market access and protection from import surges. This paper aims to identify economic and policy consequences from TRQ implementation and to test whether the trade-off between formula tariff cuts and quota expansion is adequate and thus is beneficial to the protection of declared sensitive products. Using Korea's case of soybean imports, this paper illuminates the importance of quota administration in terms of mark-ups, economic rents and the state-trading enterprises (STEs). Application of a one-product partial equilibrium model to Korea's soybean market suggests that it would be better for Korea to designate soybeans as a category of sensitive products. The derived quota equivalents under the option of sensitive products turn out to be smaller than otherwise. Examination of quota equivalents for formula tariff cuts indicates different proportionality or trade-offs among options. Finally, it concludes with potential areas to improve the TRQ administration under the WTO modalities.

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# I. Introduction

Under the Doha Round, a proposed modality is to designate sensitive products at the expense of quota expansion. This proposed modality has designated sensitive products subject to lower tariff cuts than under the tiered formula. A commonly chosen venue with which to treat certain staples as sensitive products is through the use of a tariff rate quota or TRQ mechanism that is introduced below. This study has two goals. The first is to compare and test whether the proposed modality for sensitive product treatment is equivalent to simply accepting tiered cuts for tariffs on non-sensitive products. Second, the study focuses on an important and current Korean case of a sensitive product, imports of soybeans that are subject to a TRQ. Such is done through the application of a partial equilibrium model to Korea's soybean market to discern whether a regular tiered tariff regime or the current special product treatment under the proposed modality's TRQ option is the optimal path for Korean policy makers. The results demonstrate that regular tiered cuts elicit lower imports than treatment under the sensitive products treatment.

Such goals are accomplished in a number of ensuing sections. First, this introduction provides a background on the Uruguay Round's tariffication and Tariff Rate Quota regime, with a focus on selected staple import markets for Korea and some of its Asian neighbors. Second, the study introduces an economic framework of a TRQ with focus on tariff equivalents, quota fill rates and economic rents, as well as administrative issues related to quota fill rates. Third, a review of the case of the Korean soybean market is presented, including a discussion of issues related to Korean administration of its soybeans TRQ; Korea's market patterns under the TRQ in recent years, and a focus on issues concerning state trading enterprise definitions and justification. The fourth section presents issues and complexities concerning TRQ reforms. Included are discussions of relevant modalities under the Doha Development Agenda, as well as an analysis of comparative Korean benefits elicited by reforms using quota increases vs. those elicited from tariff cuts. Finally, a summary and study conclusions are presented.

## Background on the Uruguay Round's Tariffication and its Tariff Rate Quota Regime.

During the 1986-1994 period, the Uruguay Round Agreement's (URs) adopted principle of "comprehensive tariffication" resulted in most quantitative import restrictions such as quotas (among other tariff measures) having been converted to tariff equivalents that were in turn bound.[1] However, policymakers were confronted with a daunting two-fold task: first was the challenge of specifying clear trade rules, followed by the second problem of implementing them.

Examining ex-post effects of the UR tariffication process is of keen interest to trade policy makers, researchers, and other interested agents. Conversion of non-tariff measures to a tariff-only regime contributed substantially to improved transparency in global trade market access (Josling et. al. 1996). Tariffication generally laid a foundation for reduced tariffs and expanded opportunities for global trade permeation. One notable exception, however, is Annex 5 of the UR's Agreement on Agriculture that provides certain WTO member nations with recourse to food security provisions through special treatment of imports that compete with domestic production of staple crops. As examples, the clause applied to rice for Korea, Japan, and the Philippines, and to cheese, sheep and goat meat for Israel.

On acceding to the WTO, Taiwan was able to resort to the special treatment clause for rice, an important staple, in 2002, while Japan forewent its sensitive treatment rights and tariffied its Annex 5 products in 1999. As well, Taiwan also proposed to abolish its special treatment in 2003 and completed its negotiations with other member countries in 2012.

As of 2012, only Korea and the Philippines retain special treatment for rice. Korea extended special treatment from 2004 through 2014, while having expanded quota volumes from 205,228 tons to 408,700 tons, a level just shy of 8 percent of domestic consumption (WTO 2005). Korea's in-quota tariff rate is 5 percent ad valorem. The Philippines also succeeded in postponing tariffication of rice until 2012. The final quota is 350,000 tons with an ad valorem

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1 Article 4.2 of the UR Agreement on Agriculture bans the use of various forms of non-tariff measures. They include quotas, variable import levies, minimum price for import, discretionary import licenses, voluntary export restraints and state-trading enterprises inconsistent with WTO rules.

tariff of 40 percent. The Philippines has requested a continual waiver from obligations under Article 4.2 until 2017 (WTO 2012).[2] After this waiver's expiration, Philippines rice imports will be subject to ordinary tariff treatment.

A major concern elicited with the tariffication process has been a multitude of products protected by "mega tariffs," prohibitively high tariffs of 100 percent or more. Mega tariffs often block any foreseen market as effectively as the previous non-tariff measures. Many of these prohibitive levels of tariff equivalents arose from so-called "dirty tariffication" tactics. Sometimes called "water in the tariff," dirty tariffication describes the situation where countries deliberately overestimate protection levels in order to increase their operative base of duty resulting from tariffication. And although tariffication and binding of all agricultural tariffs was a significant move in the UR's intended direction, the newly established mega tariffs provided even higher protection levels than previous non-tariff measures that the UR purports to reform (Ingco 1995; Woode 2003 Swinbank 2004).

The IATRC (1994) noted that developed and developing nations alike strategically selected price series and data that served as a basis for the new tariff equivalents that led to higher protection levels than the actual protection levels that had prevailed during the 1986-1988 base period. Additionally, since the world market prices for many commodities were relatively low in the base period, its wedge between domestic and world prices was higher from levels when tariff reductions began (Swinbank 2004). Nogués (2003) commented, perhaps bitterly, that the mega tariffs constitute one of the vaguest incidents during more than 50 years of multilateral trade negotiations.

Further, dirty tariffication created impediments to the generation of new trade. The UR's newly established tariff rate quota (TRQ) system is a representative case. The TRQ is a hybrid import regime that conveys both tariff and quota-like components (Pan et al. 2005; Carbaugh 2012). The device is primarily applied to agricultural products that were previously subject to non-tariff measures that were ultimately tariffied. The TRQ is a venue through which importing countries can continue import protection on sensitive staple products

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2 The Philippines claimed food security concerns, social problems arising from potential import surge due to the expiration of special treatment and long delays of trade negotiations under the Doha Development Agenda as justification for the waiver extension.

and exporting countries can secure market access opportunities to a certain extent (IATRC 2001).

A TRQ generally has two tiers of tariffs. An in-quota rate is placed on a predetermined quota import volume. For over-quota volumes, a much higher, often prohibitive, over-quota tariff is typically imposed. The TRQ system was initially considered a transitional instrument, whereby it would provide temporary protection of domestic markets against a surge in imports.[3]

Quotas were created by two methods (Dupraz and Matthews 2007). In order to ensure minimum trade opportunities, minimum market access (MMA) is established for up to 5 percent of the importing nation's domestic consumption level during the base period (Monnich 2003). Current market access is set as a way to maintain export markets. About 45 WTO member nations have adopted and currently operate TRQs on a total global array of 1,434 agricultural products (WTO 2006). Korea has designated and managed 63 agricultural products on a multilateral basis.[4] Additionally, Korea's TRQ regime has taken on additional complexity through introduction of a series of bilateral and country-specific TRQs as provisions in a number of negotiated free trade agreements.

## II. An Economic Framework for TRQs

### Calculations of Tariff Equivalents

Korea and many other WTO member countries are implementing the TRQ regimes over a number of agricultural products. According to WTO (2006), Norway ranks among the top WTO implementer nations with such TRQ protection imposed on 232 products. The European Union has 87 TRQs covering such products as grains, sugar, dairy and meats, while the United States has 54. Having 63 products covering over 200 tariff lines under the harmonized tariff

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3 However, the TRQ mechanism is likely to survive in the current Doha Round negotiations. This point will be further discussed in the following section.

4 Korea initially began with 67 TRQs in 1995, but orange juice, chicken and pork were converted into tariff-only schemes in 1997, followed by beef in 2001.

system (HS) at the 10 digit level, Korea also regards the TRQ as an essential policy instrument that bridges the trade interest gap among exporting and importing countries.

The TRQ conceptually and directly emerges from tariff equivalents under the UR's tariffication process. The following formula provides tariff equivalents for non-tariff measures:

$$\text{TE} = \frac{P_D - P_E}{P_E} \times 100,$$

where *TE* is a tariff equivalent in a percentage term, $P_D$ is a domestic price (representative wholesale price) and $P_E$ refers to an external price (c.i.f. unit values).

Table 1 provides newly established tariff equivalents for selected TRQ products of Korea, which were derived from the tariffication formula. Initial tariffs for malting barley in the base period recorded as high as 513 percent and 487 percent for soybeans. Korean mega tariffs on other products may suggest dirty tariffication and are consequently likely to result with in-quota levels of Korean imports. Mega tariffs for other products have apparently generated allegations of tariffication and affirm why import for TRQ products is likely limited to within quotas. Real improvement in market access is unlikely unless either over-quota tariffs are substantially reduced or quotas are substantially expanded.

TABLE 1.  Calculated Tariff Equivalents for Selected TRQs for Korea

|  | Rice | Barley | Malting barley | Soybeans | Corn | Potatoes | Sweet potatoes |
|---|---|---|---|---|---|---|---|
| World price (won/kg) | 281.3 | 111.3 | 95.7 | 198.3 | 93.7 | 112.3 | 87.3 |
| Quota (1000tons) | 205 | 14 | 64 | 1,032 | 6,102 | 21 | 19 |
| Tariff equivalent(%) | N/A | 311.9 | 513.0 | 486.9 | 328.5 | 304.2 | 385.2 |

Note: 1. The world price for malting barley was adjusted by a quality coefficient, 1.405, such that the import price from Australia, 134.5, became 95.7.
2. Rice was exempted from tariffication such that it does not have a tariff equivalent.
3. The soybean quota includes both food and feed uses.
Source: Lim and Blandford (2009)

## Quota Fills and Economic Rents

Figure 1 demonstrates how a TRQ mechanism functions within the framework of a world market. Any import faces a low in-quota tariff ($\tau_i$), a quota ($Q_{QT}$) and an over-quota tariff ($\tau_o$).

FIGURE 1.  Operation of TRQs
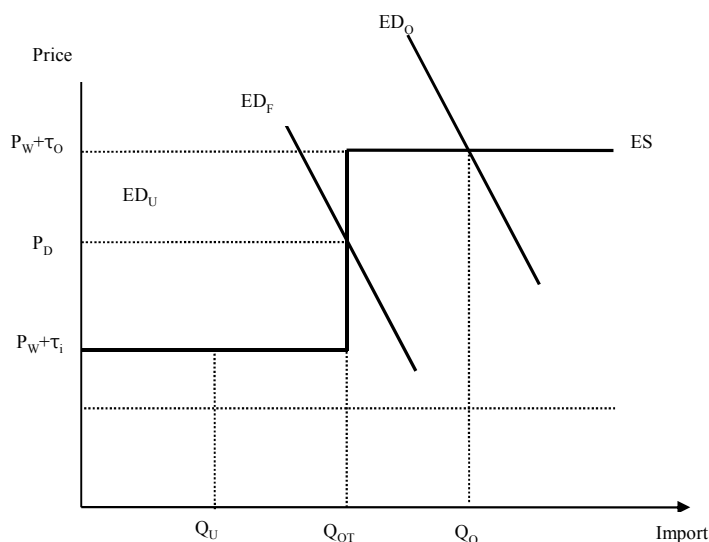


Assuming a small importing country in a competitive international market, binding import prices are either {$P_W$ (world price)$+\tau_i$} for import within the quota, or {$P_W+\tau_o$} in the case of over-quota imports. Equilibrium in the import market occurs at the point of intersection between a step function of the world excess supply curve (ES) and the excess demand curve (ED) for the importing country.

The TRQ mechanism lays out three basic cases depending on whether quotas are filled or not. First, an under-filled quota arises when the in-quota rate binds with $ED_U$. In this case, the fill rate lies between zero and one.[5] Second, it is a binding quota case with $ED_F$. The binding quota makes the fill rate one as actual import gets on terms with quota. Finally, the over-quota rate is binding case with $ED_O$. Thus, the fill rate becomes larger than one.

A peculiarity of the system lies with quota rents. As an important measurement of economic welfare, the size of quota rents is determined by the

5 A fill rate is defined as the ratio of actual import and quota.

quota, $Q_{QT}$ times the gap between domestic price, $P_D$ and $\{P_W+\tau_o\}$. So, the shaded area in Figure 1 represents economic rents when the quota is binding.

## Quota Fills and Administration

TRQ administration methods are of particular interest because they could facilitate or hinder market access opportunities in a practical manner. Quota administration involves distribution of the right to import at an in-quota tariff. According to WTO(2006), member countries practice a variety of administration methods: applied tariffs(AT), first-come/first-served(FF), license on demand(LD), auctioning(AU), historical import allocation(HI), state trading enterprises (STEs), producer groups(PG), others(OT), mixed allocation methods(MX), and non-specified(NS).[6]

Figure 2 displays the number of products whose imports fall under TRQ administrative methods reported by members to the WTO as of 2004. The applied tariff method (AT), which allows unlimited volumes at the in-quota rate, accounts for 614 TRQs or the largest share with 43 percent. It is recognized that AT, AU and FF are the more transparent administrative methods that are likely to elicit relatively higher quota fill rates. The fact that over 40 percent of exiting TRQs are still administered by relatively less transparent methods such as HI, PG and ST illuminates the urgent need for the embattled WTO to deal and resolve the issue.

FIGURE 2.　TRQ Distribution by Administration Methods in 2004
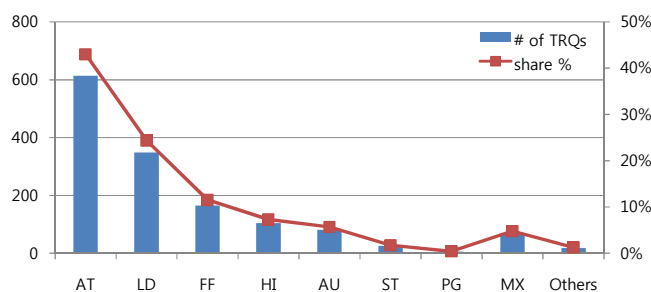


Source: WTO (2006)

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6 Technical details and characteristics by each administrative method is fully discussed in WTO (2006). It also provides explanations about the linkages between administration methods and quota fill rates.

## III. Complex TRQ Administration for Sensitive Products: A Korean Case

### A Knotty TRQ Administration

Korea has placed the TRQ regime quite high on the list of trading priorities because most TRQ products are widely recognized as politically and economically significant commodities. In this vein, the country has long used various forms of TRQ administration in which a number of institutions including state-trading enterprises (STEs) have deliberately controlled imports. For example, the Ministry of Food, Agriculture, Forestry and Fisheries (MIFAFF) has exclusive rights to import such staples as rice and barley, while the Korea Seed & Variety Service, a subsidiary body of the MIFAFF, regulates the importation of seeds. Another STE, Korea Agro-Fisheries & Food Trade Corporation (aT), administers various products including soybeans, garlic, red pepper, onion and others. In all, a total of 24 organizations including STEs, agricultural cooperatives and product-specific producer associations are being engaged in TRQ administration either by importing directly or by recommending their imports.

Since 1995, the first year of implementation for the UR Agreement, TRQ administration methods have been evolving across products. Generally, transparency has increased and the evolving process has moved more towards a market orientation over the period.

Table 2 explains how state-trading practices over TRQ products have increasingly focused on those that are increasingly market-friendly and that foster increased private sector participation. As of 2012, rice imports constitute the only product class governed by a pure state-trading method. State-trading for onions and ginger will be completely replaced by the AU method. Increasing percentage of the AU method is also expected for other ST products including garlic, red pepper, soybeans, mung beans and red beans, sesame seeds and buckwheat. Skim milk powder, condensed milk and raw silk are moving toward the more market-friendly FF method.

TABLE 2.　The Evolution of TRQ Administration Methods for Selective Products

| Product | 1995 | 2005 | 2010 | 2012 | 2015(plan) |
|---|---|---|---|---|---|
| Rice | | ST | ST | ST (100) | ST (100) |
| Barley | | HI | HI | HI (100) | HI (100) |
| Buckwheat | | ST, AU | ST, AU | ST (62), AU (38) | ST (50), AU 50) |
| Red pepper | | ST, HI | ST, AU, HI | ST (86), HI (14) | ST (56), AU (30) HI (14) |
| Ginger | | ST, AU | ST, AU | ST (27), AU (73) | AU (100) |
| Ground nuts | | ST, AU | ST, AU | AU (100) | AU (100) |
| Onions | | ST | ST, AU | ST (52), AU (48) | AU (100) |
| Potatoes | | HI | AU, HI | AU, HI | AU, HI |
| Sesame seeds | ST | ST, AU | ST, AU | ST (59), AU (41) | ST (30), AU (70) |
| Soybeans | | ST, HI | ST, HI | ST (89), HI (2) UG (9) | ST (90), AU (10) |
| Mung& red beans | | ST, HI | ST, HI | ST (98), HI (2) | ST (78), AU (20) HI (2) |
| Oranges | | AU | AU | AU (100) | AU (100) |
| Garlic | | ST | ST, AU | ST (100) | ST (50), AU (50) |
| Natural honey | | ST, AU | AU, HI | AU, HI | AU, HI |
| Raw silk | | HI | HI | HI (100) | FF (100) |
| Ginseng | | AU | AU | AU (100) | AU (100) |
| Pine nuts | | ST, AU | AU | AU (100) | AU (100) |
| Skim milk powder | Non-ST | AU, HI | AU, HI | AU (85), HI (15) | AU (85), FF (15) |
| Condensed milk | | AU | AU | AU (100) | FF (100) |

Note: 1. ST: state-trading, FF: First-come, first-serve, AU: auction, HI: historical importers and UG: user group (the small manufacturers association that mainly uses soybeans to process tofu)
　　　2. Skim milk powder and condensed milk were not state-trading products in 1995. But, they are shown to explain their advance toward more market consistent methods.
　　　3. Parenthesis in 2012 and 2015 indicates respective percentage of the method in total import quantity.
Source: The Korea Agro-Fishes Trade Corporation (2012)

　　　In summary, Korea confronts very complicated TRQ administration methods. State-trading still prevails for essential or food security products, and additional requirements for TRQ imports such as restrictions on end-use and quota allocation conditioned by using local-originate supplies remain with the regime. Nevertheless and perhaps too slowly for some market agents, Korea is steering its TRQ import regime towards more transparent and market-oriented venues.

## The Case of Korean Soybeans

Korean imports of soybeans comprise a case of particular interest for a number of reasons. Having origins on the Korean peninsula, soybeans naturally carry weight as an important source of nutrition and are essential to the Korean diet. Soybeans imported under Korea's TRQ are primarily used as ingredients for manufacturing various processed food products that are widely consumed in Korea: tofu, soybean oil, fermented soybeans (mae-ju), and soybean paste (doen-jang). They are all non-GM and distinguished from other non-food uses.

Most Korean import quotas have been administered by the large-scale trading agency, the *aT,* under an ST method. Since 2009, various small-scale food processors, as members of certain food manufacturer associations, have earned and exercised rights to import soybeans volumes of up to about 10 percent of the quota. Such political decisions arose from an underlying logic of "right to select ingredients," so as to enable smaller firms to diversify quality levels of soybean consignments in order to ensure a final product array that more accurately and consistently concords with production and consumption requirements.[7] Until that time, *aT* had exclusively imported a single standard of soybeans, US No. 1. However, this experimental attempt to permit smaller processors to diversify soybean quality is likely to be short-lived due to a number of market inefficiencies that emerged and a lack of profitability.

Figure 3 explains the mechanism by which soybeans were imported in 2011. Each year, the government extends the bound quota in order to ensure stable prices for basic food stuffs like tofu by providing relatively cheaper ingredients to the processing industry. Korea's *aT* strategically expanded in-quota volumes from 155,000 to 251,000 tons in order to fully fill the in-quota volume, while also triggering over-quota amounts to service demands for specialty soybean grades and Korean labeling requirements.

Korea's soybean imports are primarily sourced from the United States (83 percent) and China (27 percent). In-quota imports face a 5 percent ad valorem tariff, while the over-quota rate is 487 percent. This suggests that the average import price of 780 won per kg should be 819 won and 4,581 won after tariffs, respectively.

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7 For example, a compelling reason for allocating quota to the associations was that the sizes of soybeans supplied by the STE were not standardized due to bulk import.

FIGURE 3.  A State-Trading Regime for Soybeans in 2011
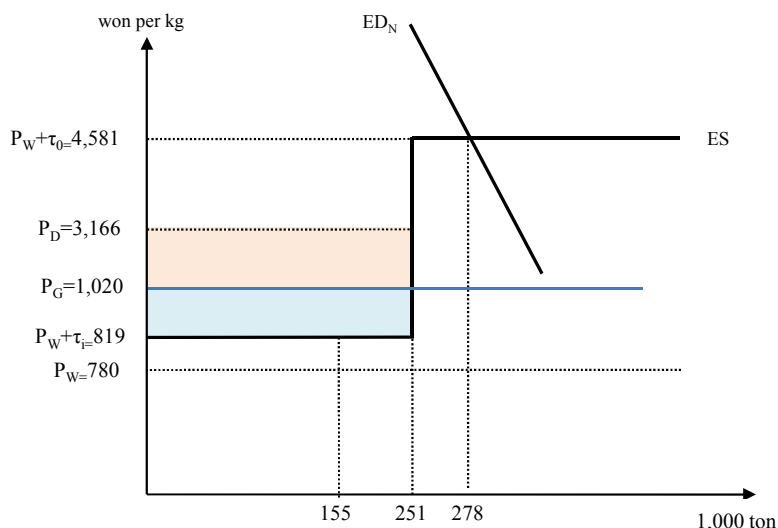


Note: PG indicates the supply price offered by the STE when releasing the quota to
    manufacturers.
Source: Authors' calculation.


Government collection of mark-ups from WTO member nations'
state-trading activities is a commonly observed practice. In fact, the
"Interpretative Notes" that laid down the agreed interpretations of GATT ar-
ticles defines mark-ups as the margin between what the STE charges over the
landed cost of import. Consequently, mark-ups cannot generate greater pro-
tection for the domestic industry than tariffs. For soybeans, mark-ups refer to
the wedge between supply price offered by the STE ($P_G$=1,020 won per kg) and
import price inclusive of the in-quota rate ($P_W+\tau_i$=819 won per kg). The gov-
ernment annually sets supply price ($P_G$) based on consideration of actual costs,
administration costs, as well as on the potential effects on Korea's food in-
flation rate.[8] Mark-ups are pooled into the so-called Agricultural Stabilization
Fund, which provides financial support to various public projects such as food
marketing enhancement programs, price stabilization tasks and rearing agricul-
tural business entities.

When quotas are completely filled, economic rents accrue to the pos-
itive difference between the domestic price and the import price. That imported

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8 Mark-ups have primarily ranged from 200 to 250 won per kg.

soybeans are not a perfect substitute for the domestically produced soybeans elicits added considerations to the process. Soybeans of domestic origins carry a relatively large premium. For example, average wholesale price for domestic soybeans with medium quality was 6,646 won per kg, compared to similar quality of imported soybeans with 3,166 won per kg. As a result, imported beans are used to discern more realistic economic rents.

Table 3 shows the estimated mark-ups and economic rents over the 2007-11 periods. While the mark-ups by the STE seem to undergo relatively large changes, economic rents appear to remain stable over years. Since 2009, $P_G$ has been fixed at 1,020 won per kg. Because of this, swings in mark-ups are mostly attributable to changes in world price and exchange rates. The un-changed government release price is also to satisfy processing industry request for low sourcing costs and ensuring business predictability of price. For in-stance, to mitigate agflation shocks, the government willingly swallowed neg-ative mark-ups in 2008.[9]

Table 3.  Estimation of Mark-ups and Economic Rents

|  | Unit | 2007 | 2008 | 2009 | 2010 | 2011 |
|---|---|---|---|---|---|---|
| WTO quota | ton | 185,787 | 185,787 | 185,787 | 185,787 | 185,787 |
| Quota expansion | ton | 34,872 | 72,198 | 42,157 | 38,135 | 93,931 |
| In-quota import by: |  |  |  |  |  |  |
| STE | ton | 220,659 | 257,985 | 227,944 | 223,922 | 279,718 |
| HI | ton | 24,700 | 15,950 | 6,500 | 4,800 | 6,200 |
| UG | ton | n/a | n/a | 29,932 | 29,905 | 27,462 |
| Over-quota import | ton | 44,061 | 33,740 | 14,633 | 20,065 | 12,921 |
| Mark-up by STE | bill won | 70.2 | -1.4 | 34.9 | 75.0 | 50.3 |
| Economic rents | bill won | 307.6 | 477.5 | 439.3 | 438.5 | 538.6 |

Note: 1. Import by HI is to satisfy the manufacturing demand for fermented soybeans.
  2. Import by UG corresponds to an allocated quota to the small manufacturers association that mainly uses soybeans to process tofu.
  3. Since mark-ups are calculated on the basis of aggregated average terms, the estimates and actual records may not reconcile each other.
Source: Authors' calculation

9 In 2008, the import price (PW) for soybeans jumped up by 2.5 times greater than the previous year.

## On the STE Definition and Justification

STEs have been existence for several decades. In fact, trade rules by the General Agreement on Tariffs and Trade (GATT) and the World Trade Organization (WTO) do not prohibit practices of STEs outright. The Article XVII of GATT 1947 and the "Understanding on Article XVII" provide the following working definition of STEs:

*"Government and non-governmental enterprises, including marketing boards, which have been granted exclusive or special rights or privileges, including statutory or constitutional powers, in the exercise of which they affect through their purchases or sales the level or direction of imports or exports"* (WTO 2003).

The trade law does not confine STEs to governmental entities or to monopolies; rather, any state enterprise or enterprise granted exclusive privileges or special rights by the government may be classified as an STE. More crucial criteria are whether exclusive or special rights or privileges are granted and have the direct consequence of statutory power on trade. Lo (2006) classifies the following as rights of STEs: the role of a single-desk seller, statutory power to regulate trade not exercised, authority over import pricing and/or distribution, intervention power over procurement, preferential access to foreign exchange, and authority to stockpile agricultural products. The most common type of STE in agriculture is the statutory marketing board that exercises monopolistic powers in trade and domestic production and distribution. As of 2003, five developed countries and fifteen developing countries were operating agricultural export STEs (Linda 2005).[10]

The OECD (2001) classifies the following as STE objectives: income support for domestic producers, price stabilization in the domestic market, output expansion, generation of government revenues, strategic control over food supplies, administration of quantitative restrictions, and managing domestic resources. Korean STE practices tend to focus on the following: (1) stabilization

10 In the 1990s over 100 STEs in thirty countries were reported (Abbott and Young 1999).

of the domestic market of intervening against low import prices and to protect Korean industry; (2) management of Korean procurement, price, and distribution of key agricultural products; (3) trade flow management in order to promote or maximize national self-sufficiency for strategic products, and (4) revenue generation from import duties and on-market distribution in accordance with national policy goals.

# IV. Quota Equivalents of TRQ Disciplines for Sensitive Products

## Modalities under the Doha Development Agenda

Although agricultural negotiations under the DDA are in the process of making a final deal, the proposed modalities in 2008 confer a very complicated system of disciplines and implementation procedures. As Table 4 summarizes, a principle of tiered formula tariff cuts is agreed and accepted as the central notion of policy reforms. The tiered approach attempts to plug the existing loopholes in the UR modalities of average-minimum tariff cuts. As usual, developing countries can claim the 2/3 rule for tariff cuts and implementation periods.

TABLE 4. Tiered Formula Cuts and TRQ Reforms

| | | Developed country | | Developing country | |
|---|---|---|---|---|---|
| | | Band | Cut | Band | Cut |
| Tariff cut | | <20% | 50% | <30% | 33.3% |
| | | 20-50% | 57% | 30-80% | 38.0% |
| | | 50-75% | 64% | 80-130% | 42.7% |
| | | 75%< | 70% | 130%< | 46.7% |
| Sensitive product (SeP) | | Designation | | Designation | |
| | | 4% of tariff line | | 5.3% of tariff line | |
| | | If >30% in top band, 2% points more | | | |
| | | Deviation from formula cut | Percentage of consumption | Deviation from formula cut | % of consumption |
| Quota expansion | | 2/3 | 4.0% | 2/3 | 2.7% |
| | | 1/2 | 3.5% | 1/2 | 2.3% |
| | | 1/3 | 3.0% | 1/3 | 2.0% |

| | | Deviation from formula cut | % of SeP | Within year |
|---|---|---|---|---|
| (Options only for developing countries instead of the above quota expansion) | | 2/3 | 25% | 1 |
| | | 1/2 | 33% | 2 |
| | | 1/3 | 50% | 3 |
| | | 0 | 100% | 3-yr longer period |
| | | The remainder of SeP is subject to full formula cut with 3 year longer implementation period, or quota expansion | | |

| TRQ | | 50% cut or threshold at 10% If <5% then cut to 0% | | 15% cut | |
| In-quota tariff | | | | | |
| | Fill rate | Action | Fill rate | Action |
| Administration | < 65% for 2 consecutive years | Effort to improve | < 65% for 2 consecutive years | Effort to improve |
| | < 65% for 3 consecutive years | First-come, first-served, or automatic, unconditional license on demand | < 65% for 3 consecutive years | Other or current methods |
| | >40% &<8%p in annual increment | | >40% &<5.3%p in annual increment | |
| | ≤40% &<12%p in annual increment | | ≤40% &<8%p in annual increment | |

Note: 1. Canada and Japan request that 6% and 8% of agricultural tariff lines must be designated as sensitive products, respectively.
  2. The modalities draft provides more specifics of policy options and additional rules to different categories of member countries.
Source: Authors' own summary of WTO modalities draft (WTO 2008)


On sensitive products, the modalities suggest detailed procedures for their designation and treatment.[11] Disciplines on in-quota rates are specified differently. Deviations from formula tariff cuts by 1/3, 1/2 or 2/3 are granted and applicable up to 5.3 percent of agricultural tariff lines.[12] However, such de-

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11 Tariff cuts for existing TRQ products refer to only over-quota rates.
12 Deviations are compatible with a concept of effective tariff cuts. For instance, 2/3 deviation is analogous to 1/3 effective tariff cut, which will yield a lowest reduction rate.

viations have a trade off or cost: the greater the deviation, the larger the required additional quota volumes. Tariff quotas being commensurate with the extent of deviation are supposed to be expanded by 2.0 percent, 2.3 percent or 2.7 percent of domestic consumption levels for developing countries.

Governments such as Korea face formidable informational challenges in accurately identifying consumption requirements for single products in order to classify products as sensitive and to justify quotas. Generating or finding disaggregated data on consumption of products is difficult, if not impossible, even at the four-digit HS code level, not to mention at the 6-digit levels or higher. A nation such as Korea must either conduct statistically-viable surveys on such disaggregated consumption patterns, or else somehow impute disaggregated consumption patterns in an accurate fashion from already existing information.[13]

In this regard, the WTO (2008) forwarded a two-step template for this purpose. In Step One, the domestic consumption for the product category is allocated to the HS6 coding level of the World Customs Organization's harmonized system on the basis of its world trade share. Each product category is identified to have 'core' products to which common consumption allocation shares are assigned. The core products typically are highly traded ones that account for 90 percent or more of the category's consumption. In Step Two, the HS6 estimates are further allocated to HS8 levels using each HS6's share in the country's trade.

The draft modalities also propose that the in-quota rate should be cut by 50 percent or decline to zero, if the current bound rate is already lower than 5 percent.[14] Developing countries have more flexibility in imposing tariff cuts. Consequently, the key components of the TRQ must be addressed: that is, in- and over-quota rates and quotas are exposed to disciplines regardless of its status as sensitive products.

Finally, the modalities dispose a binding mechanism for under-fill quota. If fill rates fall below 65 percent for two consecutive years, importing

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13 Suppose Korea designates fresh pork (HS6: 020311) as a sensitive product but not frozen one (HS6: 020321). In this case, the lack of consumption data incorporating only fresh pork would cause a problem to set up an adequate level of quota.

14 In-quota rates vary from 0 percent to 50 percent in Korea. About 24 products are subject to 5 percent or lower in-quota rates. The highest in-quota rate is 50 percent (Lim et al. 2010).

countries are required to take specific actions including a requirement to notify the WTO of such sub-minimal fill rates and modification of a TRQ's mechanism to improve the process. To resolve the under-filled quotas, the draft rule suggests a change of the administrative methods into first-come, first-served or automatic, unconditional license on demand.

An important question is whether the trade-off between formula tariff cuts and quota expansion is adequate and thus is beneficial to the protection of declared sensitive products. The study by de Gorter and Kliauga (2006) disclosed that quota expansion would be equivalent to about 1/3 the effects of tariff cuts. More specifically, Laborde et al. (2011) expected that most countries using TRQs would pick the option of a 2/3 deviation from formula cuts coined with quota expansion by 2.7 or 4 percent of domestic consumption.

Given its status as a developing country, Korea is likely to use sensitive products to the full extent of the modalities. However, since the existing TRQs represent about 13 percent of agricultural tariff lines at the HS10 level, Korea needs to strategically discern what to retain and what to drop from its TRQ regime. As for soybeans, a high weight carried on the grain as staple warrants that it would remain as a sensitive product during the Doha periods.

The proposed under-filled mechanism has also significant ramifications for Korea's TRQ administration. Lim and Blandford (2009) finds that if the under-filled mechanism is obligated with a 65 percent full-rate level, imports of existing TRQ products would increase by about 30 percent. It would be therefore preferable for some products to face formula tariff cuts, rather than taking smaller tariff cuts paid by quota expansion.

## Reforms with Quota Increase vs. Tariff Cuts

A prerequisite for TRQ reforms and an optimal choice over whether a product is classified as a sensitive product requires knowledge of the exact trade-off between quota increases and tariff cuts. From such an importing country as Korea, if the country is making every effort to minimize competing imports into the domestic market, accurate assessment for the trade-offs will play a vital role to weigh the costs and benefits for policy reforms.

As Sharma (2006) suggests, tariff equivalents for quota changes can be drawn from a one-product partial equilibrium model. The elasticity of import demand ($\eta M$) is given by:

$$\eta_M = \frac{\% \, \Delta \text{ in import}}{\% \, \Delta \text{ in price}} = - \frac{\Delta M / M_0}{\Delta P / P_0} \quad \text{..................................................} \quad (1)$$

Assuming imports are perfect substitutes for domestic products, the price of domestic product in the base period, or before tariff reduction ($P_0$) equals the world price ($P_W$) plus tariff in the base period ($t_0$). Domestic price after a tariff cut ($P_1$) is determined by PW and the reduced tariff level ($t_1$). When $P_W$ is fixed, $t_0$ exceeds $t_1$ so that, in turn, $P_0$ exceeds $P_1$. The fixed world price presumes that export supply is infinite.

$$P_0 = P_W \times (1 + t_0)$$
$$\quad \text{.................................................} \quad (2)$$
$$P_1 = P_W \times (1 + t_1)$$

The extent of import change from tariff and price changes is determined by linking equations (1) and (2). A simple manipulation of equation (2) yields the percentage change in prices ($\Delta/P_0$):

$$\frac{\Delta P}{P_0} = \frac{t_1 - t_0}{1 + t_0} = \frac{\Delta t}{1 + t_0} \quad \text{.................................................} \quad (3)$$

Plugging equation (3) into equation (1) provides the percentage change in import in terms of tariff changes and the elasticity of import.

$$\frac{\Delta M}{M_0} = -\eta_M \times \frac{\Delta t}{1 + t_0} \quad \text{.................................................} \quad (4)$$

Finally, equation (4) can be rearranged to measure the extent of import changes from the treatment of sensitive products: the change in imports ($\Delta M$)

is the difference between imports under formula cut ($M_F$) and import levels under the treatment of sensitive products ($M_S$). Similar labels hold for the changes in tariffs ($\Delta t$). Accordingly, the quota equivalent ($M_F - M_S$) or the net effect of sensitive product treatment over formula tariff cuts can be obtained by equation (5):

$$M_F - M_S = M_0 \times \eta_M \times \frac{t_s - t_F}{1 + t_0} \quad\quad (5)$$

where $M_F > M_S$ due to $t_s > t_F$. This expression is a quota equivalent for different tariffs. Given the predetermined values of $t_0$, $t_F$, $t_S$ and $M_0$, the information about $\eta_M$ is crucial to estimate the quota equivalent. The elasticity of import demand can be directly estimated or obtained from previous studies. An alternative is to derive it with more readily available information as follows.

Imports are defined as the difference between domestic demand (D) and supply (S). Note that both demand and supply functions are determined by price (P).

$$M=D(P)-S(P) \quad\quad (6)$$

Taking a partial derivative on equation (6) yield:

$$\frac{\Delta M}{\Delta P} = \frac{\Delta D}{\Delta P} - \frac{\Delta S}{\Delta P} \quad\quad (7)$$

To derive elasticity terms, multiply both sides with P/M and the right-hand side with D/D and S/S, respectively:

$$\frac{\Delta M}{\Delta P} \times \frac{P}{M} = \frac{\Delta D}{\Delta P} \times \frac{P}{M} - \frac{\Delta S}{\Delta P} \times \frac{P}{M} = \frac{\Delta D}{\Delta P} \times \frac{P}{D} \times \frac{D}{M} - \frac{\Delta S}{\Delta P} \times \frac{P}{S} \times \frac{S}{M} \quad (8)$$

Equation (8) is shortened with elasticity terms as follows:

$$\eta_M = \frac{\eta_D}{M\big/D} - \frac{\varepsilon_S}{M\big/S} \qquad \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \quad (9)$$

where $\eta_D$ is the elasticity of demand and $\varepsilon_S$ is the elasticity of supply. The terms of M/D and M/S refer to import shares in domestic demand and supply, respectively. Equation (9) may be conveniently and straightforwardly applied, insofar as demand and supply elasticities are more readily available than estimates of import demand elasticities.

Equation (9) is applied to Korea's soybean market to determine whether declaration of soybeans as a sensitive product is an appropriate choice. Table 5 provides basic data for supply and demand for soybeans over the 2009-11 periods. According to Lim et al. (2010), elasticities for demand and supply are assumed as $\eta_D = -0.35$ and $\varepsilon_S = 0.18$, respectively. Application of equation (9) renders the elasticity of import demand as $\eta_M = -0.57$.

TABLE 5.   Supply and Demand for Soybeans in Korea

|  | Production (ton) | Import (ton) | Consumption (ton) |
|---|---|---|---|
| 2009 | 139,251 | 279,009 | 418,260 |
| 2010 | 105,345 | 278,692 | 384,937 |
| 2011 | 129,394 | 326,301 | 455,695 |
| Average | 124,663 | 294,667 | 419,331 |

Source: MIFFAF (2012)

Table 6 shows the result of quota equivalents in using equation (5). A 46.7 percent cut in the bound tariff of 487 percent will decrease the tariff rate to 260 percent. The model-based quota equivalent for the tariff change amounts to 43,705 tons. Since the additional quota as a sensitive product is smaller than the quota equivalent under a tiered tariff cut, it would be beneficial for Korea to designate soybeans as a sensitive product on the presumption of import minimization. The quota equivalents for 1/2 and 1/3 deviations render similar implications. It is however worth noting that the three deviations are not pro-

portional one another. A comparison suggests that the 2/3 deviation is superior to the two other cases.

TABLE 6.    Quota Equivalents of TRQ Expansion for Soybeans

|  | Tariff or reduction rate (%) | Additional quota (ton) (a) | Quota equivalent (ton) (b) | Ratio (b)/(a) |
|---|---|---|---|---|
| Reduction rate by tiered formula | 46.7 | - | - | - |
| Bound tariff in 2011 | 487 | - | - | - |
| After formula cut | 260 | - | - | - |
| After 2/3 deviation from formula cut | 411 | 11,322 | 43,705 | 3.9 |
| After 1/2 deviation from formula cut | 373 | 9,645 | 32,779 | 3.4 |
| After 1/3 deviation from formula cut | 335 | 8,387 | 21,852 | 2.6 |

Note: For simplicity, the average consumption level over the 2009-2011 periods is used to calculate additional quotas.
Source: Authors' calculation

# V. Summary and Conclusions

Korea is among a group of nations that are positioning TRQs as an important instrument in controlling imports that compete with domestically sourced products. The Uruguay Round's tariffication process created the TRQ as a hybrid import mechanism with quotas and two-tiered tariff rates, although many thought TRQs to be a transitory measure at the time. However, the current round of the Doha Development Agenda will likely perpetuate the TRQ import method as a key instrument with which to focus on sensitive products.

TRQ implementation in many member countries since 1995 has generated mixed results. They have resulted in improved market access to the extent permitted by the quotas, although mega tariffs on over-quota imports have effectively precluded further import possibilities. High levels of applied tariff administration has fostered increased market access, while STEs have added

opacity to the process and have exercised what some deem as excessive discretion in order to accumulate mark-ups and economic rents, and to generate revenues. Nevertheless, the fill rates for imports under STE authority have been shown to frequently be as good as those of other market oriented administrative methods.

The case of Korea's soybean market highlights the complexities associated with TRQ administration and implementation. It fosters STE empowerment, accommodates discretionary changes in allocation, and permits the participation of small food manufacturer associations. Part of this complication arises from a revenue-generation motive, whereby the government collects mark-ups to fund agricultural projects, and from its goal and incentive to avoid and/or manage Korea's food inflation patterns through dampened process for soy-based products. Korean industry requests for a more varied array of available soybean products of differing quality levels and standards has resulted in direct industry involvement in Korea's in-quota imports since 2009. Additionally, labeling requirements and existing market demand for specialty soybeans has explained, in part, some over-quota volumes of soybean imports at the 487 percent mega tariff.

The modalities draft of the WTO agricultural negotiations specifies that countries can select certain percentages of their tariff lines as sensitive products and bind them to tariff cuts that are lower than a tiered formula schedule. Since the compensation for the lower cuts must be denoted in terms of proportional increases in quotas, it is critical to assess payoffs by weighing quota equivalents of the tariff cuts.

This study applied a partial equilibrium model to Korea soybean market to test Korea's relative benefits of treating soybeans as a sensitive product under a TRQ relative to benefits of including soybeans under the tiered tariff discipline. Results suggest that Korea may benefit more by designating soybeans as a sensitive product. The derived quota equivalents under a sensitive product option are smaller than under the case of tired formula cuts.

Although the WTO tabled some details on TRQ reforms, there remain a few technical clarifications. First, allocation of the aggregate measure of domestic consumption to individual tariff lines designating more disaggregated products is particularly challenging. Permitting a sensitive product by the tariff line requires the tariff line-based consumption data because it provides a basis for determining quota expansion.

Second, disciplines on TRQ administration need further improvement. The proposed 65 percent under-filled mechanism indeed appears to be harsh punishment. Regardless of its quota administration method, shortfalls in import demand may possibly occur and unavoidably result in lower fill rates. A mandatory remedy for under-filled quota conflicts with the intended spirit of TRQs. On the contrary, a shift of quota administration methods to first-come, first-served or unconditional license on demand will not likely guarantee remarkable improvement in quota filling, either.

Third, it appears that the established trade-off relationships across different options lack economic grounds. As seen from the soybeans case, quota equivalents for formula tariff cuts have different proportionality between the three deviation cases. If this is commonly true for other products, countries have to investigate all individual options to discern optimal/preferred consequences.

Finally, other related issues include: (1) further discussions on TRQ creation for additional tariff lines, (2) harmonizing TRQ administration under a multilateral setting with country-specific quotas and administration under FTAs, and (3) improving notifications, monitoring and transparency.

Future research would benefit from the relaxation of strong assumptions such as imported soybean being a perfect substitute for domestically produced soybean and Korea being a smaller importing country.

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