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How Free are Free Trade Agreements?

An Essay on Free Trade Agreements with Binding Rules of Origin

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Free Trade Agreements (FTAs) have played an important role in promoting the world's trade and development, but even with FTAs, the world is still far from complete trade liberalization. An essential protective feature of FTAs is the prescription of the Rules of Origin (ROO), which demand a certain fraction of value added to be completed in one party's territory. This paper uses a simple model to discuss the roles of ROO in FTAs.

Introduction

On June 30, 2007, The United States and the Republic of Korea signed the United States-Korea Free Trade Agreement (KORUS FTA) (Office of the United States Trade Representative[1], 2007a[2]). It is currently pending Congressional approval. If approved, it will become the United States' most commercially significant free trade agreement (FTA) in 16 years, adding "$10 billion to $12 billion to annual U.S. Gross Domestic Product and around $10 billion to annual merchandise exports to Korea."(OUSTR, 2007a) This FTA would make "nearly 95 percent of bilateral trade in consumer and industrial products "become duty free within three years of the date the FTA enters into force," eliminate or phase out tariffs and quotas on a broad range of agricultural products, and provide more market access to service sectors, such as delivery and legal consulting (OUSTR, 2007a).

The numbers tell a great story of how regional trade agreements (RTAs) have played an important role in the world's trade and economic development. RTAs enable countries to mutually reduce their tariff schedules and bring them closer to free trade (Feenstra and Taylor, 2008). As stated in the text of General Agreements on Tariffs and Trade (GATT), such agreements are always allowed as long as the member countries do not jointly increase tariffs against outside countries, and reduce the former tariffs to zero simultaneously among themselves. RTAs are also called preferential trade agreements (PTAs) sometimes, because the nature of them reveals countries' preference of trade partners (Feenstra and Taylor, 2008).

Generally, RTAs can be classified into two types. The first type is free-trade areas, which refer to groups of countries agreeing to eliminate tariffs and other trade barriers among themselves but keeping whatever tariffs they formerly had against the outside countries. A familiar example of free-trade area consists of three countries—the United States, Canada and Mexico, which was formed under the North American Free Trade Agreement (NAFTA). Another type of RTA is custom unions. A custom union is similar to a free-trade area, except that the member countries not only eliminate tariffs among themselves, but also need to agree on a common tariff schedule against outside countries. The most familiar example of a custom union is the European Union (Feenstra and Taylor, 2008).

This paper will focus on free-trade areas formed under free trade agreements (FTAs). Because each of the member countries keeps its original tariffs against the outside countries, and according to the definition, anything can be traded tariff free inside the free-trade area, it is easy to imagine that some outside country would simply choose to export products to the country with the lowest tariff rate, and then let the goods flow to the other member countries of the FTA tariff free. If such thing ever happens, keeping each country's original tariff against outside countries is meaningless—it is equivalent to them sharing the same tariff schedule, and it is always the lowest one among all the member countries. To prevent such a thing from happening, FTAs always specify rules of origin (ROO) as a part of the agreement. These typically require that goods can

[1] Will be referred to as OUSTR in later references

[2] The text online is not dated, but it is most likely that the text was prepared in 2007, around the time when the two parties settled on the final text.

be traded tariff free only if a certain fraction of the final value of the goods is added domestically in one party's territory. Such a fraction is often referred to as regional value content (RVC).

Two methods are often used to calculate RVC, one is called the build-up method, and the other one the build-down method (OUSTR, 2007b). The main distinction is whether the "value added" includes labor and capital input besides the cost of materials. For explicit formulas, let AV denote the adjusted value of the final good, which is the value without taking transportation cost and insurance fees into account. Additionally, let VNM and VOM denote the value of non-originating materials and the value of originating materials, respectively, where originating is synonym for self-produced. Given all these notations, a build-down method can be expressed as

$$RVC = \frac{AV - VNM}{AV} * 100\% \tag{1}$$

and a build-up method of calculating RVC is

$$RVC = \frac{VOM}{AV} * 100\% \tag{2}$$

In this paper, I will include labor cost as a part of the value of the final output and assume no capital input. Then I will use the build-down method when analyzing the effects of ROO.

The impacts on trade caused by FTAs have been studied from different perspectives, and debates centering on them have never failed to exist. Generally, the increase of trade can be of two types—trade creation and trade diversion. Trade creation occurs when "a member country imports a product from another member country that formerly it produced for itself." (Feenstra and Taylor, 2008) The gain from trade creation is obvious—the importing country gains a consumer surplus because of the lower price and the greater quantity of consumption, and the exporting country gains a producer surplus from expansion of sales. The gain from trade diversion, however, is trickier. Trade diversion occurs when "a member country imports a product from another member country that it formerly imported *from a country outside of the new trade region*." (Feenstra and Taylor, 2008) Notice the difference in influence on outside countries between trade creation and trade diversion: trade creation does not affect other countries no matter whether they are inside or outside the FTA, whereas trade diversion can cause an impact on both inside and outside countries.

The impact on the outside countries from trade diversion is the main reason why ROOs have received much criticism. In April, 2007, prior to the signing of KORUS FTA, *Financial Times* published an article of Martin Wolf's, who objected to the KORUS FTA because "this form of liberalization is not necessarily a move towards liberal trade," and that such FTA should be called "discriminatory trade agreements."(Wolf, 2007) He explains that the KORUS FTA, with its binding ROO, shifts supplies from more competitive to less competitive countries, and its adverse effects upon the outside countries could be huge, regardless of how much these two parties will benefit from the agreement. He goes on to explain the further economic consequences of such FTA: an explosion in administrative complexity because of the diversity of ROO; an increase in business uncertainty because every such FTA in the future will alter countries' trade preference and thus the general equilibrium; and finally, political powers might replace economic

efficiency when determining the justification of an FTA, which may drive the world away from trade liberalization (Wolf, 2007).

This paper will focus on the effects of FTAs with binding ROO on trade from a different perspective. Instead of looking at the shift of the import source as in trade diversion, I will examine the protective feature of ROO. That is, for a country that formerly imports an intermediate input at a lower price from an outside country for production, it might need to source the intermediate input domestically to satisfy the ROO. In such cases, ROO not only protect domestic industries that are less efficient, but also cause the demand for the intermediate input from the outside country to drop.

This is different from trade diversion in two aspects. First, no new trade opportunity is created. The exporting party of the FTA does not shift its source of the intermediate input from the outside country to a member country; instead, it has to produce for itself in a less efficient fashion. Second, the demand for the intermediate input from the outside country is not "all or nothing," depending on the level of ROO. That is, although the demand from the outside country is likely to drop, it will not drop all the way to zero if the ROO does not demand the RVC to be 100%. Hence, the effect of such an FTA on the outside country is likely to be smaller.

For my purpose, I will use a simple partial equilibrium model to analyze the effects of FTA with binding ROO. The setup of the model is explained in the next section, and the effects of ROO on several aspects of trade are discussed in the third section. After that, the paper will end with a brief conclusion.

A Simple Model

I will analyze a simple partial equilibrium model involving only three countries and a single industry. Suppose Country A and Country B have an FTA so that the intermediate input produced by Country B can be imported by Country A tariff free. Suppose Country A and Country C are about to sign a bilateral FTA with binding ROO, under which the final goods produced in Country A can be exported to Country C tariff free, but only if the ROO is satisfied. Otherwise, the exported final goods are subject to the original tariff rate. Also assume that the price of the intermediate input in Country B is lower than that in Country A. Figure 1 is a simple illustration of the relations among these three countries:

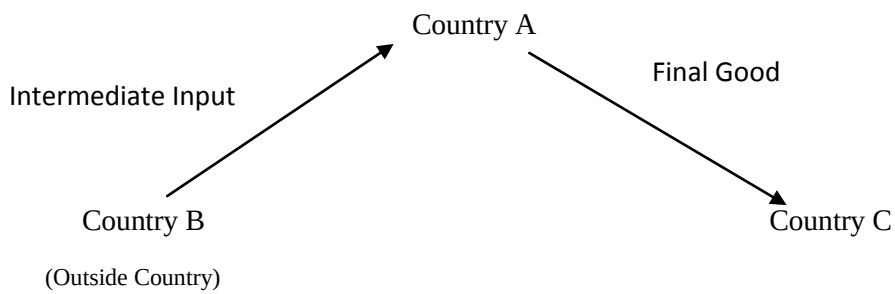


Figure 1 Relations among the three countries: Existing FTA between Country A and B; Potential Bilateral FTA between Country A and C, where Country B is an outside country.

Suppose the production function of the final good in Country A is Leontief. To simplify the equations and expressions in the model, I will use the following notations:

M: amount of intermediate input

a^M: amount of intermediate input needed to produce one unit of final good

L: amount of labor

a^L: amount of labor needed to produce one unit of final good

w^a: wage in Country A

a: price of the intermediate input in Country A

b: price of the intermediate input in Country B, and we assume that b<a

Q: quantity of final good produced by Country A

p^A: price of final good in Country A

p_R^C: price of final good in Country C under the ROO

p_t^C: price of final good in Country C with the tariff

D^C: demand for final good in Country C

t: tariff rate of the final good in Country C without the FTA

R: the percentage prescribed by the binding ROO

γ: the percentage of intermediate input sourced in Country A

Since the production of the final good is Leontief, we know that

$$Q = \min\left(\frac{L}{a^L}, \frac{M}{a^M}\right) \tag{3}$$

When the firms produce efficiently, (3) is equivalent to

$$Q = \frac{L}{a^L} = \frac{M}{a^M} \tag{4}$$

Suppose the value of the final good only consists of the cost of labor in Country A plus the values of the intermediate inputs from both Country A and Country B. Then the value of the final output can be expressed as

$$p^A Q = w^A L + \gamma M a + (1-\gamma) M b, \text{ where } \gamma \in [0, 1] \tag{5}$$

Using the relation in Equation (4) and (5) together, we can derive the price of the final good in Country A:

$$p^A = w^A a^L + [\gamma a + (1-\gamma) b] a^M \tag{6}$$

Remember that we have assumed $b < a$, and the FTA between Country A and Country B enables Country A to import the intermediate input from Country B tariff free. Since in this case Country B is the relatively efficient producer of the intermediate input, the producers of the final good in Country A will buy the intermediate input only from Country B if no ROO needs to be satisfied. In this case, $\gamma = 0$ and $p^A = w^A a^L + b a^M$.

The left hand side of Equation (6) represents the AV of one unit of the final good. On the right hand side, however, only $(1-\gamma) b a^M$ is the VNM of one unit of the final good. According to the build-down method as specified in Equation (1), the numerator of the expression of RVC is AV-VNM = $w^A a^L + \gamma a a^M$, hence RVC is $\frac{w^A a^L + \gamma a a^M}{p^A}$. Since the price of the final good in Country C depends on both that in Country A and whether Country A satisfies the ROO, we have:

$$p_t^C = p^A (1+t) \text{ if } \frac{w^A a^L + \gamma a a^M}{p^A} < R \tag{7}$$

and

$$p_R^C = p^A \text{ if } \frac{w^A a^L + \gamma a a^M}{p^A} \geq R \tag{8}$$

Using Conditions (6) and (8), we can solve for the range of γ when Country A satisfies the ROO, which is

$$\gamma \geq \frac{[R b a^M - (1-R) w^A a^L]}{[R b a^M + (1-R) w^A a^L]}, \gamma \in [0, 1] \tag{9}$$

In particular, γ can be zero if the ROO is low enough so that the required fraction R of value added in Country A is provided by the labor input. On the other hand, if the ROO is at the other extreme and demands all the value of the final good is added in Country A ($R = 1$), then Country A cannot source any intermediate input in Country B, which means γ also equals 1. That is

$$\gamma = 0 \text{ when } R \leq \bar{R} = \frac{w^A a^L}{w^A a^L + b a^M} \tag{10}$$

$$\text{and } \gamma = 1 \text{ when } R = 1 \tag{11}$$

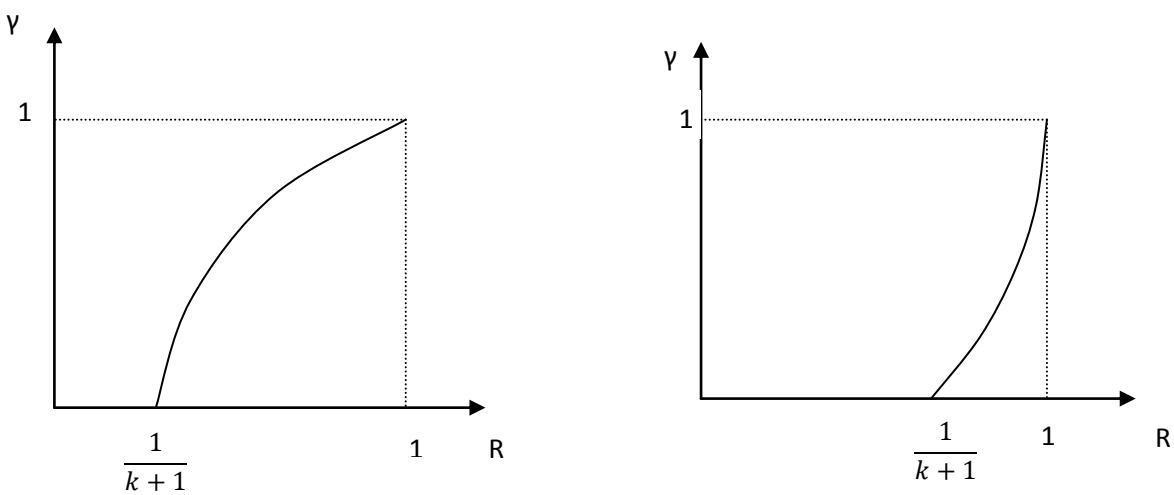
Notice that when Country A decides to satisfy the ROO, it would choose the smallest possible value of γ that satisfies Condition (9), because the smaller γ it chooses, the lower is the cost of production. Hence, we can safely assume that when ROO is satisfied, the equality in Condition (9) always holds. That is

$$\gamma = \frac{[Rba^M - (1-R)w^A a^L]}{[Rba^M + (1-R)w^A a^L]} \in [0, 1] \tag{12}$$

Notice that the relation between γ and R only depends on the ratio $\frac{ba^M}{w^A a^L}$. Denote this ratio k, then (12) becomes

$$\gamma = \frac{[Rk - (1-R)]}{[Rk + (1-R)]} \in [0, 1] \tag{13}$$

The shape of function (13) depends on the value of k. It is easy to see that when k=1, the function is linear. The graph of (13) is provided in Figure 2.



The case of $k > 1$ The case of $k < 1$

Figure 2. Relations between the percentage of intermediate input sourced in Country A(γ) and the prescribed percentage of ROO (R)

In all cases, γ is monotonically increasing in R, which also means that the total cost of production of the final good increases in R. The positive correlation between γ and R is intuitive. A larger R means a larger portion of the total value of a unit of the final goods has to be added in Country A, which can be achieved only if more intermediate input is sourced in Country A when the cost of labor does not change. This positive correlation between R and the total production cost also relies on the key assumption that the production cost of the intermediate input is lower in Country B than in Country A (b<a). Under this assumption, the more is required to be

produced in Country A, the higher is the total production cost of the final good. Now we start to discuss the effect of the ROO on several aspects of trade.

I. Effect of R on p^C

We can now show that when the prescribed ROO gets high enough, the price of the final good in Country C could be equal to that price with the original tariff, depending on the size of the original tariff rate t. Using Equations (6) and (12), we obtain the price in Country C when Country A satisfies the ROO:

$$p_R^C = \frac{b}{Rb+(1-R)a}(w^A a^L + a a^M) \tag{14}$$

When Country A decides to not satisfy the ROO, it would simply source all the needed intermediate input in Country B, for the cost is lower in Country B. Using this fact and Condition (7), we have the price of the final good in Country C without the FTA:

$$p_t^C = (w^A a^L + b a^M)(1+t) \tag{15}$$

Comparing (14) and (15) is equivalent to comparing

$$1+t \text{ and } \frac{b}{Rb+(1-R)a}\,\frac{(w^A a^L + a a^M)}{(w^A a^L + b a^M)} \tag{16}$$

Notice that $a > b$ by assumption, so $\frac{b}{Rb+(1-R)a} < 1$ and $\frac{(w^A a^L + a a^M)}{(w^A a^L + b a^M)} > 1$. If $\frac{(w^A a^L + a a^M)}{(w^A a^L + b a^M)}$ is larger than or equal to $1+t$, then by adjusting the value of R, it is possible to make the price of the final good in Country C unchanged even with the FTA. That is, if the government in Country C intends to protect domestic producers of the final good, if there are any, then it can achieve this intention even with an FTA. Additionally, once the exogenous factors a, b, w^A, a^L and a^M are fixed, the relative size of the two objects in (16) only depends on the values of t and R, which means the government of Country, who sets t and R, has a power to control Country A's incentive to sign the FTA for this industry.

In addition, as required by the ROO, the price of the final good in Country C can never consist of only labor input and the cost of the intermediate input imported from Country B, except for the very unlikely cases where $R \leq \bar{R}$. This effect of ROO on p^C may put Country A in a disadvantageous position even if the FTA comes into effect. Take South Korea and the NAFTA as an example. Suppose Mexico has a lower production cost for steel than that in Canada and South Korea. Also suppose both Canada and South Korea import steel from Mexico to produce automobiles, and sell to the United States. Since Canada is a member of the NAFTA, it can import as much steel as it needs from Mexico at the lower price, whereas South Korea has to source at a higher cost domestically in order to satisfy the ROO. Hence, there is a big distinction between signing a bilateral FTA and admitting a new member to an existing FTA.

II. Effect of R on Country C's Consumer Surplus

The effect of R on consumer surplus in Country C follows naturally from its effect on price of the final good in Country C. To better visualize such effect, we now assume a linear downward sloping demand curve in Country C for the final good. Let the inverse demand for the final good be

$$p^C = m_0 - m_1 Q \tag{17}$$

To keep it simple, we shall also assume that m_0 is larger than $(w^A a^L + a a^M)$, and there is no domestic producer of the final good in Country C. There could be a close substitute for this final good produced in Country C, which provides Country C with incentives to keep the price of the final good high for its protection.

The price of the final good in Country C can only vary between $w^A a^L + b a^M$ and $w^A a^L + a a^M$, which correspond to $R \leq \bar{R}$ and $R = 1$, respectively. The graph of the price and demand for the final good in Country C is shown below in Figure 3.

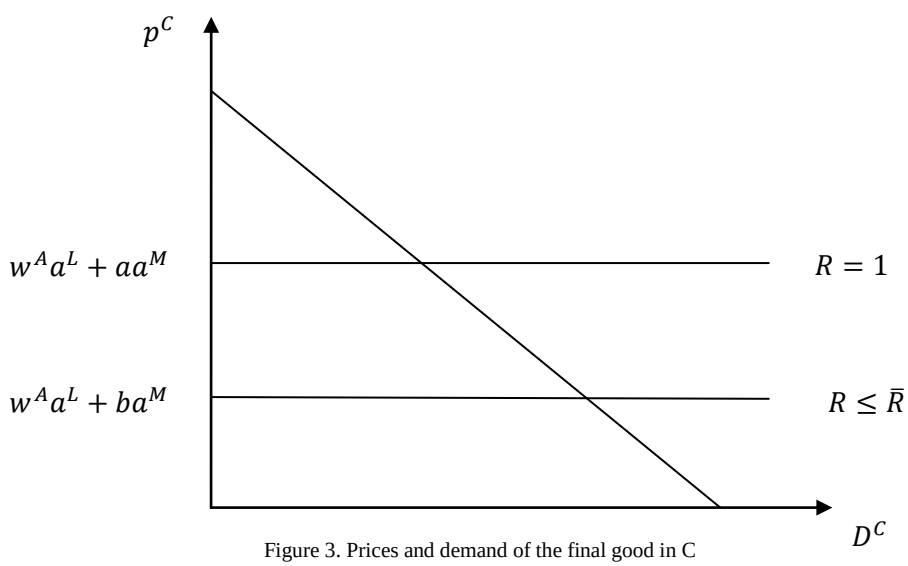


Figure 3. Prices and demand of the final good in C

Since the consumer surplus in Country C is just the upper left triangle above the price line, it is easy to calculate that the consumer surplus is

$$\frac{(m_0 - p^C)^2}{2m_1} \tag{18}$$

which is monotonically decreasing in p^C as long as $m_0 > p^C$.

Because of the effect of R on p^C, we can now draw a graph to illustrate how the consumer surplus in Country C changes with p^C, and more importantly, with R.

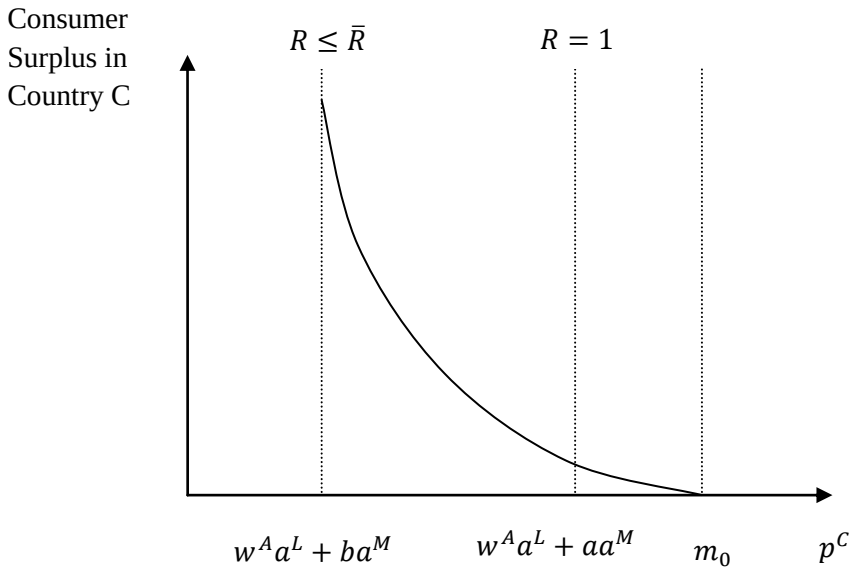


Figure 4. Changes in Consumer Surplus in C with p^C and R

This graph shows how FTAs with binding ROO could hurt consumer surplus as powerfully as a protective tariff, which explains why such FTAs are not totally "free." However, since the FTAs, even with binding ROO, eliminate or significantly decrease governments' tariff revenue, they indeed can provide incentives to lower trade barriers, which leads to the discussion on the effect of R on the net gain of Country C.

III. Effect of R on Net Gain of Country C

Again, to keep things simple, we shall assume there is no domestic producer of this final good in Country C, and we will leave out the producers of the close substitute when analyzing the net gain of Country C. That is to say, we will only discuss the net gain that consists of consumer surplus and government tariff revenue.

As a benchmark case, we first analyze how the net gain of Country C changes when under the FTA with binding ROO, the price in Country C stays the same as the original tariff. Assume that the price with the tariff is lower than $w^A a^L + aa^M$, which is the price corresponding to R=1. Denote this level of ROO as R_t; then we can read off the welfare effects in Figure 5 below.

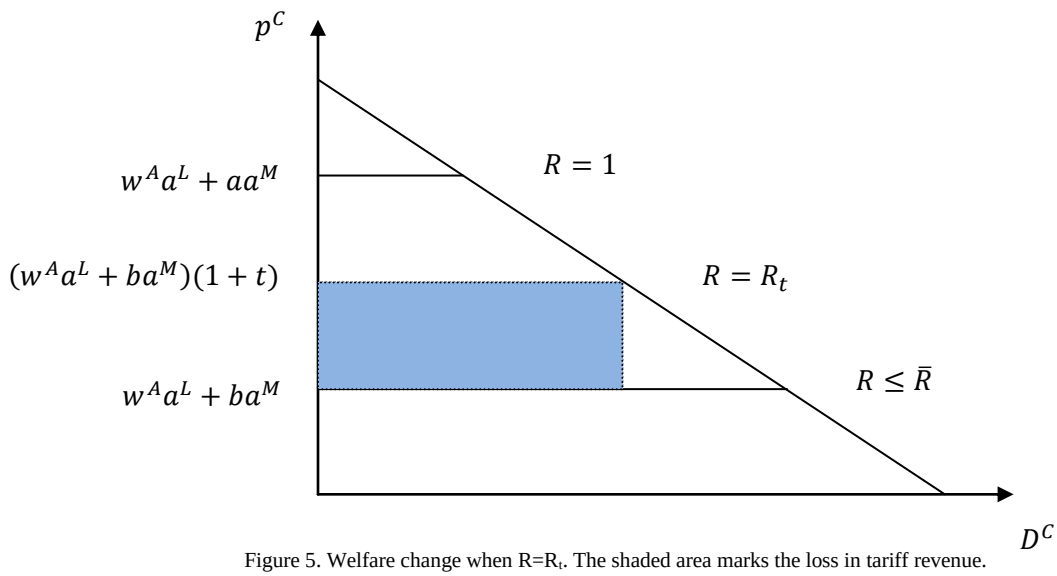


Figure 5. Welfare change when R=R_t. The shaded area marks the loss in tariff revenue.

As shown in Figure 5, if the prescribed ROO leaves the price of the final good in Country C unchanged, then the consumer gain does not change at all. At the same time, since the government of Country C loses tariff revenue represented by the shaded area, the net gain of Country C is negative. In order to obtain a positive net gain or an as small as possible negative net gain, the government of Country C would lower the value of R to allow the increase in consumer surplus to make up for the loss in tariff revenue. Particularly, given the shape of the demand curve and the price levels, there exists a level of $R = \tilde{R}$ such that the net gain is zero, and for any price below that level, the net gain becomes positive. Such a case is shown in Figure 6.

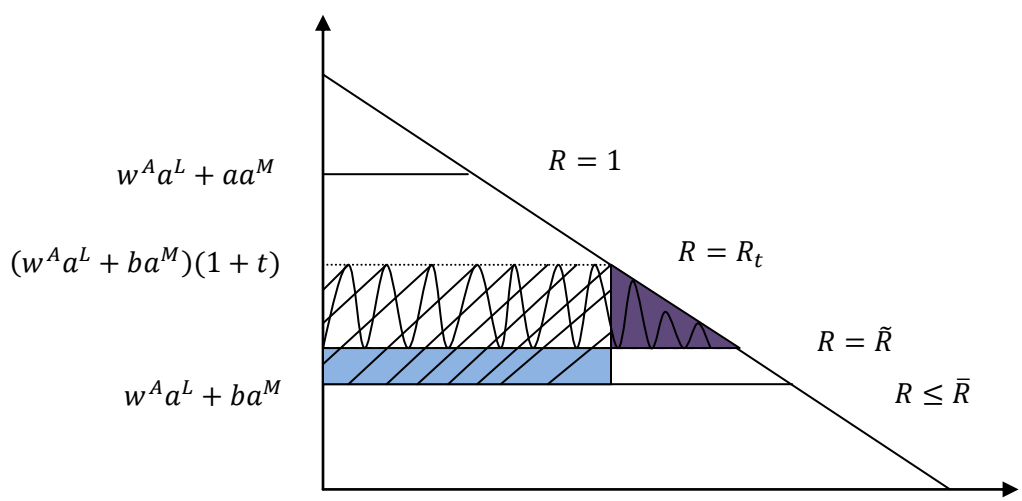


Figure 6. Welfare change when $R = \tilde{R}$

In this graph, the region with parallel line segments marks the loss of tariff revenue, whereas the one with curves marks the gain in consumer surplus. When R is selected such that the two shaded parts have the same area, net gain of Country C is zero. A direct relation between R and net gain of Country C is show in Figure 7 below.

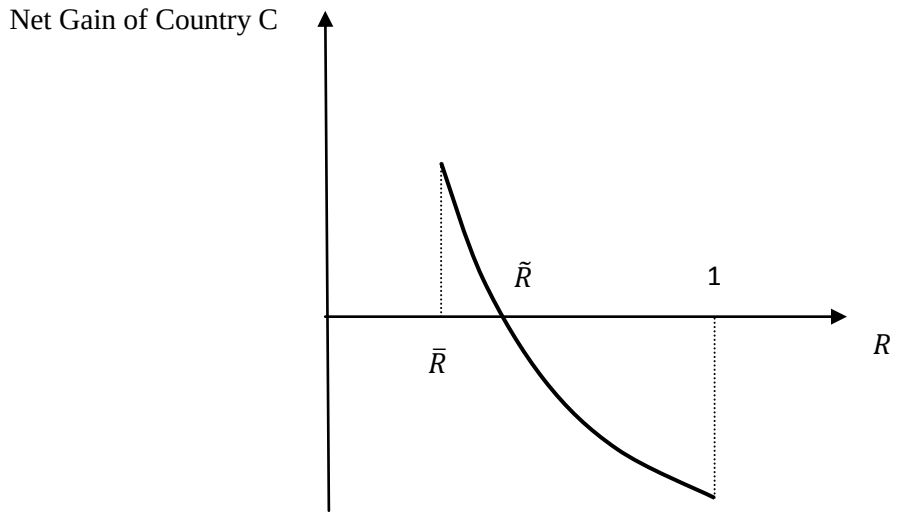


Figure 7. Change of the Net Gain of Country C with R

Since at least some of the original tariff revenue is lost for sure under the FTA, the government has an incentive to lower the trade barrier to promote consumers' welfare gain. As we can see from Figure 6, when the two shaded parts have the same area, consumer welfare gain is equal to the government's tariff revenue loss, so the net gain is zero. As the price decreases, or equivalently, R decreases, consumer gain becomes larger than the government's loss and the net gain becomes positive. This illustrates the ability of FTAs, even with binding ROO, to eliminate trade barriers. With this figure, it is tempting to conclude that the price of the final good in Country C will drop significantly. However, we need to bear in mind that we did not include the industry that produces close substitute for this final good in our analysis. If the government is set to provide some protection to that industry, then it might be optimal for the government to leave the net gain in this industry significantly below zero.

IV. The Effect of R on the Outside Country

Under this FTA, on one hand, Country A is forced to source part or all of the intermediate input at home at a higher cost because of the binding ROO. On the other hand, if the price of the final good in Country C drops and leads to more demand, it is possible that the demand for the intermediate input from Country B actually increases. We need to examine which of the two effects dominates. Generally, with a higher ROO value, Country A's demand for the intermediate input from Country B is more likely to drop. In such cases, from Country B's suppliers' point of view, the decrease in demand from Country A caused by the ROO is the same as that caused by a protective tariff. In some sense, the ROO indeed acts like a protective tariff on the intermediate input—causing a preference for domestically produced goods, even when paying a higher price.

We now analyze the tariff equivalence on the intermediate input produced by Country B. Conditions (2), (12) and (15) implicitly define how the relation between b, which is the price of intermediate input in Country B, and M changes with R:

$$m_0 - \frac{M}{a^M} = \frac{m_1 b}{Rb+(1-R)a} w^A a^L + a a^M \tag{19}$$

It is easy to check that M moves in opposite direction with b and R, which means that the demand curve in Country B for the intermediate input is also downward sloping, and that lower R encourages more demand for the intermediate input from Country B, all else equal. Denote the level of ROO having equal effect on p^C as the tariff R_t as before, and denote the corresponding quantity of demand for the intermediate input from Country B as M_t. For better distinction, denote the level of ROO under the FTA as R^* and the corresponding demand of intermediate input as M^*. Then the demand from Country B is $(1-\gamma^*)M^*$, where γ^* is the fraction of intermediate input from Country B corresponding to R^*. By comparing $(1-\gamma^*)M^*$ and M_t, we can analyze the change in quantity of demand from Country B's point of view. Notice that since the supply of the intermediate input in Country B is horizontal, the producer surplus remains zero in all cases.

For the values of R^*that make $(1-\gamma^*)M^* > M_t$, Country B benefits from a production expansion, possibly by adding more jobs. However, for the values of R^*that make $(1-\gamma^*)M^* < M_t$, Country B faces less demand of the intermediate input, which is similar as facing a protective tariff. As an extreme case, when $R^* = 1$, $\gamma^* = 1$, which means all the intermediate input is sourced inside Country A, and the equivalent protective tariff rate is $\frac{a-b}{b}$. Also notice that although $(1-\gamma^*)M^*$ decreases in R^*, R^*has lower bound $\bar{R}$, hence it is possible that $(1-\gamma^*)M^* > M_t$ could never hold. Leaving the extreme case of $R^* = 1$ out, we can divide the discussion into two cases:

Case 1: $(1-\gamma^*)M^* < M_t$ when $R^* = \bar{R}$.

In this case, no matter what value of $R^*$is prescribed in the FTA, Country B would always face a decrease in demand of the intermediate input, and the size of decrease gets larger as R^*becomes larger. From Country B's point of view, the equivalent protective tariff always exists under this FTA, and the size of such tariff equivalence increases in the level of ROO. Denote the protective tariff equivalence τ and the value of the protective tariff equivalence corresponding to $\bar{R}$ as $\bar{\tau}$. An illustration of such a relation is shown in Figure 8.

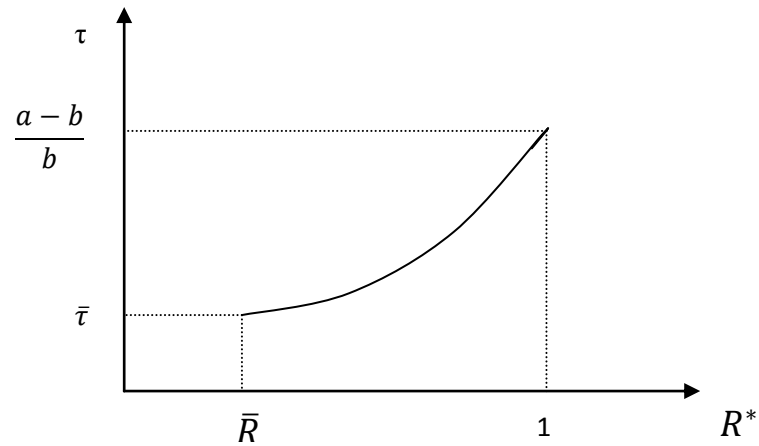


Figure 8. Relation between the protective tariff equivalence and ROO (i)

Case 2: $(1-\gamma^*)M^* > M_t$ when $R^* = \bar{R}$.

In this case, for small values of R^*, suppliers in Country B might not face a shrinking of production. Furthermore, they could even have an expansion of production, which means the value of τ could be negative. As a benchmark, denote R_e as the level of ROO that makes $(1-\gamma^*)M^* = M_t$, where e represents "equal." Then $\tau < 0$ for $R^* < R_e$, $\tau = 0$ for $R^* = R_e$, and $\tau > 0$ for $R^* > R_e$.

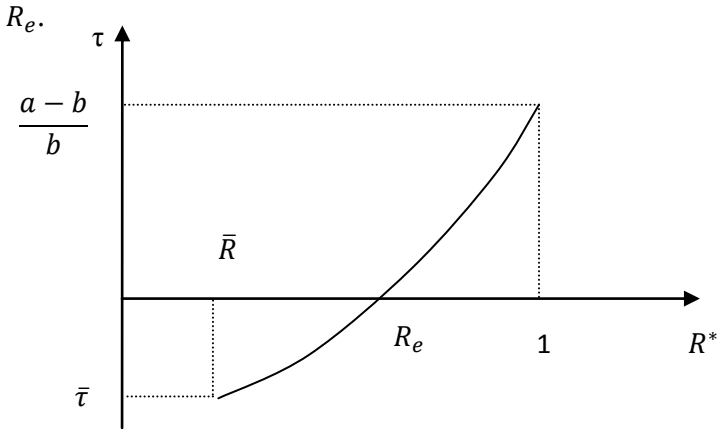


Figure 9. Relation between the protective tariff equivalence and ROO (ii)

Both cases reveal the possibility of decreasing demand for the intermediate input from Country B, which is equivalent to a tariff aiming to protect domestic producers of the intermediate input in Country A. This explains another negative side effect of such FTAs with binding ROO—hurting one party's trade with an outside country.

This adverse effect on Country A's trade with Country B reveals another negative aspect of bilateral FTA with binding ROO. As an example mentioned earlier, suppose the United States imports steel as an intermediate input for automobile production from Mexico tariff free because

of the NAFTA, the KORUS FTA with binding ROO in automobile industry may put an indirect protective tariff of steel producers in the United States, which renders the NAFTA broken in effect.

If the FTAs with binding ROO fail to eliminate trade barriers and at the same time raise the cost of production of the final good, why do countries still have incentives to sign such agreements? I think the answer is two-fold. First, as discussed earlier, although ROO can be as effective as tariffs in erecting trade barriers and protecting domestic industry, the fact that governments lose tariff revenues under FTAs provides them incentive to transfer the gain to consumers, which lowers the trade barrier overall.

Second, while producers of the final good in Country A operate at a higher cost, the binding ROO obviously benefits the producers of the intermediate input in Country A. Thus the decision of whether to sign such a FTA always falls on politicians, who weigh the influence of unions and other social aspects, instead of economists. After all, higher cost does not mean lower profit. When the level of ROO is low, the producers of the final good in Country A can still benefit from the FTA, which would probably make whether to join this FTA an easier decision to make.

Conclusion

Regional trade agreements (RTAs) have played an important role as part of the world's trade liberalization. Free-trade areas formed under free trade agreements (FTAs), is one of the two major types of RTA. They demand member countries to reduce trade barriers among themselves, and at the same time enable them to keep relatively flexible tariff schedules against outside countries. Rules of origin (ROO) are necessary for maintaining the flexibility of tariffs as well as for preventing outside countries from exporting goods to the free-trade areas through the member country with the lowest tariff rate.

This paper uses a simple partial equilibrium model with three countries and a single industry to examine the effects of ROO on trade flows. In this model, the exporting party of the FTA can originally import the intermediate input with no tariff from an outside country, which has a more efficient production of the intermediate input. As a result, prescribing ROO in the FTA can be as effective as a protective tariff, because it can cause the total cost of production of the final good to rise. Consequently, larger ROO hurt the consumer surplus in the country that imports the final good, as does a larger tariff rate.

Nonetheless, FTAs with binding ROO can provide the governments with incentives to lower overall trade barriers. This is because under an FTA, the government of the importing country generally loses the entire tariff revenue, which leads the net gain of this country after joining the FTA to be more towards negative. As a result, the government has an incentive to lower the trade barrier in order to transfer the government tariff loss to gains in consumer surplus. This reveals a positive effect on trade liberalization of FTAs.

If the government of the importing country indeed chooses a level of ROO such that the price of the final good is lower than before, then there is a typical gain in the form of trade creation—the consumers in the importing country now enjoy a lower price and a large quantity for consumption, and the producer of the exporting country is likely to benefit from an expansion of production. Even though in this simple model the supply curve of the final good is always horizontal, a larger quantity sold may benefit the labor force in the exporting country through higher wages or more employment.

On the other hand, since ROO require that at least a certain fraction of the value originates from the exporting side of the FTA, it is more likely than not that the import of the intermediate input from the outside country would drop. When the ROO require that all the value of the final good is added domestically in the exporting country, no intermediate input is imported from the outside country anymore. This effect mimics a protective tariff on the intermediate input, which protects the less efficient domestic industry. Since the model discussed in this paper does not involve a third member country that produces the intermediate input, the effect of ROO in this case is not exactly trade diversion. In fact, since the new source of the intermediate input is produced domestically instead of being from another member country, the increase in trade does not exist. At the same time, the outside country is likely to suffer from the decrease in demand for the intermediate input, so it still captures the negative side effect of trade diversion.

Finally, as we have seen in the earlier section, ROO divert the demand for the intermediate input from a more efficient supplier to a less efficient one. In addition, since governments consider many factors such as union power, industries of close substitutes for the final good, total social welfare change, and so on, all at the same time when negotiating the FTA, the determinants of world's trade are more likely to shift from concerns about welfare gains to competition of sovereign powers. This may cause increase in economic inefficiency and business uncertainty associated with international trade.

As said by Cordell Hull, the US secretary of state from 1933 to 1944, "enduring peace and welfare of nations are indissolubly connected with friendliness, fairness, equality, and the maximum practicable degree of freedom in international trade." (Wolf, 2007)[3] However, because of the protective feature of ROO, most of the FTAs with binding ROO fail to realize the friendliness, fairness, equality and freedom in trade. Hence, ROO are not at all an ideal part of FTAs. Future economists and policy makers should go hand in hand to explore new measures to pursue the most possible gains from trade liberalization while maintaining the stability of domestic economic growth.

[3] Wolf cited Hull's speech in his article in *Financial Times*, April 4, 2007

References

Feenstra, Robert C., Alan M. Taylor, *International Economics*, Worth Publishers, New York, 2008

Office of the United States Trade Representative, Korea - U.S. Free Trade Agreement, http://www.ustr.gov/trade-agreements/free-trade-agreements/korus-fta, 2007a

Office of the United States Trade Representative, Chapter Six, Rules of Origin and Origin Procedures, Korea - U.S. Free Trade Agreement, http://www.ustr.gov/trade-agreements/free-trade-agreements/korus-fta, 2007b

Wolf, Martin, *"A Korean-American Strand Enters Trade's Spaghetti Bowl,"* Financial Times, April 4, 2007, p.11