Do Developing Countries benefit from GSP?

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Abstract

The paper studies the effect of the GSP program on the welfares of small countries. The study considers the case that there is political pressure on the producer's side of small countries. The paper compares the welfares of small countries under the sequential tariff bargaining game when MFN is imposed with the sequential bargaining game when GSP is granted. The study finds that small countries benefit from the GSP program when the political pressure is low. Otherwise, they are indifferent between MFN tariffs and the GSP program. Also, the GSP granting country gains from the GSP program and the total welfare improves. Finally, the study finds that sequential tariff bargaining cannot attain efficient tariffs even when GSP is granted.

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1. Introduction

The concept of a Generalized System of Preferences (GSP) program was initiated at the first United Nations Conference on Trade and Development (UNCTAD) held in 1964.[2] The GSP was adopted at UNCTAD II in New Delhi in 1968.

As stated in Resolution 21 (ii) taken at the UNCTADII conference in 1968, the objectives of the GSP program are i) to increase the export earnings of the least developed (LDCs) and developing countries (DCs), ii) to promote their industrialization, and iii) to accelerate their rates of economic growth.[3] The GSP program is intended to help LDCs and DCs through trade rather than foreign aid. The GSP program was first launched by the European Economic Community (EEC), which later became the European Union (EU), in 1971, followed by Japan in the same year. The United States then authorized its GSP program in 1976 by Title V of the Trade Act of 1974.[4]

There are currently 13 countries granting GSP preferences: Australia, Belarus, Bulgaria, Canada, Estonia, the European Union, Japan, New Zealand, Norway, the Russia Federation, Switzerland, Turkey, and the United States of America. Currently, there are more than 200 beneficiary countries from the GSP program in total.

However, there is still controversy regarding the effect of the GSP program on the welfare of developing countries. The traditional trade theory indicates that the GSP program should promote welfare through trade creation and diversion (see, for example, Baldwin and Murray (1977), Promfret (1986)). On the other hand, many studies still doubt that the GSP program can promote the welfares of developing countries. Clark and Zarrilli (1992) demonstrate empirically that the GSP granting countries disproportionately substitute non-tariff for tariff protection on sensitive GSP eligible products. Also, the GSP program is not a unilateral benefit to DCs but comes with the cost of adopting intellectual property rights and increasing the degree of openness. Violations of intellectual property rights (IPRs) are the second most common source of complaint in country-practice petitions. For example, in 1997, the United States removed half of Argentina's GSP privileges in a dispute over intellectual property right.[5]

[2] See Clark (1991)
[3] www.unctad.org
[4] Graham (1978)
[5] Handbook on the scheme of the United States of America.

A question that arises here is whether the GSP program promotes the welfare of the least developed and developing countries or not.

In the related literature, most of the previous works study the trade benefit of the GSP. Baldwin and Murray (1977) adopt a partial equilibrium framework to calculate the trade benefit of the US, EEC and Japan GSP program, with and without MFN tariff cuts. The study finds that developing countries benefit from the GSP and they will have more to gain from MFN tariff cuts.

Promfret (1986) introduces the product differentiation or non-horizontal export supply to the partial equilibrium framework and finds that unless trade diversion is zero, GSP beneficiaries gain more from the GSP program without MFN tariff cuts although the world as a whole benefits from such a program.

Brown (1989) employs a general equilibrium computational model of world production and trade to estimate the trade, price, welfare, and employment effects of the EEC GSP schemes and finds that welfare gains for the Latin American DCs were small or negative. Benefits are distributed across all beneficiaries.

Grossman and Sykes (2005) find that the economic effect of tariff preferences is that they impose a negative externality on the exporting countries that do not qualify for preferential treatment. However, the granting of tariff preferences promotes trade volume and export earnings in the preference-receiving countries.

Some literature argues that GSP does not benefit small countries. Clark and Zarilli (1992) calculate trade coverage ratio to assess the incidence of non-tariff measures used on GSP covered products and finds that the GSP granting countries substitute non-tariff barriers for tariff protection on sensitive GSP eligible products.

Some literature finds that the GSP program obstructs global trade liberalization. Ozden and Reinhardt (2003) study whether the GSP program makes a beneficiary country liberalize its trade policy and lower its trade barrier. They find empirical evidence that the GSP program prevents the country from liberalizing its own trade policy.

Limao (2002, 2006) study the effect of preferential trade agreement (PTA) on multilateral tariffs and find that PTAs increase the cost of multilateral tariff reductions and thus cause a stumbling block to global free trade. The negotiation procedure in his study is such that developed countries choose MFN tariffs in the first stage. Then, in the second stage, each developed country makes a take-it-or-leave-it PTA offer constrained with the MFN tariffs as the highest credible threat.

Our study is different from Limao (2002, 2006) in many aspects. First, his works compare multilateral MFN tariffs when PTAs are offered (the game reaches the second stage) with the MFN tariffs when there are no PTAs (the game ends at the first stage). Therefore, there is no room for forward manipulation discussed in Bagwell and Staiger (2004) in his study.[6] Instead, we consider the two-stage sequential bargaining game with MFN in which two developed countries negotiation the MFN tariff in the first stage. Then one of the developed countries continues to negotiate to lower its MFN tariff with developing countries in the second stage. We compare the result of this game with the two-stage sequential bargaining game in which the developed country makes the GSP proposal to developing countries in the second stage instead.

Furthermore, while Limao (2002, 2006) assume that developing countries derive no utility from non-numeraire goods, we consider when developing countries consume both numeraire and non-numeraire goods. Finally, we allow transfers among countries in the negotiation game.

The purpose of our paper is to examine whether developing countries benefit from the GSP. We begin by constructing the general framework. The study uses a quasi-linear model of bilateral trade based on Bagwell and Staiger (2001), modified to include political pressure on the importing industry of small countries.

Next, we set up a tariff bargaining game. We consider the transferable bargaining game in which two big countries negotiate over their tariff set with each other. Then one of the big countries continues to negotiate the tariffs with all small countries simultaneously. The study considers the case that only small countries have political pressure. We compare the results when MFN is imposed and when the GSP is granted to all small countries.

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[6] Forward manipulation is the problem that developed countries manipulate the MFN tariffs set in the first stage to worsen the threat points of small countries in the second stage. We will discuss more about forward manipulation in Section 4.

Finally, the paper compares the welfares of small countries when MFN is imposed and when GSP is granted. The study determines when small countries benefit from the GSP program. Also, we consider the efficiency of the tariff outcomes from the tariff bargaining game.

2. The Basic Model

In this section, we first develop a three-country partial equilibrium model in which all countries are big, and then we extend the framework to the n+2 country model with n small countries.

2.1 Three-country framework

In this section, we develop a three-country partial equilibrium model with quasi-linear utility based on Bagwell and Staiger (2001).

Suppose that there are three symmetric countries, called 1, 2 and 3, with two taxable goods. There are three goods in this model, namely a numeraire (v) and two non-numeraire, taxable goods (x and y). Suppose that the numeraire good v is sufficiently abundant in each country so that we consider only a partial equilibrium analysis of the two traded goods. The existence of the numeraire is for the sake of overall trade balance and international transfers.

We assume that each country's representative consumer has a quasi-linear utility function in the form of:

$$U^j = v + \phi(x^j) + \phi(y^j) \qquad (1)$$

For $j \in \{1,2,3\}$ and where $\phi(.)$ is a quadratic function so that the demand function is linear, D(P) = a-P. Country 1 is endowed with v_o units of the numeraire good, $\overline{X}_1$ units of good x, and $\overline{Y_1}$ units of good y. Country 2 is endowed with v_o units of the numeraire good , $\overline{X}_2$ units of good x, and $\overline{Y_2}$ units of good y. Country 3 is endowed with v_o units of the numeraire good, $\overline{X}_2$ units of good x, and $\overline{Y_2}$ units of good y, with $\overline{X}_1 < \overline{X_2}$, and $\overline{Y}_1 > 2\overline{Y_2}$. Therefore, Country 1 is an importer of good x, and an exporter of good y.

Country 2 is an importer of good y, and an exporter of good x. Country 3 is an importer of good y, and an exporter of good x.

When $P_i^j, i \in \{x, y\}\ j \in \{1,2,3\}$ denote the local price of good i in country j, and τ_x^j is the import tariff of good x from country j, imposed by country 1, and τ_y^k is the import tariff of good y from country 1, imposed by country k, the local prices obey the following arbitrage and market clearing conditions:

$$P_x^1 = P_x^j + \tau_x^j \qquad j = \{2,3\}$$
$$P_y^2 = P_y^1 + \tau_y^2 \tag{2}$$
$$P_y^3 = P_y^1 + \tau_y^3$$

and $$M^j(P_i^j) = \sum_{k \in N} E^k(P_i^k) \qquad \text{for } j \neq k, j,k \in N \text{ and } N = \{1,2,3\} \tag{3}$$

given that M(.) is the import function and E(.) is the export function.

The import function can be defined as $M^1(P_x^1) = D^1(P_x^1) - \overline{X_1}$ for Country 1 and $M^j(P_j^j) = D^j(P_y^j) - \overline{Y_2}$ for Country 2 and 3, and the export function is $E^j(P_x^j) = \overline{X}_2 - D^j(P_x^j)$ for Country 2 and Country 3 and $E^1(P_y^1) = \overline{Y_1} - D^1(P_y^1)$ for Country 1. We associate tariff revenue of country j in the form of $TR^j = \sum_{k \in N \setminus j} E^k \tau_i^{jk}$ when country j is an importer of good i.

From the demand functions and endowments, we can find the market clearing local price in Country 1 as follows:

$$P_x^1 = \frac{3a + \tau_x^2 + \tau_x^3 - \overline{X_1} - 2\overline{X_2}}{3} \tag{4}$$

$$P_y^1 = \frac{3a - \tau_y^2 - \tau_y^3 - \overline{Y_1} - 2\overline{Y_2}}{3}$$

The consumer surplus comes from $\int_{p_1}^{a} d(p)dp$. Let $CS_i^j(P_i^j)$ be denoted as consumer surplus of good i in country j.

2.1.1 Government objectives

We now define a government objective function. Suppose that there is political pressure on the importing industry of Country 3. In order to include political pressure in the government's consideration, this study follows the government welfare function in Baldwin (1987). In this model, governments can put different weights on producer surplus.

Given that γ is the political pressure on the producer surplus of Country 3, $\gamma > 1$, the aggregate welfare function in each country can be expressed as follows:

$$
\begin{aligned}
W^1(\tau_x^2,\tau_x^3,\tau_y^2,\tau_y^3) &= v_0 + CS_x^1(P_x^1(\tau_x^2,\tau_x^3)) + CS_y^1(P_y^1(\tau_y^2,\tau_y^3)) + TR(\tau_x^{12},\tau_x^{13}) + P_x^1\overline{X}_1 + P_y^1\overline{Y}_1 \\
W^2(\tau_x^2,\tau_x^3,\tau_y^2,\tau_y^3) &= v_0 + CS_x^2(P_x^2(\tau_x^2,\tau_x^3)) + CS_y^2(P_y^2(\tau_y^2,\tau_y^3)) + TR(\tau_y^2,\tau_y^3) + P_x^2\overline{X}_2 + P_y^2\overline{Y}_2 \quad (5) \\
W^3(\tau_x^2,\tau_x^3,\tau_y^2,\tau_y^3) &= v_0 + CS_x^3(P_x^3(\tau_x^2,\tau_x^3)) + CS_y^3(P_y^3(\tau_y^2,\tau_y^3)) + TR(\tau_y^2,\tau_y^3) + P_x^3\overline{X}_2 + \gamma P_y^3\overline{Y}_2
\end{aligned}
$$

We allow the political pressure only on the producer surplus of Country 3 (Developing country) for simplicity of the model. Also, it is supported by the history of trade policy. The industry protection is heavily implemented by the governments during the early stage to develop their industries. The degrees of protection decrease once their exporting industries are mature. Also, the results of this paper do not change although we allow the political pressure in developed countries (Country 1 and 2). The key discussion of this paper is that the benefit developing countries attain from the GSP program varies upon the level of a developing country's political pressure.

2.1.2 Nash Equilibrium

Consider that when each government sets its tariff policy unilaterally, it chooses a tariff that maximizes its own welfare function. Therefore, the tariff outcome becomes the best-response tariff, τ_i^{BRj} for $\forall j \in N$, $\forall i \in I$ which solves the following maximization problems:

$$
\text{(M1)} \quad
\begin{aligned}
&\max_{\tau_x^2,\tau_x^3} W^1(\tau_x^2,\tau_x^3,\tau_y^2,\tau_y^3) && \text{for country 1} \\
&\max_{\tau_y^2} W^2(\tau_x^2,\tau_x^3,\tau_y^2,\tau_y^3) && \text{for country 2} \\
&\max_{\tau_y^3} W^3(\tau_x^2,\tau_x^3,\tau_y^2,\tau_y^3) && \text{for country 3}
\end{aligned}
$$

The best-response tariffs in our model are:

$$\tau_x^{BR2} = \frac{7\tau_x^3 - \overline{X_1} + \overline{X_2}}{11}$$

$$\tau_x^{BR3} = \frac{7\tau_x^2 - \overline{X_1} + \overline{X_2}}{11}$$

$$\tau_y^{BR2} = \frac{\tau_y^3 + \overline{Y_1} - \overline{Y_2}}{8}$$

$$\tau_y^{BR2} = \frac{\tau_y^2 + 9\overline{Y_1} - (3\gamma - 15)\overline{Y_2}}{64}$$

When all countries choose to set their tariff policy at the best-response level, we will have Nash equilibrium:

$$\tau_x^{NE2} = \tau_x^{NE3} = \frac{\overline{X_2} - \overline{X_1}}{4}, \quad \tau_y^{NE2} = \frac{3\overline{Y_1} - (5 - 2\gamma)\overline{Y_2}}{21}, \text{ and } \tau_y^{NE3} = \frac{3\overline{Y_1} - (19 - 16\gamma)\overline{Y_2}}{21}.$$

2.1.3 Efficient Tariff

In this section, we consider an efficient tariff policy. The tariff τ_i^{cj} for $\forall j \in N$, $\forall i \in I$ is the efficient tariff if and only if it maximizes the joint welfare function. Such efficient tariff policy is the tariff outcome from the following maximization problem:

(M2) $$\max_{\tau_x^{12}, \tau_x^3, \tau_y^2, \tau_y^3} \sum_{j \in N} W^j(\tau_x^2, \tau_x^3, \tau_y^2, \tau_y^3)$$

Later in the bargaining game, lump sum transfers across countries are allowed in the negotiations. Therefore, the efficiency frontier is the sum of welfare across all countries.

In our model, the efficient tariffs are such that:

$$\tau_x^{c2} = \tau_x^{c3} = 0, \ \tau_y^{c2} = 0, \text{ and } \tau_y^{c3} = (\gamma - 1)\overline{Y_2}.$$

2.2 n+2 country model

Suppose that Country 1 and Country 2 are big countries, and Country 3 is partitioned into n identical countries, indexed by $j \in S = \{3, 4, \ldots, n+2\}$, where n is very large $n \to \infty$, each of which shares the same endowment and preferences with the linear demand function $D^j(P) = \frac{a-P}{n}$ and endowment $\frac{\overline{X_2}}{n}$ and $\frac{\overline{Y_2}}{n}$.

Using the arbitrage and market clearing conditions given in (2) and (3), the local prices in Country 1 are as follow:

$$P_x^1 = \frac{3a + \tau_x^2 + \frac{1}{n}\sum_{j=3}^{n+2} \tau_x^j - \overline{X_1} - 2\overline{X_2}}{3} \tag{6}$$

$$P_y^1 = \frac{3a - \tau_y^2 - \frac{1}{n}\sum_{j=3}^{n+2} \tau_y^j - \overline{Y_1} - 2\overline{Y_2}}{3}$$

Suppose that all small countries have equal political weights on their producer surplus, the welfare functions of Country 1 and 2 do not change from (5), and the welfare function of each small country j becomes:

$$W^j(\tau_x^2, \tau_x^3, \tau_y^2, ..., \tau_y^{n+2}) = v_0 + CS_x^j(P_x^j(\tau_x^2, ..., \tau_x^{n+2})) + CS_y^j(P_y^j(\tau_y^2, ..., \tau_y^{n+2}))$$
$$+ TR(\tau_y^2, ..., \tau_y^{n+2}) + P_x^j \frac{\overline{X_2}}{n} + \gamma P_y^j \frac{\overline{Y_2}}{n} \tag{7}$$

2.2.1 Nash equilibrium and efficient tariffs

Using the tariff outcomes from the maximization problem (M1), the best-response tariff in Case II are:

$$\tau_x^{BR2} = \frac{7(\frac{1}{n}\sum_{j=3}^{n+2}\tau_x^j) + \overline{X_2} - \overline{X_1}}{11}, \quad j \in S = \{3,4,.....,n+2\}$$

$$\tau_x^{BRj} = \frac{7(\frac{1}{n}\sum_{k \neq j}\tau_x^j + \tau_x^2) + \overline{X_2} - \overline{X_1}}{11}, \quad j \in S = \{3,4,.....,n+2\}$$

$$\tau_y^{BR2} = \frac{\overline{Y_1} - \overline{Y_2} + \frac{1}{n}\sum_{j=3}^{n+2}\tau_y^j}{8} \tag{8}$$

$$\tau_y^{BRj} = \frac{\overline{Y_1} + \tau_y^2 + (\gamma - 1)\overline{Y_2}(9n-3)}{9n-1}$$

When all countries choose the best response tariff at the same time, we see Nash equilibrium in the limit, which is:

$$\lim_{n\to\infty}\tau_x^{NE2} = \lim_{n\to\infty}\tau_x^{NEj} = \frac{\overline{X_2} - \overline{X_1}}{4}$$

$$\lim_{n\to\infty}\tau_y^{NE2} = \frac{\overline{Y_1} - \overline{Y_2} + (\gamma-1)\overline{Y_2}}{8} \qquad (9)$$

$$\lim_{n\to\infty}\tau_y^{j1} = (\gamma-1)\overline{Y_2}$$

Next, using the maximization problem (M2), in the limit when $n \to \infty$, the efficient tariff are similar to those of the three country case, i.e. $\tau_x^{c2} = \tau_x^{c3} = 0$, $\tau_y^{c2} = 0$, and $\tau_y^{cj} = (\gamma-1)\overline{Y_2}$, $j \in S = \{3,4,.....,n+2\}$.

3. The Bargaining Game

In this section, we construct the tariff bargaining game between 2 big countries and n small countries. We consider the bargaining game in two cases: i) the tariff bargaining game when MFN is imposed, and ii) the tariff bargaining game when the GSP is granted for small countries. We consider a transferable welfare game between n+2 countries. International transfers among countries are allowed to make the model more tractable. The welfare functions after transfers can be defined as follows:

$$W^1(\tau_x^2,..,\tau_x^{n+3},\tau_y^2,,,.\tau_y^{n+2},T_2,..,T_{n+2}) = v_0 + CS_x^1(P_x^1(\tau_x^2,...,\tau_x^{n+2})) + CS_y^1(P_y^1(\tau_y^2,..,\tau_y^{n+2}))$$
$$+TR^1(\tau_x^2,..,\tau_x^{n+2}) + P_x^1\overline{X_1} + P_y^1\overline{Y}_1 - T_2 - T_3 -..- T_{n+2}$$

$$W^2(\tau_x^2,..,\tau_x^{n+2},\tau_y^2,..,\tau_y^{n+2},T_2,...,T_{n+2}) = v_0 + CS_x^2(P_x^2(\tau_x^2,..,\tau_x^{n+2})) + CS_y^2(P_y^2(\tau_y^2,..,\tau_y^{n+2}))$$
$$+TR^2(\tau_y^2,..,\tau_y^{n+2}) + P_x^2\overline{X_2} + P_y^2\overline{Y_2} + T_2 \qquad (10)$$

$$W^j(\tau_x^2,..,\tau_x^{n+2},\tau_y^2,...,\tau_y^{n+2},T_2,...,T_{n+2}) = v_0 + CS_x^j(P_x^j(\tau_x^2,...,\tau_x^{n+2})) + CS_y^j(P_y^j(\tau_y^2,...,\tau_y^{n+2}))$$
$$+TR(\tau_y^2,...,\tau_y^{n+2}) + P_x^j\frac{\overline{X_2}}{n} + \gamma P_y^j\frac{\overline{Y_2}}{n} + T_j$$

for $j \in S = \{3,4,.....,n+2\}$.

Furthermore, we define N = {1,2,…….,n+2} as the set of countries, we define C_i as a subset of N indicating the set of countries participating in each tariff bargaining round, with C_1 = {1,2}, C_2 = {1,3,….,n+2}.

3.1 The tariff bargaining with MFN

In this section, we study the result of the tariff bargaining game in the WTO. For now, we consider the case that only MFN is applied since reciprocity is not directly enforced in tariff negotiations when tariffs go down but will be imposed in the renegotiation process.[7]

We follow the sequential bargaining game presented in Bagwell and Staiger (2003). In Stage 1 of the game, Country 1 makes a take-it-or-leave-it offer to Country 2. The offer contains the binding MFN tariff of good x ($\tilde{\tau}_x$), the tariff of good y imposed by Country 2 (τ_y^{B2}) and a transfer to Country 2 (T_2). Next, in the second stage, Country 1 makes a similar take-it-or-leave-it offer to all n small countries simultaneously and seperately. The only difference is that, if Country 2 accepts the proposal in the first stage, the MFN tariff of good x that Country 1 proposes in this stage has to be lower than or equal to the binding tariff set in the first stage. The game can be summarized as follows:

Stage 1: Country 1 offers tariff $(\tilde{\tau}_x \le \tau_x^{BR}, \tau_y^{B2})$ and transfers T_2. Country 2 either accepts or rejects.

Stage 2: If Country 2 accepts, Country 1 offers tariff $\{\tau_x^B \le \tilde{\tau}_x, \tau_y^{B3}, ..., \tau_y^{Bn+2}\}$ and transfers $\{T_3, ..., T_{n+2}\}$, which each small country, Country 3,…,n+2, accept or reject, separately and simultaneously. If Country 2 rejects, Country 1 offers $\{\tau_{x\backslash 2}^B \tau_{y\backslash 2}^{B3}, ..., \tau_{y\backslash 2}^{Bn+2}\}$ and transfer $\{T_{3\backslash 2}, ..., T_{n+2\backslash 2}\}$ which each small country, Country 3,…,n+2, accepts or rejects separately and simultaneously. If small countries rejects, it plays the best-response tariffs while Country 1 and 2 commit the agreement in the first stage, $(\tilde{\tau}_x, \tau_y^{B2}, T_2)$. Once Stage 2 is complete, all countries are assumed to set their best-response tariffs subject to any restrictions they have agreed to in the negotiations.

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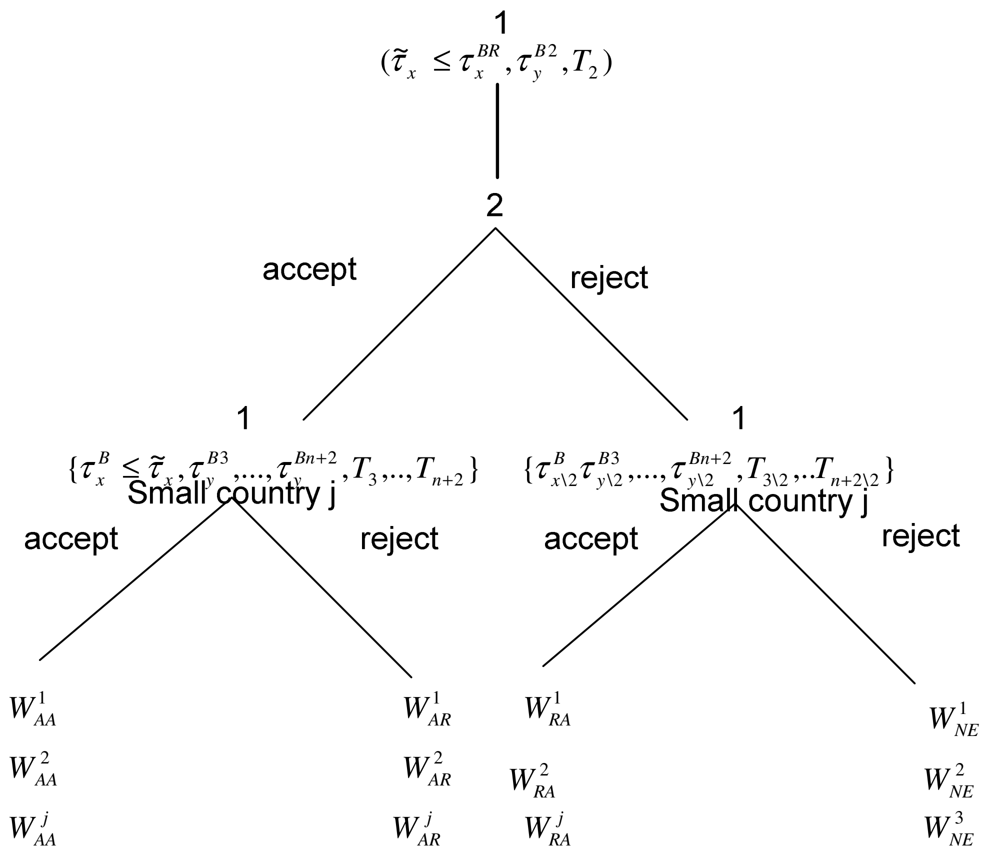
[7] See also Bagwell and Staiger (1999,2003)

Let $\tilde{\tau}_x$ denote the binding tariff of good x, τ_i^{Bj} denote the tariff proposal of good i in Country j, T_j denote transfers from Country 1 to Country j, and $\tau_{i\backslash 2}^{Bj}$ denote the tariff proposal of good i in Country j when Country 2 rejects the proposal in the first stage and set the best-response tariff.

Figure 1: The extensive form game of sequential bargaining with MFN



The extensive form of the sequential bargaining game is illustrated in Figure 1. Let W_{AA}^j be the welfare of Country j when both Country 2 and all small countries accept Country 1's offers; therefore, $W_{AA}^j = W^j(\tau_x^B, \tau_y^{B2}, \tau_y^{B3}, .., \tau_y^{Bn+2}, T_2, .., T_{n+2})$. Next, let W_{RA}^j be the welfare of Country j when Country 2 rejects the offer from Country 1 in the first stage but small countries accept the offer in the second stage. Therefore, $W_{RA}^j = W^j(\tau_{x\backslash 2}^B, \tau_y^{BR2}(\tau_{y\backslash 2}^{B3}, .., \tau_{y\backslash 2}^{Bn+2}), \tau_{y\backslash 2}^{B3}, ..., \tau_{y\backslash 2}^{Bn+2}, T_3, T_4, .., T_{n+2})$. Then, let W_{AR}^j be the welfare of Country j when Country 2 accepts the offer from Country 1 but small countries rejects. In this case we have $W_{AR}^{j} = W^{j}(\tilde{\tau}_x, \tau_y^{B2}, \tau_y^{BR3}, .., \tau_y^{BRn+2}, T_2)$. Finally, W_{NE}^{j} denotes when all countries reject Country 1's offer and trigger trade wars. The welfare outcome here is the welfare from Nash equilibrium.

When a country chooses to reject, it will play a best-response tariff regardless of the strategies that other countries are choosing. Also, it will not receive transfer. If all countries reject Country 1, the outcome is Nash equilibrium.

Solve the bargaining game using the backward induction method to search for a subgame perfect equilibrium (SPE). First consider the last stage of the game when Country 2 rejects Country 1's offer. In this case, there is no binding on the tariff of good x. Given the tariff of good y imposed by Country 2, the offer Country 1 proposes solves the following maximization problem:

$$\text{(M3)} \quad \max_{\tau_x, \tau_y^3, ..., \tau_y^{n+2}, T_{3j}, ..., T_{n+2}} (W^1(\tau_x, \tau_y^{BR2}, \tau_y^3, ..., \tau_y^{n+2}, T_3, ...T_{n+2})$$

$$\text{s.t. } (W^j(\tau_x, \tau_y^{BR2}, \tau_y^3, ..., \tau_y^{n+2}, T_3, ...T_{n+2}) = W_{NE}^j$$

$$\text{for } j \in S = \{3, 4, ..., n+2\}.$$

The maximization problem (M3) implies that Country 1 always makes an acceptable offer to all small countries. This will always be the equilibrium. Beginning with Nash equilibrium, it is possible to adjust the tariff and transfer policy so that total welfare increases. Given that Country 1 holds all the bargaining powder, it can leave small countries' welfares at the Nash level and receives all surplus from policy changes. As a result, Country 1 makes an acceptable offer that leaves the welfare of small countries no worse than the welfare under trade wars.

Next, consider the left branch of Figure 1. After Country 2's acceptance, the threat points for small countries are no longer Nash payoffs but a function of the tariff binding $\tilde{\tau}_x$ and τ_y^{B2}. The maximization problem becomes:

(M4) $\max_{\tau_x,\tau_y^3,...,\tau_y^{n+2},T_{3j},...,T_{n+2}} (W^1(\tau_x,\tau_y^{B2},\tau_y^3,...,\tau_y^{n+2},T_2\ ,T_3,...T_{n+2})$

s.t. $W^j(\tau_x,\tau_y^{B2},\tau_y^3,...,\tau_y^{n+2},T_3,...T_{n+2} \geq W^j(\tilde{\tau}_x\ ,\tau_y^{B2},\tau_y^{BR3},...,\tau_y^{BRn+2})$

$\tau_x^2 = \tau_x^3 = ... = \tau_x^{n+2} = \tau_x \leq \tilde{\tau}_x$

for $j \in S = \{3,4,.....,n+2\}$.

Following the same logic, Country 1 still always offers an acceptable proposal to small countries. By inducing acceptance, Country 1 is at least weakly better off. The only difference is that the choice of the tariff of good x is limited by the tariff binding in the first stage.

Finally, consider the game in the first stage. Country 1 will make an acceptable offer for Country 2 since Country 1 cannot benefit from inducing a rejection. The logic is that, in the second stage, Country 1 always offers the acceptable proposal for small countries. As a result, the first stage policy does not affect Country 2's threat point. The maximization problem can be written as follows:

(M5) $\max_{\tau_x^2,\tau_y^2,T_2} (W^1(\tau_x^2,\tau_x^{B3}(\tau_x^2),\tau_y^2,\tau_y^{B3}(\tau_y^2),T_2\ ,T_3,...,T_{n+2})$

s.t. $W^2(\tau_x^2,\tau_x^{B3}(\tau_x^2)\tau_y^2,\tau_y^{B3}(\tau_y^2),T_2\ ,T_3,...,T_{n+2}) \geq W_{RA}^2$

$\tilde{\tau}_x\ \leq \tau_x^{BR}$

The second constraint defines an upper bound on the tariff binding of good x. The binding has to be credible in the sense that the binding tariff of good x cannot be higher than the best response level.

Define $\bar{\tau}_x(\gamma)$ as the tariff of good x that satisfies $W_{AA}^j = W^j(\bar{\tau}_x(\gamma),\tau_y^{B2}(\tau_y^{BR3},...,\tau_y^{BRn+2}),\tau_y^{BR3},....,\tau_y^{BRn+2})$, for j= {1,3,…n+2}. $\bar{\tau}_x(\gamma)$ is the tariff binding that makes small countries' welfares equal to the threat point and serves as the lower bound of the tariff binding. With $\bar{\tau}_x(\gamma)$ increasing in γ and $\frac{\partial^2 \bar{\tau}(\gamma)}{\partial \gamma^2} > 0$, there is a cut-off type of small countries, $\bar{\gamma}$, such that $\bar{\tau}_x(\bar{\gamma}) = \tau_x^{BR}$, i.e. the cut-off type of small countries that makes $\bar{\tau}_x(\gamma)$ equal to the best-response level. [8]

Now we can summarize the feature of the binding tariff chose by Country 1 in the first stage in the following lemma.

Lemma 2: When $\gamma \leq \bar{\gamma}$, $\tilde{\tau}_x = \tau_x^{BR}$, and when $\gamma > \bar{\gamma}$, $\tilde{\tau}_x = \tau_x^{B}$ that maximizes $\sum_{j \in C_1} W^j$.

Proof: *See Appendix.*

If the political pressure is not too high, Country 1 can set the binding tariff of good x in the first stage to be high enough so that small countries will participate in the bargaining game in the second stage and lower their tariffs in return. Even though the tariffs that small countries set initially (under Nash equilibrium) are efficient, Country 1 still prefers small countries to lower their tariffs to benefit from backward stealing, which is discussed in Bagwell and Staiger (2004), at the expense of Country 2. Backward stealing means that the welfare of Country 2 obtains when there is no agreement reached in Stage 2 is higher than its equilibrium welfare. Therefore, Country 2 is hurt when Country 1 further the negotiation with small countries. In stage 2, Country 1 uses its transfer policy to compensate small countries to lower their tariffs and benefits from an improvement in its terms of trade, at the expense of Country 2.

The result of the binding tariff in Lemma 2 also exhibits the forward manipulation problem discussed in Bagwell and Staiger (2004). Country 1 uses the first stage policy tariff binding $\tilde{\tau}_x$ to position itself more favorably for negotiations with small countries in the second stage. Since $\tilde{\tau}_x$ never gets implemented once the bargaining game is complete,

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[8] The binding tariff has to satisfy the following two conditions: $W_{AA}^j \geq W^j(\tilde{\tau}_x, \tau_y^{B2}(\tau_y^{NE3}, ..., \tau_y^{NEn+2}), \tau_y^{NE3}, ..., \tau_y^{NEn+2})$ and $\tilde{\tau}_x = \tau_x^{BR}$. Given that γ is low, $\bar{\tau}_x(\gamma) < \tau_x^{BR}$ and it is the best for Country 1 to set $\tilde{\tau}_x = \tau_x^{BR}$. When γ reaches $\bar{\gamma}$, $\bar{\tau}_x(\bar{\gamma}) = \tau_x^{BR}$. Therefore, when $\gamma > \bar{\gamma}$, $\bar{\tau}_x(\bar{\gamma}) > \tau_x^{BR}$ and there is no credible binding tariff. So Country 1 needs to enter the second stage with $\tilde{\tau}_x = \tau_x^{B}$.

Country 1 chooses $\tilde{\tau}_x$ as high as possible (which is $\tilde{\tau}_x = \tau_x^{BR}$ in this case) to make small countries' threat points less favorably.

However, when the political pressure is high enough, Country 1 enters the second stage with the optimal tariff against small countries, $\tilde{\tau}_x = \tau_x^B$ and it has to compensate small countries with transfers to make them lower their tariffs in the second stage. Again, Country 1 is willing to pay via transfers to reduce the tariffs of small countries to enjoy the benefit from backward stealing.

The logic is simple. The higher the political pressure, the higher the best-response tariffs of Country 2 and small countries. Therefore, Country 1 has to lower its tariffs drastically in exchange for the lower tariff of Country 2. Therefore, it will have little concession left to negotiate with small countries to lower their tariffs. Once the political pressure is high enough ($\gamma > \bar{\gamma}$), Country 1 begins the game in the second stage with the optimal tariff against small countries, namely $\tilde{\tau}_x = \tau_x^B$, and hence has to makes transfer to small countries to compensate for their lower tariffs.

The subgame perfect equilibrium of the sequential bargaining game with MFN is that both Country 2 and small countries accept Country 1's offers.

The outcome of the tariff bargaining game with MFN can be summarized in the following proposition.

<u>Proposition 1</u>: The tariff outcome of the bargaining game with MFN is that:

i) if $\gamma \le \bar{\gamma}$, the tariff outcome is τ_y^2 that maximizes $W^1(\tau_x^B, \tau_y^2, \tau_y^{B3}(\tau_y^2)..,\tau_y^{Bn+2}(\tau_y^2), T_3,..,T_{n+2}) + W^2(\tau_x^B, \tau_y^2, \tau_y^{B3}(\tau_y^2)..,\tau_y^{Bn+2}(\tau_y^2))$ subject to $\tau_x^2 = \tau_x^3 = ... = \tau_x^{n+2} = \tau_x$ and $\{\tau_x, \tau_y^3, ..., \tau_y^{n+2}\}$ that maximizes $\sum_{j\in C_2} W^j(\tau_x^B, \tau_y^{B2}, \tau_y^3, .., \tau_y^{n+2})$ s.t. $\tau_x^2 = \tau_x^3 = ... = \tau_x^{n+2} = \tau_x$, and taking τ_y^{B2} as given, with the international transfers of $T_2 = W^2(\tau_{x\backslash 2}^B, \tau_y^{BR2}(\tau_{y\backslash 2}^{B3}, .., \tau_{y\backslash 2}^{Bn+2}), \tau_{y\backslash 2}^{B3}, ..., \tau_{y\backslash 2}^{Bn+2})$ - $W^2(\tau_x^B, \tau_y^{B2}, \tau_y^{B3}, .., \tau_y^{Bn+2})$, and $T_j = W^j(\tau_x^{BR}, \tau_y^{B2}, \tau_y^{BR3}, .., \tau_y^{BRn+2})$ - $W^j(\tau_x^B, \tau_y^{B2}, \tau_y^{B3}, .., \tau_y^{Bn+2})$ for $j \in S = \{3,4,.....,n+2\}$.

ii) if $\gamma > \overline{\gamma}$, the tariff outcome is τ_y^2 that maximizes $W^1(\tau_x^B, \tau_y^2, \tau_y^{B3}(\tau_y^2)..,\tau_y^{Bn+2}(\tau_y^2), T_3,..,T_{n+2}) + W^2(\tau_x^B, \tau_y^2, \tau_y^{B3}(\tau_y^2)..,\tau_y^{Bn+2}(\tau_y^2))$ subject to the MFN restriction that $\tau_x^2 = \tau_x^3 = ... = \tau_x^{n+2} = \tau_x$ and $\{\tau_x, \tau_y^3,...,\tau_y^{n+2}\}$ that maximizes $\sum_{j \in C_2} W^j(\tau_x^B, \tau_y^{B2}, \tau_y^3,..,\tau_y^{n+2})$ s.t. $\tau_x^2 = \tau_x^3 = ... = \tau_x^{n+2} = \tau_x$, , and taking τ_y^{B2} as given, , with the international transfers of $T_2 = W^2(\tau_{x\backslash 2}^B, \tau_y^{BR2}(\tau_{y\backslash 2}^{B3},..,\tau_{y\backslash 2}^{Bn+2}), \tau_{y\backslash 2}^{B3},...,\tau_{y\backslash 2}^{Bn+2})$ - $W^2(\tau_x^B, \tau_y^{B2}, \tau_y^{B3},..,\tau_y^{Bn+2})$ and $T_j = W^j(\tau_x^B, \tau_y^{B2}, \tau_y^{BR3},..,\tau_y^{BRn+2})$ - $W^j(\tau_x^B, \tau_y^{B2}, \tau_y^{B3},..,\tau_y^{Bn+2})$, for $j \in S = \{3,4,.....,n+2\}$. <u>*Proof*</u>: *See Appendix.*

When the political pressure is not high, it is possible for Country 1 to set the tariff of good x at a very high level, but credible in the first stage in order to make small countries agree to lower their tariffs in return in the second stage with very bad threat points so that Country 1 can extract the highest surplus from negotiation. However, when the political pressure is high enough, there is no binding level of good x in the first stage that is credible and high enough to make small countries agree to lower their tariffs in return in the second stage. Therefore, Country 1 has to compensate with transfers to small countries so that they agree to lower their tariffs in return.

<u>**Lemma 3**</u>: The tariff outcome from the tariff bargaining game with MFN is not efficient.

Consider when $\gamma \leq \overline{\gamma}$, the bargaining game displays the backward stealing problem. Backward stealing implies that the welfare that Country 2 gains when the game reaches the disagreement point in the second stage is higher than the welfare from the outcome of the game. Therefore, Country 2 hurts when Country 1 furthers negotiation with small countries in the second stage. When country 1 continues its negotiation with small countries, Country 2 is forced to have lower export volume and gains the lower price of the exporting goods.[9]

[9] See also Bagwell and Staiger (2003).

The game also establishes the forward manipulation problem in which Country 1 sets the tariff of good x at the very high level in the first stage in order to push small countries' threat points to the worst points. With the appearance of both backward stealing and forward manipulation problems, the outcome is not efficient.

Next, when $\gamma > \bar{\gamma}$, Country 1 enters the second stage of bargaining with the optimal tariffs of good x against small countries, i.e. $\tilde{\tau}_x = \tau_x^B$. In this case, Country 1 has to compensate small countries with direct transfers to make small countries lower their tariffs in return. The game still shows the backward stealing problem mentioned earlier.

Finally, while the tariff outcome is not efficient, it is lower than that of Nash equilibrium.

In the next section, we will consider the tariff bargaining game when GSP is granted to all small countries.

3.2 The tariff bargaining game with GSP

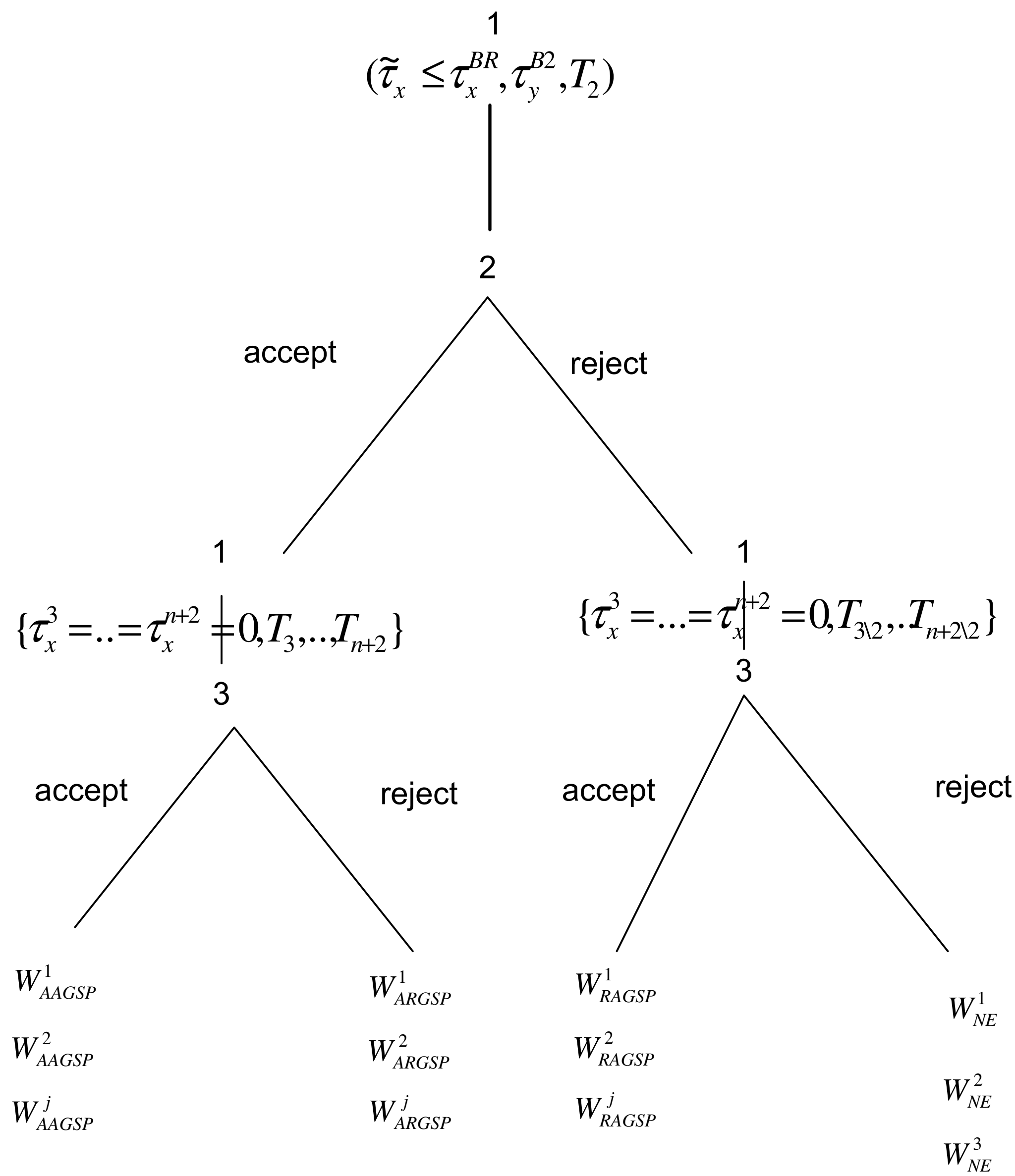
With the GSP program, the big country will grant the unilateral duty free to small countries. Therefore, the only instrumental variable in the second stage of the game is transfer. It is consistent with what happens in the GSP program; in exchange for the unilateral trade liberalization of the GSP program, GSP beneficiaries have to adopt the policies requested by the big country such as intellectual property rights, degree of openness, and working conditions. We can interpret these policies as direct transfers to the big country.

The sequential bargaining game with GSP will proceed as follows: In the first stage, Country 1 makes a take-it-or-leave-it offer to Country 2 which Country 2 can either accept or reject.

In the second stage, Country 1 makes a GSP proposal to small countries simultaneously and separately which they can either accept or reject.

Figure 2 summarizes the extensive form of the sequential bargaining game with GSP.

Figure 2: The extensive form of sequential bargaining with GSP



Let W_{AAGSP}^j denote the welfare of Country j when Country 2 accepts the offer of Country 1 in the first stage and all small countries accept Country 1's GSP offers; therefore, $W_{AAGSP}^j = W^j(\tilde{\tau}_x^2, \tau_x^3 = 0, .. \tau_x^{n+2} = 0, \tau_y^{B2}, \tau_y^{BR3}, ..., \tau_y^{BRn+2}, T_2, ..., T_{n+2})$. Next, let W_{RAGSP}^j be the welfare of Country j when Country 2 rejects the offer from Country 1 in the first stage but small countries accept the GSP offer in the second stage.

Therefore, $W^{j}_{RAGSP} = W^{j}(\tau_x^{BR2}, \tau_x^{3} = 0,.., \tau_x^{n+2} = 0, \tau_y^{BR2}, \tau_y^{BR3},..., \tau_y^{BRn+2}, T_{3\backslash 2}, T_{4\backslash 2},.., T_{n+2\backslash 2})$.

Then let W^{j}_{ARGSP} be the welfare of Country j when Country 2 accepts the offer from Country 1 in the first stage but small countries rejects the GSP offer in the second stage, $W^{j}_{ARGSP} = W^{j}(\tilde{\tau}_x, \tau_y^{B2}(\tau_y^{BR3},.., \tau_y^{BRn+2}), \tau_y^{BR3},.., \tau_y^{BRn+2}, T_2)$. Finally, W^{j}_{NE} denotes when all countries reject Country 1's offer and trigger trade wars.

The tariff bargaining game with GSP can be defined as follows:

Stage 1: Country 1 offers tariff $(\tilde{\tau}_x \leq \tau_x^{BR}, \tau_y^{B2})$ and transfers T_2. Country 2 either accepts or rejects.

Stage 2: Country 1 offers the GSP proposal $(\tau_x^{3} = ... = \tau_x^{n+2} = 0, \tau_y^{BR3},..., \tau_y^{BRn+2}, T_3,..., T_{n+2})$. Each small country accepts or rejects separately and simultaneously. Once Stage 2 is complete, each country is assumed to set its best-response tariff subject to any restrictins it has agreed in the negotiation.

Solve this game using the backward induction. Beginning with the rejection of Country 2, the GSP proposal of Country 1 solves the following maximization problem:

$$\text{(M6)} \max_{T_1, T_3, ..., T_{n+2}} (W^{1}(\tau_x^{BR2}, \tau_x^{3} = 0,.., \tau_x^{n+2} = 0, \tau_y^{BR2}, \tau_y^{BR3},..., \tau_y^{BRn+2}, T_3,... T_{n+2})$$

$$\text{s.t. } W^{j}(\tau_x^{BR2}, \tau_x^{3} = 0,.., \tau_x^{n+2} = 0, \tau_y^{BR2}, \tau_y^{BR3},..., \tau_y^{BRn+2}, T_3,... T_{n+2}) = W^{j}_{NE}$$

$$\text{for } j \in S = \{3,4,....., n+2\}$$

It is implicitly assumed in (M6) that Country 1 always offers an acceptable proposal here. The reason is that the total welfare under GSP is higher. Given that Country 1 holds all bargaining power, it can extract all surplus from the acceptable proposal. Thus Country 1 cannot be better off from inducing rejection here.

Next, consider the left branch of Figure 2. Following the acceptance of Country 2, the maximization problem in the second stage is as follows:

$$\text{(M7)} \max_{T_1, T_3, ..., T_{n+2}} (W^{1}(\tilde{\tau}_x, \tau_x^{3} = 0,.., \tau_x^{n+2} = 0, \tau_y^{BR2}, \tau_y^{BR3},..., \tau_y^{BRn+2}, T_3,... T_{n+2})$$

$$\text{s.t. } W^{j}(\tau_x^{BR2}, \tau_x^{3} = 0,.., \tau_x^{n+2} = 0, \tau_y^{BR2}, \tau_y^{BR3},..., \tau_y^{BRn+2}, T_3,... T_{n+2}) = W^{j}_{ARGSP}$$

$$\text{for } j \in S = \{3,4,....., n+2\}.$$

Country 1 again makes an acceptable offer to small countries. The reason is that as the GSP proposal improves the total welfare and Country 1 has all bargaining power, it is better for Country 1 to make an offer that small countries accept.

Finally, consider the game in the first stage. The maximization problem is identical to (M5). In the equilibrium, Country 1 will offer an acceptable proposal to Country 2. Regardless of the type of small countries, the first-stage policy cannot affect the threat point of Country 2. Therefore, inducing rejection gives no benefit to Country 1.

The subgame perfect equilibrium of the sequential bargaining game with GSP is that both Country 2 and small countries accept Country 1's offers.

The outcome of the sequential bargaining game with GSP can be summarized in the following proposition.

Proposition 2: The result of the bargaining game with GSP is:

i) the tariff outcome $\{\tau_x, \tau_y^2\}$ that maximizes

$$W^1(\tau_x, \tau_x^{B3}, .., \tau_x^{Bn+2}, \tau_y^2, \tau_y^{BR3}(\tau_y^2).., \tau_y^{BRn+2}(\tau_y^2), T_3, .., T_{n+2}) + W^2(\tau_x, \tau_x^{B3}, .., \tau_x^{Bn+2}, \tau_y^2, \tau_y^{BR3}(\tau_y^2).., \tau_y^{BRn+2}(\tau_y^2))$$

with $\tau_x^{B3} = ... = \tau_x^{Bn+2} = 0, \tau_y^3 = \tau_y^{BR3}, ..., \tau_y^{n+2} = \tau_y^{BRn+2}$

ii) and the international transfers of $T_2 = W^2(\tau_{x\backslash 2}^B, \tau_y^{BR2}(\tau_{y\backslash 2}^{B3}, .., \tau_{y\backslash 2}^{Bn+2}), \tau_{y\backslash 2}^{B3}, ..., \tau_{y\backslash 2}^{Bn+2})$ -

$W^2(\tau_x^B, \tau_y^{B2}, \tau_y^{B3}, .., \tau_y^{Bn+2})$ and $T_j = W^j(\tilde{\tau}_x^2, \tau_x^3 = 0, ..\tau_x^{n+2} = 0, \tau_y^{B2}, \tau_y^{BR3}, .., \tau_y^{BRn+2}) - W^j(\tau_x^B, \tau_y^{B2}, \tau_y^{BR3}, .., \tau_y^{BRn+2})$.

Proof: *See Appendix.*

We can see that, in the GSP game, the tariff binding ($\tilde{\tau}_x$) set in the first stage will be implemented at the end of the game. Therefore, the binding tariff has to be set at the optimal level in the first stage. Country 1 is no longer able to set the binding tariff in the first stage at a high level to make small countries' threat points less favorably even though they have low political pressure ($\gamma \leq \bar{\gamma}$). If Country 1 was to continue to set its binding tariff in the first stage at very high level, it would have to continue to live with that tariff when the game is complete because there is no opportunity for it to lower its own tariff in Stage 2. Therefore, the binding MFN tariff has to be optimal. The threat points of small countries become $W^j(\tau_x^B, \tau_y^{B2}, \tau_y^{BR3}, .., \tau_y^{BRn+2})$ regardless of the level of their political pressure. As Country 1 holds all bargaining power, these threat points are the welfares small countries attain from sequential bargaining with GSP.

Obviously, when small countries have low political pressure, the threat points of small countries under the GSP program are higher than under MFN. Considering sequential bargaining with MFN, Country 1 begins the second stage with the binding tariff $\tilde{\tau}_x = \tau_x^{BR}$. Therefore, the threat points of small countries are $W^j(\tilde{\tau}_x = \tau_x^{BR}, \tau_y^{B2}, \tau_y^{BR3},..,\tau_y^{BRn+2})$. On the other hand, with the GSP program, Country 1 sets the binding tariff in the first stage at $\tilde{\tau}_x = \tau_x^B$, the optimal MFN tariff, because the GSP proposal will be offered instead of the MFN proposal in the second stage. As a result, the threat points of small countries are $W^j(\tilde{\tau}_x = \tau_x^B, \tau_y^{B2}, \tau_y^{BR3},..,\tau_y^{BRn+2})$ which are higher than the threat points under sequential bargaining with MFN as the tariff outcome of good y ($\tau_y^2, \tau_y^3,..,\tau_y^{n+2}$) does not change but τ_x is lower.

We can see that the GSP program eliminates forward manipulation that occurs when small countries have low political pressure from sequential bargaining. The logic is simple. Under sequential bargaining with MFN, Country 1 knows that the binding tariff $\tilde{\tau}_x$ will never be implemented. Therefore, it manipulates $\tilde{\tau}_x$ to worsen the threat points of small countries in Stage 2 in order to extract the greatest surplus from the negotiations. However, under the GSP program, it has no opportunity to lower the binding tariff in Stage 2. Therefore, the binding tariff $\tilde{\tau}_x$ set in the first stage has to be optimal. Hence, the GSP program eliminates forward manipulation from sequential bargaining. This result is summarized in Proposition 3.

Proposition 3: The GSP program eliminates forward manipulation from sequential bargaining.

On the other hand, when the political pressure is high enough, $\gamma > \bar{\gamma}$, small countries are indifferent between sequential bargaining with MFN and sequential bargaining with GSP. The reason is that, in this case, the threat points of both cases bring about the same welfares. Under sequential bargaining with MFN, Country 1 enters the second stage with the optimal MFN tariff against small countries, $\tilde{\tau}_x = \tau_x^B$ due to lack of credible binding tariff threat mentioned in the last section. Therefore, the threat points of small countries are $W^j(\tilde{\tau}_x = \tau_x^B, \tau_y^{B2}, \tau_y^{BR3}, .., \tau_y^{BRn+2})$. Considering the GSP program, Country 1 sets the binding tariff at the optimal level, $\tilde{\tau}_x = \tau_x^B$, in the first stage when it offers the GSP proposal in the second stage. As a result, the threat points are $W^j(\tilde{\tau}_x = \tau_x^B, \tau_y^{B2}, \tau_y^{BR3}, .., \tau_y^{BRn+2})$, identical to the threat points under sequential bargaining with MFN. As small countries will attain their welfares after compensating transfers equal to the threat points when Country 1 has all bargaining power, they are indifferent between the GSP program and the MFN tariffs. In this case, there is no forward manipulation appears in the sequential bargaining game with MFN. Therefore, small countries' welfares do not improve from the GSP program.

The main difference between the two bargaining protocols comes from the fact that, under the GSP program, Country 1 is going to offer the unilateral duty free to small countries. Therefore, it is not allowed to lower the MFN tariff of good x in the second stage. Hence, it sets the binding tariff of good x at the optimal level in the first stage regardless of the level of small countries' political pressure.

Using this logic, when small countries have low political pressure, they gain from the GSP program since their threat points improve. However, when they have high political pressure, Country 1 enters the second stage with the optimal tariff regardless of the bargaining protocol. Therefore, small countries are indifferent between the MFN and the GSP program.

In conclusion, the benefit of the GSP program to small countries is that it is the way to mitigate the forward manipulation problem that is faced by small countries in sequential bargaining with MFN. As forward manipulation shows up in sequential bargaining with MFN when small countries have low political pressure, only the small countries with low political pressure gain from the GSP program.

The welfare outcomes of small countries can be summarized in the following table.

Table 1 : An increase in welfare outcome from Nash equilibrium of small countries in each bargaining protocol[10]

The bargaining protocol	**Low political pressure**	**High political pressure**
Sequential bargaining with MFN	$\frac{\overline{Y_2}^2}{6}-(\frac{\overline{Y_1}-\overline{Y_2}}{9})^2-(\frac{\overline{Y_1}-\gamma\overline{Y_2}}{18})^2$	$\frac{\overline{Y_2}^2}{6}-(\frac{\overline{Y_1}-\overline{Y_2}}{9})^2-(\frac{\overline{Y_1}-\gamma\overline{Y_2}}{18})^2+(\frac{15}{1568}(\overline{X_2}-\overline{X_1})^2$
Sequential bargaining with GSP	$\frac{\overline{Y_2}^2}{6}-(\frac{\overline{Y_1}-\overline{Y_2}}{9})^2-(\frac{\overline{Y_1}-\gamma\overline{Y_2}}{18})^2+(\frac{15}{1568}(\overline{X_2}-\overline{X_1})^2$	$\frac{\overline{Y_2}^2}{6}-(\frac{\overline{Y_1}-\overline{Y_2}}{9})^2-(\frac{\overline{Y_1}-\gamma\overline{Y_2}}{18})^2+(\frac{15}{1568}(\overline{X_2}-\overline{X_1})^2$

Country 2 hurts from the GSP program if the political pressure is low. With the GSP program, Country 2 gains fewer trade volumes and has worse terms of trade. The result supports the assertion of Grossman and Sykes (2005) that GSP imposes a negative externality on the country that is not granted preferential treatment.

Finally, the world's total welfare improves under GSP as the tariff outcome is closer to the efficient level. As a result, Country 1 has higher welfare under the GSP program, as it has all bargaining power and can attract the surplus of the GSP program via transfers.

We can summarize the changes in welfares from GSP in the following lemma.

Lemma 4: When small countries have low political pressure, they are better off from the GSP program. Otherwise, small countries are indifferent between the two bargaining methods.

Next, we consider the efficiency of the tariff outcome in lemma 5.

[10] See the tariff outcomes from each bargaining protocol in the appendix.

<u>Lemma 5</u>: The tariff outcome from tariff bargaining game with GSP is not efficient.
<u>Proof</u> : See Appendix.

Although the tariffs imposed small countries, $\{\tau_x^{Bj}, \tau_y^{Bj}\}, \forall j \in S = \{3,4,.....,n+2\}$, are efficient, the tariffs imposed by Country 1 and Country 2 in the first stage, $\{\tau_x^{B2}, \tau_y^{B2}\}$, maximizes the joint welfare of Country 1 and Country 2, not the world joint welfare function. Therefore, even though the tariff outcome is lower than sequential bargaining with MFN, it is not efficient.

4. Conclusion

The study considers whether small countries benefit from the GSP program compared to the MFN tariffs. To do this, we construct the sequential tariff bargaining game when MFN is imposed, compared to when GSP is granted to small countries. The study finds that the benefit from the GSP program depends on the level of political pressure. If small countries have high political pressure, they are indifferent between sequential bargaining with MFN and sequential bargaining with GSP. Otherwise, small countries are better off from the GSP program. The study also finds that the benefit of the GSP program comes from the fact that it eliminates forward manipulation that small countries encounter in the second stage of sequential bargaining with MFN. Also, the exporting country that is not granted preferential treatment has lower welfare under the GSP program. In any cases, the sequential bargaining game cannot yield the efficient tariffs.

5. Limitations and further studies

In this study, we suppose that big countries will negotiate with all small countries at once. In WTO negotiations, country-by-country negotiations are more common. The study should, thus, be extended to the case of a big country negotiating with small countries on a country-by-country basis. Furthermore, the study should generalize parameters and allow asymmetry among the two goods. In addition, the study should be extended to do the empirical test of the theoretical part. Finally, the study should consider different allocations of the bargaining power among countries.

References:

Bagwell, K., Staiger, R.W.,(1999), "An Economic Theory of GATT". American Economic Review 89, 215-248.

Bagwell, K., Staiger, R.W.(1999), "Multilateral Trade Negotiations, Bilateral Opportunism and the Rules of GATT" NBER Working Papers 7071, National Bureau of Economic Research.

Bagwell, K., Staiger, R.W. (2001), "Reciprocity, Non-Discrimination and Preferential Agreements in the Multilateral Trading System". European Journal of Political Economy 17, 281-325.

Bagwell. K., and Staiger, R.W. (2002), *The Economics of the World Trading System*, MIT Press.

Bagwell, K., Staiger, R.W.(2003), "Backward Stealing and Forward Manipulation in the WTO" NBER Working Papers 10420, National Bureau of Economic Research.

Baldwin, R.E. and Murray, T. (1977), " MFN Tariff Reductions and Developing Country Trade Benefits Under the GSP", *The Economic Journal*, Vol.87, No.345, 30-46.

Bond, Ching and Lai (2003), The Rolf of MFN in WTO Accession, mimeo.

Brown, D.K. (1989), "Trade and Welfare Effects of the European Schemes of the Generalized System of Preferences", Economic Development and Cultural Change, Vol.37, No,4, 757-776.

Cebi and Lumeda (2001), The Rise and Fall of the Most-Favored-Nation Clause, mimeo, Georgetown University.

Clark, D.P. (1991), "Trade versus Aid: Distributions of Third World Development Assistance", *Economic Development and Cultural Change*, Vol.39, No.4, 829-837.

Clark, D.P., and Zarrilli, S. (1992), "Non-Tariff Measures and Industrial Nation Imports of GSP-Covered Products", *Southern Economic Journal*, Vol.59, No.2, 284-293.

DeVault, J.M. (1996), "Political Pressure and The US Generalized System of Preferences", *Eastern Economic Journal*, 22(1), 35-46.

GAO(2001), *Comparison of US and European Union Preference Programs*, United States Accounting Office.

Graham, T.R. (1978), "The US Generalized System of Preferences for Developing Countries: International Innovation and the Art of the Possible", *The American Journal of International Law*, Vol.72, No.3, 513-541.

Grossman, G.M. and Sykes, A.O. (2005), "*European Communities-Conditions for the Granting of Tariff Preferences to Developing Countries*", The American Law Institute.

Lumeda,R. (1991), International Trade Bargaining and the Most-Favored-Nation Clause, *Economics and Politics*, 3(1), 1-20.

Ludeman, R.D., Mayda, A.M. (2005), "Do Countries Free Ride on MFN?", mimeo.

Murray, T.(1973), "How Helpful is the Generaised System of Preferences to Developing Countries?", *The Economic Journal*, Vol. 83, No. 330, 449-455.

Murray, T.(1973), "Preferential Tariffs for the LDCs", *Southern Economic Journal*, Vol. 40, No. 1, 35-46.

Ozden, C. and Reinhardt, E. (2003), "The Perversity of Preferences: The Generalized System of Preferences and Developing Country Trade Policies, 1976-2000", *Policy Research Working Paper 2955*, The World Bank Development Research Group.

Pomfret, R. (1986), "The Effects of Trade Preferences for Developing Countries", *Southern Economic Journal*, Vol.53, No.1, 18-26.

Sicinski, Kamil (2003), "Welfare and Efficiency implications of sequential bargaining under MFN", Mimeo.

Whalley, J. (1990), "Non-Discriminatory Discrimination: Special and Differential Treatment Under the GATT for Developing Countries", The Economic Journal, Vol.100, No.403, 1318-1328.

Appendix

Proof for Lemma 1:

Given $\lambda_2,...,\lambda_{n+2},\beta$ are Lagrangian Multipliers, the Kuhn-Tucker conditions for the maximization problem are:

$$\lambda_2 = \lambda_3 = ... = \lambda_{n+2} = 1 \quad \text{(A1)}$$

$$\frac{\partial W^1}{\partial \tau_x} + \lambda_3 \frac{\partial W^3}{\partial \tau_x} + .. + \lambda_{n+2} \frac{\partial W^{n+2}}{\partial \tau_x} + \beta = 0 \quad \text{(A2)}$$

$$\frac{\partial W^1}{\partial \tau_y^j} + \lambda_3 \frac{\partial W^3}{\partial \tau_y^j} + .. + \lambda_{n+2} \frac{\partial W^{n+2}}{\partial \tau_y^j} = 0 \text{ for } j \in S = \{3,4,.....,n+2\} \quad \text{(A3)}$$

$$\beta(\tilde{\tau}_x - \tau_x) = 0 \quad \text{(A4)}$$

When $\tilde{\tau}_x > \tau_x$, then from (A2) τ_x is such that it maximizes $\sum_{j \in C_2} W^j$. When $\tilde{\tau}_x = \tau_x, \tau_x$ is such that it maximizes $\sum_{j \in C_1} W^j$. From (A1) and (A2), we have $T_j = W_{AA}^j - W_{RR}^j$. When $\tilde{\tau}_x > \tau_x, W_D^j = W^j(\tau_x^{NE}, \tau_y^{B2}(\tau_y^{NE3},...,\tau_y^{NEn+2}), \tau_y^{NE3},...,\tau_y^{NEn+2})$, so $T_j = W_{AA}^j - W_{RR}^j < 0$. When $\tilde{\tau}_x = \tau_x$, $W_{RA}^j = W^j(\tau_x^B, \tau_y^{B2}, \tau_y^{NE3},...,\tau_y^{NEn+2})$, so $T_j = \frac{1}{n}[nW^j - W_D^j - (W^1 - W_D^1)] > 0$. Q.E.D.

Proof for Lemma 2:

From the first order condition (A1) and slackness condition:

$$\frac{\partial W^1}{\partial \tau} + \sum_j \frac{\partial W^j}{\partial \tau} - \beta = 0 \quad \text{(A5)}$$

$$\beta(\tilde{\tau}_x - \tau_x) = 0 \quad \text{(A6)}$$

Given that β is the Lagrange multiplier, the only possible outcome in the second state is $\tilde{\tau}_x = \tau_x$. Suppose that $\tilde{\tau}_x > \tau_x$, then $\tilde{\tau}_x$ has to simultaneously satisfy the following two equations:

$$W^j(\tau_x = \tau_x^B, \tau_y^2 = \tau_y^{B2}, \tau_y^{Bj}) - T_j \geq W^j(\tau_x = \bar{\tau}_x, \tau_y^2 = \tau_y^{B2}, \tau_y^{BRj}) \quad \text{(A7)}$$

$$\tilde{\tau}_x \leq \tau_x^{BR} \quad \text{(A8)}$$

Given that $W_D^j = W^j(\tau_x = \bar{\tau}_x, \tau_y^2 = \tau_y^{B2}, \tau_y^{NEj})$, (A5) implies that:

$$W^j - T_j \geq W_D^j$$

$$n(W^j - W_D^j) \geq W^1 - W_D^1 \qquad \text{(A9)}$$

Then the $\bar{\tau}_x(\gamma)$ that makes $n(W^j - W_D^j) = W^1 - W_D^1$ is decreasing in γ since $nW^j - W^1$ is increasing in γ and $nW_D^j - W_D^1$ is decreasing in $\bar{\tau}_x$.

Proof for Lemma 3:

When $\gamma \leq \bar{\gamma}$, there is credible threat. Country 1 will make the threat welfares of small countries as low as possible to make the transfers from small countries to Cou0ntry 1 highest. Therefore, $\tilde{\tau}_x = \tau_x^{BR}$. The rest of this lemma comes directly from lemma 1 and 2.

Proof for Proposition 1:

For the tariff outcome, see proof for lemma 1-3. From our model setting, we have $\tau_x^B = \frac{\overline{X}_2 - \overline{X}_1}{7}$, $\tau_y^{2B} = \frac{(12\gamma - 3)\overline{Y}_2 - 9\overline{Y}_1}{31}$, and $\tau_y^{jB} = \frac{(30\gamma - 23)\overline{Y}_2 - 7\overline{Y}_1}{31}$.

For transfers, when $\gamma \leq \bar{\gamma}$, the threat point for small countries are $\tilde{\tau}_x = \tau_x^{BR}, \tau_y^{jB} = \tau_y^{jBR}$, and $\tau_y^2 = \frac{(2\gamma - 1)\overline{Y}_2 - \overline{Y}_1}{7}$. We then have

$$T_j = \frac{(632\gamma^2 + 1916\gamma - 38)\overline{Y}_2^{\,2} - (3180\gamma - 1840)\overline{Y}_2\overline{Y}_1 + 2510\overline{Y}_1^{\,2}}{47089n} - \frac{15(\overline{X}_2 - \overline{X}_1)^2}{1568n} < 0$$

from our assumption regarding the endowment pattern.

For transfers, when $\gamma > \bar{\gamma}$, the threat point for small countries are $\tilde{\tau}_x = \tau_x^B, \tau_y^{jB} = \tau_y^{jBR}$, and $\tau_y^2 = \frac{(2\gamma - 1)\overline{Y}_2 - \overline{Y}_1}{7}$. We then have

$T_j = \frac{(632\gamma^2 + 1916\gamma - 38)\overline{Y}_2^{\,2} - (3180\gamma - 1840)\overline{Y}_2\overline{Y}_1 + 2510\overline{Y}_1^{\,2}}{47089n} > 0$ from our assumption regarding the endowment pattern.

Finally, consider the threat point of Country 2. $\tau_x = \tau_x^B\ \tau_y^j = \frac{(8\gamma-7)\overline{Y}_2 - \overline{Y}_1}{9}$,

and $\tau_y^2 = \frac{(\gamma-2)\overline{Y_2} - \overline{Y_1}}{9}$.

So, we have $T_2 = \frac{(1738\gamma^2 + 3254\gamma - 1120)\overline{Y_2}^2 - (6730\gamma - 5494)\overline{Y_2}\,\overline{Y_1} + 6112\overline{Y_1}^2}{77841} > 0$.

<u>Proof for Proposition 2</u>:

Using the first order condition:

$$\lambda_2 = 1 \tag{A10}$$

$$\frac{\partial W^1}{\partial \tau} + \lambda_2 \frac{\partial W^2}{\partial \tau} = 0 \tag{A11}$$

(A10)-(A11) implies:

$$\frac{\partial W^1}{\partial \tau} + \frac{\partial W^2}{\partial \tau} = 0 \tag{A12}$$

(A12) is similar to the outcome of tariff from maximizing $\sum_{j \in C_1} W^j$.

From our model setting, we have $\tau_x^{2B} = \frac{\overline{X}_2 - \overline{X}_1}{7}$, $\tau_y^{2B} = \frac{(2\gamma-1)\overline{Y_2} - 9\overline{Y_1}}{7}$, and $\tau_y^{jB} = (\gamma-1)\overline{Y}_2$. For transfers, the threat point for small countries are $\tilde{\tau}_x = \tau_x^B, \tau_y^{jB} = \tau_y^{jBR}$, and $\tau_y^2 = \frac{(2\gamma-1)\overline{Y_2} - \overline{Y_1}}{7}$. So in comparison with proposition 1, when $\gamma \le \overline{\gamma}$, small countries are better off and when $\gamma > \overline{\gamma}$, small countries have identical payoffs.

Finally, the threat point of Country 2 is $\tau_x^2 = \tau_x^{BR}, \tau_y^j = \frac{(8\gamma-7)\overline{Y}_2 - \overline{Y}_1}{9}$, and $\tau_y^2 = \frac{(\gamma-2)\overline{Y_2} - \overline{Y_1}}{9}$. So Country 2 has lower payoff here.

<u>Proof for Lemma 5</u>: See proof for proposition 2.